Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

UNITED STATES
DEPARTMENT OF AGRICULTURE
ARTHUR M. HYDE
Secretary

YEARBOOK OF AGRICULTURE

1931

MILTON S. EISENHOWER
Editor
ARTHUR P. CHEW
Associate Editor

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1931

For sale by the Superintendent of Documents, Washington, D. C. - - - Price $1.50 Cloth

Organization of the United States Department of Agriculture

Corrected to April 15, 1931

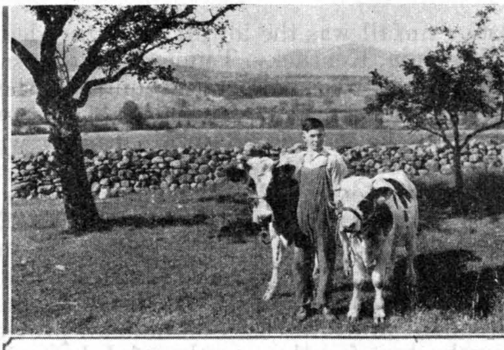
Secretary of Agriculture	ARTHUR M. HYDE.
Assistant Secretary	R. W. DUNLAP.
Director of Scientific Work	A. F. WOODS.
Director of Regulatory Work	WALTER G. CAMPBELL.
Director of Extension Work	C. W. WARBURTON.
Director of Personnel and Business Administration	W. W. STOCKBERGER.
Director of Information	M. S. EISENHOWER.
Solicitor	E. L. MARSHALL.
Weather Bureau	CHARLES F. MARVIN, *Chief.*
Bureau of Animal Industry	JOHN R. MOHLER, *Chief.*
Bureau of Dairy Industry	O. E. REED, *Chief.*
Bureau of Plant Industry	WILLIAM A. TAYLOR, *Chief.*
Forest Service	R. Y. STUART, *Chief.*
Bureau of Chemistry and Soils	H. G. KNIGHT, *Chief.*
Bureau of Entomology	C. L. MARLATT, *Chief.*
Bureau of Biological Survey	PAUL G. REDINGTON, *Chief.*
Bureau of Public Roads	THOMAS H. MACDONALD, *Chief.*
Bureau of Agricultural Economics	NILS A. OLSEN, *Chief.*
Bureau of Home Economics	LOUISE STANLEY, *Chief.*
Plant Quarantine and Control Administration	LEE A. STRONG, *Chief.*
Grain Futures Administration	J. W. T. DUVEL, *Chief.*
Food and Drug Administration	WALTER G. CAMPBELL, *Director of Regulatory Work, in Charge.*
Office of Experiment Stations	——————, *Chief.*
Office of Cooperative Extension Work	C. B. SMITH, *Chief.*
Library	CLARIBEL R. BARNETT, *Librarian.*

FOREWORD

FARMERS and research workers are partners in the task of shaping the agricultural industry to the most profitable and desirable ends. Each group must therefore maintain close contact with the other. This Yearbook, the fifth in a series of volumes similarly planned, is designed to facilitate that contact by reporting, in short popularly written articles, the results of research and service activities conducted by the United States Department of Agriculture. It deals also with the administrative responsibilities entrusted to the department under various Federal laws. ¶For farmers information about what the department is doing has a threefold value. First, it assists research, because the farm is the natural laboratory of the agricultural scientist; farmers who understand the method and purpose of scientific research are its most efficient support. Secondly, science discovers short cuts to the knowledge required in adapting agriculture to its constantly changing natural and economic environment. In a stable situation experience alone would eventually perfect an adequate technique. But no situation is stable. In a rapidly changing situation, like that with which farmers have had to deal since the war, blind groping is too slow and costly a method of initiating necessary modifications in farm practices. Science, through observation and experiment under controlled conditions, establishes principles whereby the risks of experimentation may be minimized. Thirdly, information about agricultural science is necessary to farmers, because without it the progress of knowledge may actually injure them. Nowadays scientific discoveries soon become known throughout the world. If not used in the country of their origin, they are used to its prejudice by competing countries. This is particularly true of the results of economic investigations. Changes on both the demand and the supply side of the agricultural markets throw certain types of farming or combinations of crops into the discard and put a premium on others. Timely notice of these changes is indispensable to farmers who wish to direct their efforts into profitable channels and thus to avoid useless struggles. ¶In the articles which comprise the section of this Yearbook entitled "What's New in Agriculture," the reader will find brief accounts of many of the research projects in which the department is engaged. More detailed information may be obtained in other department publications, through correspondence with members of the department's staff, or by consulting extension agents. ¶As usual, the volume contains the Annual Report of the Secretary to the President and a compilation of the principal agricultural statistics. Nonagricultural readers will find much of interest in the Yearbook, because the department has manifold activities of importance to everyone.

ARTHUR M. HYDE,
Secretary of Agriculture.

CONTENTS



THE YEAR IN AGRICULTURE

THE SECRETARY'S REPORT TO THE PRESIDENT

WASHINGTON, D. C., *November 15, 1930.*

To the PRESIDENT:

THE 1930 DROUGHT

The worst drought ever recorded in this country prevailed during much of the 1930 crop-growing season and greatly reduced farm production. Widespread droughts occurred in 1881, 1894, 1901, 1911, 1916, and 1924. These, however, did not equal the drought of the present year in duration, in the extent of the areas covered, in deficiency of precipitation, or in severity. In 1881 June was very dry in the Southwest, and July and August in the central valleys and in the East. Droughty conditions in 1894, though severe, were confined to the central valleys and the Northwest. In 1901 the central valleys, especially the western Corn Belt, suffered most. In 1911, the greatest shortage in precipitation occurred rather early in the season. The droughts of 1916 and 1924 covered comparatively small areas.

Up to the 1st of September, 1930, an area in the Middle Atlantic States, comprising mainly Maryland, Virginia, and West Virginia, had deficient precipitation every month from December, 1929. Over much of the interior of the country, especially in the Ohio and middle Mississippi Valleys, the drought persisted for six months, from the 1st of March to the 1st of September. For the spring season, March to May, the driest States were those in the Potomac, Ohio, and middle Mississippi Valleys. In June the drought area extended to the South Central States, especially those in the lower Mississippi Valley. In July the drought was severe in most States east of the Rocky Mountains. August was deficient in precipitation in most sections until about the middle of the month. Thereafter scattered rains partly relieved conditions over an area comprising principally South Dakota, Nebraska, and much of Kansas. Toward the end of August, however, the drought was intensified in some Northern and Southeastern States that had not previously been severely affected.

Precipitation in the spring (March to May) was the lowest of record in West Virginia, Kentucky, Indiana, Illinois, and Missouri. Only Florida and Nebraska had a rainfall equal to the normal rainfall for the entire area east of the Rocky Mountains. The summer

(June to August) rainfall was the lowest ever recorded in Maryland, Virginia, West Virginia, Kentucky, Tennessee, Arkansas, and Mississippi. In 15 States east of the Rocky Mountains, the average was little more than half the normal. In general, July was the driest and hottest month of the season. Rainfall in July was deficient in all States east of the Rocky Mountains, except New England and Georgia. The deficiency exceeded all previous records in Maryland, Virginia, West Virginia, Ohio, Kentucky, Illinois, Missouri, and Arkansas, and averaged only about one-third of the normal. Some other important agricultural States had the driest July in more than 30 years. On the other hand most of the Rocky Mountain area had an unusually abundant rainfall. In Colorado all previous high rainfall records were broken for the months of July and August combined. In Wyoming the August rainfall exceeded the previous maximum for that State by more than 50 per cent.

River stages showed the severity of the drought. Low river stages are not unusual for July and August in the Missouri Basin above Pierre, S. Dak., and that part of the upper Mississippi Basin above the Iowa-Minnesota line. In the remainder of the drainage area of the Mississippi River system, however, and on the Atlantic slope of Pennsylvania, Maryland, Virginia, and North Carolina, the dry weather was plainly reflected in low-water stages. Many of the small streams in the Missouri Basin became dry. In the rest of the drought area all streams were either as low as they had ever been in August, or were very close to the low record.

Wells failed; water for stock was scarce; and in some places sewage disposal became an acute problem. Hydroelectric plants on large streams did not suffer, but some plants on the smaller streams had to shut down. Navigation on rivers controlled by locks, dams, and so forth was not interrupted, but on the Mississippi, especially north of Cairo, low water made it necessary materially to decrease the length of tows. This was a serious interruption to navigation.

What caused the drought is a question that can not as yet be answered. All that can be said is that there was a prolonged stagnation of the air over nearly the whole continental extent of the United States. In ordinary years this great blanket of atmosphere overlying the continent is in more or less active circulation. Cool air from the polar regions moves southward from time to time. This circulation was especially absent this summer. Warm air from the tropical latitudes moves northward at intervals. Air from the oceans and from the Gulf of Mexico moves inland. There is a more or less active and continuous interchange of these different air masses which causes the favorable conditions that usually prevail. This interchange did not occur for a long time during the present great drought. Occasional showers and thunderstorms here and there seemed only to dry out the overlying air masses. Only a part, at best, of the water thus precipitated is evaporated back into the free air. With little or no new moisture borne in by winds from the oceans, each successive inland shower, coupled with the stagnation and absence of general rain-causing processes, tended further to deplete the moisture supply and intensify the drought. The lack of precipitation permitted the culmination of excessive temperatures, which are normally at their maximum over most of the United States about the last week of July.

EFFECTS OF THE DROUGHT

Only in North Dakota, Montana, Oklahoma, Texas, and New Mexico, did the drought come early enough to reduce seriously the yields of wheat, oats, or barley. These crops, taking the country as a whole, yielded somewhat more than the usual average. Irrigated crops, such as sugar beets and some fruits largely grown outside the drought area, also produced well. Practically all nonirrigated crops growing late in the season, however, were affected, particularly the feed crops. Hay and pasturage suffered greatly. About 30 States, including all those in the great central area extending from Virginia to Montana and from Pennsylvania to Texas, were hard hit. In many localities farmers have little to sell and will be obliged to practice strict economy in their livestock feeding. In some parts of the country, thousands of farm families will suffer privation. Unhappily, moreover, the cut in farm production coincided with a sharp decline in the demand for farm commodities, and consequently in the farm-commodity price level. This development, a result of world-wide economic depression, bore heavily upon farmers outside the drought areas as well as upon those within it. Only in the case of a few commodities was the drop in production partly compensated by a rise in prices. Farm-commodity prices as a group slumped toward the end of the season to the lowest point in 15 years. Hence, the immediate economic consequences of the drought fell predominantly on the farmers. They were not shared to any great extent by the consuming public. Perhaps the farm-commodity price level would have gone lower under the shock of the world depression had farm production in this country been normal. In the case of some crops sold on the world market, prices are not greatly affected by variations in the production of the United States. Commodities produced and sold on a domestic basis usually respond quickly to changes in domestic supply conditions. One thing is clear. The demand for farm commodities fell off more than the supply did. Hence, the drought though it may have retarded the decline of prices, did not, except in the case of a very few commodities, cause any advance. Eventually the shortage of feed for livestock may reduce the supply of meat products and bring about a rise in the prices of those commodities, but no such results are noticeable as yet. Some areas not affected, or little affected, by the drought are finding wider markets for their products than they would otherwise have had. Local benefits of that sort, however, can not be set down on the credit side of the agricultural ledger, because they are merely the reverse side of distress and difficulty elsewhere. Through an unusual combination of economic circumstances, the effects of the drought were heavily concentrated upon agriculture instead of being rather widely diffused, as usually happens when serious crop shortages occur.

DROUGHT RELIEF

On August 14, at a conference of governors of drought-stricken States called by you, it was agreed that a committee representing the various Federal agencies concerned should be organized, that State drought committees should be set up, composed of State officials and farmer, banker, and Red Cross representatives, and that county committees should be organized in each county seriously affected by the drought. These county committees were to survey their local situations and determine the extent and character of the needs. At your request I have served as chairman of the Federal Drought Relief Committee, and much of the work of the committee has been done by members of the staff of the Department of Agriculture, to which representatives of several other departments have contributed materially. The State and county committees were set up promptly in most of the States and in general have been active where definite need has existed. Surveys of needs are still in progress.

The State committees were urged to give consideration particularly to credit needs of farmers for funds to finance necessities for their families, for feed for livestock, and for financing crop production. At a meeting of banker representatives of the State committees on August 27, recommendation was made for the setting up of agricultural-credit associations where normal financial agencies are not in position to furnish credit to those who can offer tangible security as a basis for loans. Some of the States decided that they had no need for such associations, while others have taken or are taking active steps looking toward their organization.

The railroads have cooperated by granting reduced rates on the movement of hay, feed, and water into drought-stricken counties, and livestock out of such counties into sections where feed is available. These rates were put into effect during the latter half of August to continue until October 31. They were later extended to November 30.

The Department of Agriculture assumed the responsibility for (1) determining the counties in which drought damage had been sufficiently severe to justify the granting of these rate reductions to farmer-consumers, and (2) issuing certificates recommending the granting of the rate reductions on specific shipments to farmer-consumers, or dealers. Several hundred counties were certified as in need of this aid, on the basis of telegraphic advice from county extension agents regarding needs and on crop conditions shown in the August crop report. About August 15 a special questionnaire on the condition of pasture, feed crops, and corn was sent to 108,000 crop correspondents in the drought-stricken States. Additional counties were certified to receive the reduced rates on the basis of the information contained in these questionnaires. In general, certification was made only of those counties that showed a condition of pastures, corn, and feed crops of not more than 50 per cent of normal. Altogether, 1,017 counties in 21 States were certified to the railroads to receive the rate reductions. The list included all or a large part of the counties in the States of Maryland, Virginia, West Virginia, Kentucky, Tennessee, Mississippi, Missouri, Arkansas, Louisiana, and Oklahoma, with considerable numbers in Ohio, Illinois, Indiana, Alabama, Texas, and Montana, and a few in Pennsylvania, North Carolina, Georgia, New Mexico, and Wyoming.

The rate reductions were made available on direct shipments to individual farmers or groups of farmers whose feed supply and pastures had been seriously depleted by the drought and who were in need of assistance, and also to dealers who agreed to sell to such farmers and to pass on to them the advantage of the reduced rates. Certificates covering the movement of many thousand cars of hay and feed have been issued, and material relief has been given the farmers over a wide area.

To aid in providing employment in the drought-stricken States, the Federal-aid road authorizations for the fiscal year 1932 were made available for the making of contracts for construction, and, under certain limitations, arrangements were made for payments on such contracts. As yet, however, comparatively little has been done in the utilization of these funds.

The cooperation of wood-using industries, particularly the railroads and the cooperage industry, was requested in making purchases of ties, timber, and stave bolts from farmers owning wood lots in the drought area. Extension agents assisted in the location of available supplies of feed, and a special letter on feed and livestock market conditions was sent weekly to these agents by the Bureau of Agricultural Economics. That bureau also gathered and distributed information on the location of feed and hay surpluses. The planting of fall pasture crops and gardens was urged, and in certain States loans were made to farmers to assist them in planting such crops. In other States seriously affected by drought, in which the seed loan appropriation was not available, the American Red Cross cooperated by giving seed rye for pasture to farmers who were unable to obtain it, and also by distributing seed for fall gardens.

Extension agents have called the attention of farmers to the need for saving available surpluses of seed for farm crops, particularly corn, and have suggested to farmers outside the area seriously affected by drought the desirability of saving extra supplies of seed corn, with a view to having supplies available for the drought area next spring. Home-demonstration agents not only urged the planting of fall gardens and the preservation for winter use of all available surpluses of vegetable crops, but demonstrated the canning of beef and poultry, thus aiding in saving for food many animals which otherwise would have been sacrificed for lack of feed and water. These agents have also cooperated with public-health agencies and the Red Cross in assisting rural women to make the best possible use of available food supplies or of funds for their purchase, particularly with a view to prevention or control of nutritional diseases such as pellagra.

EMERGENCY LOANS TO FARMERS

Following severe damage to crops by storms and floods in the Southeastern States, Congress early in 1929 made $6,000,000 available to the department for emergency loans to farmers for seed, feed, and fertilizer. About $5,550,000 was loaned in Virginia, North Carolina, South Carolina, Alabama, Georgia, and Florida on staple crops. About $200,000 was loaned in southern Florida on vegetables. By June 30, 1930, $4,580,683 had been repaid. This is an excellent record, especially in view of the stringent financial conditions that prevailed in the area and the low prices received by the growers there for the principal crops. This year Congress appropriated an additional $6,000,000 for emergency loans to farmers in drought, storm, or flood stricken areas. The amount became available by the approval of the first deficiency act of March 26, 1930. From this fund loans were made to other farmers in the six States already mentioned, and crop financing was aided in Indiana, Illinois, Missouri, Oklahoma, New Mexico, Minnesota, North Dakota, and Montana. Except in the Southeastern States and in North Dakota and Montana, however, the amounts loaned were negligible. The total amount loaned in the spring of 1930 was $4,612,136. In August and September approximately $500,000 was loaned in Florida on winter vegetables, while loans up to October 15 to aid farmers to plant fall pasture crops in Alabama, Missouri, Oklahoma, and Virginia had amounted to $170,000.

CROP PRODUCTION IN 1930

As a result of the drought, crops were poorest this year from Virginia and Maryland westward to central Missouri, Arkansas, and Oklahoma. In much of this area, including most of Ohio, Kentucky, and West Virginia, the southern third of Indiana and Illinois, and south-central Pennsylvania, the yields were only about two-thirds of the normal. In a larger area the crops were somewhat less severely affected. This area included western Pennsylvania, Michigan, northern Indiana and Illinois, most of Iowa, the Dakotas and Montana, and the region from Kansas south to central Texas. On the other hand, crops were mostly average or better than the average in New England, New York, New Jersey, Nebraska, and Wisconsin. Fair yields were harvested in most of the Cotton Belt east of the Mississippi River. Particularly good yields were obtained in Georgia and South Carolina, and yields were above the average in Alabama. Satisfactory results were obtained also in most of the Western States, with the exception of Montana and parts of Washington and Wyoming. In Colorado, Arizona, and Oregon crop yields were 13 to 19 per cent heavier than usual. They were about 10 per cent better than usual in California.

Acreage

Spring weather favorable for farm work and an ample supply of labor brought an increase of about 1 per cent in the total acreage planted, though farm-commodity prices were rather unfavorable at planting time. Large increases in acreage were made in the case of several important cash crops. Thus the acreage in flaxseed was increased 47 per cent, that in rye 9 per cent, that in broomcorn 31 per cent, that in beans 12 per cent, that in rice 10 per cent, and that in tobacco 5 per cent.

The acreage in potatoes was increased 3 per cent, that of sweetpotatoes 4 per cent, and that of other commercial truck crops 6 per cent, though the strawberry acreage was reduced appreciably and the cabbage, carrot, onion, and spinach acreages in a lesser degree. The principal increases were in lettuce, snap beans, green peas, tomatoes, and muskmelons. Increased acreages also were planted to watermelons, cauliflower, and celery. The acreage of vegetables grown for canners and packers was one-sixth larger than in 1929 and was the largest on record. The acreages in certain crops were decreased. Some shifts from barley to oats took place, owing to the unusually early spring and to the fact that trouble had been experienced the previous year from barley diseases. In parts of the South a shift was made from cotton and peanuts to feed crops. In the Corn Belt States, which began the season with rather large supplies of hay on hand, some shift took place from hay to grains and cash crops. As already noted, however, the increase in the total acreage and in the acreages of particular crops was more than offset by low yields. In proportion to the population, the harvest showed nearly the usual production of food crops, about an average production of cotton, tobacco, flaxseed, and broomcorn, and a greatly reduced production of feed for livestock.

Cereal and Other Food Crops

The wheat crop totaled about 840,000,000 bushels, as compared with 806,000,000 bushels in 1929 and an annual average of 833,000,000 bushels for the five years 1924–1928. Winter wheat, which constituted 597,000,000 bushels, was a larger proportion than usual of the total wheat output. Its relative amount reflected continued gradual expansion of wheat acreage in the Great Plains area, relatively low production of durum wheat on a reduced acreage, and a production slightly below the average production of the other spring wheats. Rye production, with yields close to the usual average, was estimated at 46,700,000 bushels, as compared with 40,500,000 bushels harvested in 1929 and an average production of 50,900,000 bushels during the five years 1924–1928. Among the grains principally used for human food only buckwheat is in seriously short supply. This crop was caught by drought in practically all States where it is grown and yielded only about 12 bushels an acre, or less than in any previous year since 1886. The total production is estimated at 8,700,000 bushels, or 24 per cent less than in 1929 and 37 per cent less than the annual average of the 5-year period 1924–1928.

Rice production is estimated at 38,600,000 bushels, as compared with 40,200,000 bushels harvested last year and an average of 39,100,000 bushels harvested annually during the preceding five years. The yield was slightly below the average and much below that of 1929. The bean crop was very large. Sugar-beet production likewise was unusually heavy. The production of sorgo for sirup, however, was considerably reduced. Peanut production was less than usual.

Cotton

Cotton production is estimated at 14,486,000 bales, as compared with 14,828,000 bales harvested in 1929. The crop, though not large in comparison with those of some recent years, is nevertheless more than ample for the market's reduced requirements. Yields varied greatly in different States. In the eastern Cotton Belt the severe winter of 1929–30 and dry weather during the early summer kept the boll weevil in check. As a result South Carolina, Georgia, and Florida are harvesting the best yields of cotton in a number of years. Record yields are being harvested in New Mexico and Arizona. California's yield, estimated at about 400 pounds an acre, is the highest since 1916. Oklahoma and Arkansas, on the other hand, have the lowest yields since 1923 Texas has the lowest yield since 1925. Taking the cotton-producing States as a whole, however, the yield per acre is expected to be close to the usual average, or about 155 pounds.

The Feed Crops

Total production of corn, oats, barley, and grain sorghums was estimated at only 90,000,000 tons, as compared with 103,000,000 tons in 1929 and an annual average of nearly 107,000,000 tons during the 5-year period 1924–1928. All told, the output of the principal feed grains is thus about 13 per cent less than in 1929 and 16 per cent less than the 5-year average.

Corn production is estimated at 2,047,000,000 bushels, or 22 per cent less than the production in 1929 and 24 per cent less than the average annual production of the preceding five years and less than the production in any year since 1901. The yields were low in practically all the important corn States. In the seven States most seriously affected by the drought yields averaged less than half those usually obtained. The proportion of the crop available in the form of grain will probably be considerably less than in any recent year, since much more than usual of the crop will be utilized for silage and forage.

Oat production was reduced by the drought in North Dakota and Montana and in parts of the South. In other States, however, the yield per acre was equal to or better than the average. For the country as a whole, oat production is estimated at 1,410,761,000 bushels, or 15 per cent above the production in 1929 and 3 per cent above the average production of the 5-year period 1924–1928. The barley crop is estimated at 328,000,000 bushels, about 8 per cent more than the quantity harvested in 1929 and 36 per cent more than the average production of the preceding five years. The yield per acre was estimated at 25.7 bushels, as compared with 23.2 bushels in 1929 and an average of 25 bushels during the previous 10 years.

Grain sorghum, which takes the place of corn in parts of the Southwest, was much affected by the drought in Texas, Oklahoma, Kansas, and New Mexico, where about nine-tenths of the crop is usually grown. Including the grain sorghums that will be fed to livestock in the bundle, the production was estimated at 79,232,000 bushels, as compared with 100,845,000 bushels in 1929 and an annual average of 128,175,000 bushels during the 5-year period 1924–1928. The output was lower than in any year since 1919, when the records on this crop were started.

Hay production was estimated at 96,100,000 tons, or about the same as in 1926 and less than the production in any other year since 1918. It was 16 per cent below the production in 1929 and 10 per cent below the average annual production of the previous five years. Both tame and wild hay were damaged by the drought. In some States grass and clover gave but a fraction of their usual yield. Alfalfa, soybeans, and other deep-rooted hay crops, though less hurt, did not make a normal growth. Wild hay made up 12,000,000 tons of the hay crop and tame hay 84,100,000 tons. The wild-hay crop was the smallest in 20 years, with the exception of that in 1926, and the tame-hay crop was the smallest since 1921. Yields were below the average in all States except in New England, Iowa, Wisconsin, Georgia, Colorado, the far Southwest, and the Pacific Coast States. In California, Oregon, and Arizona record hay crops were obtained. The drought killed new seedlings of grass and clover in many fields and the result will be noticed in next year's hay crop.

Livestock feed supplies are augmented, of course, by such commercial feedstuffs as bran, middlings, cottonseed meal, and flaxseed meal. Output of these products is expected to be somewhat heavier than usual this year, though not in excess of the production last year. Taking the feed situation as a whole, the total tonnage of feed grain, commercial feedstuffs, and hay produced will be about 12 per cent below the usual average. In proportion to the number of livestock needing to be fed, it will be about 10 per cent less than usual. Economical use of the available supply will stretch it somewhat. More straw and corn fodder will be fed, as well as increased quantities of wheat and cottonseed. Hogs will be marketed at lighter weights. Fewer cattle will be put on grain feed, and these will be fed grain for shorter periods. The grain ration for livestock of all kinds will be reduced. These expedients will not, however, suffice to obviate serious effects from the feed shortage.

Tobacco and Flax

Tobacco production was estimated in October at 1,500,000,000 pounds, the total including about 800,000,000 pounds of flue-cured tobacco and 290,000,000 pounds of Burley tobacco. Yields in Kentucky and Virginia were extremely low and reduced the average yield for the United States to about 700 pounds an acre, or less than in any year since 1897. Though the area planted was about 100,000 acres greater, the production was about 1 per cent less than in 1929. However, the final yield is not yet accurately known, since it depends greatly on shrinkage in curing.

Flax production was estimated at 25,200,000 bushels, or 50 per cent above the production in 1929, but only approximately 6 per cent above the average annual production during the five years 1924–1928. As a result of the increased planting previously noted, the flax area was nearly 4,400,000 acres, by far the largest ever planted to flaxseed in the United States. The yield, however, averaged only 5.7 bushels an acre. This was only slightly better than the yield in 1929 and was the second lowest yield in 10 years.

Fruits and Vegetables

Fruit production was at least one-fifth greater than in 1929. Prunes, plums, and apricots were abundant, and a good crop of citrus fruits is expected. Apples and peaches were a smaller proportion of the total supply than in the previous year. Taken as a whole, the bearing acreage of fruits and nuts produced less than an average yield per tree or vine, but the reduced yield was offset by an increase in the bearing acreage, which continued the trend of recent years. The net result was a fruit crop somewhat greater than the usual average total supply. Allowing for the year's increase in population, it represented about the average quantity per capita.

For the second year in succession much of the central portion of the country had a light fruit crop. In the northeastern, southeastern, and western areas conditions, however, were more favorable. The supply from these areas was more than sufficient to offset the shortage in the central areas. New England, New York, New Jersey, Florida, Washington, Oregon, and California had an exceptionally good year. The large crop in California was in sharp contrast to that of 1929, when early spring freezes limited the output.

Apple production was about 153,400,000 bushels, or 8 per cent larger than the short crop of 1929, though 15 per cent below the average crop of the 5-year period 1924–1928. The commercial crop, or the part marketed for consumption as fresh fruit, amounted to nearly 32,000,000 barrels, slightly below the average quantity but about 10 per cent larger than the commercial crop of 1929.

The peach crop was 49,250,000 bushels, 8 per cent larger than the 1929 production, but 13 per cent below the 5-year average. Low winter temperatures and spring frosts cut the crop sharply in the Central States. It was practically a failure in Indiana, Illinois, Missouri, and Arkansas.

The pear crop was close to 25,000,000 bushels, about one-sixth larger than either the 1929 production or the previous 5-year average production, and was the largest crop on record except that of 1926. It was relatively light in most of the central and southern areas, but exceptionally large in New York and the three Pacific Coast States, where the bulk of the crop is grown.

Grape production amounted to 2,350,000 tons, about an average production, but 12 per cent larger than in 1929. The increase was in California. Production outside California was less than in the year before, though 8 per cent better than the average. The orange and grapefruit crop now being picked is estimated at almost half larger than in the previous season and lemon production at about one-fourth larger.

Potato production, on a slightly increased acreage, amounted to about 352,200,000 bushels, as compared with 359,800,000 bushels in 1929 and an average crop of 393,000,000 bushels during the five years 1924–1928. The early commercial potato crop largely escaped the drought. It was grown on an acreage one-fifth larger than that of the previous year, and the output was correspondingly larger, the yields averaging about the same. A large part of the late-potato crop was damaged. The northeastern and central regions, including many of the important late-potato-shipping States, suffered the full effect of the hot, dry spell. The sweetpotato crop also was hurt. The total production is estimated at 67,670,000 bushels, as compared with 84,660,000 bushels in 1929. Fall rains partly restored the crop in southern areas. In the four commercially important sweetpotato-producing States on the Atlantic coast north of the Carolinas drought persisted into the fall. Production in this area was much below normal.

Despite the increase in the vegetable and truck-crop acreage, yields were so much lower than in 1929 that the supply of these perishables was not greater. Snap beans and sweet corn were the vegetable crops most seriously affected by the drought. The supply of sweet corn was comparatively short. The production of other canning crops was not exceptionally light in the aggregate, though the yields were low.

THE WHEAT SITUATION

Income from this year's wheat crop is likely to be considerably below that received from the previous crop. Farm prices through the first four months of the marketing season (July through October) averaged only about 71 cents a bushel, whereas in the corresponding months of the previous season the average was about 109 cents a bushel. Despite the short corn crop and the feeding of much wheat to livestock in the United States, prices have declined to the lowest level since 1901 and 1902.

The carry-over of wheat has increased each season since 1926. The carry-over in the United States on July 1, 1930, amounted to 275,000,000 bushels, as compared with 247,000,000 on July 1, 1929, and a 5-year average of 122,000,000 bushels. The world stock as of July 1, though very large, was not quite as large as at the beginning of the previous season. World stocks outside Russia and China probably were reduced approximately 100,000,000 bushels during the 1929–30 season.

The world is harvesting about an average wheat crop. Production outside Russia and China for the 1930–31 marketing season probably will exceed the production of the past season, when several countries had short crops. Conditions reported toward the end of October indicated that the world's wheat crop will amount to about 3,650,000,000 bushels—about 160,000,000 bushels more than in 1929, but 320,000,000 bushels less than in 1928. During the 1929–30 season consumption apparently exceeded production by at least 100,000,000 bushels. Short feed-grain crops and low wheat prices should cause some increase in wheat consumption, both in the United States and in Europe. Increased consumption in the United States alone may suffice to offset the increase in world production.

Russia continues to be an uncertain factor in the situation. Apparently the Russian wheat crop is better than that of the previous season. Russia's exports through southern ports are reported as having amounted by the middle of October to about 25,000,000 bushels. Just before the World War Russia was the leading wheat-exporting country. During the war and the revolution, however, her exports practically ceased. In the 1926–27 season Russia's exports amounted to 49,000,000 bushels and then declined to small amounts until the beginning of the present season. Apparently wheat production in Russia is now equal to or greater than her pre-war production. Although Russia's exports during the present season may not greatly exceed those of the 1926–27 season, the producers in the United States should watch carefully the possibility of keen competition from Russia during the next 10 years.

THE COTTON SITUATION

Developments in the cotton market continue to emphasize the importance of adjusting as far as possible the production of each quality of cotton to market requirements. Our cotton crop in 1929 was the fifth largest in our history, and the area harvested was exceeded only in 1925 and 1926. As the carry-over from the previous year was relatively small, the world supply of American cotton in the 1929–30 season was the smallest in five years. Farmers who marketed their crop early received fairly good prices. From August to December, 1929, the prices paid to farmers for cotton ranged from about 18 cents to 16 cents a pound, or slightly less than the average for the previous season. These are the months during which a large proportion of the crop normally leaves the farmer's hands. Thereafter prices declined, and at the close of the marketing season were about 11 cents a pound, or on a level as low as that reached during the large crop year 1926–27. The downward movement of prices partly reflected reduced world consumption of American cotton. In fact, there has been a shift away from American cotton to that grown elsewhere during the last two years. Price differences during this period have been less favorable to American cotton, and quality differences between American and foreign growths have been less marked. It is evident that an adjustment between the quality of cotton produced and the consumers' preferences is very important if American cotton producers are to maintain their supremacy in the world's cotton markets.

Yields of cotton per acre in 1929 averaged 155 pounds for the United States as a whole. This was about equal to the average for the 10-year period 1919–1928. There were wide variations in the yields of the different States. In Texas, Oklahoma, and North Carolina yields were unusually low. In all the other cotton-producing States yields were above the average. Although the crop as a whole was fairly satisfactory from the standpoint of yield, the quantity of each quality produced was not in adjustment with the market's wants. In fact, it was distinctly lacking in that respect, whereas some foreign cottons, notably Indian cotton, showed improvement. In recent years the Department of Agriculture has gathered and published information on the number of bales of cotton ginned of each grade and staple. The last grade and staple reports showed that the cotton ginned during 1929–30 was lower in grade and slightly shorter in staple than the cotton ginned during 1928–29. About 20 per cent of the 1929 crop was thirteen-sixteenths of an inch or less in length of staple; 38 per cent was seven-eighths of an inch; 19 per cent was fifteen-sixteenth of an inch; 12 per cent was $1\frac{1}{32}$ inches; 11 per cent was $1\frac{1}{16}$ inches or longer. No less than 24 per cent of all the cotton ginned in the United States during 1929–30 was untenderable on futures contracts. In 1928–29 the corresponding proportion was 18 per cent.

These facts have a close bearing upon the trend of the world's consumption of American cotton. Previous to 1929–30 there were three years of record world consumption of American cotton. The total consumed in 1926–27 was about 15,777,000 bales. In 1927–28 the total consumption was 15,407,000 bales, and in 1928–29, 15,066,000 bales. Never in any previous year had the world consumption reached 15,000,000 bales. In 1929–30 the world's consumption of American cotton was 2,000,000 bales less than in 1928–29. The world's consumption of all kinds of cotton in 1929–30 declined only about 700,000 bales from that of the previous year. American cotton was thus replaced to a considerable extent by that grown in other countries. The consumption of Indian cotton increased 900,000 bales and the consumption of cotton from other countries increased 500,000 bales. Reduced consumption in our own mills accounted for half the decline in the world's consumption of American cotton. The remaining drop of 1,000,000 bales was in Europe, half of it in Great Britain. Comparative prices and qualities made it economical for many spinners to use foreign cotton exclusively or for mixing with American cotton.

More information is needed about the trend in the world's consumption of various growths, and study of the problem is under way in the department. Its results should help farmers to anticipate changes in the demand and to adjust their output thereto more promptly than they have done heretofore. Efforts to improve the quality of cotton grown in the United States meet difficulty in the system whereby cotton at primary markets is bought at flat prices without sufficient regard to the quality of individual bales. Producers have small encouragement to grow better fiber when they have no assurance that they will get more for good fiber than their neighbors will get for poor. Manufacturers gladly pay premiums for superior cotton. The effect of this action on production practice is negligible when the premiums at central markets are not reflected in the prices paid at country markets.

In 1928–29 premiums paid in the central markets for white grades above Middling were reflected in price differences at local markets in a proportion varying from less than 20 per cent for Strict Good Middling to less than 50 per cent for Strict Middling. Of the discounts established in the central markets for white grades below Middling, the proportion reflected in the local markets varied from about 40 per cent for Strict Low Middling to about 75 per cent for Good Ordinary. Only 12 per cent of the discounts made in central markets for cotton having a staple length of thirteen-sixteenths of an inch or less was reflected in local price differences. Staple premiums in the central markets were reflected to growers at local markets in proportions varying from less than 15 per cent for fifteen-sixteenths of an inch cotton to less than 40 per cent for cotton with a staple length of 1⅛ inches. In other words the central but not the local markets discriminated with some nicety between the different quality cottons produced. This situation obviously penalizes the grower of superior fiber and retards the production of better-quality cotton.

THE LIVESTOCK SITUATION

The livestock situation was favorable at the beginning of 1930, but adverse conditions developed as the year advanced. Returns to livestock producers fell far below those of 1929. In the case of cattle and hogs, a decline in the demand was the principal difficulty. Cattle numbers in January were only slightly above the low point reached in 1928, and cattle slaughter seemed not likely to exceed that of the previous year. Hog production had been reduced and a marked reduction in hog slaughter was in prospect. Only in the sheep industry were there indications of overexpansion. Yet the prices for all three classes of livestock dropped greatly, the sheep industry suffering particularly because it had to deal with an increased production as well as with a reduced demand.

Cattle prices began to weaken early in March, evidently as a result of a declining consumer demand. Weakness in the demand was particularly marked from the beginning of June to the middle of August, when unusually high temperatures prevailed over much of the country. Toward the end of July the average price of all grades of slaughter steers had fallen to the lowest level since 1926, and at the low point was 40 per cent below the average price at the corresponding period in 1929. A sharp advance took place in August and September, notably in the prices of the better grades. Early in

October, however, the price level was still about 22 per cent below that which prevailed a year previously. Feeders, who had suffered losses in the spring and early summer, bought less than their usual supply of feeder animals. As a result, more than the usual proportion of market offerings went into slaughter channels.

For cattle and calves slaughtered under Federal inspection during the first eight months of 1930, producers received about $119,000,000 less than they received for the cattle and calves slaughtered under Federal inspection in the corresponding period of the previous year. In gross value this represented a decline of 18 per cent, though the total slaughter of cattle and calves was only 1.4 per cent less. From a supply standpoint, however, the cattle industry is still in a strong position. Improvement in the demand for beef should, therefore, be quickly reflected in better prices for beef animals.

Hog producers suffered less severely. Hogs slaughtered under Federal inspection during the first eight months of 1930 numbered 29,331,018 head, or 8 per cent fewer than in the first eight months of 1929. The average price received was $9.74 a hundred pounds, or 6.8 per cent less than in the corresponding period of the previous year. The combination of reduced slaughter and reduced prices lowered the gross return to $670,000,000, a reduction of 14 per cent from the $779,000,000 received for hogs slaughtered under Federal inspection from January to August, inclusive, in 1929. From the gross return in the first eight months of 1928, however, it was a reduction of only $28,000,000.

Foreign markets for American pork and lard were relatively unfavorable. Hog numbers had increased in the important hog-producing countries of Europe, and our exports of both bacon and lard declined. Our total exports of cured pork from September 1, 1929, to August 31, 1930, were somewhat smaller than in the corresponding months of the previous marketing year. Depressed economic conditions, as well as increased hog production in Europe, reduced the demand for American hog products.

The sheep industry had to market an unusually large supply of both lambs and wool. Slaughter supplies of fed lambs from December, 1929, to April, 1930, were about a million head larger than in the corresponding period a year earlier. On a tonnage basis, the increase exceeded 21 per cent. In the first four months of 1930 the market was compelled to absorb a fourth more lambs than in the first four months of the previous year. This heavy marketing, combined with reduced consumer buying power, resulted in an average price for sheep and lambs during the fed-lamb season of only $10.56 a hundred pounds, as compared with $15.03 in the 1929 season. Returns to lamb feeders, despite the increase in marketings, were approximately $10,000,000 less than in the preceding season.

These low returns curtailed the demand for feeding lambs from the 1930 lamb crop, which was 2,000,000 head larger than that of 1929. Producers were therefore obliged to sell more lambs than usual for slaughter, and prices were forced down to the lowest level in many years. In August the average prices of Good and Choice feeder lambs fell to $6.50 a hundred pounds. The average price of Good and Choice slaughter lambs at Chicago in the first week of October dropped to $7.52 a hundred pounds. These prices were, respectively, 50 and 40 per cent lower than the prices prevailing in the corresponding weeks of 1929. Wool prices, in the foreign as well as in the domestic market, declined during the year in about the same proportion as lamb prices. After a period of steadiness, the wool market early in October indicated some further weakness.

THE DAIRY SITUATION

From about 1921 to the end of 1929 the dairy industry of the United States was more stable and on the whole more profitable than most other agricultural enterprises. Late in 1929 and in 1930 it suffered a setback. The demand for dairy products fell off, underlying tendencies to overproduction were disclosed, feed supplies and pasturage were reduced by the drought, and feed costs advanced beyond the costs that would have prevailed but for the drought. Unfavorable conditions in foreign dairy markets affected American dairy interests, though the margin between domestic and foreign butter prices did not widen sufficiently to cause any increase in our butter imports. Since October, 1929, butter prices have been lower than in the corresponding months of the previous season and also below the 5-year average. A pronounced upturn took place in July and August, when dairy production was affected by the drought. Yet butter prices are still below those of a year ago. They seem likely to remain for a time at a lower level than that of the last few years, owing to a continuing tendency toward expansion in the industry.

On two previous occasions since the World War—in 1921–22 and in 1924–25—the dairy price situation was similar to what it is now. In those seasons, however, the difficulty was remedied by a rather prompt cut in production. The reduction came from three causes: (1) A decrease in the use of concentrated feeds; (2) increased culling of herds; and (3) a tendency among farmers, especially in the Corn Belt, where many beef cows are milked, to let the calves do the milking. Only one of these causes—a reduced use of concentrated feeds—has been noted this year. Farmers seem to have had no more profitable alternatives than dairying; hence there has not been much close culling of herds or any marked shift from dairying in the Corn Belt. Rigorous culling of low-producing cows should be profitable, especially in view of the tendency toward overexpansion in the dairy industry.

Though the drought caused a heavy drop in dairy production during the pasture season, supplies of roughage and hay are fairly ample in the more important dairy sections. Accordingly dairy production this fall and winter, though it will not be as large as it was during the corresponding periods last year, will not be as much below the last season's level as the summer production was. More than the usual seasonal advance in corn prices is expected; supplies of oats, barley, and wheat, however, are so abundant that no extreme advances in feed-grain costs are probable. In the specialized dairy territory, where about 85 per cent of our total butter output is produced, feed supplies are not seriously depleted. Feed shortages could reduce production in other areas by as much as a third without causing more than a 5 per cent drop in our total butter production. Milk cows and heifers are increasing in numbers. It is therefore probable that the effects of the drought in curtailing production will be only temporary. Improved business conditions would stimulate the demand for dairy products, probably not sufficiently, however, to obviate the need for reducing production.

The immediate outlook for the dairy industry varies widely in different localities as a result of the varying degree in which they have suffered from the drought. Following the drought a critical situation existed in most of the Ohio Valley and in parts of a larger area extending from Maryland to southern Missouri and southward into the lower Mississippi Valley. In these areas water was scarce, pastures failed, crops were seriously damaged, and farmers began feeding their scanty supply of hay and grain earlier than usual. There has been some distress selling of milk cows. As already noted, however, the more specialized dairy regions are in better shape. In the northern dairy sections production during the winter months will largely depend, as usual, on the spread between the cost of grain and the price received for milk or cream. Where grain and hay supplies are ample, milk production may be as profitable as other livestock enterprises. Only local milk shortages are probable, and there is no scarcity of milk cows for replacement purposes. In short, the dairy industry faces the combined influence of lessened consumer demand, both at home and abroad, and a tendency toward expansion. Though it can make rather quick changes within certain limits in the volume of its output of milk and other products, it can change the supply of its basic stock only very slowly.

THE POULTRY SITUATION

Egg production in 1929 was less than in 1928, and the summer movement of eggs into storage was smaller than usual. As a result the poultry industry entered 1930 with prices generally high. As the year advanced, however, laying flocks were considerably expanded. The resulting heavy egg production, combined with a lighter demand, caused a marked decline in egg prices. In the first part of the flush production season, the demand for eggs to be placed in storage remained good. Eggs in storage accumulated rapidly, however, and on August 1 the supply was the largest on record. Egg prices dropped instead of showing the usual seasonal rise. At this writing the heavy supply of eggs in storage and the early lay of the 1930 pullet crop are depressing factors. Material improvement in the egg market, other than the normal seasonal rise, is not expected before the early part of 1931. Exceptionally good demand for baby chicks prevailed during the first few months of 1930. From February to June the production of salable chicks by the hatchery industry, according to reports received from commercial hatcheries, was about 22 per cent above the production of the corresponding period in 1929. Some of the increase undoubtedly represented a shift from farm to commercial hatching. Returns covering about 20,000 ordinary farm flocks indicated that on July 1, 1930, chickens and young chicks of the current year's hatch numbered about one-half of 1 per cent less than on July 1, 1929. The contrast between the showing of the commercial hatchings and the showing of the farm flocks may be partly attributable to reduced hatchings on farms, heavier mortality of baby chicks, and a tendency among poultrymen to market a larger number of pullets as broilers.

The number of laying hens in farm flocks on July 1 was about 1 per cent greater than on the same date in 1929. Since then, however, relatively low egg prices have caused a fairly heavy movement of fowls to market. It is therefore probable that farm flocks in 1931 will be smaller than they were in 1930. Moreover, the current low egg prices may cause poultrymen to feed their flocks less intensively. Indications are, in fact, that laying flocks will enter the spring of 1931 in a condition below normal. Hence the total egg lay during the flush production of 1931 is likely to be less than it was in 1930. Whether the prospective decline in production will be accompanied by a proportionate rise in prices depends, of course, on the consumer demand, which is primarily affected by the business situation.

The poultry market, as well as the egg market, was oversupplied in 1930. Heavy hatchings from the preceding year and a lessened consumption demand caused a marked accumulation of poultry in cold storage. Heavy hatchings this year aggravated the situation. The movement of both old and young stock to market was very free. From January to September, inclusive, the receipts of fresh-killed western poultry at principal western markets were 3 per cent more than the receipts in the corresponding months of 1929. These liberal receipts, added to the influence of storage stocks that were nearly at the record level, caused a slump in poultry prices. However, the lower prices stimulated poultry consumption. In the first nine months of 1930 the consumption was 15 per cent heavier than in the corresponding months of 1929. Hence the prospect for 1931 is not unfavorable. Producers should find the market more nearly normal, without burdensome storage accommodations and without excessive market receipts.

THE FRUIT AND VEGETABLE SITUATION

Many fruit and vegetable producing sections were seriously affected by the drought of 1930. Some crops in the Central and East Central States were a complete failure. Others were greatly reduced. In other localities a combination of unfavorable weather at planting time and high temperatures during the harvesting period not only reduced yields but caused certain crops to mature within an abnormally short period. The result was a temporary flooding of markets, with sharp price declines. Early watermelons all matured in a short period instead of over several weeks, and shipments became so heavy that for a short time cars of melons could not be sold at shipping points at prices sufficient to cover the harvesting and loading charges.

These disasters, while of great importance locally, had but little effect upon the total shipments of fruits and vegetables for the country as a whole. The staple fruits and vegetables are now produced commercially in so many sections that a failure in a few areas does not mean a national shortage or prohibitive prices for what is produced. Even when there is a material reduction in a crop which is grown in restricted areas, such as the citrus fruits, the price is only moderately affected. The great variety of fruits and vegetables from which the buyer has to choose during practically all months of the year serves as an equalizer of prices. A material increase in the price of one results in the substitution of some cheaper product.

The rapidity of transportation and the wide distribution of market information by the department's market news service, the daily press, the telegraph, telephone, and radio are doing much to secure equitable distribution of these highly perishable products, which often are in too heavy supply in some markets while others are bare. The motor truck is doing much to equalize distribution. Overnight hauls of 250 miles or more from oversupplied to undersupplied markets are common. There is a tendency toward heavier car-lot shipments to the larger markets, from which daily deliveries of mixed truck loads are made to the jobbing houses and retailers within an ever-increasing radius. An opposite tendency, which has had some success, is an attempt to expand the shipment of mixed car lots to the smaller cities.

The development of large terminals by the carriers and by other private capital in many of the principal markets during the last few years has done much to overcome the confusion which formerly existed because of inadequate unloading facilities and the use of the railroad car as a warehouse and a salesroom.

FARM INCOME IN 1929 AND 1930

Farm incomes from the production of 1930 are expected to be lower than for any season since 1921. The gross income from the 1929 production amounted to about $11,851,000,000, or about $110,000,000 greater than that for 1928, but the returns from this year's livestock marketings have to date been considerably lower than the comparable returns last year, and returns from the 1930 crops now in process of being marketed are also considerably below those obtained from the 1929 crops. The aggregate gross income from the 1930 production will probably be about $9,950,000,000, or 16 per cent below that of 1929.

In 1929 the major farm expenditures showed very little change. Hence the increased gross income in that year resulted in an increase in net income computed as a return for the farm operator's capital and labor. The net income available in 1929 as a return for the operator's capital and labor was $1,055,000,000, as compared with $984,000,000 in 1928 and $1,206,000,000 in 1925, which was the best year since the post-war slump. Farm expenditures in 1930 have been less than they were in 1929, but the reduction is small compared with the reduction in gross income.

The reduced farm incomes of 1930 follow a series of years—1924 to 1929, inclusive—in which, despite diverse conditions in different agricultural sections, the aggregate income was fairly stable. This year all sections suffered because of world-wide industrial depression. In addition, farmers in a wide area suffered seriously from drought. In the drought-stricken area the gross farm income will be reduced about 25 per cent below that of 1929. In other sections the gross income, though greatly reduced, may be better than it would have been had the drought not lessened the country's total farm production.

Farm Prices in Relation to Farm Income

The great change from moderate improvement in 1929 to severe depression in 1930 is largely attributable to price movements since the summer of 1929. Total farm production in the fall of 1929 was not excessive, as compared with that of recent years. In August, 1929, the index of prices received by farmers was higher than in any month in the previous season and averaged 143 per cent of pre-war prices. By November the index had declined to 135 and by March, 1930, to 126. After a slight recovery in April it resumed the downward trend. A still more severe decline in the prices of practically all farm products in July lowered the index to 111. On August 15 it stood at 108, 2 points lower than the lowest level reached in the drastic deflation of 1921 and only 8 per cent above the pre-war level. The level of prices received by farmers declined nearly 30 points in one year, from September 15, 1929, to mid-September this year. With no offsetting increases in marketings this drastic decline in prices caused a 25 per cent drop in current gross farm incomes as compared with those of August and September, 1929.

Practically all branches of American agriculture received lower returns this year. Last year in August the cotton growers received 18 cents a pound for cotton; in August, 1930, they received less than 11 cents a pound for a crop believed to be slightly smaller than last year's.

Wheat growers in August, 1929, received an average of $1.11 a bushel. This season, for a crop not much larger, the August price averaged 74 cents—37 cents less than last year's. Even the potato crop, which is expected to be the smallest since 1925, sold in August at $1.09 a bushel, compared with $1.39 a bushel for a larger crop last year.

Producers of livestock and livestock products fared no better. Wool at 19.8 cents a pound in August was nearly 30 per cent below the prices received in August last year. Lambs brought less than $7 a hundred pounds, as compared with $11.46 last year. Beef cattle at $6.26 a hundred pounds on August 15 averaged $3.36 below last year's prices. Hogs, which in August, 1929, brought $10.28 a hundred pounds, sold for about $8.50 in August this year.

The dairy and poultry industries lost much of their previously advantageous price positions. The price of butterfat on August 15. 1930, at 35.7 cents a pound, was more than 7 cents lower than in August, 1929. Eggs sold for nearly 30 per cent less and chickens for 20 per cent less. Last year, when all farm prices averaged 143 per cent of the pre-war level, poultry products averaged 151 and dairy products 137. In August, 1930, when the average of all farm prices had slumped to 108 per cent, poultry products averaged 107 and dairy products 117. As compared with the prices received for other farm products dairy prices remained relatively high. Grains at 101 and cotton and cottonseed at 94 per cent were relatively low.

Farm prices declined more than nonagricultural prices. The average level of the wholesale prices of all commodities, according to the Bureau of Labor Statistics, declined about 15 per cent from August, 1929, to August, 1930. The wholesale prices of farm products during the same period declined 21 per cent and food 16 per cent, while the prices of nonagricultural products declined only about 10 per cent.

The prices that farmers pay for the goods they usually buy declined much less than the prices of farm products. The average of the prices paid by farmers in August, 1929, was about 155 per cent of the pre-war level. By August, 1930, the prices of these articles had been reduced to an average of 149 per cent of the pre-war level, a reduction of only about 4 per cent in the year. The ratio of prices received to prices paid was reduced from 90 per cent in August, 1929, to 72 per cent of the pre-war average in August, 1930.

FACTORS IN THE CURRENT DEPRESSION

The current slump in agricultural prices and incomes reflects the combined influence of continued overproduction in some important farm products and of the world-wide business depression. Agricultural overproduction existed before the business depression began. Its effects were heightened when the depression curtailed demand. The business depression caused a tightening of credit, a world-wide decline in commodity prices—in which agricultural prices suffered most—widespread unemployment, and a general reduction in the purchasing power of consumers. Agriculture's added difficulties this year are attributable largely to conditions outside the agricultural industry.

The year began without the prospect of increased burdensome agricultural surpluses. There was a large carry-over of old wheat in the United States, but the world's production in 1929 was below normal. It seemed likely that the United States would be able to market the increased carry-over and the new crop at prices better than had prevailed in the previous season. The cotton crop was of moderate size, as compared with the crops of 1925 and 1926, and the carry-over was not large. Fruit crops were generally short, and relatively high prices were to be expected. Prospects were for relatively small marketings of cattle and hogs at relatively high prices. Large production of lambs, wool, and dairy and poultry products was in prospect, and lower prices were to be expected, but not enough lower to constitute a material depression. There was a reasonable expectation that the prices of agricultural products in general for the season would be higher than in the previous season and that agricultural income would continue to improve. All such expectations had to be abandoned with the break in the business situation and the subsequent marked decline in prices.

Many of the factors which contributed to the decline in agricultural prices and income are related, and their influences can not be measured separately. Business activity in the United States in 1928 and 1929 was greater in some lines than could be maintained. The volume of business in the United States began to decline in the summer of 1929. The stock market turned down in September and broke sharply in November, and the break appeared to precipitate similar slumps in many other countries. Increased unemployment reduced the purchasing power of consumers. The prices of agricultural products fell not because of an increase in the supply, but because consumers were either unable to buy as much as usual or were unwilling to buy for future needs, except at lower prices.

The effect of this reversal in the business situation on agriculture was most clearly seen in the prices of cotton, butter, and meat animals. In these commodities there were no great changes in supplies. The price declines clearly resulted from a decline in the demand. A reduction in the mill consumption of cotton, both at home and abroad, was a principal factor in depressing the price of cotton to low levels in March, 1930, and to a still lower level in the summer months. The 1930 crop is slightly smaller than that of last year, but the cotton farmers are faced with a larger carry-over because of the depression. Cotton prices are about 6 cents a pound below those of last year, a decline of more than 30 per cent. The change in domestic and foreign business and the general decline of commodity prices have cost the cotton growers so far this season about $30 per bale, or more than $400,000,000 on the total crop.

The turn in the business situation began to affect the dairy industry in the summer of 1929, when the consumption of butter declined. Toward the end of 1929, increased production and declining demand produced record cold-storage holdings. Prices on surplus fluid milk were lowered, and butter prices not only failed to make their usual seasonal advance, but dropped to the lowest levels since 1921. Though some recovery in butter prices took place during the summer of 1930, they are still well below last summer's prices.

The reduced purchasing power of consumers was reflected also in prices for meat animals lower than those that usually prevail for such numbers as have been marketed so far this year. The combined production of all meats has been practically constant since 1924, but prices and returns to farmers for their marketings have varied with changes in the purchasing power of consumers. In 1929 the total cash income from the sale of livestock amounted to more than $2,500,000,000. The returns in recent months have been at a rate fully 25 per cent lower. The prices received by farmers for meat animals in August, 1929, average 165 per cent of the pre-war level. By August, 1930, they had declined to 119, or a drop of 28 per cent. If business activity this year had remained on the high level of last year, the prices paid to farmers last year probably would have prevailed in general this season. Hence it appears that the business slump is probably causing the livestock producers a loss of more than $500,000,000.

World-wide Price Decline

In some countries commodity-price recessions were in progress before the summer of 1929. In most countries the downward movement was accentuated in the last few months of that year. The combined price level for the countries that take most of our farm exports (the United Kingdom, Canada, Germany, France, Italy, the Netherlands, Japan, and China) followed a downward trend after 1924. In the succeeding five years, until the summer of 1929, an average of their prices showed a decline of about 10 per cent. Commodity prices in the United States declined in the same period but to a somewhat lesser extent. High industrial activity in 1928 and 1929 was a sustaining influence. The decline in the United States during this 5-year period was about 6 per cent. Since July, 1929, and particularly since September, 1929, the average of commodity prices in these countries has declined more than 10 per cent.

The decline in general price levels in foreign countries has been brought about in the same manner as the reduction in the general price level of the United States. Business depressions have reduced the demand for raw materials for manufacture, such as cotton and wool. Unemployment has reduced the power of consumers to purchase foodstuffs and clothing. These conditions have affected the international market for agricultural products. Many countries have endeavored to strengthen the domestic markets for their own products by increased tariff duties and other restrictions upon imports. Countries that export agricultural products have been forced to sell at low prices. This necessity has naturally curtailed their power to buy industrial products.

It is perhaps significant that the general price declines this year in June and July did not continue in August and September, although certain key products, both industrial and agricultural, notably copper and wheat, reached new low levels in September. The reduced agricultural production of 1930 has already strengthened some agricultural prices. This in turn should help to stabilize the general commodity price trend, and tend to create more confidence in the business situation. The depression has already continued about as long as former depressions of this character. In the immediate future, however, any marked price advances are likely to reflect supply changes, rather than improvement in the domestic or the foreign demand.

AGRICULTURAL EXPORTS

Exports of agricultural commodities in the year ended June 30, 1930, were the lowest since the year ended June 30, 1915. The export index number for the 12-month period was 97. This index is based on the exports of 44 of the principal farm commodities, with the movement in the period 1909–10 to 1913–14 taken as the base. The decline in the exports was general. With cotton (which bulks so large in the total) excluded from the reckoning, the index number for the remaining commodities was 117. This was lower than the corresponding number for any preceding similar 12-month period since 1913–14. The index for cotton calculated separately was 82, the lowest in six years.

These figures reflect essentially the volume, not the value, of the exports, though values are considered in the weighting of the index. In value the agricultural exports of the United States were 19 per cent lower in 1929–30 than in 1928–29. Lower prices diminished the unit value of the goods exported, and increased world competition lessened the foreign demand for United States crops. Excluding forest products, our agricultural exports for the year 1929–30 were $1,495,000,000, against $1,847,000,000 in the previous year. Agricultural products constituted only 32 per cent of our total exports, as compared with an average of 40 per cent in the period 1925–1929.

The dominant factor in reducing the value of the exports was a smaller movement of cotton at a lower average price. There were also substantial decreases in the value of the exports of grains, fruits, animal oils and fats, vegetable oilcake and oilcake meal, and dairy products. Tobacco made the best showing. In quantity the tobacco exports increased notably and in value slightly. Exports of meat were higher in both volume and value. Lard exports were larger but the total value was less.

Cotton exports (excluding linters) were 7,097,000 bales, valued at $667,251,000. This was a decrease of 19 per cent in volume and of 26 per cent in value from the annual average for the period 1925–1929. Germany again displaced the United Kingdom as the principal outlet for American cotton. It took 1,770,000 bales, or 25 per cent of the total exports, whereas Great Britain took only 1,307,000 bales, or 18 per cent. Much cotton credited to Germany in the exports statistics, however, is reexported to other European countries.

Japan took 1,078,000 bales. As compared with the figures for the previous year, cotton exports to Germany declined 6 per cent, those to the United Kingdom 32 per cent, and those to Japan 21 per cent. Only France among the principal cotton-importing countries took more than in the previous year.

Exports of wheat decreased slightly and those of other grains heavily. The movement of wheat and flour was lower than in any year since 1914 except 1918 and 1926. It was 20 per cent less than the average annual movement for the period 1925–1929, though only 6 per cent under the movement in 1928–29. Japan took the equivalent of 9,863,000 bushels, or more than double the amount taken in the previous season. China, on the other hand, took less. The net gain in the shipments of wheat to the Orient was 2,023,000 bushels. Rye and rye-flour exports amounted only to the equivalent of 3,000,000 bushels, the lowest figure since 1914. This was a decrease of nearly 89 per cent from the average of the five preceding years, though the production for the season was only 14 per cent less. Rice exports were only 10,401,000 bushels, as compared with 14,137,000 bushels the previous year. The decline was particularly marked in the exports of California rice. Drastic declines were recorded in the exports of feed grains. Exports of corn and corn meal were 10,280,000 bushels, the lowest since 1925. Oats exports dropped to 7,966,000 bushels, the lowest since 1914. Exports of barley, including malt, were only 24,054,000 bushels, or 33 per cent less than the annual average for the period 1925–1929, despite the fact that barley production in the United States in 1929 was the second highest on record.

Most classes of meat exports showed an improvement both in quantity and in value. Hams, shoulders, and pickled pork were exceptions. Heavy exports to the United Kingdom chiefly accounted for the increase. About 60 per cent of all the meat exported was cured pork. More bacon was shipped than in the previous year but less hams and shoulders. As a result the total exports of cured pork were slightly under those of 1928–29 and lower than in any year since 1875. Exports of lard were about 7 per cent above the average volume for 1925–1929 but were 12 per cent lower in value. The average price for lard during the season was lower than in any year since 1922. Exports of fresh pork amounted to 18,771,000 pounds, an increase of 23 per cent over the average for the five years immediately preceding. Shipments of beef amounted to 17,227,000 pounds. This total, though greater than the amount exported in 1928–29, was 19 per cent under the 1925–1929 average and was equal to only 14 per cent of the quantity of beef imported into the United States.

Exports of leaf tobacco exceeded those of 1928–29 by 29,230,000 pounds. They were larger than those in any preceding year except 1919 and 1920. Exports of bright flue-cured tobacco amounted to 429,942,000 pounds, a gain of 15,993,000 pounds over those of 1928–29. Exports of dark-fired Kentucky and Tennessee tobacco were 96,395,000 pounds, an increase over the shipments in the preceding two years, but a decrease from the annual average for the period 1925–1929.

Exports of all classes of fresh, dried, and canned fruit declined. The movement of both boxed and barreled apples was less than half that of the 1928–29 period. Exports of oranges and grapefruit were under those of the preceding year, but with that exception were higher than those of any preceding year. Exports of prunes were 31 per cent below the average for the period 1925–1929. Exports of raisins were 19 per cent below the corresponding average.

More vegetable oils were exported than in the previous 12 months but at lower prices. The volume of the movement, however, was less than the average for the preceding five years. Cottonseed-oil exports, though greater than in 1928–29, were 38 per cent less in volume and 46 per cent less in value than the annual average for the 1925–1929 period. Exports of linseed oil were 9 per cent below the 1925–1929 average. Exports of soybean oil were 37 per cent above the 5-year average. Exports of canned vegetables were only slightly under the record figure reached in 1928–29.

AGRICULTURAL IMPORTS

Imports of agricultural products also declined. The value of agricultural imports, excluding forest products and rubber, declined from $1,943,000,000 in the fiscal year ended June 30, 1929, to $1,696,000,000 in the fiscal year ended June 30, 1930. The value of imports of all agricultural products, excluding forest products and rubber, was about the same as in 1924 and not so low as in 1922.

The principal causes of the decline in the value of imports were a decline in the prices of many products and, in some cases, a material curtailment in the demand. The reduction in the value of the imports of sugar and coffee constituted nearly half the reduction in the value of the total imports. More coffee was imported, but prices fell so much that the total value was greatly reduced. A curtailment in the manufacturing demand for such raw materials as silk, wool, and cotton subtracted about $74,000,000 from the total imports. The value of the imports of oils and oilseeds declined $21,000,000. Flaxseed imports were maintained, but the value of palm kernel, copra, and other coconut products reduced the total.

Rubber is not included in the above total valuation of imports. Though more rubber was imported, the value of the rubber imports was $39,000,000 less than in the preceding year.

Imports of hogs, cattle, and sheep were reduced. A large clip and a reduced demand for wool resulted in a reduction of about $24,000,000 in the value of the imports of carpet and combing wools. The value of the imports of dairy products was reduced by about $6,000,000. The imports of eggs and egg products, on the other hand, increased by a small amount. The Orient sent larger quantities of the dried yolks and albumen of eggs. A short fruit crop in the United States in 1929 also resulted in a slight increase in the imports of fruits, including some increase in the imports of bananas.

OVERPRODUCTION AND CROP ADJUSTMENTS

One aspect of the farm problem overshadows all others. Production in a number of important lines is out of balance with the market, and surpluses pile up continuously. Barring such temporary fall in demand as we experienced in the past year due to world-wide business depression, our difficulty is not a sudden emergency, but a cumulative overproduction. Farm production, already above normal requirements, became disastrously excessive when the depression curtailed purchasing power. Exceptional weakness on the demand side was added to the trouble on the supply side. I want to emphasize the need for equitable, intelligent, systematic, and collective action to bring supply into better relationship with demand.

Farmers, of course, must deal mainly with the supply phase of the problem in one way or another. There are two main alternatives. They can let matters drift until production is reduced by the ruin of thousands and their elimination from the farming industry, or they can consciously direct the readjustment process to lessen its difficulty and hasten its end.

The answer to overproduction is less production. Crops must be balanced as nearly as possible with market demands and offered only in such quantities as can be sold at prices covering the farmers' cost of production plus a profit. If readjustment is not brought about by intelligent action, it will be effected through blind economic forces at excessive cost. Let us not deceive ourselves by saying that real overproduction is impossible, since all the foods and fibers produced are eventually consumed at some price. There is overproduction if the price received does not exceed the cost of production by a margin sufficient to give the reasonably efficient farmer a fair net income.

Technical Progress in Production

The growing efficiency of American agriculture helps to explain but does not justify its persistence in overproduction. Technical progress has increased farm productivity tremendously in the last 15 years, but the benefit has gone largely to the consumers. Farming has been industrialized and mechanized. It has used science, decreased its production costs, and increased its output, without finding either profit or security in the process. It has made two blades of grass grow where one grew before, only to find the second blade depressing the price of both. Continuing in this path, in the hope that still greater efficiency will eventually force our competitors out of the market, seems likely to work no better in the future than it has done in the past. Farming is becoming more efficient all over the world, and crop acreage and livestock breeding are increasing. The competing groups know that a halt in production will have to be called, but no group wishes to be the first to slow down.

Other industries behave differently. In the first seven months of 1930 the production of motor vehicles in the United States declined 44 per cent. This decline was not compelled by bankruptcies, but resulted from voluntary concerted effort to adjust output to the demand. Low-cost as well as high-cost plants participated. They found that course better business than to go on glutting the market, in the hope of driving enough producers out of it to leave a good field for the rest. While the problem in farming is more difficult, this same logic should apply to agriculture. It does not follow, because some farmers can produce at a lower cost than others, that the low-cost farmer should do nothing to prevent overproduction. Narrow competitive views of that sort invite bankruptcy. Bankruptcy is contagious. Ruthless competition means, in the end, measuring living standards by the lowest in the scale.

World Wheat Expansion

Since wheat particularly is overabundant, let us consider the wheat situation. The world's wheat area is 42,000,000 acres larger than it was before the war. The United States has contributed 14,000,000 acres to the increase. These figures do not include Russia's acreage. Russia will undoubtedly increase its wheat exports. Wheat surpluses have piled up steadily in the last half decade, and world carry-overs reached huge proportions after the bumper crop of 1928. The current year's world carry-over on August 1 exceeded 500,000,000 bushels, though the 1929 world crop was less than that of the preceding year by almost the same amount.

Consuming countries have reduced their wheat imports by high tariffs, by forcing the consumption of substitute cereals and starches, and by encouraging their own wheat production. For instance, Germany has raised her tariff on wheat to $1.62 a bushel. Importing countries in the crop year 1929–30 imported 237,000,000 bushels less than in the previous year. Meantime wheat growing continues to expand in the exporting countries, particularly in parts of the United States and in Canada, Argentina, and Australia. The area sown to wheat in our southwestern winter wheat States increased approximately 4,000,000 acres from 1924 to 1929. During the same period the area in Canada, Argentina, and Australia combined, increased more than 10,000,000 acres, from 49,000,000 to 59,000,000 acres. This is in line with the trend in expansion since 1910. The entire wheat-producing world faces increased acreage, increased production, and unsatisfactory prices. It is vainly trying to beat the law of supply and demand. In the last seven years it has produced an annual average of 43,000,000 bushels of wheat more than has been consumed, and the United States' carry-over has piled up to the record total of 275,000,000 bushels. This year, moreover, our wheat crop is larger than that of last year.

It is sometimes urged in defense of continuous wheat expansion in the United States that certain extensive wheat-growing areas in this country can produce wheat more cheaply than it can be produced anywhere else in the world. Whether or not this is entirely correct we do not know. Our methods and our machinery are up-to-date, but other countries are efficient too; and some of them have much cheap and fertile land. Even if our growers are in a relatively strong competitive position, it does not follow that they should blindly offer themselves for punishment. Competition to see who can stand the heaviest losses is irrational. Live and let live is a better doctrine. Moreover, the number of relatively low-cost producers in this country is too great to justify an endurance contest among them. Their interest lies not in fighting among themselves but in combining to adjust their total output to market needs. In this task they can expect help from the Federal Government, but only if they approach it practically. By this time it is evident that supply-and-demand conditions can not be set aside by legislation, that the dumping of surpluses abroad is not feasible, that the indefinite storing of surpluses tends to prevent rather than to cause a rise of prices, that tariff duties are not effective on commodities produced largely for export, and that subsidies would increase rather than restrain production. Voluntary curtailment of production is the only logical remedy for the surplus problem.

A striking instance of world resistance to dumping has been afforded us lately by Russia's efforts to sell wheat and other products in other countries at extremely low prices. Agitation began in France some months ago against soviet dumping, particularly of wheat. As a result the Government issued a decree on October 3, which provided for the control, through licensing, of imports from Russia into France of certain merchandise, including "cereals and their derivatives," and also a number of other products, mainly foodstuffs. The license system limits the quantities that may be admitted. Similar action was taken by Belgium on October 25, under a decree requiring an import license on grains, flour, wine, and a number of other articles from Soviet Russia. Rumania has issued an ordinance understood to apply particularly to imports from Soviet Russia. It requires on imports the stamp of the country of their origin, and also a permit issued by the Rumanian trade attaché. Rumania has no such official in Soviet Russia, because of the absence of diplomatic relations between the two countries. Hence, the ordinance seems to place a complete embargo on importations into Rumania from Soviet Russia. It was recently announced that Hungary was contemplating a license system covering imports from countries with which it has no trade agreements. Soviet Russia is the only country to which this condition applies. The latest increase in Germany's tariff on wheat, though applying to imports from all countries, is acknowledged to be a move to control the dumping of Russian wheat in the German market.

Curtailment of Acreage

The curtailment of acreage, indispensable if wheat growing is again to be profitable over a period of years, can not be recommended as a blanket policy applying equally to all farmers regardless of their special circumstances. In areas specially adapted to wheat and on farms that have no other satisfactory alternative cash crop, the problem is not the same as it is where nature or circumstances offer a choice of major enterprises. Adjusting production is an intricate process with varying applications in different regions and on different farms. Not merely the available crop enterprises but the size and shape of fields, the characteristics of the soil, the climatic conditions, and the extent to which farm operations are mechanized must be considered.

These considerations justify a flexible adjustment policy. They do not justify a refusal to make adjustments. Not every acre now growing wheat should be in that crop even in the specialized wheat areas, whose opportunities for making crop shifts are often underestimated. Whole-hearted cooperation in a concerted effort to bring our wheat industry more nearly in line with its market would disclose many useful modifications of the existing 1-crop system. It would develop forage-crop and other side lines, and eliminate many high-cost acres from wheat growing. If by leaving acres fallow a better profit can be obtained, that, in itself, is good farm economy.

There is no merit in growing a crop at a loss merely because there is no crop that might be grown at a profit. Continuing to do that may, in fact, turn one's attention away from possible profitable alternatives. The intentions-to-plant reports this fall showed that continuous expansion is not unavoidable in the wheat fields. They indicated an intention to reduce the winter wheat acreage by 4½ per cent. Whether this is a response to the price situation or to the general argument in favor of readjustment makes no difference. It shows that adjustment is possible.

Eliminate High-Cost Acres

Mainly, readjustments in acreage are necessary as a corrective of low prices. It is elementary that prices can never rise in an overstocked market. That, however, is not their sole value. Wise acreage adjustments can help to decrease the unit cost, as well as the volume of production, and thus to widen the favorable margin, when any exists, between costs and prices, or to decrease that margin when it is unfavorable. This effect is produced by the elimination of the higher-cost acres, and the concentration of the remaining production on the more productive land. In the case of a widely distributed crop like wheat, acreage readjustment would affect lands varying much in productivity. On some farms, where wheat is a rotation crop, it might be retained at a cost of production that would be prohibitive in a cash-wheat area. Everywhere, however, the general principle of the readjustment process would be the same. In each region or locality it would transfer the highest-cost acres to other uses and thus tend to reduce average costs of production. This would obviously be an important advantage in world competition.

It is not correct to say that the same result would be reached by leaving the curtailment to the free play of economic forces, as is often recommended. That course lacks scientific discrimination. It forces good land as well as poor into the discard, because it acts primarily on farmers instead of on acres. When a farmer is driven out of business, his whole farm suffers. Acreage readjustments collectively engineered have more precision in relocating production to economic advantage. This procedure, instead of throwing much valuable agricultural land blindly out of use, makes crop shifts that maintain the farm business as a going concern, while at the same time modifying its tendency to create surpluses. Comparatively small changes, on a sufficient number of farms, have in the aggregate a great beneficial effect. All that is necessary to set this constructive force in motion is team play. Farmers must recognize their common as well as their competitive interests.

Not sentiment but logic is the foundation of this policy. If all the wheat land in America were owned by one man the problem of adjusting the output to the market demand would be easy. The owner would reduce his production when need arose, not by abandoning scientific methods or the use of machinery but by reducing his acres. Though our wheat acreage will never be owned by any one man, the problem, from the standpoint of the wheat industry, is the same as if it were, and the solution is the same. Our numerous farm operators have the same reason for not systematically oversupplying the market as an individual owner would have. At present they are engaged in destructive competition, each, by surplus production, beating down the price of the commodity for all. This is illogical and destructive.

Many farmers think production can not be controlled by controlling acres, since output depends also on the weather and on insect pests and plant diseases. Locally this is true. But taking the country as a whole production per acre is surprisingly uniform. In the last 25 years the average yield of wheat per acre has been 14.5 bushels. The highest yield was 17 bushels and the lowest 12.2 bushels, a maximum variation above the average of only 17 per cent and below the average of 16 per cent. In most of these years the yield was much closer to the average. Production, taking the country as a whole over a period of years, is primarily determined by acreage. Farmers who take a national as well as a local view of their business problems will recognize the practical application of this truth. In the long run man rather than nature controls the volume of farm production.

What has been said about wheat applies to many other farm commodities. It is easy to find objections to the policy of concerted action for the regulation of production. Like most things worth while, the policy involves labor and thought. It calls for a widespread cooperative spirit, alertness in recognizing opportunities for profitable crop shifts, close study of market prospects, and more careful farm accounting. Much farming is done unprofitably because the farmers do not count the costs. Not knowing what it costs them to grow a crop, they have a poor idea as to what it should bring them. Continuing to grow a crop at a loss merely because one's neighbor does, or through the force of inertia, is not rational production adjustment. But those who emphasize the obstacles to concerted action for the regulation of output fail to reflect that the alternative policy, namely, reliance on the competitive elimination of high-cost men and high-cost acres, has also its drawbacks. It means wholesale bankruptcies. It has the destructive wastefulness of other uncontrolled natural laws. Letting the surplus problem solve itself by progressive calamity is not creditable in a scientific age.

Goal Is to Increase Farm Profits

The final measure of agriculture improvement must be a rise in the average net farm income. There is no other satisfactory criterion. Productivity will not do, nor a rise in the quality or variety of the things produced. Nor is it admissible to be satisfied with figures showing increased investments in agricultural land or plant. Unless gain in these respects is translated into income, it is illusory from the standpoint of the working farmer. Net income, as every farmer knows, depends on two factors—costs of production and prices received. These factors vary in relative importance with circumstances, and circumstances determine which should be most emphasized at any given moment. At present, the price factor is predominant. Production in many lines is excessive, demand has shrunk somewhat, and farm commodity prices are at a heavy disparity with the prices of other goods. That is why I emphasize the supreme importance of production adjustments as a means of affecting profits favorably.

It goes without saying, however, that the other factor in net income, production costs, remains important, no matter how greatly it may temporarily be overshadowed by the price situation. Action taken to control the volume of production can not save the consistently high-cost producer. He must either get out or accept a low standard of living. If prices should show a downward trend in the next few years, not necessarily downward from the low point of the summer of 1930 but downward in the sense that the peak of the next price cycle is not as high as the peaks of the preceding ones, efficiency in farming, to keep costs down, will be more imperative than ever. So much progress in individual efficiency has been made by American farmers in recent years, however, that reiteration of its value seems unnecessary. Rising output per man engaged in agriculture shows clearly that American farmers understand the importance of keeping down their costs of production. There is one point about the subject of efficiency that may need to be emphasized. Increasing efficiency is not in contradiction with the need for reducing production. Sometimes it is accompanied by increased output, but that is not an inevitable relationship. Efficiency should reduce costs of production, while organization regulates the total volume. These two principles, far from being antagonistic, are the twin pillars of agricultural prosperity.

FARM TAXATION

Farm taxes last year continued to rise. In 1928 the real-estate tax per acre for the country as a whole was 5 per cent above the 1924 level. In 1929 it was 7 per cent above the 1924 average. The upward trend since 1924, however, has been less steep than that from 1913 to 1924. The most rapid increase in farm taxes since 1913 occurred in the period 1917 to 1923.

The ratio of taxes to land values has advanced rapidly. This is a result not only of the rise in taxes but also of the decline that has taken place in land values in the last decade. Tax levies in 1928 were $1.43 and in 1929 $1.46 for each $100 of the full value of farm real estate, as compared with $1.22 in 1924 and $0.68 in 1913.

With lower land values, and with the usual increase in taxes, the tax rate this year probably is about $1.50 per $100 of the full value of farm real estate. Farm real estate taxes now equal the interest which farmers would pay at 6 per cent on a mortgage indebtedness amounting to 25 per cent of the full value of the real estate, as compared with about 11 per cent in 1913.

In the last 15 years there has been a tremendous increase in State and local expenditures in the United States, which has put a heavy strain upon the prevailing system of raising revenues. The cornerstone of that system is the general property tax. In 1922, the last year for which official data are available, the general property tax accounted for 79 per cent of State and local taxes combined, and 89 per cent of local taxes alone.

The general property tax is little more than a tax on real estate. Personal property, especially intangibles, generally escapes taxation. The inducement to withhold property from the tax rolls becomes greater as taxes increase. Hence the revenue from the taxation of personal property has diminished greatly in relation to the total value of that property. The attempt to tax personal property, especially intangibles, by means of the general property tax, is generally a failure. Accordingly it has been necessary to increase the tax rate on property that can not escape taxation. Farm property is of that kind because it consists mainly of real estate, and of tangible personal property. Tangible personalty on the farm, such as livestock and equipment, can not be as easily hidden as intangibles, such as notes, stocks, and bonds.

More so than that of other groups of citizens, the farmer's income is directly dependent upon tangible property, primarily real estate, which is readily accessible to the tax assessor. The farmer's acute tax problem results from a rapidly increasing public expenditure met by a system of taxation that places most of the burden on real estate and tangible personal property. The burden has been made heavier in recent years by a diminution in the farmer's equity in his real estate, through the increase in mortgage indebtedness and the decline in real estate values.

The remedy lies in two directions: (1) More effective control of expenditures, and (2) revision of the prevailing system of taxation, so that more revenue will be derived from sources other than general property. Greater economy is imperative in State and local expenditure, not only through the careful scrutiny of expenditures but through the consolidation of local government units and the realignment of administrative functions. In recent years more progress has been made in these respects by the Federal Government than by State and local governments.

Of the total increase in State expenditures from 1915 to 1927, 41 per cent resulted from added expenditures for education and 20 per cent from added expenditures for highways. Probably about half the total increase in taxes on farm property since 1915 resulted from increased expenditures for education and about a fourth from additional expenditures for roads. Nevertheless the rural schools are not, generally speaking, up to the standard prevailing in cities; and the roads need further improvement. It would be easy to exaggerate the possibility of reducing farm taxes by cutting down school and road expenditures.

There is more prospect of farm-tax relief by changing our system of State and local taxation so that wealth other than real estate and tangible personalty will carry more of the load. The State governments, and to some extent the National Government, contribute to the support of schools; perhaps their responsibility in this respect is not fully recognized. Education is far less local in character than the present system of school financing indicates. The children in rural communities, many of whom are the future citizens of other communities and other States, should have educational opportunities comparable to those enjoyed by city children. This need should be met to a greater extent by taxes levied on sources other than general property and by the larger taxing jurisdictions.

A constructive position is taken by organized agriculture. By formal resolutions and otherwise the American Farm Bureau Federation and other organizations have emphasized the need for economy and urged careful study as a basis for revision of the State systems of taxation. No fixed program is applicable to all States, because their legal and economic problems vary.

Fuller information is necessary as a basis for public economy and tax revision, and farm organizations have taken steps to create permanent committees to study the problem. The American Farm

Bureau Federation has also formally urged that the tax-investigation work of this department be extended. Though legally a State problem, farm taxation from a broad economic standpoint concerns the whole Nation. Organized agriculture is justified in asking additional Federal research regarding farm taxes, for sound policy in taxation requires impartial research and the translation of the results into informed public opinion.

FARM-LAND VALUES

Farm real-estate values, though not regionally uniform in the direction or the extent of their movement during the last year, continued downward, considering the country as a whole. Recessions in the year ended March 1, 1930, rounded out a decade of declines. The number of farms that changed hands through forced sales and related defaults in the 12-month period up to March 1, 1930, was high in relation to the number of voluntary transfers. Recovery in values was impeded by heavy taxation and by other factors, notably falling agricultural commodity prices.

Surveys indicated that the average decline in value per acre of farm real estate for the entire country for the year ended March 1, 1930, was approximately the same as in the previous year, 1 per cent of the pre-war value as represented by a 1912–1914 average. This compares favorably with decreases of 2, 5, 3, and 3 per cent for the years ended March 1 of 1928, 1927, 1926, and 1925, respectively. The declines of the last two years have been the smallest reported since the break following the peak of land values reached in 1920. Farm valuations were then approximately 170 per cent of the 1912–1914 level. The March 1, 1930, level was 115 per cent of the 1912–1914 average.

A significant development was an apparent resumption of the decline in the East and West North Central and the Middle and South Atlantic States, which had previously shown some tendency toward stability. In a majority of the States, declines of 3, 4, and 5 per cent replaced the declines of 1 and 2 per cent reported for the previous year. An exception was Kansas, which for the fifth consecutive year reported practically no change in the average for the State as a whole. In western Kansas much new land has recently been brought into cultivation by power machinery. This may largely account for the State's favorable showing. The averages for the Pacific and the West South Central States remained essentially stationary. Those of the New England and Mountain States increased slightly. All told, 24 States reported declines, 6 reported increases, and 18 reported no change. In the previous year 28 States reported declines, 4 reported increases, and 16 reported no change. By States, the reduced number reporting declines and the larger number reporting increases were a favorable indication. Many of the declines, however, were more severe than those of the previous year.

Forced Sales and Voluntary Sales

Taking the country as a whole, forced transfers of farm realty were nearly as frequent as voluntary transfers. Tax sales, mortgage foreclosures, sales in bankruptcy, and sales made to avoid such formal actions involved approximately 20.8 farms per 1,000 for the year ended March 1, 1930, as compared with 19.5 per 1,000 reported the previous year. A downward trend was indicated during the three preceding years. The rate of voluntary sales and trades in farm real estate was 23.7 farms per 1,000—practically the same as in the previous year. In the New England, Middle Atlantic, East South Central, Mountain, and Pacific divisions voluntary transactions were more frequent than involuntary. In the West North Central and South Atlantic States, the converse was true. In the East North Central States the two types of transfer occurred with nearly equal frequency. The number of farm bankruptcies concluded in the courts in the fiscal year ended June 30, 1929, was five and a half times the pre-war figure. Later figures are not yet available.

During the last decade a large number of farms have been acquired by mortgagees. Mortgage loan companies, insurance companies and the land banks, as well as smaller operators, find themselves with land which they must either sell, operate, rent, or leave idle. Since these agencies are not organized primarily to operate or rent farms, the pressure to sell is very strong. Buyers are largely local farmers. But the extraordinarily large supply of farms for sale and the impaired buying power of prospective purchasers do not make a strong market.

FARM-CREDIT CONDITIONS

Farm-credit conditions were unfavorable this year. Lowered farm-commodity prices interfered with the liquidation of loans, and reduced the supply of new credit in country banks. In the smaller country banks of the leading agricultural States, deposits dropped to the lowest level since 1922. Many banks failed in parts of the Middle West and in some of the Southeastern States. Declining farm-land values affected the credit status of farmers and forced many to reduce their mortgages though they were ill prepared to do so. For the country as a whole, as previously indicated, farm-land values averaged 32 per cent lower than in 1920, and only 15 per cent above the average of the pre-war period. With allowance made for postwar changes in the value of the dollar, farm-land valuations were 20 per cent below the pre-war level. Bank loans based on the shrinking security of farmers' equities in their land were difficult to liquidate. In areas affected by the drought, credit facilities were strained, while the demand for credit, particularly for the purchase of feed, increased. Special measures, however, afforded substantial relief from this condition.

In short, the year saw the borrowing power of the farmers much reduced. This can not be attributed in any large measure to a lack of credit machinery or of credit institutions. Agricultural credit facilities have been vastly improved in recent years. The Federal reserve act, by giving greater flexibility to our banking system, greatly strengthened the country banks as well as the city banks. The Federal farm loan act of 1916 began a sound policy of farm-mortgage finance, through long-term amortization loans. The Federal land banks in 1930 had $1,194,000,000 in loans outstanding, and the joint-stock land banks $570,000,000. Under the agricultural credits act of 1923, 12 regional intermediate credit banks were set up to provide production credit for terms longer than those usually covered by bank credit. Though these institutions have not been as much used as was expected, they play an important part in our farm-credit system, particularly in the financing of cooperative associations. More go-between institutions are necessary to make their resources directly available to the farmers, since the law does not authorize direct borrowing by farmers from the intermediate credit banks. Some fairly large credit corporations formed to use the discount facilities of the intermediate credit system have been very successful, and there is room for more. Under the agricultural marketing act of 1929 the Federal Farm Board provides funds for loans to cooperative associations for marketing, for the acquisition of plant and equipment, and for other purposes. Credit thus supplied supplements that furnished by other agencies. Agriculture is much better served with credit facilities than it was 10 or 15 years ago.

The Risk Factor

The farm-credit problem, however, is not exclusively a problem in facilities. It is also a problem in risks. Its dual nature is evident from a study of the numerous bank failures that have taken place in recent years. More than 4,000 banking institutions in the agricultural areas have closed their doors since the postwar depression began. These failures might have been fewer had certain errors in banking methods and in banking organization been avoided. Too many country banks were chartered before 1920, and destructive competition for an insufficient total volume of business resulted. Many risks were assumed that prudent banking would have rejected. Often, too, bank managements were relatively inexperienced. In so rapid a growth of banking institutions the supply of trained men was inadequate. Obviously, however, defects of this character explain the bank casualties only in part. The underlying cause was the agricultural depression, with its reduced farm commodity prices and its reduced farm valuations. Loans that had seemed secure when made proved uncollectible. The farm-credit problem is merely a phase of the farm problem as a whole. Healthy credit conditions demand not merely sound credit institutions but sound farm management and sound farm conditions. If the supply of farm credit is to be adequate and the cost low, farmers and bankers must unite in action to lessen the hazards of the agricultural industry.

Farm credit remains costly in many parts of the United States notwithstanding the improvements brought about by the Federal reserve act, the farm loan act, and the agricultural credits act of 1923. Regional differences in the cost of credit reflect partly differences in local credit facilities and partly differences in agricultural risks. In some areas there is room for improvement both in the facilities and in the lessening of risks. Many farmers, especially in the South, depend excessively on costly merchant credit. They do so partly because an undependable farming system discourages banking enterprise and forces recourse to the merchant, and partly because of faulty credit management on the part of individual borrowers who often use the costly merchant credit even when in a position to avail themselves of the less expensive cash loans. Studies made by the department show that the high cost of merchant credit results largely from the high percentage of losses incurred.

Field for Production Credit

There is a large field for constructive activity by banking and credit institutions to correct these conditions. Credit institutions can not be expected to make loans at low rates where agricultural hazards are extreme, but they can do something to reduce these hazards. They can urge better farm management when loans are being negotiated, and can offer special inducements for the promotion of side-line or other enterprises calculated to strengthen the farm business. Production credit furnished at reasonable rates, on conditions tending to improve the business organization of agriculture, is urgently necessary.

Credit policy should not confine itself to the exercise of a legitimate influence upon the choice of farm enterprises, but should consider also the basic financial structure of agriculture. For certain purposes it is convenient to distinguish short term from intermediate credit, and both from long term or mortgage credit. But the distinction should not obscure the essential interdependence of these forms of credit. Unsoundness in one form is quickly communicated to the others. This happens conspicuously when shrinking farm equities make difficult or impossible the funding of " frozen " short-term credits.

It is particularly important that mortgage financing should be based on careful and scientific land valuations. Too often the guide is not the current earning power of the land but its estimated selling value as security for loans. As this is reckoned on hopes for the future as well as on current realities, it frequently is wrong. More emphasis on farm earning power is required, and the educational process necessary to effect this should reach lenders as well as borrowers. For the most part, the United States is in no present danger of a reinflation of farm-land valuations with consequent over-borrowing. In fact mortgage credit just now is too short rather than too plentiful. But there is always danger in too much reliance on estimated capital values and too little on actual earning power, as the basis for loans. Our newer agricultural areas in the Great Plains, where power machinery is farming lands formerly not capable of being profitably farmed, run some risk of this sort. Farmers in these areas should be careful not to build excessively on the results of too short a period. Practically every State in the Union made this mistake in the World War period and is now paying for it.

The Trend in Mortgage Debt

Recent studies by this department indicate that up to 1920 the volume of mortgage indebtedness in the United States closely reflected the upward trend in farm real-estate values. After the postwar slump, however, the two curves diverged. Mortgage debt continued to increase though land values fell. As a result the total farm-mortgage debt of the United States now represents about 22 per cent of the value of all farms, compared with only 10 per cent in 1910. For the year 1928 the estimated total of farm mortgage debt for the United States was $9,468,526,000, as compared with $7,857,700,000 in 1920, and $3,599,000,000 in 1910. The total has continued practically unchanged during the last two years. It seems that since 1928 a halt has been reached in the long upward trend. In fact, the principal lending agencies reported a definite decline in 1928 and 1929 in the amount of their farm-mortgage loans. Some of the increase in farm-mortgage debt since 1920 represents the funding of short-term bank debt. A proportion of course represents new credit. It need scarcely be remarked that the burden upon agriculture represented by the postwar rise in farm-mortgage debt is very heavy. The part played in the creation of the burden by past errors in borrowing and lending should be carefully considered.

The criterion in negotiating any type of agricultural loan should be the amount of credit the borrower can profitably use. When the lender considers only how much it seems safe to lend on the security offered, he goes against his own interests as well as against those of the borrower. Capital values, though ultimately based on earning power, are not necessarily a true measure of earning power at any given moment; and earning power is the only source from which the debt payments can be maintained. Essentially it is the earning power of a farm that determines the limit of profitable borrowing. When farmers borrow excessively in the hope that advancing land values will enable them to pay off their obligations in the future, they run heavy risks.

It is quite impossible, of course, to lay down a general rule as to the proportion that should subsist between the farmer's own capital and the capital that he borrows. That will vary with the man, with the farm, and with the general economic and market situation. Lending institutions are, just now, perhaps too conservative in making agricultural loans. They are naturally impressed with the practically continuous fall in farm-land values since the war and with the resulting heavy damage to themselves. Short-term as well as long-term credit sources respond in the same way to the postwar situation. Country-bank failures counsel conservatism powerfully. It does not follow, however, that the prevailing conservatism is wise. It may be merely a blind reaction from the preceding excessive liberality. More attention is paid to earning power in negotiations for short-term credit than in long-term credit operations, but even in the short-term field the prevailing influence is the memory of recent losses, rather than a sober study of current opportunities. When credit can be profitably used it should be furnished. In such circumstances it is wasteful to withhold it, just as it is wasteful to extend credit for which there is no profitable use.

Common Interest of Lender and Borrower

Increased farm earnings, though indispensable, are not all that is necessary to make agriculture prosperous. The producer must retain a fair share of the increase. In other words, care must be taken to see that capital charges are moderate. Farmers can not succeed when interest, rent, and other fixed charges continually absorb an increased proportion of the farm income, as has happened in recent years. It is necessary to maintain a correct relationship between capital charges and what is called labor income, or the margin left after interest, rent, operating expenses, and taxes have been paid. The first essential is to estimate farm earning power with approximate accuracy, so that land prices and mortgage debt will not discount speculative hopes excessively. Borrowers and lenders have an equal interest in bearing this truth in mind. Since current income is the only source from which debt can be paid, it profits nothing in the long run to burden agriculture with more capital charges than its current income can sustain.

LAND UTILIZATION

How to make a better use of our land resources is a pressing problem. It would demand attention even if there were no crisis of overproduction. It is not simply a question of finding new uses for farm lands whose products can not now be profitably sold, but of allocating various types of land to the most advantageous ends.

In the United States we have a domain of nearly 2,000,000,000 acres, of which about 400,000,000 acres are classed as employed for cultivation. But if needed we could use nearly a billion acres for crop production. This is about half the total area of the Nation. In a general way our crops are grown in the areas to which they are best adapted; but a much better adjustment than that brought about by trial and error is possible. Heretofore much land has been occupied in ignorance of better lands elsewhere, as well as of progress in agricultural technic, and is now unprofitable. Much land has been put into crops that should have been left in grass or forest. Large areas have been settled under conditions that invited failure. The time has come to correct some of the mistakes of the past and to take precautions against similar mistakes in the future.

A profitable agriculture, however, can not be brought about merely by correction of past errors. It is becoming necessary to reshape the very foundations of the agricultural industry. Nothing less will accommodate it to the pressure of the powerful economic forces affecting supply and demand conditions. On the demand side, for instance, the displacement of work animals by power-driven machinery is removing the need for many million tons of corn, oats, and hay. Changes in diet are lessening the demand for certain products and increasing the demand for others. The American people are eating less bread, less corn meal, and less cereal foods per capita than they did 10 years ago. They are consuming more milk, more pork, more sugar, and possibly more fresh vegetables and more fruit. Export demand is narrowed by the recovery of European farm production from the effects of the war. Pre-war levels in production have been regained in most European countries and surpassed in some. Europe seeks greater self-sufficiency also through import restrictions. This year world-wide business depression has further weakened the agricultural markets.

On the production side technical progress is bringing extensive semiarid areas into cultivation not only in the United States but also in Russia, Canada, Australia, Argentina, and elsewhere. Labor-saving machinery is promoting the cultivation of low-yield areas that formerly could not be profitably cultivated. American agriculture, always more economical of labor than of land, is pushing this principle to a new high level. Yet it has, of course, no monopoly on efficient farm technic. Production is outrunning consumption in most of the world. Argentina is now the leading corn-exporting country and has four times the corn acreage it had in 1900. Its exports of beef in 1929 were nearly a hundred times greater than ours. Exports of butter from New Zealand, Australia, and Argentina have increased sevenfold since 1900, and last year exceeded 350,000,000 pounds. Australia's wool production in 1929 was twice what it was in 1900. Russia is exporting wheat again. With a population only 20 per cent greater than that of 1900, the world's wheat and rye production is now something like 40 per cent greater and its production of corn, oats, and barley, taken together, about a third greater.

Seven Major Objectives

These conditions emphasize, though they do not create, the need for a rational land-utilization policy. Such a policy (1) calls for a scientific classification of our land resources, so that crop, pasture, and forest requirements may be more efficiently met. Knowledge of land resources is indispensable to the wise direction of production. (2) The contraction of farm acreage is necessary in some areas, and a check upon its expansion is necessary in others. (3) Steps should be taken by public agencies, local, State, or Federal, to divert tax-delinquent lands or lands obviously submarginal for farming purposes to other than farm uses. (4) Our national reclamation policy should be reconciled with the need of restricting farm production. (5) Public reforestation should be pushed. (6) Our public-domain policy should equally serve the interests of the local farming and grazing industry, the interests of agriculture as a whole, and the interests of the Nation. (7) Information should be made available to guide private enterprise in land settlement.

These points need not all be discussed in detail, though one or two may be amplified. It is particularly important to foster the contraction of farm acreages in unprofitable areas and to discourage expansion in others. Recent technical progress in American agriculture has changed our agricultural map considerably. Expansion in some areas has created distress in others. This is one of the inevitable penalties of progress. Specialized cotton growing on large farms in Texas and Oklahoma has put a heavy handicap on extensive areas in the Old South where boll-weevil infestation is heavy. Tractors and combines have caused a marked concentration in the production of wheat in the Great Plains area. In the States to the east wheat growing has declined.

Farming by the old methods, in fact, has become unprofitable in extensive areas, and much acreage has been abandoned and become tax delinquent. Often, however, the abandoned farms are resold instead of being excluded from crop production. It should be an essential aim of our agricultural policy to facilitate the withdrawal from agriculture of acreages that seem likely to remain unprofitable. Public provision should be made for the utilization of this land for purposes other than farming. This is not possible in many States under existing laws, which generally provide for the resale of tax-delinquent lands. There seems to be an opportunity here for Federal cooperation with State and local governments to promote the economic stability of distressed areas. A study should be made to determine what classes of land are ill-adapted to private cultivation, grazing, or timber growing, and to indicate what benefits might be derived from the public acquisition of such areas.

The States should take the leading part in acquiring lands unsuited to private utilization; in fact, several are progressing in that direction. In most States, however, lack of funds or other difficulties prevent such action. The Federal Government might well cooperate with the States through a system of Federal aid to acquire lands suited to forestation, and it might cooperate with State and local governments in consolidating tax-delinquent and similar lands into administrative units.

The public acquisition of idle lands, though in contrast with our historic land policy, seems justified by present conditions and by changing national objectives. Land not immediately needed for crops or pasture often suffers under private ownership or control. Private interests seldom do much to protect stream flow, to prevent erosion, or to conserve game and fish. Often, under the pressure of heavy carrying charges, they try to push idle land into agricultural uses, whether that is economically sound or not. This is easy in times of temporary agricultural prosperity, but the practice leads to distress. Public ownership of lands that can not be profitably farmed would, in many areas, mean a better economic use of the lands in question, and also do something to relieve the pressure of unneeded production upon the markets.

Our land-utilization policy should also tend to prevent unnecessary and ill-advised farm expansion. Most of our potential crop land is in private ownership, and to prevent mistakes in employing it for farming when the owners wish to promote that use is difficult. It should be possible, however, to discourage ill-advised expansion. Farmers may easily be misled about the character of lands that they do not know. An information service to tell them about the economic possibilities of different areas would be a restraining influence. It is true that no agency can make infallible judgments about agricultural possibilities. Much better information could be made available, however, than that on which intending settlers commonly rely. Heretofore little has been done by public agencies to direct agricultural expansion. The opportunity to do so in the future should not be neglected. In this field the Department of Agriculture and State agencies should work in close cooperation.

Economic Problem of the Public Domain

In the past we have neglected the opportunity for helpful guidance when new lands in the public domain were made available for settlement. The responsibility for selecting his land has been placed largely on the settler himself. Some safeguards were provided in the grazing homestead act of 1915, but these did not prevent much poorly judged settlement. Our homestead policy in the last two decades has stimulated overproduction and caused heavy losses to homesteaders. Little land remains in the public domain suitable for cultivation, but the homestead policy still has a tendency to encourage uneconomic farm expansion. The danger would be increased should land now in Indian reservations be thrown open. Research to show the economic feasibility of using different areas for agriculture and the amount of land requisite for an economic unit and wide publication of the results must be the mainstay of any program for the better control of agricultural expansion, whether in the public domain or in private hands.

Relation of Reclamation to Farming

In our Federal reclamation policy it seems highly desirable to weigh the advantages of local or regional development against the disadvantages of promoting excessive agricultural expansion. Many proposed reclamation projects involve nonagricultural considerations, such as flood control and the development of water power. Such projects obviously can not be judged exclusively from an agricultural standpoint. Moreover, the number and scope of such projects seems likely to increase. The Nation is working gradually toward comprehensive flood control in place of piecemeal local drainage and levee construction. This broad policy should be more efficient and economical than the one it replaces. There are, however, many reclamation projects under discussion that should be considered primarily, if not exclusively, from the standpoint of agricultural welfare. It is a serious question whether in view of the existing overproduction in agriculture it is advisable to promote agricultural expansion through irrigation and drainage. The Federal reclamation policy involves a direct subsidy to agricultural expansion in the form of interest-free loans. This subsidy policy seems inconsistent with the efforts now being made by the Federal Government to restrict agricultural production. Studies of our land requirements which take into consideration the available land areas, the probable growth of population, the trend in consumption, technical progress in agriculture, and foreign-trade prospects indicate that the present need is not agricultural expansion but contraction. For a decade at least our chief task will be to prevent too rapid an expansion of the arable acreage.

Reforestation

Reforestation will be more fully discussed later, but I mention it here because reforestation is a fundamental part of the land-utilization problem. Our reserve of timber, though fast shrinking, is still large enough to prevent timber prices from rising sufficiently to stimulate private reforestation. Hence, though private reforestation should be encouraged where it operates on a basis of sustained yields, the foundation of reforestation in the United States must be public action. Fortunately, it is now generally acknowledged that the public ownership of forest lands is desirable. Many countries where timber is scarce and dear, and where in consequence private enterprise might seem to be attracted to reforestation, have more of their forests publicly owned than has the United States. Japan has more than 60 per cent of its forest land in public ownership and Germany more than 45 per cent. Italy and Rumania each has more than 50 per cent of their forest land in Government hands. Some of the newer countries also have followed the policy of retaining a larger proportion of the forest area in public ownership. Thus, Canada has 90 per cent and Australia and New Zealand nearly 80 per cent each.

The United States has more than half a billion acres that could be devoted to timber growing without detriment to farm development. Much of this land may become a neglected waste of small value unless our public reforestation program is greatly enlarged. Some abandoned farm land is growing up to brush and timber of low utility, and the lack of an individual or public interest in its protection against fire makes it a menace to other more valuable areas. Public reforestation is imperative for several reasons. It is necessary to promote timber production, to protect stream sources, to check erosion, to provide recreational facilities, and to utilize land resources that would otherwise produce little or nothing.

FIELD RESEARCH IN FARM MANAGEMENT

There have been many discussions, but too few demonstrations, of sound farm-management principles. This is true in part because our experiment stations have not been able to demonstrate the best labor practices for a certain crop in a given area and year, for instance, as well as they have demonstrated the quantity of nitrogen, potash, and phosphorus needed to grow that crop on a given soil. We have talked about the size of farms, the size of fields, the location and topography of farms, the use of one farm practice rather than another, the use of machinery, and so on. Practical tests of all these economic and production principles on individual farms would be desirable. Many farmers have developed their own systems of farm management—largely by trial and error. The cost of trial and error is high. Its results are not always the best. It would undoubtedly be helpful if the State and Federal experiment stations could expand their operations to include research in farm management in the field on land specially set aside for the purpose.

The object of improvement in farming is a high standard of living. To obtain this, agriculture must be profitable. This has long been recognized as a matter of public concern. It is now to the public's interest, as well as to agriculture's interest, to encourage economic research as vigorously as we have encouraged the research in the technic of production, without diminishing our efforts in the latter field. On farms given wholly to experimentation and demonstration we could test the soundness of various farm practices and farm-management methods.

MOVEMENTS OF POPULATION

Movements of population from the farms to the cities and from the cities to the farms of the United States, though still very large, have decreased somewhat in the last few years. The movement to the towns and cities, according to surveys made by this department, comprised 1,876,000 persons in 1929, 1,923,000 persons in 1928, 1,978,000 persons in 1927, and 2,155,000 persons in 1926. In 1929 the total number of persons who went to the farms from the cities was estimated at 1,257,000; in 1928, 1,347,000; in 1927, 1,374,000; and in 1926, 1,135,000. The net cityward movement was 619,000 in 1929, 576,000 in 1928, 604,000 in 1927, and 1,020,000 in 1926.

These figures do not indicate the net loss of farm population. The latter figure is determined not only by the ebb and flow of population between the country and the town, but also by birth and death rates. As the birth rate on the farm is much higher than the death rate, the annual loss of farm population is less than the net annual migration. For 1929 the net loss of farm population is calculated at 269,000 persons, for 1928 at 208,000 persons, for 1927 at 193,000 persons, and for 1926 at 649,000 persons. The estimated farm population of the United States as of January 1, 1930, was 27,222,000, as compared with 27,491,000 on January 1, 1929, 30,200,000 on January 1, 1922, and 32,076,960 on January 1, 1910.

Our farm population has been a declining proportion of our total population for many decades. This is partly a result of increasing farm efficiency, which enables fewer men to produce a given quantity of food and fiber. Some migration to the cities is therefore inevitable and desirable. It lessens agricultural competition, while broadening the urban market. In recent years, however, the cityward movement has been excessive, as is evident from the magnitude of the return movement. A smaller migration, had it been more definitely in one direction, would have sufficed for the necessary redistribution of population between town and country.

The slight decline in the total population movement both ways in the last few years—3,133,000 in 1929 and 3,290,000 in 1926—indicated, up to the present year, a gradual stabilization of economic conditions, an increasing permanence in the adjustment of persons to their occupations. Too much scurrying backward and forward betokens social and economic maladjustment. We seem very slowly to be getting away from that evil.

Always, no doubt, there will be a considerable movement both ways. Progress in farm technic will progressively release men from agriculture. On the other hand, many city persons will be drawn to agriculture. Some will inherit and others will buy farms. Many farm people who try city life will find themselves unsuited to it and will return to the country at the first opportunity. It is well to keep the doors swinging freely. Just how much ebb and flow of population between the farms and the towns is desirable depends on economic and social factors so complex and numerous that they can not be measured. This much we can say with certainty: Population movements as large and conflicting as those of recent years betoken economic disorder. What effect the current world-wide depression will have on population movements will be indicated by the 1930 census.

THE TARIFF ACT OF 1930

The tariff act of 1930 came in answer to the growing sentiment that a protective tariff must become more and more an integral part of our national agricultural policy. Three substantial reasons for this point of view present themselves.

In the first place, tariff protection is of increasing importance to agriculture in the United States because agriculture is becoming less dependent on foreign markets and more dependent on home markets. Fifty years ago farm products comprised 80 per cent of all our exports; to-day they comprise less than 35 per cent. Similarly, our agricultural exports are becoming a smaller percentage of our total domestic farm production. At the turn of this century we exported about 24 per cent of the total value of animal products and of crops not fed; to-day we export well under 15 per cent. There is every reason to expect that this trend will continue and that the domestic market will grow in importance to the domestic producer.

Protects Domestic Market

In the second place, competition in farm products in world markets has increased enormously. Wheat, to name only one of many examples, has increased 40 per cent in world production since 1900, whereas world population has increased only 20 per cent. Products from new lands, produced by cheap labor, fill the market places of the world. And yet the world is far from its productive limit. An additional obstacle to surplus-producing countries has been the steady increase in import duties in Europe, the principal importing area for products which compete with our farm products. A report by the United States Tariff Commission on 14 major agricultural products reveals, for 1929, a widespread increase in import duties and milling restrictions throughout Europe. The height to which import duties on farm products have risen throughout the world is startling. The duty on wheat is now 74 cents a bushel in Spain, 85 cents in France, 87 cents in Italy, and $1.62 in Germany. Our duty is 42 cents a bushel. On barley our duty is 20 cents a bushel; foreign duties go as high as 66 cents. On corn our duty is 25 cents a bushel; foreign duties reach 48 cents a bushel. On bacon our duty is 3¼ cents a pound; foreign duties reach 13 cents a pound. On lard our duty is 3 cents a pound; foreign duties reach 6 cents a pound. On butter our duty is 14 cents a pound; foreign duties go as high as 27 cents a pound. Sweetened condensed milk imported into the United States pays a duty of 2¾ cents a pound; foreign duties go as high as 26 cents a pound. On unstemmed leaf tobacco our import duty is $2.27¼ a pound; foreign duties go as high as $5.49 a pound.

Under these conditions our domestic market is of the utmost importance. The tariff act of 1930 is the best means available of preserving the American market for American farmers.

Helps Balance Production

A third reason why agriculture places increased reliance upon the tariff lies in the tariff's value in helping balance production against market demand. By improving the domestic market for products which might be raised in greater quantity in this country the tariff will permit shifts from surplus to deficit crops. For instance, we import vegetables which it requires 388,000 acres to produce; dairy products and by-products which it requires 450,000 acres to produce; cattle, hogs, and sheep which it requires 818,000 acres to produce, and so on. The total shift in acreage from crops of which we now produce a surplus to crops to which increased tariff protection offers a better market could run as high as 10,000,000 acres. Farmers contemplating such shifts should of course figure relative production costs closely.

It is not surprising, then, that the American farmer is to-day taking a far greater interest in the protective tariff than he once did. His interest in the recent tariff legislation was vigorously voiced through his organizations. He looked to the tariff act of 1930 to remove some of the disparity between the protection afforded industry and the protection afforded agriculture. The tariff bill as enacted should give him considerable satisfaction.

Measured in terms of equivalent ad valorem rates, the average rate for all 15 schedules of the tariff was increased from 33 to 40 per cent, a gain of 7 points, or 20 per cent. The average rate for Schedule 7, agricultural products and provisions, was increased from 20 to 34 per cent, a gain of 14 points, or 69 per cent. This is by far the largest increase for any schedule in the tariff act. In other schedules of direct interest to agriculture there were the following increases: Sugar, molasses, and manufactures of them, 14 per cent; wool and manufactures of wool, 21 per cent; spirits, wines, and other beverages, derived principally from agricultural products, 30 per cent. Fifty-four per cent of the items in Schedule 7 bear higher import duties now than in previous tariff acts. This increase is greater, both in number and percentage, than the increase in any other schedule with one exception—wool and wool manufactures. In that schedule, also of direct concern to agriculture, increases affected 79 per cent of the items.

The tariff act of 1930 includes substantial increases in duty on cattle, meats and meat products, hides, wool, long-staple cotton, flaxseed, soybeans, butter and cheese, milk and cream, casein, eggs and egg products, sugar, and a long list of fresh fruits and vegetables. Many of these rates, such as those on wool, eggs, long-staple cotton, and dairy products, will be generally beneficial. Others will be of maximum assistance in border markets and under favorable market conditions. All will help hold the home market for the American producer and add to the economic urge to agriculture to balance its production against the market demand.

Increases Favor Agriculture

This protection would, of course, be fictitious if the rates on the things the farmer buys were increased as much as the rates on the things he sells. I have already indicated, however, that the average increase for all schedules in the tariff act was only 20 per cent, in terms of equivalent ad valorem rates, whereas items in the agricultural-products schedule were granted increases averaging 69 per cent. The point can be illustrated by this concrete example:

The average farm family's annual budget amounts to $1,159, studies by the Department of Agriculture indicate. In order to test the effect of the tariff upon this budget the new rates have been applied to it. The rate on each item was then weighted by the expenditure for that item to get a weighted tariff rate. We find that the weighted average tariff rate on commodities bought by farmers was 16 per cent by the tariff act of 1922 and is 20.2 per cent by the tariff act of 1930. The maximum possible increase in the farmer's budget appears, therefore, to be around 4 per cent, or about $48 a year.

Stated in round numbers and assuming that the rate increases on farm products are entirely effective, the average income per farm on the basis of 1928 production and prices would be increased by about $150. The average expenditures per farm—assuming, again, that the tariff rates are fully effective—would be increased about $48 by increases in duties on the things the farmer buys. The net balance resulting from the new tariff rates, therefore, would be about $102 per farm in favor of the farmer.

Neither the increases on the commodities the farmer buys nor on those he sells will be fully effective. But the foregoing analysis is sufficient to demonstrate that, so far as tariff protection can go, the farmer is in a stronger position by virtue of the 1930 act.

FOREIGN AGRICULTURAL SERVICE

A much-needed expansion of the foreign service of the Department of Agriculture is provided for by a new act of Congress, Public, No. 304, approved June 5, 1930. This measure directs the Secretary of Agriculture to (1) acquire information regarding world competition and demand in agricultural products; (2) investigate farm management and economic phases of agriculture in foreign countries; (3) demonstrate standards for cotton, wheat, and other American products; and (4) appoint representatives of the Bureau of Agricultural Economics as officers of the foreign agricultural service of the United States. These officers will be attached, through the Department of State, to the diplomatic missions of the United States, or to the consulates of the United States in the countries where they are stationed. The measure recognizes the increasing need of precise and extensive information about foreign agricultural conditions. Heretofore information about foreign crops and markets has been fragmentary and often inaccurate. Many Governments do not report upon the agricultural activities of their countries, and some that do report the subject inadequately or in terms that are not satisfactory for comparative purposes. Supplementary field work by trained observers, as contemplated under the new law, should add much to the practical value of our foreign crop and market reports.

This department spends annually more than $2,000,000 on domestic crop and livestock estimating, on price analysis, and on market news distribution. Similar work on foreign conditions is necessary to supplement the domestic information. Farm-commodity prices within the United States often depend as much on conditions abroad as on conditions at home, and an economic information service that does not broadly cover foreign conditions obviously can not fully answer its purposes. American farmers can not adjust their production intelligently to market requirements if they are in the dark about foreign demand and foreign competition.

Correlation of Foreign Work

Prior to the enactment of the new legislation this department maintained a foreign agricultural information division with resident representatives in London, Berlin, Shanghai, and Marseilles. Subsequently a resident representative was stationed in Belgrade to cover the Danube Basin. Resident agricultural representatives are to be stationed in South America, South Africa, Australia, India, and the Scandinavian countries. In addition, specialists will be assigned to study the world situation with respect to specific commodities, notably cereals, cotton, tobacco, wool, fruits, livestock and meats, and dairy products. Work done by the department's foreign information service will be correlated as closely as possible with similar work in the Consular Service of the State Department and in the offices of the Department of Commerce in foreign countries.

40442°—31——4

For this purpose a committee has been appointed, with the Department of State, the Department of Agriculture, the Department of Commerce, and the Federal Farm Board each represented by one member.

The International Institute of Agriculture, at Rome, furnishes considerable material on agriculture in foreign countries. Adequate world reporting on important commodities will require at least 10 foreign posts to cover the important producing and consuming areas. In short, the situation calls for a national organization to interpret crop and market data in terms of prospects for American agriculture. This need the new legislation should in large measure supply. A knowledge of world conditions in regard to acreage sown, crop conditions, harvest yields, stocks, numbers and kinds of livestock, and prices, together with information on present and prospective demand conditions, is the aim.

REGULATING TRADE IN PERISHABLE PRODUCTS

Regulation of the trade in fresh fruits and vegetables is provided for by an act of Congress passed this year, Public, No. 325, approved June 10, 1930. This law, designed to suppress unfair and fraudulent practices, prohibits fraudulent charges, improper rejections, failures to deliver, discarding or dumping of products without reasonable cause, false reporting about shipments, failure to account correctly for shipments, misrepresentations as to the origin of shipments, and the removing or altering of tags representing Federal inspection. It provides for the licensing of commission merchants, dealers, and brokers, and authorizes the Secretary of Agriculture to reject or revoke licenses for violation of the act. It also gives the Secretary authority to order the payment of reparations to injured parties. Civil suits may be entered in the courts to compel the fulfillment of such orders.

The act gives permanent authority for the department's fruit and vegetable inspection service. All branches of the fruit and vegetable trade, as well as organizations representing the producers, indorsed the principles of this legislation. The Food Administration during the World War period required all handlers of fruits and vegetables to take out licenses; the results of this system were generally satisfactory. It lapsed, however, with the return of peace. Shippers and others have urged its restoration through permanent legislation. Both shippers and receivers of fruits and vegetables have sought protection against unethical practices and against difficulties created by the lack of uniform methods for the settlement of disputes. These requests became so insistent that many bills designed to meet them were proposed before the present one was adopted. Though it has been in operation only a few months, it has done much good already. Notably it is causing some formerly haphazard phases of the fruit and vegetable industry to be brought under contractual relationships. Incomplete and indefinite contracts are a common cause of misunderstanding between shippers and receivers of fresh fruits and vegetables. Cooperative associations, as well as private merchants, dealers, and brokers, are required to take out licenses. Individual producers, however, are not obliged to if they sell only produce of their own raising. A person buying produce solely for sale at retail is not considered a dealer within the meaning of the act, unless his annual purchases exceed 20 carloads. These are the only exceptions to the operation of the measure in interstate and foreign commerce. Essentially all that the act requires of the licensee is square dealing and proper records. It will not interfere with the proper conduct of his business, but will make it less hazardous by reducing the frequency of disputes.

CENSUS OF AGRICULTURE

The agricultural census, taken this year in connection with the decennial census of population, will furnish much more complete information than did any of the preceding agricultural censuses. Besides giving particulars about crop acreages, classes of livestock, landlords and tenants, farm valuations, and so on, it will go into detail about certain phases of agriculture not previously covered in census material, or covered less fully, such as farm incomes, expenditures for operating, equipment, taxes, farm mechanization, soil erosion, and movements of agricultural population. It will furnish a classification of pasture lands, statistics on milk production and poultry production, and on the use of home conveniences in farm homes, and new data on the value of farm products, which will afford a basis for classifying farms by types of farming. Census information is foundation material in the department's economic services to agriculture, and the broadened scope of the present census will make it exceptionally valuable.

As yet the only information for all States available from the census is the count of farms. This indicates that the number of farms has continued to decline in most parts of the United States since 1925. For the country as a whole the decline is about 1 per cent, or much the same as the decline between 1920 and 1925. The most notable decline in the number of farms is indicated in New England, New York, New Jersey, and Pennsylvania. In these States, however, the indicated decrease may partly reflect changes in the decisions of the enumerators as to what places should be called farms. The census taken in 1925 was exclusively an agricultural one. It therefore tended to include as farmers many persons whose main occupation may not have been agriculture. The 1930 agricultural census, since it was taken in conjunction with the general census, probably registered more precise occupational discriminations. The census instructions this year, as in prior years, provided that no place producing less than $250 worth of products annually should be enumerated as a farm, unless it exceeded 3 acres in size; but the instructions with reference to farm population added, "and which is also locally regarded as a farm." In Massachusetts, for example, it has been estimated that there are only about 13,000 real farms, but, in addition, that there are about 50,000 small home places, mostly along the main highways, which produce small quantities of milk, poultry, and garden truck. Many of these small places undoubtedly were included in the census of 1925 and excluded in the 1930 census.

In other parts of the country where the number of part-time farmers is relatively small the decline recorded by the census in the number of farms is undoubtedly real. This is true of Kentucky, Ohio, Indiana, and Illinois. A decline for those States is recorded of from 5 to 15 per cent since 1920. A decline has taken place also in South

Carolina and Virginia. In the western Corn Belt, and in the wheat regions generally, the number of farms has remained about stationary. The same is true of the Rocky Mountain States and the Pacific Northwest States. The number of farms has increased in Oklahoma, Texas, Louisiana, Arkansas, Mississippi, North Carolina, Arizona, and California. There has been a partial recovery in Georgia from the great decrease that took place in that State between 1920 and 1925. Power farming, particularly in the Great Plains States, has made many large farms; in other parts of the country the automobile has brought into existence a greater number of small farms.

World Census of Agriculture

Much important basic information for world crop reporting will be obtained from the world census of agriculture which is being taken this year. Practically all governments have promised their cooperation. In the last 25 years only 37 countries have taken an agricultural census. These 37 countries represent less than half the land area of the world and only about 30 per cent of its population. Moreover, the censuses they took varied in dates and in methods used. Their lack of uniformity made them not very valuable for statistical purposes. In the world census now being taken, three uniform schedules, drawn up by an international committee, are employed. One is an extended schedule for the use of the more highly developed agricultural countries, another is less extensive, and a third, representing minimum requirements, is intended for the less developed agricultural countries. In this way it is hoped to gather data much more accurate and suitable for making comparisons than have ever before existed. Agricultural progress depends to an important degree on a knowledge of agricultural resources. The world census of agriculture will furnish an inventory of such factors as land areas, crop acreage, harvest yields, the number and kinds of livestock in different countries, the amount of mechanical power and equipment used, and the amount of human labor available for agriculture. It should help farmers everywhere in adjusting their production and marketing more accurately to the demands of the market and should also disclose strong and weak points in agricultural systems.

COOPERATION WITH THE FEDERAL FARM BOARD

As required by the agricultural marketing act of 1929, the department cooperated closely with the Federal Farm Board. The Division of Cooperative Marketing was transferred from the department's Bureau of Agricultural Economics to the Farm Board. Other units of the department assisted the board with research and service. In this way duplication of effort was avoided. The board's agricultural responsibilities do not overlap those of the department, but rather supplement them. The primary duty of the board is to help farmers organize cooperative marketing associations, for the improvement of the distribution of farm products, and to aid in preventing the production of surpluses. An important part of the department's contribution to the work of the board is to furnish accurate economic and other information upon which the board may base its policies. In its efforts to minimize speculation, to prevent inefficient and wasteful distribution, to organize the producers into effective marketing associations, and to bring about a better adjustment between farm production and market needs, the board depends vitally on facts given to it by the department. It looks to the department for basic information on land utilization, credit, insurance, crop, and price conditions, foreign agricultural conditions, and market prospects at home and abroad. The board is assisted by the department's extension forces in campaigns for organization among farmers and for a better adjustment of crop acreages. This phase of the department's cooperative relations with the Federal Farm Board will be referred to again in connection with the department's extension and information work generally.

EXTENSION WORK

Cooperative extension work took a strong economic turn during the year. As a result, marked progress was made in the effort to reorganize farming so as to place equal emphasis on effective individual practice and on wise group action tending to regulate production and the movement of commodities into consuming channels. Facts presented by extension agents bearing on production and marketing and on the economic situation met with intelligent response from farmers and had a constructive influence in changing farm practices. A vigorous effort was made to acquaint farmers with the objects, relations, and business possibilities of cooperative associations and with the requirements for membership. The assistance of extension agents in organizing over 1,000 local cooperative marketing associations in 1929 indicates the practical support the Extension Service gave the Federal Farm Board in the administration of the agricultural marketing act.

Helping Farmers Look Ahead

Extension agents helped farmers to look ahead. They combined general economic information furnished by the Bureau of Agricultural Economics with local data gathered by State agencies. Facts on the needs of particular localities, and even on the needs of particular farms, were applied in farm-management recommendations. By bringing about a substantial adoption of those recommendations, extension agents made progress in aiding farmers to establish a good balance among different crop enterprises and to adjust production to market requirements. In these efforts to meet the economic situation by adjustment of production, extension agents cooperated in the campaigns conducted by the Federal Farm Board in the Cotton Belt and in the spring and winter wheat areas.

Technical and economic facts were presented at hundreds of farmers' meetings. Recommendations made in the department's periodical outlook report were more widely and painstakingly disseminated than ever before. Market conditions were analyzed in an effort to foresee the probable effects of failure to readjust farm production. Certain crop enterprises, particularly tobacco and potato growing, were brought into a better relationship with the markets as a result of extension work done in farm management and economics. An effective organization—the Interstate Early-Potato

Committee—was sponsored by the extension divisions of Maryland, Virginia, North Carolina, South Carolina, and Florida. Its representation included growers' associations, shippers, and others interested in the early-potato market.

Credit Facilities Improved

Farm-credit facilities were improved in some regions through extension work. Agents helped farmers in taking annual inventories and in making out credit statements for their banks. This work was done in a greater number of States than ever before. It resulted in a measurable shifting of expensive short-time merchant credit into much cheaper and more efficient bank credit. More than 25,000 farmers cooperated with extension agents in keeping detailed accounts which were useful, not only for credit purposes, but as a guide in farm management. Twenty thousand farmers cooperated in keeping cost-of-production records. These records showed the strong and the weak spots in farm business and helped to raise the average standard of farm practices by focusing attention on the practice of the more successful farmers. In many counties in all parts of the country, county agricultural programs were developed on the basis of census figures and other data.

4-H Clubs

Boys' and girls' 4-H clubs made an exceptional showing during the year. The total enrollment in these clubs was 758,096. Sixty-seven per cent of this membership satisfactorily completed the work prescribed in agriculture and home-making. The showing was considerably better than that of the previous year. It was, in part, a result of the use of increased funds made available by the Capper-Ketcham Act of 1928. Credit is due, also, to a quickened interest manifested in the club movement, not only by farm people but by other groups. Many national organizations cooperated with the department and with the State agricultural colleges in drawing attention to the value of the clubs and in building up their membership. Club members reported giving 994,262 demonstrations of improved farm and home practices, or more than 51 per cent of all the demonstrations of that character that were made through extension channels during the year. Taking the country as a whole, county agricultural agents and home demonstration agents devoted about a third of their time to 4-H club work. Federal, State, and county funds supported the club work. It gives boys a practical training in plant and animal production and girls an equally practical training in gardening, poultry raising, cooking, dietetics, and home-making.

The talking picture made its advent in the field of mediums used in extension teaching, such as publications, news stories, lantern slides, charts, and exhibits. A drop in the demand for silent films used by extension agents naturally resulted. Nevertheless, the call for the department's motion pictures continued to exceed the available supply. More than 3,500,000 persons attended showings of loaned department pictures, and 3,368 film shipments were made during the year. The attendance at showings of the department's films was, however, less than in the preceding year. This seemed to be a result of "talkie" competition, and the department accordingly made experiments in sound-recording projects. It purchased a disk sound-projecting apparatus and provided a synchronized accompaniment for two existing pictures. As soon as facilities are available, production will be started by the department on sound pictures.

Growth in Personnel

Cooperative-extension forces grew during the year. County agents, who numbered 2,580 throughout the country on June 30 last, were aided by 854 full-time and 246 part-time subject-matter specialists attached to the State agricultural colleges. The extension service also included 1,225 county home-demonstration agents, 246 county club agents, and 303 negro extension agents. There were 414 supervisors and assistant supervisors and 74 administrative officers and assistants. This was an increase for the year of 184 county workers, 4 administrative and supervisory workers, and 63 subject-matter specialists. Approximately 4,800 of the extension workers were cooperative employees of the department. Increased funds became available under the Capper-Ketcham Act of May 22, 1928, which made immediately available to each State an additional $20,000 for cooperative extension work. In 1929 the increase was supplemented by a lump sum of $500,000, only the latter contribution requiring to be matched with an equal contribution from the States. Nevertheless, State and local appropriations have been increased during the last two years by approximately $1,500,000. One result was an increase of 317 in the number of home-economics extension workers. On June 30 last the personnel engaged in this work was 1,685, among whom were 1,345 county home-demonstration workers. Farm women participated as local leaders in home-demonstration work in increased numbers.

Funds for Extension Work

The total funds available for cooperative extension work from all sources during the fiscal year were $24,257,800, an increase of nearly $1,340,000 over those for the previous year. Approximately $274,000 of this increase was in Federal funds and $1,066,000 in State and county funds. Of the total funds, 38.1 per cent, or $9,251,760, was contributed by the Federal Government, exclusive of the privilege of using penalty envelopes; and 28.6 per cent, or $6,948,450, was from State appropriations to the agricultural colleges and other State agencies. The remaining 33.3 per cent, or $8,057,590, came from county appropriations for extension work and from contributions by local organizations and individuals. About 95.4 per cent of all funds used for cooperative extension work in 1930 came from public sources.

INFORMATIONAL WORK

By distributing approximately 25,000,000 popular and technical publications; by giving press associations, syndicates, newspapers, and magazines some 3,000 news and interpretive articles; by cooperating with editors, special writers, and correspondents; by furnishing speakers and manuscripts daily to over 300 radio stations in all parts of the country; by having officials give hundreds of addresses, including lectures in colleges; and by writing several million letters the department made its information available during the fiscal year 1930. The purpose of these activities was not to gain publicity for the department, but to make known facts that farmers and home makers can use to improve their practices.

Economic Information Used Extensively

Popular, as distinguished from technical, publications were in such demand that only 60 per cent of the requests received from farmers could be met. A large percentage were requests for economic information, such as data on prices, probable future demand, acreage adjustments, and farm management. This showed that farmers were becoming economic minded. The demand for information on plant production and animal breeding increased also. The economic and scientific services of the department and State agencies are so correlated that farmers can readily secure information concerning all their farming operations.

Gathering and distributing facts to help farmers make adjustments to meet changing conditions in production and marketing is a major function of the department. Facts on trends of production and demand must be used as a guide in planting and livestock breeding. The agricultural-outlook service has now been extended into every State and covers over 40 crops and classes of livestock. This year's outlook report, presenting facts on production and demand and indicating the probable market for the season's crops, was not only brought directly to more than 200,000 farmers at 4,200 group meetings, but was also used in one special and many follow-up radio programs which carried the information quickly to several million farmers; furthermore, special publications were issued on this subject, and the press helped extensively. The market-news service was extended to several States in the South and Northwest which had not previously been served with daily market reports. The crop-reporting service was expanded to cover fruit, truck, and canning crops. These are only parts of a growing economic-information service which is more widespread and detailed than any other ever established by a government.

Special Informational Campaigns

Unusual developments in the agricultural situation and in Federal help to agriculture called for special informational campaigns. For example, the weakness in cotton prices prompted a vigorous educational campaign by information and extension forces to influence southern planters to grow cotton on profitable acres, and to set aside as much of the land ordinarily devoted to cotton as would be necessary to provide food for the farm family and feed for livestock. A similar campaign was carried on to encourage a reduction of the wheat acreage and the growing of crops for which a better market was anticipated. The Federal Farm Board's efforts to encourage and strengthen cooperation among farmers, the drought situation, and the fight against the Mediterranean fruit fly in Florida also necessitated intensive informational work.

A rapid expansion took place in the department's radio work at practically no additional cost to the Government. For enlarged chain broadcasts, giving the entire country daily economic information, for weather and market news broadcasts, and for general educational programs the department now uses daily more than 50 per cent of the radio stations in the country. Radio time contributed free to the department is worth commercially about $1,500,000 annually. Plans will soon be completed for a new Pacific coast program, which likewise will cost the department nothing.

In the past it has been the policy of the department to furnish its publications and other information pamphlets free to all who can use them. Necessarily there is a growing restriction on this general principle because of the large cost that would be entailed in satisfying all requests. To offset this somewhat, the Superintendent of Documents is selling more of the department's bulletins. Additional funds appropriated for printing and binding will alleviate the present condition somewhat.

TRADING IN FUTURES

Trading in wheat futures on the grain exchanges designated as "contract" markets under the grain futures act of 1922 amounted, in the year ended June 30, to 19,606,790,000 bushels. This was the largest volume of future trading done in wheat in any of the nine years for which the Grain Futures Administration has records. Wheat futures accounted for 78.4 per cent of all the trading done in grain futures on the United States markets, as compared with a 9-year average of 64.9 per cent. The total for the previous year was 12,195,034,000 bushels. The previous record volume of trading was done in the season 1924–25, when the total was 18,875,965,000 bushels. The smallest volume of trading in wheat futures done in any year covered by the Grain Futures Administration's records was 7,316,910,000 bushels in 1923–24.

The increased activity in wheat futures was not, as is frequently the case, associated with rising but with falling prices. As a group the large speculators operated principally on the short side. Hedging against the country's large stocks of wheat partly accounted for the increased trading. In addition there was large speculative buying by small traders and the general public. Apparently these buyers had hopes of higher prices. The Grain Futures Administration, as in former years, issued daily reports of the trading done and of the total of open commitments in each future at the principal markets. No particularly violent fluctuations in prices were recorded on individual days. Evidence was disclosed, however, of certain practices that led to the filing of charges against three operators on one grain exchange. Cases arising out of these charges are now pending before a commission set up under the grain futures act.

Exchanges Are Necessary

Grain exchanges play a necessary and important part in our marketing system. They afford an easy and rapid method for the expression of the mass opinions of buyers and sellers as to supply and demand relationships. Each hour of the trading day, trading in futures establishes public prices against which producers and consumers can check any offers they receive. Markets for the purchase and sale of commodities for future delivery are necessary for the obvious reason that the total available supply of a commodity can not be delivered at once, nor can it be processed or manufactured immediately it is produced. Millers and dealers use the futures markets much as other merchants use insurance. They cover present transactions in the cash-grain markets with hedging transactions in the futures markets, thereby getting protection against violent price fluctuations. This practice, by lessening speculative hazards, enables the millers and dealers to do their business on a smaller margin of profit than would otherwise be necessary. The same observations apply to the cotton-futures markets. The facilities afforded by these institutions should be retained. At the same time, they should be improved and in some respects fortified with additional safeguards to prevent abuses. Considerable improvement has already been afforded through the administration of the grain futures act; yet more remains to be done.

Trading Practices Should Be Improved

There is the problem, for example, of the deliverable grades. Until recently in Chicago a buyer who desired the delivery of wheat purchased in the futures market might be compelled to accept 17 different grades or a combination of 17 grades at different warehouses, and at prices and bonuses fixed by the exchange. Recent amendments to its rules by the Chicago Board of Trade have reduced the deliverable grades to nine, thus strengthening the contract from the buyer's standpoint.

The rules of cotton and grain exchanges are not, at present, subject to review by any agency in the interest of the producers or the consumers. It would seem to be in the public interest to change this condition.

Contract-market rules covering the execution of futures orders should be amended to give customers and traders assurance that their purchases and sales will be handled by brokers who are not themselves interested in the market. Under present conditions, brokers have an opportunity to take customers' orders to their own accounts, at prices advantageous to themselves. This is wrong. Another practice that should be stopped is cross trading whereby operators buy and sell the same quantity of grain in the same future at the same price, with exactly offsetting results. This practice affords a means of registering fictitious quotations, and of concealing the brokers' personal interest in orders handled for customers.

Grain exchanges have cooperated in the enforcement of the act and in the elimination of abuses. As I have already said, much improvement has been made. The nature of future trading and the intricate machinery necessary to conduct it on a large scale make supervision necessary and desirable. Existing legislation does not give the Federal Government any authority to limit excessively large speculative trading, or to limit short selling calculated to demoralize prices.

PLANT QUARANTINES

Efforts to eradicate the Mediterranean fruit fly have been far more successful than was expected at the beginning of the eradication campaign. While total eradication can not yet be announced, there is strong hope of it. Up to July, 1930, no adult fly had been found in Florida since August 27, 1929; and only two larval infestations (one on November 16, 1929, and one on March 4, 1930) had been found subsequent to that date. In the November infestation, 4 larvae were found in one orange in a grove near Orlando, Fla. In the March case, 10 larvae were found in two sour oranges in a grove in Orlando. The most recent infestation discovered consisted of 2 living fruit fly larvae in a dooryard at St. Augustine, Fla., on July 25, 1930.

The minor nature of these infestations, together with the results of the intensive field inspection indicate that the eradication work performed in Florida has been so successful as to justify the removal of many of the more stringent quarantine conditions previously enforced. An order approved August 9, 1930, materially modified the restrictions governing the movement of Florida fruits and vegetables. One change made it unnecessary thereafter to sterilize Florida fruits and vegetables for shipment to the Middle Western States, except in the case of products grown on properties close to recent infestations or where growers had failed to comply with clean-up, spraying, and similar requirements. On shipments to the Southern and Western States, where the fruit fly if established would be especially injurious, the sterilization requirements except in the case of limes were continued in force. Shipments to that region, however, were permitted throughout the shipping season instead of being restricted to the mid-winter months as was done in the winter 1929–30. It was decided to allow the shipment of Florida fruit throughout the entire United States up to June 15, 1931, except in the event of the discovery of new serious outbreaks of the fly. Restrictions on vegetable shipments were modified, and the so-called infested areas, in which special safeguards are required, were reduced in size. Reshipment restrictions from the Northeastern States to the Middle West were removed. The only restrictions retained in force concerned the movement of Florida host fruit and peppers from points north of the southern line of Virginia, Kentucky, Missouri, Kansas, and Colorado to the 18 Southern and Western States. This movement, as in 1929, was prohibited.

Spread of Fruit Fly Prevented

There is no doubt that the prompt action taken by the department in 1929, in cooperation with the State authorities of Florida, prevented widespread infestations of this extremely destructive pest. The saving thus effected in eradication and control work is incalculable. From March 27 to June 13, 1930, lack of funds necessitated the suspension of field-inspection work. On the latter date, however, inspection was resumed. In January last a Federal fruit-fly board was appointed, consisting of five leading entomologists—W. C. O'Kane, State entomologist of New Hampshire and chairman of the board; George A. Dean, professor of entomology, Kansas State Agricultural College; W. P. Flint; State entomologist of Illinois; P. J. Parrott, entomologist of the New York Experiment Station; and J. J. Davis, professor of entomology at Purdue University. This board studied the problem in Florida, put eradication policies into effect, and supervised the expenditure of Federal funds. It recommended a number of the changes already reported in the fruit-fly quarantine districts.

Quarantine restrictions against the Mediterranean fruit fly mean unavoidable expense to growers, shippers, and others. It is worth noting, however, that the restrictions in 1929 permitted the marketing of Florida's fruits and vegetables in almost a normal manner, though fly infestation was then very heavy. Quarantines are generally considered as tending to throttle business. In the case of the Mediterranean fruit-fly quarantine, Federal certification made the country's markets largely open to Florida's products. The Federal quarantine legally inhibited State quarantines and thus kept open many markets that might otherwise have been closed.

Japanese-Beetle Quarantine

The quarantine enforced to check the spread of the Japanese beetle was of similar advantage. Under this quarantine plants and plant products are certified for shipment after they have been inspected and, in some cases, treated. Certificates thus issued guarantee the acceptance of the certified plant by inspection officials in the States to which the shipments are sent. In the fiscal year 1930 Federal certification authorized the movement of 97,788,480 plants out of the area quarantined on account of the Japanese beetle; also many thousands of boxes of cut flowers and thousands of carloads of sand, soil, and earth were certified for shipment. The Japanese beetle spread during the year at its normal rate and was discovered at several points some little distance from the quarantined area. These points were quickly subjected to control with respect to the movement therefrom of susceptible products.

Pink Bollworm of Cotton

An outstanding development of insect infestation in 1929 was the outbreak of the pink bollworm of cotton in a large area of the Salt River Valley in Arizona. This area specializes in the growing of Pima or long-staple cotton. The department, in cooperation with the State commission of agriculture and horticulture, began eradication measures. Two noncotton zones were established, and a field clean-up of some 47,000 acres of cotton was made, with funds specially appropriated for the emergency. The undertaking promises to be successful. Congress also appropriated funds to enable the Federal Government to compensate growers in the affected area for one-half of the actual and necessary loss resulting to them from ceasing to grow cotton. The other half of the loss will be paid by the State of Arizona.

Mexican Fruit Fly

The Mexican fruit fly reappeared in the Rio Grande Valley in the last fiscal year, but was promptly exterminated. It first appeared there in 1927. The department is cooperating with the Mexican Government in measures to reduce the infestation in near-by areas on the Mexican side of the Rio Grande. Inspection and clean-up work is also in progress in the citrus areas of the Rio Grande Valley in Texas.

CONTROL OF INSECT PESTS

New means for controlling insect pests developed from the research in the Bureau of Entomology. Particularly successful work was done in the improvement of poison bait for the Mediterranean fruit fly and in the treatment of fruit to prevent its being a means of spreading the insect. A safe and effective bait spray for the fruit fly is now in general use in the originally infested area of Florida. It substitutes a copper carbonate solution for the lead arsenate solution used at first, which was believed to diminish the acid content of the fruit and make it more or less insipid. Extensive use, besides demonstrating the safety and effectiveness of the new spray, indicated that it may be valuable also against other insects. This discovery was a striking advance in pest control. It was made in a search of the entire group of available poisons for a bait spray at once harmless to citrus plants and toxic to the fly.

In treating fruit to make it safe for handling, shipment, and sale, the bureau improved both the heat process and the cold process that it developed in 1929. These methods permitted the successful and profitable handling of Florida's citrus crop and proved valuable in the handling and storing of fruits and vegetables for other reasons than the necessity of controlling the Mediterranean fruit fly. The heat treatment was used widely for the immediate handling and sale of fruit. The cold treatment, as modified on the basis of experiments made in Hawaii, permitted the successful storing of fruit for later sale and distribution. It calls for a temperature of from 30° to 31° F. continued for 15 days. This temperature practically eliminates risk of freezing the fruit and is well within the range of the standard equipment used in cold-storage plants. It is easily maintained in ordinary storage practice. In experiments in Hawaii, the modified treatment was always fatal to both eggs and the larvae of the fly.

Aid to Peach Growers

Insect-control measures advocated by the bureau helped peach growers this year to market a crop much better in quality than the crop of 1929, when insects caused heavy damage. Two species, the plum curculio and the recently introduced oriental fruit moth, were the chief causes of the 1929 loss, which was widespread east of the Mississippi Valley, particularly in the South. Though much fruit was discarded in the orchards, a considerable amount reached the market in a wormy condition. Consumers lost confidence in the quality of peaches in general, and prices suffered. This year the bureau carried on an intensive campaign to impress upon growers the necessity for insect control. It especially emphasized the importance of fighting the plum curculio. State entomologists and extension workers cooperated. Growers paid special attention to spraying and dusting, destroying infested fruit, and other means of control. These measures with the added advantage of favorable weather brought gratifying results.

Protective Treatment for Stored Grain

Better protection of stored grain from insects is now possible by a new fumigation method developed during the year. This was the outcome of cooperative work between this department (through the Bureau of Entomology and the Bureau of Chemistry and Soils) and the Bureau of Mines. It requires the use of the fumigant, ethylene oxide-carbon dioxide mixture. So efficient and easy to use is the new method that it promises to replace all other means of protecting grains stored in bulk. In tests made with the cooperation of the New York Produce Exchange, in which several million bushels of wheat were treated, the ethylene oxide-carbon dioxide mixture proved highly toxic to grain insects and practically free from the fire hazard that attended the use of certain of the older methods. Outstanding importance attaches to this discovery of a new and safe insecticide for grain insects, which cause heavy damage to stored grain and cereal products, particularly in the South.

Insect Damage to Livestock Reduced

Losses caused by insect damage to livestock have been reduced during the year in the Southwestern States. The screw worm is a destructive pest of cattle, sheep, and goats. Screw-worm damage has been much reduced by a system of prevention and control which involves the prompt destruction of carcasses in which the fly may breed; dehorning and other measures to reduce the number of wounds that afford entrance for the pest into live cattle; the control of breeding so that calves, lambs, and kids will be born out of the screw-worm season; location of " hospital pastures " on high ground; the use of fly cages to protect valuable injured animals; the use of fly traps; and the use of benzol and pine-tar oil in treating screw-worm cases.

The department in cooperation with the Texas experiment station developed a new dip for the destruction of the lice that attack the Angora goat. This treatment, which is cheap and effective, is the dipping of goats in a suspension of very fine sulphur and water, which kills all the lice and their eggs in one operation without injuring the goats or their hair. It promises to be of great value to the Angora-goat industry.

Pine-Tip Moth Controlled by Parasite

A striking result last year in forest-insect work was the control of the pine tip moth at the extensive plantations of the Forest Service at Halsey, Nebr. For 20 years the pine tip moth has seriously retarded the growth of young pines at Halsey until, in 1925, the Bureau of Entomology introduced into the Halsey area an insect parasite of the tip moth from Virginia. This year the degree of parasitism existing near the point where the parasite was originally released amounted to about 82 per cent, and the number of pine trees infested by the pine tip moth had dropped from 90 per cent to 33 per cent. Permanent self-sustained control with little expense seems probable.

European Corn Borer

The European corn borer did not spread normally this year in Pennsylvania, Ohio, Indiana, and Michigan. Its increase was checked by heat and drought. A large percentage of the eggs, which are laid on the underside of leaves, were killed when the leaves curled and exposed the eggs to the sun. The mortality was heavy in the larvae also. As a result, there was practically no westward spread of the insect. There was a little spread to the south—in West Virginia, Ohio, and Indiana. Practically no commercial damage was done in the western area. In New England, in the so-called 2-generation area, the borer increased somewhat. More infestation in vegetables and weeds as well as in corn was observed.

Introduction of the corn borer's natural enemies into the United States promises to be an important controlling influence. This season up to July nearly 650,000 imported parasites, representing 17 different species, were released. It appeared, from the recovery of parasites from previous liberations, that at least 11 species had been successfully established. In some cases colonies of the parasitic insects had become so strong that collections could be made therefrom for shipment to other areas. Whether the corn borer will prove a serious menace to the main Corn Belt is still undetermined.

Other Serious Pests

Serious damage was done this year by the range caterpillar to the valuable blue grama grass on cattle ranches in northern New Mexico and in the Texas Panhandle. This insect has barbed spines that are extremely irritating and poisonous both to range animals and to man. It causes loss of forage in addition to the grass it actually consumes because cattle will not eat where the caterpillar has crawled or fed, since it leaves behind it webs in which are incorporated its poisonous shed skins and spines. About 15 years ago an outbreak of the range caterpillar was brought under control by the natural increase of an egg parasite of the pest. The Bureau of Entomology is attempting to speed up the increase of this parasite so that control of the caterpillar, which would tend to come about under natural conditions in six or eight years, may be brought about in three or four.

In northwestern Colorado a serious outbreak of the Mormon cricket was brought under control, through cooperative work with the State of Colorado in control campaigns. Only outlying districts distant from cultivated areas remain to be cleaned up. Final clean-up work, though extremely difficult because of the nature of the country, is essential as a safeguard against future outbreaks.

The Mexican bean beetle, which was not known in the Eastern States until 1920, now inhabits most of the United States east of the Mississippi River. It has caused heavy damage to beans. Indications are that it has now reached its northern limit of destructive abundance. General remedies such as plowing under the bean crop and planting bush rather than pole beans are valuable. Insecticides, such as magnesium arsenate and pyrethrum, give satisfactory control of the insect.

The European earwig, which was introduced many years ago simultaneously on both Pacific and Atlantic coasts, probably will spread more or less widely and prove an important addition to the list of introduced pests. It is not destructive to important crops, though it harms garden plants and the succulent ornamentals. It is chiefly obnoxious in houses in which it swarms. The Bureau of Entomology has developed a bait for the earwig which is satisfactory under dry conditions and where gardens are not artificially watered.

RESEARCH IN CHEMISTRY AND SOILS

In a definite program to diminish soil erosion, which involves annually a loss of more than 500,000,000 tons of soil in the United States, the Bureau of Chemistry and Soils last year set up six experiment stations for the study of the problem. These are in Oklahoma, Kansas, Missouri, Texas, and North Carolina. Erosion under different soil conditions will be studied at these stations. The Oklahoma station is intended to serve the red-plains region, which comprises more than 36,000,000 acres. Erosive soils, comprising about 6,000,000 acres, are the subject of study at the Kansas station. The station in Missouri will serve a region in Iowa and Missouri comprising about 6,000,000 acres. One Texas station is located in a sandy region; another serves the rich black belt of that State. The work there will cover a large area of similar neighboring lands in Arkansas and Louisiana. The station in North Carolina will study the southern piedmont soils, comprising some 30,000,000 acres. More than 60 per cent of this area has been damaged by erosion, some of it irreparably.

Important facts have been learned already. In the rich black belt of Texas, for example, the white chalky subsoil absorbs water much faster than the black topsoil. This makes the subsoil less erosive. The demonstration of this fact has an important bearing on agriculture and also on highway building. In Oklahoma experiments in the protection of eroding fields by terracing have stimulated wide interest. Farmers are applying the demonstrated methods on their own farms. Terraces of various types are being built and tested at all the soil-erosion stations. Cropping schemes are being studied to show their relationship to erosion control.

Fertilizers Increase Sugar-Beet Yields

Soil-fertility experiments have produced significant results in the last year. In 7 of the 18 States where sugar beets are widely grown, it was demonstrated that the proper use of fertilizer would increase the yields by an average of 3 tons an acre. Fertilizers high in phosphoric acid produced the largest increases. It was shown that sugar-beet lands can be fertilized at from $2 to $2.50 an acre. An increase of 3 tons an acre in the yield means a gross profit of about $18 above the cost of the fertilizer. The acreage fertilized this season was estimated at from 200,000 to 250,000 acres. Should the yield be increased by 3 tons an acre as a result of the fertilizing, the value of the crop would be increased by $5,000,000, less $500,000 spent for fertilizer.

In the Southeastern States the bureau has demonstrated that small applications of manganese sulphate and other heavy metals on nonacid soils will make these soils yield profitable truck crops. When these soils are not so treated, many crops thereon fail. Similar soil treatment has proved useful in the truck sections of North Carolina and South Carolina, particularly with strawberries. The gain to the growers from the discovery that their soils may be improved by manganese sulphate is substantial.

Soil Surveys Cover 800,000,000 Acres

More than 21,500,000 acres in counties representing every important farming region of the country were mapped by the soil survey in the last fiscal year. This work brought the total area surveyed and described to more than 800,000,000 acres. It will be necessary eventually to classify the lands of the United States according to their natural productivity and adaptation to different crops. In this task the information gathered by the soil survey will be indispensable. Heretofore the expenses of the soil survey, both Federal and State, have been only slightly more than 2 cents an acre. For this small expenditure the Nation has an inventory of its soil resources which in accuracy, scope, and practical value is acknowledged to surpass anything in existence elsewhere. The surveys show what soils are the most productive and give the exact location and the extent of the different soils in each county surveyed. They show how soils may be selected in the order of their natural productivity. Special value attaches to this work at the present time because of the readjustments that are taking place in American agriculture.

Chemistry Aids Cotton Industry

The Bureau of Chemistry and Soils developed this year an entirely new series of vat-dye intermediates from diphenyl and phthalic anhydride. These are expected to be of great value to the cotton-textile industry and therefore to the growers of cotton. In 1929 the consumption of domestic vat dyes in the United States exceeded 9,000,000 pounds, as compared with 6,500,000 pounds in 1928. The new dye intermediates produced by the department's chemists will, it is expected, be a further help in meeting the competition of foreign vat dyes. The domestic vat-dye industry is based on the department's synthesis of phthalic anhydride. The new products will lead to the production of fast dyes that should materially widen the market for cotton goods.

The bureau demonstrated during the year that cottonseed meal, commonly used as a cattle feed, may become valuable in human nutrition. It is rich in and by far the cheapest source of the antipellagra vitamin G. It is also an important carrier of the antineuritic vitamin B. Yeast is considered the richest natural source of these two vitamins, but commercial cottonseed meal is the only substance that even approximates yeast as a source of both of these vitamins. Yeast is used in treating pellagra, but it is costly. Commercial cottonseed meal is not suitable for human consumption. Experiments are under way, however, which may overcome this difficulty.

Fish Oils a Valuable Source of Vitamins

The Bureau of Chemistry and Soils, in cooperation with the Bureau of Fisheries, Department of Commerce, recently demonstrated that fish oils containing vitamin D are available in immense quantities and can be used profitably in animal feeding. These oils can be obtained at about a third to a fourth of the present cost of cod-liver oil, which is widely used in livestock feeds. In fact, vitamin D is considered essential for the raising of chicks and other young animals. California produces annually about 4,000,000 gallons of pilchard oil, which is as rich as cod-liver oil in vitamin D. Tuna oil, equally rich in this vitamin, is produced in smaller quantities. Salmon oil, which is very abundant, is about half as rich in vitamin D as cod-liver oil. It ranks with the poorer grades of cod-liver oil in vitamin A content. The price paid for vitamins A and D in salmon oil is lower than the price paid for the same vitamins in cod-liver oil. It seems possible, moreover, to improve the vitamin A content of salmon oil by better manufacturing processes. The supply of salmon oil can be increased fivefold or sixfold. At present millions of pounds of salmon offal are dumped into the waters of Alaska every year.

Pine-Gum Filter Improves Rosin

The Bureau of Chemistry and Soils has developed a new type of filter for cleaning crude yellow-pine gum. This filter cleans the gum so completely that the resultant rosin is as transparent as ordinary colored glass. It is the first practical means of cleaning crude gum without diluting it with rosin solvents. The process will probably add a dollar to the value of every barrel of rosin filtered by it. Its general use would add half a million dollars to the value of the South's annual production of rosin. Rosin made by the new process should be in keen demand by manufacturers of varnishes and paper size.

Cheaper Potash Indicated

Cheaper potash for American farmers seems possible in the near future. The department has recently demonstrated that the volatilization of potash from leucite is feasible by smelting with special reagents and that the potash can subsequently be recovered in concentrated form. This can be done to special advantage simultaneously with the volatilization of phosphoric acid. The materials thus obtained can be combined to form potassium phosphate, a highly concentrated fertilizer salt.

Enormous deposits of leucite exist in Wyoming, along with plentiful supplies of high-grade phosphate rock and cheap fuels. The utilization of these resources in the production of potash by the method newly discovered, or by improvements thereof, seems entirely practicable. In fact, our annual production of potash salts has increased rapidly in recent years and now totals more than 100,000 tons. Nevertheless this country still depends largely on foreign potash. This is unsatisfactory not only because it involves high transportation costs but because our increasing use of concentrated fertilizers demands large quantities of high-grade potassium salts. The department's recent discoveries will no doubt help in the expansion of the American potash industry.

Besides studying the properties of the leucitic rock of Wyoming, the department is studying the alunite of Utah, the potash shales of Georgia, and the greensand of New Jersey. Alunite has a promising future as a raw material for potash and alumina. Heretofore the processes employed in extracting these products have not been economical. The alumina recovered has not been pure enough nor abundant enough to give it a satisfactory market position. The department is developing improved extraction methods that are expected to permit the use of lower-grade alunite than that formerly required. This will increase the latent potash resources of the raw material. Investigations made at the request of the Bureau of Mines on the ammonium carbonate-ammonia extraction of polyhalite (a Texas saline material) indicate the commercial possibility of effecting a practically complete separation of the potash from the associated calcium and magnesium compounds. It appears practicable, also, to make an additional saving at the same time through the formation of ammonium sulphate from sulphuric acid of the polyhalite and the ammonia in the leaching solution. In these concentrated forms the fertilizer salts can be transported at a greatly reduced cost. In acid-extraction experiments with the greensands of New Jersey, iron and aluminum salts and adsorptive silica (glaucosil) have been obtained as valuable by-products.

Rotenone Tested Against Destructive Pests

Research is under way to develop a synthetic process for producing rotenone, a promising substitute for lead arsenate as an insecticide. Chemists in the department recently extracted rotenone from Derris root for the first time in the United States. This poison is highly toxic to many insects, yet it is as harmless to plants and to warm-blooded animals as any insecticide that has yet been discovered. In recent tests as a stomach poison it proved thirty times as toxic to the silkworm as lead arsenate. Rotenone is being tested against the codling moth, the European corn borer, the Mexican bean beetle, aphids, and other destructive insects. The department's chemists believe it will be harmless to man if eaten in the form of a spray residue on fruit. This quality should give rotenone, if it can be produced cheaply in commercial quantities, an advantage over lead arsenate, the poisonous residue of which is difficult to remove from apples and pears. The present cost of rotenone, from $10 to $20 a pound, prohibits its use by the average farmer or fruit grower. There is hope of producing it artificially or by developing a similar chemical product. The sole present source of rotenone is Derris root (*Derris elliptica*), which is obtained in the East Indies.

Fire Hazards From Moving Belts Preventable

Means of preventing the serious fire losses often caused by static electricity in moving belts in factories have been developed by the Bureau of Chemistry and Soils. How serious the fire hazard is may be judged from the fact that in some cases 25,000 to 50,000 volts were detected between pulleys, though the shafts and pulleys were well grounded. The bureau has demonstrated that belts can be made to conduct electrical charges to the pulleys from which the charges can be grounded harmlessly. This is done by weaving wires into the belts. Accumulating static charges are carried through these wires and grounded without the risk of ignition which would otherwise be present. It is also possible to prevent electrical discharges on moving belts by treating the belts with dressings that have conducting properties. This treatment causes the static charges to pass over the surface of the belts to the grounded pulleys.

Nitrogen Fixation

Research by the fixed-nitrogen laboratory of the Bureau of Chemistry and Soils is reflected in the progress of the fixed-nitrogen industry of the United States, whose output in 1929 was more than three times that of the preceding year. Its production this year is expected to show a substantial increase over that of 1929. The research laboratory has made a number of important discoveries that have been put into commercial practice. An ammonia catalyst was discovered. Published results of studies undertaken to ascertain the essential properties of nitrogen, hydrogen, and ammonia have profoundly influenced commercial practice. Improved catalytic materials are being developed. The bureau's contribution to air-nitrogen fixation in the United States is not measurable solely in research results, but includes also a contribution of personnel to the industry. Many scientists who began their studies of the problem in the Government laboratory are now leaders in the commercial field. The Government began the study of air-nitrogen fixation about 15 years ago. Progress is now rapid in both research and practice.

Output of inorganic nitrogen by the air-fixation process in the United States was 84,000 tons in 1929, as compared with 26,000 tons in 1928 and 5,900 tons in 1923. These figures may be usefully compared with the output of by-product nitrogen, which was 187,600 tons in 1929, 170,000 tons in 1928, and 123,500 tons in 1923. Our supply of inorganic nitrogen is obtained from three sources—imports, the by-product process, and air fixation. The foregoing figures show the rapid relative advance of air fixation. Domestic production in 1926 furnished 60.5 per cent of our supply of inorganic nitrogen, as compared with 49.5 per cent in 1923.

The first successful direct synthetic-ammonia plant in the United States began production in 1921. Seven others have since gone into operation, one of them this year. The largest has an annual capacity of 108,000 tons of ammonia and the second largest an annual capacity of 54,000 tons. These two plants will be enlarged. Another is under construction. The largest makes sodium nitrate, which competes directly with Chilean sodium nitrate for use as fertilizer. Liquid ammonia is shipped from the fixation plants to the fertilizer factories, to be added to superphosphate. This practice, which is now general, is a distinct economy. Prior to 1929 practically all the ammonia produced by the direct synthetic-ammonia plants of the United States was used for other than agricultural purposes. The output of the new facilities which will come into operation soon must be marketed as fertilizer, as well as part of the output of the existing plants. Linked with the bureau's work on nitrogen fixation are studies of potash and phosphoric acid. A fuel-fired blast furnace is used on experiments in the volatilization of both potash and phosphoric acid. Farmers in the United States spend about $250,000,000 annually for fertilizer, for which outlay the progress of air-nitrogen fixation promises a much increased return.

PLANT INDUSTRY ACHIEVEMENTS

Plant types and varieties much better adapted to their environment than those now grown will eventually be developed, experiments by the Bureau of Plant Industry definitely indicate. The development and use of crop varieties specially adapted to given conditions play an increasing part in the growing efficiency of American agriculture. The bureau, in cooperation with the State experiment stations, is now applying recent genetic discoveries to many crops on a scale not previously attempted. This plant-breeding work covers practically the entire range of food, forage, and fiber crops, including fruits and vegetables and ornamental plants.

In the northern Plains region the new wheat varieties, Reliance and Ceres, proved distinctly more satisfactory than other varieties grown there. Under favorable conditions, particularly under irrigation, Reliance wheat gave a high yield though it was not resistant to black-stem rust. Ceres wheat showed some resistance to black-stem rust and proved more widely adaptable than any other variety of hard red spring wheat. Both these varieties produce a kernel of good commercial quality. In the quality of disease resistance the best variety yet developed is called Hope. This wheat seems to be practically immune to rust, bunt, and loose smut. Its commercial production is beginning.

A new variety, Tenmarq, in the central Plains region has shown itself more winter-hardy than the Blackhull variety. Oro wheat, a variety developed by the bureau in cooperation with the Oregon experiment station, has proved high yielding and also highly resistant to smut. It has yielded well in Kansas, Nebraska, and Montana. Cooperative experiments with soft red winter wheats, at the Cornell experiment station, have produced from red-kerneled selections an average of 7.5 bushels an acre more than the yield produced by an equal number of white-kerneled selections. Forward wheat, an improved red-kerneled variety developed in these experiments, is being more widely planted. Nevertheless the red varieties are still less grown than the white wheats in New York State.

Stem Rust of Wheat

A discovery of great importance in combating stem rust of wheat has been made in studies conducted cooperatively with the Minnesota Agricultural Experiment Station. Stem rust is the most serious wheat disease in the United States. The infection enters through the open stomata, or breathing pores of the plant. In the resistant varieties it was discovered these stomata remain closed in the morning until after the dew, in which the fungus spores germinate, has dried; hence the fungus spores have no opportunity to infect the wheat. This clue to one cause of rust resistance in wheat is expected to have important practical consequences.

Resistance of Corn to Cold

Important factors in the resistance of corn to cold were developed in cooperative studies at the Illinois experiment station. Some strains while maturing are injured by temperatures considerably above freezing. Others are not seriously hurt by temperatures several degrees below freezing. Some of the strains that resist cold well in the ripening stage resist it also in the seedling stage. All strains resist cold better on the more fertile soils. Strains that are resistant to cold tend also to be resistant to stalk-rotting fungi. These strains also produce better yields and better-quality corn. In the seedling stage the cold-resistant strains are less susceptible to the seedling blights. The practical importance of these facts is obvious. Early fall freezes severe enough to injure corn are often followed by several weeks of favorable weather. The varieties of corn capable of resisting such early freezes and having also several other desirable characteristics should be more widely planted.

Sugar-Beet Seed Commercially Feasible

The commercial feasibility of sugar-beet seed production from overwintered seedlings is shown by harvest records obtained by the bureau, in the Southwestern States, where mild winters permit the safe wintering of small sugar-beet plants in the field. This method is much less expensive than the one commonly employed in which mother beets must be lifted in the fall, carried over the winter in silos or pits, and replanted the following spring. Seed yields from the overwintering method approximate the standard yields in the most favored sugar-beet seed-producing countries. Commercial development of this method of producing sugar-beet seed would help to develop disease-resistant varieties. Our beet seed now comes from Europe. European beet seed, however, has no resistance to the curly-top disease, which is indigenous to the United States and threatens the sugar-beet industry west of the Rocky Mountains. It has been demonstrated that resistance to curly top can be developed in sugar beets as a varietal characteristic. The demonstration that the home production of sugar-beet seed is possible on a commercial scale by the overwintering method marks an important forward step for the American sugar-beet industry.

Other Developments

From 50 to 75 per cent of the acreage planted to lettuce in the Imperial Valley of California in 1929 was planted to disease-resistant varieties developed in the Bureau of Plant Industry. This year's lettuce acreage in the same region, estimated at 30,000 acres, is about 75 per cent planted to the resistant sorts. These varieties are resistant to mildew and brown blight. They are also more productive than the sorts previously grown.

Notable progress was made in the growing of improved strawberry varieties. The Blakemore, a good dual-purpose variety of excellent flavor, was extensively planted. It was developed at the United States Plant Field Station at Glenndale, Md. About 85,000 strawberry seedlings of known parentage, developed from well-mated crosses, were under observation in Oregon, Montana, and northern California. These studies gave promise of establishing new combinations of color, flavor, size, vigor, and yield.

In a field test near Beaver Dam, Wis., a variety of hemp called Michigan, developed by the bureau for earliness, was harvested and spread for retting 16 days earlier than hemp from unselected commercial seed. This variety was equal in quality and yield to the product of the commercial seed. Another variety developed by the bureau was harvested and spread for retting at the same time as the commercial variety, but yielded 50 per cent more.

Better Cotton Varieties Developed

In recent years many improved varieties of cotton and improved methods of production have been developed, tested, and demonstrated. It is no longer necessary for agricultural reasons to plant varieties producing less than 1-inch staple in any part of the United States. Yet we continue to grow millions of bales of inferior fiber which enters the world market in direct competition with the very short staples of India and China. Fine fabrics are in demand. Larger quantities of strong and uniform fiber are needed in the automobile industry and also in the production of fabrics for airplanes, balloons, and dirigibles. The textile industry in general wants better cotton staples than those generally offered. Here is an opportunity which is not yet sufficiently recognized.

Recent developments in cotton breeding emphasize the fact that in this field agricultural science is far ahead of agricultural practice. A new variety of cotton of real commercial possibilities was developed by crossing Pima, a long-staple variety of Egyptian type, with Sakel, the best of the varieties grown extensively in Egypt. Pima is better than Sakel in type of plant, productivity, size of bolls, and length of lint. Sakel is thought to be better in strength of lint and in spinning value. A combination of the best features of both varieties is obviously very desirable. The Sakel-Pima cross has been grown during 11 successive years. It appears to be quite as uniform as selected strains of Pima and Sakel. Tested in Arizona, it proved in average seasons to be at least as productive as the best strains of Pima. It gave indications that it will outyield Pima in seasons when the first killing frost comes late, since the plants set a very heavy top crop. The new variety has long fruiting branches and bolls that are exceptionally large for an Egyptian type. It gives a consistently higher lint percentage than Pima; moreover it is superior to Pima in abundance of lint on the individual seeds.

Another new cotton variety seems to have distinct resistance to the boll weevil. This is an early maturing type of upland cotton known as the Kekchi. It was selected from cotton discovered in 1902 in Guatemala among the Kekchi Indians. The first plantings in Texas were very abnormal and some were sterile. After several years of acclimatization and breeding, however, normal habits of earliness and productivity reappeared. In several cases Kekchi cotton outyielded all the other varieties commonly grown, and the fiber was of better quality. More important still, the Kekchi variety continued flowering and fruiting after other varieties had ceased to do so on account of weevil attack.

Plant Introductions

The introduction of foreign plants into the United States has been important throughout our history. In fact, our agricultural and horticultural industries, as well as our animal industries, are based on plants and animals introduced from other regions and largely from other continents. This is true not only of the cereals and the grain sorghums, but of corn, potatoes, sweetpotatoes, tomatoes, peanuts, and tobacco. By this time probably most of the foreign crops which can be successfully introduced without change into American agriculture have been introduced. Plant introduction is taking on a new character. It is directed more to the discovery of important new material for the plant breeder than to the immediate establishment of foreign varieties not hitherto grown here.

Varieties of sugarcane introduced from Java some years ago restored the cane-sugar industry of Louisiana, which had been threatened with extinction by mosaic disease. But the Javanese varieties lack certain desirable qualities. Therefore in 1928 plant explorers for the department obtained as breeding stock more than a hundred primitive varieties and strains of sugarcane from the jungles of New Guinea and Papua. The object is to combine these varieties with types already established in the United States. The entire collection was planted this year in southern Florida and in August was growing satisfactorily. It is planned to make crosses which will combine the vigor of the wild varieties with the high sugar content of the best commercial varieties.

Among the varieties introduced from New Guinea is a species which grows from 25 to 30 feet high, stools prolifically, and is remarkably erect and vigorous. It seems also to be disease resistant. Most of the world's cane sugar now comes from seedlings resulting from crossing a small wild cane (*Saccharum spontaneum*) with cultivated varieties. Since the new wild cane (*S. robustum*) is much larger than *S. spontaneum*, its hybrid progenies should give larger sugar yields. The Bureau of Plant Industry has devised a method whereby a ton of seed cane can be increased sufficiently within two years to plant 1,000 acres. Under the commercial methods in general use only about 30 or 40 acres could be planted under the same conditions. Hence a commercial supply of planting stock can be grown from the new canes in a comparatively short time.

Work With Other Plants

Similar work with other plants promises important results. Alfalfa in the Middle West is threatened with a serious disease called bacterial wilt. Investigators observed that certain alfalfa seed from France and Turkestan produced plants which resisted the disease better than other varieties. Accordingly, seed for testing was obtained in Europe and Turkestan. Samples were brought from every important seed-producing district in the latter country. It is too early as yet to predict the result, but it should give some relief from the bacterial-wilt disease. In the same expedition other seeds of potential value to American agriculture were obtained, including the seeds of numerous grasses, legumes, and melons. Samples of wild and cultivated apricots, pears, and pistachio nuts also were obtained.

In an effort to replace the native American chestnut, now almost destroyed by blight accidentally introduced from Japan and discovered in this country about 25 years ago, the bureau has located blight-resistant strains of the forest type of Asiatic chestnut in Japan and Chosen. It has brought large quantities of seed to this country. This year more than 70,000 trees, representing 162 selected strains of Asiatic chestnuts, were planted in permanent locations. These trees are being tested for blight resistance and other qualities under widely varying conditions. The Asiatic chestnuts have a tannin content in the wood and in the bark equal to that of the American chestnut.

More than 200 lots of soybeans of both wild and commercial strains were recently imported from the Orient. It is believed the collection will extend the areas in which soybeans can be grown in this country and will also increase yields.

Plant-Disease Control

Though some plant diseases may be checked by treating the seed before it is planted, the most destructive diseases, especially those of the fruit and vegetable groups, are more effectively controlled by dusting and spraying. Investigations in the bureau have demonstrated that zinc-lime spray, a recently discovered fungicide, is successful in controlling peach bacterial spot. Large quantities of this material were used by growers this season. Zinc-lime spray may be of value also in controlling peach scab and apple scab.

The campaign against citrus canker is practically won. An infection was found this year in a nursery in Victoria County, Tex., and 5 grapefruit and 15,000 2-year-old *Citrus trifoliata* were destroyed as a control measure. Some scattered infections were found in dooryard plantings in Louisiana. The disease is not known to occur, however, in any region commercially producing citrus fruits. No infections were found during the past year in Florida, Alabama, or Mississippi.

White-pine blister rust is increasing and will undoubtedly reach Maryland, Virginia, and West Virginia within a short time. In the protected pine areas of New England and New York the loss from this destructive disease is less than one-tenth of the losses in unprotected areas. Protection is achieved by eradicating the gooseberry and currant bushes that are the alternate hosts of the disease organism. The bureau is cooperating with the Forest Service and the National Park Service in protecting white pines in the national forests and parks. It is cooperating also with officials and lumbermen in several Western States in a campaign for the eradication of the host plants. Vigorous and prompt action is necessary to avoid heavy loss. The rust recently extended in Oregon to within 50 miles of the Californian border. This is a menace to the forests of southern Oregon and of California. Experiments in local control, however, have indicated that these areas can be protected at a reasonable cost.

In areas where most of the common barberry bushes have been destroyed in the campaign for the control of black stem rust of wheat, local outbreaks of rust have been much reduced. The effectiveness of the barberry-eradication movement is beyond question. It needs, however, to be carried on with unflagging energy.

Eradication of Phony Peach Disease

Complete eradication of the phony disease of peach trees appears practicable, even though it is now known that the disease is not confined entirely to Georgia and Alabama. This season the Bureau of Plant Industry, in cooperation with the States of Georgia and Alabama, began an eradication campaign. It obtained the willing aid of peach growers. Diseased trees were destroyed with great rapidity. Inspectors examined nearly 12,000,000 peach trees during the season, most of them in Georgia. About 87,000 in Georgia were definitely identified as infected, about 600 trees in Alabama were identified as infected, and about 140 in Mississippi. Many trees were removed on the suspicion that they might be infected. Slight infections were discovered in Louisiana, Arkansas, and Tennessee, and recent inspections located cases of the disease in North Carolina and South Carolina. Accordingly it is planned to extend the eradication campaign to all these States.

PROGRESS IN ANIMAL INDUSTRY

The Bureau of Animal Industry made some notable contributions to the technic of livestock breeding and feeding, and to the control of animal diseases and parasites.

The bureau demonstrated that suitable Wiltshire sides for the English bacon market can be obtained from American breeds of hogs fattened on the commonly grown hog feeds. This means that by the same method farmers can produce hogs for both the foreign and the domestic market. It is simply necessary to select the hogs rigidly for type and to feed them with the market purpose in view. A shipment of hogs was fattened on barley, tankage, and alfalfa pasture at the United States Range Livestock Experiment Station at Miles City, Mont. The hogs were slaughtered and processed in the United States and sold on the Liverpool and London markets. English authorities pronounced the bacon from these hogs equal to the best brands of Canadian bacon.

Recent experiments in sheep raising show that lambs raised on good pasture will produce meat as well finished and as palatable as that from lambs raised on expensive grain feeds. In one experiment a number of lambs that had only pasture brought a slightly higher net return than other lambs that were fed grain while running with their dams on pasture. This result was in accordance with the outcome of similar experiments made in cooperation with Purdue University. Pasture as a feed for lambs is exceptionally valuable both from the standpoint of the return to the grower and from the standpoint of the quality of the meat.

About a third of all the fertile eggs incubated in the United States fail to hatch. The bureau has discovered that the principal causes are hereditary factors, improper nutrition, and faulty conditions of incubation. Experiments with White Leghorns and Barred Plymouth Rocks showed that hatchability decreases as inbreeding increases, and that full brother and sister matings are more detrimental than less intensive breedings. The character of the proteins in the diet of the breeding flocks is extremely important. Tests showed that a diet generous in animal proteins, lime, and cod-liver oil if sunshine is deficient, is necessary, and that a source of pigment, such as yellow corn or green feed, is also required. It is obviously desirable to cull out the hens that lay eggs of low hatchability.

Suppression of Animal Diseases and Parasites

Progress in veterinary science, in the administration of livestock laws and regulations, and in the adoption of control methods brought notable results in the suppression of animal diseases and parasites. Records of Federal meat inspection showed a marked decline in tuberculosis among cattle and swine. In the fiscal year 1930, though federally inspected slaughter of cattle and swine was more than 1,000,000 head greater than in the previous fiscal year, 10,000 fewer tuberculous carcasses and 40,000 fewer parts of carcasses of cattle, calves, and swine were condemned. Testing to eradicate bovine tuberculosis has been practically completed in nearly a third of the counties of the United States. The tuberculosis-eradication campaign was pushed forward in cooperation with every State in the Union and with several of the insular possessions. In May, 1930, a survey indicated that only 1.7 per cent of the country's cattle were tuberculous, as against 4 per cent in 1922. The number of cattle tested for tuberculosis during the fiscal year exceeded 12,000,000 head. Approximately 217,000 affected animals were slaughtered. Three States, North Carolina, Maine, and Michigan, are now recognized as practically free of bovine tuberculosis, and other States are approaching the same goal. The feasibility of eradicating bovine tuberculosis from large areas as well as from individual herds is thoroughly established.

Fifteen counties in five States were released during the year from the Federal quarantine against the cattle tick. The last remaining counties in Alabama were freed, and that State became the tenth of the 15 originally infested States to emerge from the quarantine. Mississippi was entirely released from the quarantine on July 1, 1930. The tick-infested area of the United States is now only about 20 per cent of its original size. In many localities where the tick quarantine has been lifted purebred cattle have been rapidly introduced. Purebred bulls are now fairly numerous in many sections of the South where only tick-infested scrub sires were previously known.

Infectious abortion continued to take heavy toll of the cattle industry and also of the swine industry. Research has not yet developed a fully satisfactory means of coping with the disease. It has recently developed the important fact, however, that the eye may be a frequent channel of infection. Experiments also indicated that the infection may gain entry to the animal through the skin, even though there may be no visible abrasion.

Complete success terminated a campaign begun two years ago in California for the control of liver flukes of cattle and sheep. This pest formerly caused heavy losses, particularly to sheep growers. There were no losses last year from liver flukes in the area covered by the campaign.

In hog-cholera control work a great increase was recorded in the production of clear antihog-cholera serum. This is a more refined product than that previously in general use. In establishments licensed by the department to produce antihog-cholera serum the principle of pasteurization was introduced. Pasteurized clear serum safeguards livestock from possible contamination with harmful bacteria. As it is now made in the licensed establishments, the serum is either sterile or of very low bacterial content when marketed.

Animal-quarantine regulations designed to exclude foreign plagues were enforced, as usual, during the year, and the country was kept free of foot-and-mouth disease, rinderpest, contagious pleuro-pneumonia of cattle, surra, and other dangerous livestock maladies. The beneficial effect of all these disease-control activities is shown by the fact that in recent years less than 2 per cent of the carcasses handled in federally inspected slaughterhouses have been condemned in part or in whole because of diseased conditions.

Omaha Rate Case Decision

In livestock marketing an important development during the year was a decision by the United States Supreme Court, handed down February 4, 1930, upholding the authority of the Secretary of Agriculture to prescribe rates for the handling of livestock on a commission basis at public stockyards. This case was commonly known as the Omaha commission men's rate case. The decision, besides sustaining the Secretary's right to prescribe reasonable rates, held that the rates he had prescribed were not confiscatory. Proceedings have been instituted to determine the reasonableness of the commission rates charged at other public stockyards. Studies of stockyard rates and property values are under way to determine what rates are necessary to give a fair return.

At a conference held in Chicago on October 22, 1929, at the invitation of the Secretary, resolutions were adopted to eliminate unfair and uneconomical practices in the packing industry. All branches of the meat-packing industry were represented. The resolutions banned secret rebates, the giving of premiums, the selling of goods below a reasonable market value to injure competitors, the issuance of misleading statements concerning the grade, quality, condition, and origin of packing-house products, and other practices held inconsistent with modern business principles.

DAIRY RESEARCH AND SERVICE

Increased utilization of dairy by-products was promoted by the Bureau of Dairy Industry by developing, standardizing, and assisting manufacturers to apply a new method of making casein. This grain-curd method was adopted at a number of plants. It enabled them to produce a superior product which immediately commanded a higher price. Casein is the principal material in cheese. Commercial casein is used extensively in another form in making paper. Casein is used also in making glues, paints, fungicides, plastic products, and insecticides.

Over half of the 51,000,000 pounds of casein consumed last year in the United States came from abroad. The new tariff act increased the duty on casein. This fact and the grain-curd method of making casein should widen the market for the domestic article. It would require about a billion pounds of skim milk to produce the casein that we have heretofore imported annually. If the United States made all the casein it needs, its farmers would get annually about $3,000,000 that now goes to other countries, and they would get it for a dairy by-product, skim milk, which is hard to sell at any price in some parts of the country.

Our imports of casein were large in the past, partly because low costs of production in some other countries made it possible to sell the imported product in the United States at a price that discouraged domestic production. Prices received by the domestic manufacturers were so low and irregular that casein manufacturing was seldom profitable and the manufacturer had not much inducement to make casein of high quality. As a result paper coaters could not depend on the quality of the domestic casein supply as a whole, though many producers turned out a good article. These difficulties ought now to disappear. At present casein is high enough in price to be a fairly satisfactory outlet for skim milk. The increased tariff on casein should maintain the price at a favorable level, provided our casein industry meets the demand of the market as to quality. It is striving to do so. When the Bureau of Dairy Industry called attention through the press to its grain-curd method for making casein, numerous casein manufacturers sought aid in putting the method into practice. There is a good inquiry from paper mills for ample and regular supplies of the grain-curd product. This is significant because paper making takes more than 75 per cent of the casein consumed in this country.

Assistance Given to Manufacturers

Technical help was also given by the Bureau of Dairy Industry to manufacturers of butter, American and Swiss cheese, and concentrated sour skim milk. The bureau carried on this work in cooperation with the State colleges of agriculture. In one instance an association of farmers' cooperative creameries was helped to improve its manufacturing methods; as a result about $300 a week was added to the sales of the member creameries. A cheese factory, by the use of manufacturing methods developed in the bureau, raised the quality of its product to an extent that increased its profits several hundred dollars a month. Many other dairy-products factories reported to the bureau that they had increased their profits by improving their operation and management methods as recommended by the bureau.

The bureau developed and improved methods for the manufacture of lactose, or milk sugar, which constitutes a third of the solid constituents of milk. Research on this problem continues on three lines—to reduce manufacturing costs and increase yields; to convert the present milk sugar of commerce into a sweeter and more soluble form, better for table use; and to develop methods of fermenting lactose into products having a market value. In the manufacturing problem distinct advances were made. Valuable food proteins are discarded before the sugar is crystallized in the usual commercial processes. The bureau improved a process whereby lactose is crystallized from concentrated whey in a manner that leaves the albumen in its natural state for further purification. This was an important step toward the economic use of milk by-products, a year's supply of which is estimated to contain nearly a billion and a half pounds of milk sugar.

New facts of potential value to the cheese industry were developed by the bureau during the year in studies of the bacteria used as starters in cheese making. Fancy Swiss cheese results from the combined action of several kinds of bacteria, which produce the desired end only when a definite balance is maintained among them. Too many or too few bacteria of a particular group may materially affect the quality of the cheese. The bureau's discoveries should give increased control of the bacteria present in cheese making.

A process for separating albumen from whey without injuring its emulsifying or whipping properties was perfected. An experiment was started to determine whether the product can be used advantageously in ice cream. Another possibility is the utilization of albumen in modified milk for infants.

Dairy Herd Improvement

In the breeding of dairy cattle, research in the bureau developed principles which, if widely applied, should greatly increase the productivity of dairy herds. Modern breeding methods, carefully and intelligently followed, can develop strains of dairy cattle that are pure in inheritance for high production. The dairy herd-improvement associations, which number more than 1,100 in the United States, are an important means of translating dairy science into dairy practice. These associations are local cooperative groups of dairy farmers. They are organized by the State colleges of agriculture in cooperation with this department. They keep precise records which serve to show how much room for improvement there is in the efficiency and economy of milk production generally. It is highly significant, for example, that the average milk production of the cows handled by the associations is close to 7,500 pounds a year. The average milk production for all the cows in the United States is about 4,600 pounds. As yet only about 2.5 per cent of the dairy cows in the country are included in the dairy herd-improvement associations. As the proportion increases, the country's milk production per cow should increase.

Records compiled by the associations show that only about a third of our milk cows earn a profit, a third return just about what it costs to keep them, and the rest are carried at a loss. Study of the association records shows the dairy farmer how to increase his dairy profits by selling unprofitable cows. But culling, though it raises the average production of a herd, is costly because the butcher's price for the culled animals does not equal what has been spent to rear them. The obvious remedy is better breeding so that fewer low-producing cows will need to be culled from the dairy herds.

Feeding and Management

Success in dairying depends not on breeding alone, of course, but also on the feeding and management of the dairy herd. The Bureau of Dairy Industry studies feeding and management problems and helps dairymen to apply the results achieved. It announced last year important results in the utilization of pastures. In experiments at Huntley, Mont., remarkably economical milk production was obtained by feeding alfalfa exclusively or as the main part of the ration.

WILD-LIFE CONSERVATION AND CONTROL

This year marked the beginning of a 10-year national program for the establishment of refuges for migratory game birds. Systems of refuges for these birds are essential to carry out our treaty obligations with Great Britain for the protection of the species that twice each year pass between the United States and Canada. With funds provided at the beginning of the fiscal year for the administration of an act authorizing these refuges, the Bureau of Biological Survey began nation-wide investigations of areas recommended as suitable. The food resources for wild fowl were studied on more than 3,700,000 acres, involving 189 units in 48 States. Eighty-nine of these units were found suited, from a biological standpoint, to the object in view. On 40 of the units, involving approximately 1,225,000 acres in 24 States, land-valuation surveys looking toward purchases were made.

Migratory-Bird Refuges Established

Two refuge areas on the public domain were set aside by Executive order, one of 12,000 acres in Montana and one of 20,000 acres in Oklahoma. The Migratory Bird Conservation Commission created under the act approved the purchase of one area of more than 32,000 acres in South Carolina, and another of more than 5,000 acres in Colorado, at an average price of $1.13 an acre. Other areas aggregating 56,000 acres were recommended for purchase and await the action of the commission. This is excellent progress toward the completion, within the 10-year period, of a program that will provide a network of Federal refuges covering the important flight lines and the wintering and breeding resorts of our migrant game birds.

Under separate acts of Congress for the creation of migratory-bird refuges, progress was made on one refuge at the mouth of Bear River, Utah, and initial steps were taken for establishing another in the Cheyenne bottoms in Kansas. The former, which covers more than 56,000 acres of land and water, will provide a large fresh-water area for wild-fowl breeding, feeding, and resting in a locality where wild ducks formerly perished in thousands from disease. Engineering work has already much lessened the menace to the birds. When completed, the refuge will help to protect the wild-fowl resources not only of Utah but of adjacent and distant States, as demonstrated by bird-banding operations of the Biological Survey. The migratory-bird refuge in the Cheyenne bottoms was authorized by Congress on June 12, 1930. Data previously gathered enabled the department to proceed in acquiring needed land and water areas that will cover about 20,000 acres.

Changes in Conservation Laws

In December, 1929, the department decided to reduce the bag and possession limits on ducks and geese with the opening of the hunting season of 1930–31. Exhaustive field investigations had shown the necessity for the reduction, which was strongly recommended by the principal game-protective associations and by State game commissioners. It was urged also by the advisory board set up under the migratory-bird treaty act. Years are required to increase the number of ducks and geese and to provide enough resting and feeding sanctuaries. An immediately beneficial effect should follow restrictions on the annual kill by hunters. With the opening of the hunting season in the fall of 1930, the limits were reduced from 25 to 15 a day on ducks and from 8 to 4 a day on geese; and a possession limit was prescribed of 30 ducks and 8 geese. Sportsmen themselves must exercise restraint if wild-fowling as a sport is to continue.

International wild-life protection entered a new phase with the passage of the tariff act of 1930, under the terms of which the principle of the Lacey Act governing illegal interstate transportation of wild animals or parts thereof is made international in scope. No wild mammals or birds or parts thereof of species specially protected in a foreign country may be imported into the United States unless accompanied by a certification of the United States consul for the consular district in which the point of export is located declaring that the animal or part thereof was not acquired or exported in violation of local laws or regulations. The new law should have a salutary effect.

Progress in Rat Control

The common house rat is the most destructive rodent in the United States. Besides menacing human life, it takes heavy toll of growing and stored crops and does much damage to other property. Recent experiments by the Bureau of Biological Survey demonstrated that red-squill powder is effective in rat control and relatively harmless to human beings and to livestock. Red squill is a wild perennial plant of southern Europe, with a large bulb from which the powder is made. The experiments showed that the powder can be produced at comparatively low cost. No other known rat poison combines the same advantages. Rat-control campaigns, in which the use of red squill was recommended, have had marked success.

FOOD AND DRUG ADMINISTRATION

Enforcement of the laws within the jurisdiction of the Food and Drug Administration, though primarily intended to protect consumers, also benefits producers. This is particularly true of the farmers. Food products that reach the market in a raw state are seldom subject to adulteration. Food products that have to be processed before reaching the consumer can be, and often are, adulterated. When this is done in the manufacturing process, the producer of the raw materials suffers along with the consumer of the manufactured commodity. The demand is lessened. This was illustrated in a type of adulteration against which action was taken under the food and drugs act in November, 1929. More than 5,000 cases of canned tomatoes were seized at various points because analyses showed that they were adulterated with water. Every pound of water illegally incorporated in the product deprived the farmer of a legitimate demand for an equal quantity of tomatoes. The sale of water at the price of canned tomatoes is a cheat to which reputable canners do not lend themselves. In checking the imposition the Food and Drug Administration improved the market both for raw tomatoes and for the honestly processed article.

Prior to the enactment of the food and drugs act, canned goods were a comparatively unimportant item in the American dietary. Such goods were often of uncertain quantity and quality and were mostly used where fresh food products could not be obtained. Cans were seldom full of the food they purported to contain. Often they contained an insignificant amount of food with an excessive amount of water. This condition was changed following the passage of the food and drugs act. Cans were required to be filled with the foods mentioned on the labels, and the use of liquid exceeding the proportion necessary for processing was prohibited. Rigid and continuous enforcement of this rule made the slack-filled can a rarity. The insistence on a full can increased the demand for the products of the farm, not merely by preventing fraudulent adulteration, but by increasing the confidence of the public in canned goods.

Spoilage by Freezing

Sometimes action is necessary which protects the ultimate interests of the farmers in a manner that seems costly and burdensome at first. In January last much citrus fruit in the Rio Grande Valley of Texas was damaged by frost. Freezing causes a physical breakdown in citrus fruit. In a week or so the inside dries and becomes unfit to eat, though the fruit may still look all right on the outside. After a severe freeze, some growers rush frost-damaged fruit to the market though it may be worthless when delivered to the consumer. Such action discredits the producing region and tends to reduce the demand for the sound fruit that may be produced subsequently. The more farsighted growers understand this and do not ship frost-damaged fruit. They can not, however, restrain others less conscientious or less interested in the long-time prosperity of the industry. Accordingly, an inspector of the Food and Drug Administration, in cooperation with the State authorities of Texas and with leaders of the citrus industry in the Rio Grande Valley, showed growers how to tell whether their fruit had been hurt enough to make it unfit for shipment. He urged the destruction of seriously damaged fruit, pointing out that if shipped it would be seized under the food and drugs act. As a result a great quantity of fruit was voluntarily taken from the trees by the growers and destroyed. Only a small amount was shipped contrary to the warnings given and had to be seized. The action taken on this question helped to maintain the reputation of the Texas citrus industry. The Food and Drug Administration has been adversely criticized for adopting an "advisory before the act" attitude in situations of this kind, but the method taken assures a much more adequate and widespread protection of the consumer and likewise of the permanent interests of the producer than could be achieved by relying on strictly punitive and confiscatory measures. Educational methods make seizure or prosecution largely unnecessary. During the year many other products were brought into conformity with the law either through legal action or in appropriate instances by the advisory method just described.

Insecticide Act

Results achieved in the administration of the insecticide act illustrate the protection given by such regulatory legislation. Calcium arsenate, which is widely used to protect cotton against the boll weevil, is produced on a large scale by 21 manufacturers whose aggregate output exceeds 25,000,000 pounds annually. In the fiscal year ended June 30 last, the plants of these manufacturers were inspected, and samples of calcium arsenate were collected. Samples were also collected from dealers and distributors. Ninety-four per cent of the samples were entirely satisfactory both in composition and in labeling. The remaining 6 per cent of the samples were of a proper composition, but were not correctly labeled. Steps were taken to remove this defect.

Import Milk Act

Substantial benefits have accrued to the American dairy industry and to the consumers of dairy products from the import milk act, which was approved February 15, 1927. This measure has reduced our imports of milk and cream materially. In the year ended March, 1930, our imports of milk from Canada totaled only 29,646,561 gallons, against 53,858,992 gallons imported in the year ended March, 1927. This reduction is largely attributable to the exclusion of milk produced under conditions below the standards of sanitation imposed by the import milk act.

Farmers have a substantial interest as consumers in the enforcement of these regulatory laws. They are large buyers of manufactured food products and thus share with city dwellers in the benefits of the food and drugs law. They are specially protected by action taken to prevent the marketing of fraudulently labeled stock remedies and of adulterated or misbranded feedstuffs. Twenty-five seizures of fraudulently labeled stock remedies were made during the last fiscal year. In many cases manufacturers changed their formulas voluntarily or altered labels after their attention had been called to the necessity for so doing. Farmers reaped a twofold benefit. They saved money that would otherwise have gone for worthless goods and avoided injuring their livestock with harmful products.

EXPERIMENT STATIONS

Research at the State experiment stations continued to expand under the stimulus of increased financial support from Federal, State, and local sources. The funds available for these institutions during the last fiscal year totaled about $17,000,000, approximately a fourth of which, or $4,335,000, was contributed by the Federal Government. As provided by the Purnell Act of 1925, Federal support to the State experiment stations has been increased $10,000 annually for each State during the last five years. The increase has now reached $60,000 annually for each State, the maximum increase provided by the Purnell Act. Previously under the Hatch Act and Adams Act the Federal Government provided $30,000 annually to each of the States; hence the total annual contribution to each State is now $90,000. The income of the stations has been increased to a still greater extent from State and local sources. As a result they are cooperating effectively with one another and with this department in a research program that covers practically every phase of agriculture and rural life. They are giving special attention to agricultural economics, home economics, and rural sociology, as authorized by the Purnell Act.

Seven Thousand Research Projects Under Way

More than 7,000 research projects are under way at the experiment stations. These studies, in which the work of one station is in large measure coordinated with that of others and with the work of the United States Department of Agriculture, deal with both the technical and the economic problems of farm production. They deal also with marketing and distribution and with rural-home and rural-community problems. In general the experiment stations emphasize local or regional needs, while this department deals with farm problems largely from a broad national viewpoint. This division of effort has justified itself in practice and promises increased benefits in the future. The Office of Experiment Stations represents the Federal Government in administering the Hatch, Adams, and Purnell Acts.

Research at Insular Stations

The Office of Experiment Stations supervises the use of the funds appropriated by Congress for the maintenance of agricultural experiment stations in Alaska, Porto Rico, Hawaii, Guam, and the Virgin Islands. The Alaska station made noteworthy progress in developing strains of beef and dairy cattle suited to the Territory. Successful experiments in dairying were made in the Matanuska Valley. Satisfactory results have followed the establishment of joint control of the Hawaii Agricultural Experiment Station by the United States Department of Agriculture and the University of Hawaii. This was provided for in an act of Congress passed May 16, 1926, to extend the benefits of the Hatch Act and supplementary acts to Hawaii. Experiment stations previously maintained seperately by the department and by the University of Hawaii were combined.

The experiment station in Porto Rico helped to restore the agriculture of the island following the destructive hurricane of 1928. It was especially active in repairing the damage to coffee plantations and citrus orchards. Research men attached to the station demonstrated that leaves of banana trees, planted extensively as temporary shade for coffee, furnish a fiber that can be used in making coffee and sugar bags. This indicated a possible saving of a million dollars or more annually to Porto Rican farmers. From coffee plantings that withstood the storm, the experiment station supplied enough seed of the Excelsa variety to replant nearly 2,000 acres. It helped to get a commercial precooling plant for citrus fruits and pineapples erected at San Juan. Fruit handled in this plant reaches New York in a much better condition than fruit not so handled.

The experiment station in the Virgin Islands developed a new variety of sweetpotatoes which yields 50 per cent more, is of better quality, and keeps better than the common varieties. Planting of the new variety is going forward rapidly. The station has also demonstrated the practicability of growing vegetables to improve the local dietary and to ship to New York. The Guam experiment station has brought about an improvement in the livestock of the island, encouraged the planting of better forage crops, demonstrated the feeding value of copra meal, and helped to bring about the commercial planting of pineapples for canning.

HOME ECONOMICS

Research in the Bureau of Home Economics touches the general farm problem at some vital points. It reveals deficiencies in farm living standards and indicates remedies. It shows that in many areas a vicious circle is formed between low income and poor diet, poor health, and lowered production. Other unsatisfactory aspects of family living on the farm result from lack of skill in the expenditure of the farm income. The food purchased may be poorly chosen; the clothing purchased may be ill adapted to farm needs; farm homes may be equipped less efficiently than the means available would permit; and lack of information on commodity values may cause much waste in household buying.

The bureau recently drew attention to the dietaries reported by 61 families in a rural district of South Carolina as showing the interdependence of income and family living standards. Pellagra, a chronic disease directly caused by badly selected food, is prevalent in this area. The average farm income available did not suffice for an adequate diet. Poor diet caused disease, and disease impaired the economic efficiency of the group. It was evident that the needs of the region required the attention of the economist as well as of the home economist. It was necessary to offer suggestions looking both to improved farm practices and to a better use of the available farm income.

Preliminary surveys in other regions indicate that similar conditions exist there. The department has recognized the complex character of the family-living problem by studying it from several angles simultaneously. Thus the Bureau of Home Economics is cooperating with the Bureau of Agricultural Economics and with the Kentucky Agricultural Experiment Station in a study of land utilization and living conditions in eastern Kentucky. In this study it is the task of the Bureau of Home Economics to show wherein the standard of living is wanting.

Rural Diet Deficiencies

The Bureau of Home Economics has found that the diet of city dwellers has made more progress toward a scientific ideal in recent years than has the diet of farm dwellers. City people are eating more vegetables and fruits. On the farms, though the use of fruit and vegetables is greater than it formerly was, these foods still do not form a sufficient part of the diet. Reports of the foods used by 2,402 farm families in nine States indicated that dietaries could be much improved in some areas by the use of more fruits and vegetables. Milk consumption on the farms in all these States was lower than it should be. In the State reporting the least use of milk, pellagra is common.

Practical Value of Nutritional Studies

Research done by the bureau on the vitamin content of certain foods has a twofold value to the farm family. In the first place it shows how diets may be improved. Second, such research indicates that certain products ought to have a wider market. It has been demonstrated, for example, that the watermelon is a good source of vitamins A and C and contains small amounts of vitamins B and G. Study of the vitamin content of spinach showed that three varieties were about equal as sources of vitamins A and B. But one of these varieties is less potent than the others in vitamin C and loses more of the vitamin C in the canning process. Such knowledge has obvious practical value in view of the importance of an adequate vitamin content in the diet. As is well known, many serious nutritional disorders result from an inadequate supply of vitamins. Besides studying the composition, the bureau experiments also with the cooking of foods. It is cooperating with specialists in animal husbandry to test the palatability of meats. Facts developed by this research will be useful to livestock producers as well as to meat consumers.

Textile Utilization

In an effort to encourage a more intelligent use of cotton and wool produced in this country the bureau studies the utilization of textiles, publishes designs for clothing and household articles, and assists textile manufacturers in learning more about the consumer's needs. In this way the interests of both the producer and the consumer are promoted. The production of desirable types of cotton and wool materials is encouraged and home makers are helped to make a better selection of fabrics. In cooperative studies with other bureaus of the department the Bureau of Home Economics inquires into the relationship between different grades and qualities of cotton and wool and the value of the fabrics woven therefrom. Fabrics produced by manufacturers under scientifically controlled conditions are given laboratory and wearing tests. The interest shown in the textile studies by manufacturers and consumers is some evidence that their potential value is appreciated.

PROGRESS IN WEATHER FORECASTING

Increased appropriations made possible marked expansion of the Weather Bureau's service along airways. This now includes continuous 24-hour service along approximately 6,000 miles of airways and a less frequent exchange of reports for some 7,000 miles. The hourly reports are transmitted mostly by means of teletype systems maintained and operated by the Department of Commerce. One circuit extends from Boston to Richmond; another from Portland, Oreg., to San Diego. These are united by the main transcontinental line from New York to San Francisco, which has two channels from Omaha to Cleveland—one by way of Chicago and the other through Kansas City, St. Louis, and Louisville.

On the transcontinental line between New York and San Francisco a network of stations is maintained, covering a strip about 150 miles either side of the airway, which report every three hours to central airport stations at Cleveland, Fort Crook (Omaha), Salt Lake City, and Oakland (San Francisco). Summaries and short-period forecasts prepared at these centers are broadcast from Department of Commerce radio stations to aircraft in flight. They are picked up also by numerous airports and by others interested. During the fiscal year 1931 the airways service will be expanded still further with the aid of additional funds. Hourly reports will be organized on about 3,000 additional miles of airways, and the 3-hour forecast service will be extended to include the Southeastern, Southern, and extreme Northwestern States, with centers at Atlanta, Dallas, Fort Worth, and Portland, Oreg.

Reports from Ships at Sea

Synoptic weather reports from ships at sea were briefly described in the report for 1929. Under the international agreement concerning these, each nation is responsible for enlisting a selected number of ships to radio regular reports at least twice a day to designated shore stations. The present program includes about 21 American, 31 British, and 5 French ships. Ten German ships are expected to report in the near future. On any one day only a fraction of the whole number of enlisted ships are in position to render reports.

These reports have great value to the forescasters of the bureau, as well as to those of all other national services receiving them. The great continental areas are dotted with numerous stations which make at least two reports a day. Without ship reports the vast ocean areas are a complete blank, and the forecaster's picture of the atmosphere is incomplete. Ship reports enable him to sketch in and tie together both land and sea conditions. The combination gives from observation to observation the picture of the ever-changing circulation of the air over the whole Northern Hemisphere. The data for the vast ocean areas are still scanty and incomplete, but new reports are being added each year, and improve the basis for better and more complete forecasts.

THE NATIONAL FORESTS

The national forests are administered with a view to obtaining from them the largest net total of public benefits. Their resources are very great. During the year their net area—that is, the area of federally owned land within their boundaries—was increased by 340,297 acres, to a total of 160,090,817 acres. Their use by the public exceeded in various particulars all previous records, with a greater cut of timber, greater total receipts for uses involving a charge, and a greater number of recreation visitors by several million than in the preceding or any earlier year. Through their wise development, their scientific management, and careful safeguarding of their productivity their public value and services can be made to increase still further and immensely.

The first need of the West that national-forest administration aims to meet is that for water. This necessitates the working out of methods and plans of use that will insure the preservation of a suitable vegetative cover on important watersheds. Certain of the national forests were created specifically to protect Federal reclamation projects and at the request of the Reclamation Service. Watershed protection is a complex matter. While it is a primary objective of national-forest administration, it can not be pursued as an independent objective. To be fully serviceable the national-forest land areas must be managed with a view to utilizing their capacity to grow timber crops and forage crops along with their capacity to regulate water flow. The most difficult problems of national-forest administration lie in combining and coordinating the water-control function with the utilization of the natural products of the soil.

The Protection Problem

Severe drought made protection of the national forests against fire in the summer and fall of 1929 exceptionally difficult. Never before in the history of national-forest administration had the western fire season had so late a close. The expenditures of the year for fire suppression alone exceeded $3,400,000. The estimated damage to the Federal properties exceeded $4,300,000, of which nearly $4,000,000 represented timber and reproduction destroyed. The fires burned over more than 978,000 acres of land within the national forests, of which more than 799,000 acres were owned by the Government. Only twice has a greater area been burned over, and only three times—in 1910, 1919, and 1926—has the estimated damage been greater. Of the area burned over, 96 per cent was in the national forests of the West. Both the expenditures for fire suppression and the fire damage fluctuate greatly from year to year. The expenditures, which have averaged for the last decade $1,280,000, were less than $320,000 in 1923, as against more than ten times that amount in 1929. The damage averaged for the decade $1,363,000, but was less than $181,000 in 1923, as against a high in 1926 of more than $4,560,000. The protection problem centers in the bad fire years. Bad years are due to precipitation shortages, high temperatures, low atmospheric humidity, excessive wind, and severe lightning storms. The climate, the character of the forest, the topography, and the inaccessibility of great areas make protection in the West extremely difficult always. The years of peak load necessitate the employment of hundreds and even thousands of men on the fire lines.

Most Damage Done by Large Fires

Most of the damage and outlay are caused by relatively few very large fires. More than half the fires are put out before they have covered one-fourth of an acre. More than half the rest are held to less than 10 acres. Only a small percentage exceed 100 acres. In California last year, where fire-control conditions were exceedingly unfavorable, out of 202,000 acres burned over by 1,416 fires of all sizes, 184,000 acres, or 91 per cent, was covered by 10 per cent of the fires, which covered 100 acres or more each. Area alone, however, is not a satisfactory index of the damage done or the efficiency of the control system. Grass fires may cover a large acreage without causing much loss, and different types of timber vary widely in their susceptibility to damage. The Forest Service is adjusting its system of fire control to the degree of difficulty of the relative values at stake, and their susceptibility to damage in each case. This is done by setting up for each forest standards of satisfactory performance in keeping down the area burned over in bad years.

The standards vary from 0.1 per cent of the total area to 2.5 per cent where there is little of value to protect—for example, where the growth is only grass or brush and the watershed values involved are inappreciable. When the standard of satisfactory performance thus established is compared with what is actually being accomplished, the problem of protection is given new definiteness.

Of the 149 national forests, 74 are rated as now receiving satisfactory protection; 37 are on the border line; 38 are definitely substandard and show a ratio between the area burned in bad years and the total area that averages about five times what the standards set up would allow. It is urgently necessary to give better protection to these substandard forests, which are the critical spots, taking the greater part of the outlay for fighting large fires and accounting for the greater part of the fire losses. This calls for strengthening the preparedness of the protective organization to function swiftly and effectively under the stress imposed by the bad years.

Preparation for Forest Protection

Preparedness calls for a specially trained and competent personnel, properly organized and located; for advance plans of action, including arrangements for obtaining, transporting, provisioning, equipping, and officering additional manpower in such quantities as may be requisite; for efficient systems of detection, communication, and transportation in the form of observatories, telephone lines, roads, trails, and the like; and for adequate supplies of such forms of equipment as trucks, power and hand pumps, specialized machinery, tools, and many other accessories of fire fighting. In the past the Forest Service has been greatly restricted, in comparison with the protection needs, in making the expenditures necessary for preparedness. The appropriations for the current year, however, afford much greater latitude for preparedness than has ever existed before. To equip the critical forests adequately with the permanent improvements necessary for economical and efficient protection will take years; but the line of attack upon the problem of fire control that has now received legislative sanction should progressively safeguard the forests and increase their usefulness.

Forest protection includes protection against the ravages of destructive insects and tree diseases as well as against fire. The three are related, for large quantities of dead timber greatly increase the fire hazard, while fires increase the susceptibility of the forest to insect and disease attack. As intensive forest management becomes possible, harvesting the timber crop can be made a means of putting the forest into much better condition for protection through reduced fire hazards, applying measures of forest sanitation to check tree diseases and insect infestations, and making all parts of the forest easy to reach. Regulated grazing also can contribute to protection. But as a rule the national forests have not reached the development that permits intensive management. They are in a transition stage between the wilderness period of their history, when even the most elementary requirements for protection were lacking, and the period when all their resources will be in full use. In consequence, the problem of protection is still largely an isolated problem rather than a matter of creating and maintaining, as a part of resource development and management, the right conditions.

Trends in Western Forest Ownership

Since 1891, the year in which the President was authorized to create reserves, the western system of national forests has been moving gradually toward its completion. At the same time the available area has been progressively diminishing through disposal of the public-domain timberlands under other laws. Nevertheless there is left a considerable acreage of unreserved and unappropriated public land having forest values for timber production or watershed protection that justify and make desirable its inclusion in national forests.

Some of the forest land that has passed into private ownership since the policy of reservation was first proposed is likely to gravitate back into public ownership after its timber has been removed. In the Lake States tax delinquency and land abandonment have reached serious proportions; they are beginning to threaten in parts of the South, and they are creating acute local problems in some Western States. There is a distinct possibility of the building up of a new public domain, but this time in the hands of the States, which become the reluctant recipients of what the private owner throws away. In some parts of the West a growing disposition exists to look to the Federal Government for relief from the accumulation of abandoned cut-over lands in State ownership.

Some small relief is taking place under the exchange laws. The purpose of these laws is to facilitate the consolidation and rounding out of national forests. In or near many are private lands which the Government should acquire to form more logical administration units. The Forest Service may negotiate exchanges with the owners of lands within the forest boundaries, and in some cases up to 6 miles distant from the boundaries. For the lands acquired, lands, timber, or both may be exchanged; but usually the Government obtains land with more or less timber and gives timber only. Lumber companies wishing to operate national-forest stumpage under the customary timber-sale regulations can thus sometimes pay in land or in land and standing timber instead of in cash. Often they turn over lands with much more timber on them than they receive, being induced thereto by the more favorable location for them of the timber obtained. It may be close to lands that they are already logging. In other cases cut-over lands are turned over. In this way some land which otherwise might eventually be forfeited to the States through nonpayment of taxes is kept productive. The exchange policy should in time afford an appreciable, if minor, relief from the consequences of temporary private ownership assumed solely for the sake of the timber.

Exchanges are also made with States. Under the school-land and other grants, the Western States received extensive rights to lands subsequently included in national forests. A number of these States have received solid blocks of land in exchange for scattered sections in the national forests. Some of the lands have been outside the national forests, but Idaho, Washington, Oregon, California, Montana, South Dakota, Michigan, and Colorado have obtained or are in process of obtaining blocks of timberland from the forests. These areas are suitable for permanent forest administration by the States themselves, and the outcome will probably be State forest enterprises essentially like that of the Federal Government. As tax-reverted cut-over lands accumulate, they will presumably necessitate State plans for their consolidation and administration.

More than four-fifths of the forest land west of the Plains, not including that in Alaska, is now in public ownership. This includes national forests and national parks, State and municipal forests and parks, Indian reservation and open public domain forest lands, and State forest lands for which no policy of administration is in sight. Private ownership accounts for the rest. Every effort should be made to encourage and facilitate private forestry on this land. Nevertheless, public ownership will eventually have to take over more of the western forest area. Steps should be taken to place under administration for forest purposes, by the appropriate agencies, both the remaining timbered areas of the public domain and other timberlands subject to Federal control whose permanent status is not yet determined. It is desirable that the States also should undertake greater responsibilities for the permanent administration of forest lands.

The Eastern National Forests

Although several of the eastern national forests were created by reserving portions of the public domain and 38 per cent of the Federal land in the eastern forests has come through such reservations (chiefly in Arkansas, Minnesota, Michigan, and Florida), the eastern system of national forests is being built up under a policy of acquisition. The law of March 1, 1911 (the so-called Weeks law), provided for the purchase of "lands located on the headwaters of navigable streams or those which are being or may be developed for navigable purposes." Although the law set no regional limitations on purchases, it was accepted as providing for the building up of a small system of eastern national forests that would be confined to the mountain ranges of the southern Appalachians and to the White Mountains of New Hampshire and southwestern Maine. It was believed that Federal administration of well-chosen strategic areas totaling 5,000,000 acres in the southern Appalachians and 1,000,000 acres in the White Mountains could lead the way to right management and use of the forests of the two regions. But as acquisition advanced, forest exploitation also advanced. The result was to enlarge in these regions the area requiring Federal administration to protect navigable streams, as well as to make clear that protection should be extended to various similar areas outside the regions.

Beyond that, Congress in 1924 broadened the Weeks law by directing the Secretary of Agriculture to recommend for purchase lands necessary for the production of timber, and also by removing the restriction which had confined acquisitions for watershed protection to lands "located on the headwaters of navigable streams." This amendment was part of the Clarke-McNary law, a comprehensive measure enacted after an inquiry by a Senate committee had shown the need for enlarged Federal activities in forestry. Since the original program was formulated, and particularly since the Clarke-McNary law was passed, additional purchase areas have been established in Arkansas, Pennsylvania, the Lake States, and the southern pine region. In these areas 886,167 acres had been acquired up to the close of the last fiscal year, together with 2,527,126 acres in the two original regions.

The present program is limited to putting into effect the intent of the two laws providing for forest-land acquisition. It is not a program based on a broad survey of the requirements of the eastern forest situation. It calls for the acquisition of a total of approximately 9,500,000 acres, of which the major part will be added to some 6,000,000 acres already owned or under contract of purchase by the Federal Government to protect the headwaters of navigable streams. The rest will be acquired primarily to aid in timber production and to demonstrate forestry practice in the southern pine and the northern Lake States regions. The Federal Government already has about 1,800,000 acres in these regions, mainly derived from the reservation of areas of public lands. If this program is to be carried out within a reasonable time, the rate of acquisition will need to be substantially accelerated. A forward step was taken by Congress, near the close of the fiscal year, in authorizing appropriations up to $3,000,000 in each of the fiscal years 1932 and 1933.

The completed program will provide an eastern system of national forests containing some 16,000,000 acres of Government-owned land, chiefly in areas selected for their value in protecting the headwaters of the principal navigable rivers, in other words, chiefly mountain lands. But the needs of the East for permanent forests to control floods and erosion will not be met by this program. It will take care of only a minor part of these needs. Still less will it meet the needs of the East for public ownership and management to insure and promote timber production. In the eastern half of the United States approximately 350,000,000 acres are classed as forest land. In addition there are many million acres of marginal and submarginal farm lands which might better be used for forest purposes than for farming, and which will sooner or later largely revert to forest. Of the present area of eastern forest land, more than 95 per cent is privately owned. The practice of forestry by private owners is relatively rare. Private forestry should be encouraged and promoted by every means consistent with sound public policy, but it can not be expected to restore to productiveness all of the cut-over and burned-over lands. Sooner or later eastern public forest land ownership on a far greater scale than has yet been thought of will become inevitable. While the responsibilities and the burdens that will be involved may in the main be regarded as appropriately falling first on the States and local governments, both the magnitude of the tasks that will be imposed and the extent to which national interests are affected will almost surely make necessary substantial Federal participation along new lines.

FEDERAL-AID ROADS

Included in the Federal-aid highway system at the present time are 193,049 miles of the country's most important interstate and intercounty highways. Initial Federal-aid improvements were completed during the past year on 7,317 miles in this system.

Since 1916, when the Federal-aid policy was adopted, the Government has cooperated with the States in the improvement of 86,978 miles. Provision for the designation of the Federal-aid system was not made until 1921. Between 1916 and 1921 a considerable mileage was improved that was not included in the Federal-aid system when it was finally designated. The roads omitted were not considered of sufficient importance to warrant their inclusion, but, as Federal funds had been applied to their improvement, the States have been required by law to maintain them.

To permit the States to return these roads to the care of the county and township authorities, by whom they should properly be maintained, a plan has been developed under which the States may substitute for these unimportant roads outside of the system other roads in the system. Federal funds previously paid for the older improvements, supplemented with new funds as required, are applied to the newly included roads. As the substituted roads require more expensive improvements than the roads they replace, the mileage that can be improved with the transferred funds is less than the originally improved mileage. By such substitutions the mileage for the maintenance of which the States are held responsible has been reduced by 696 miles. By the relocation of previously improved roads in the course of stage construction, a further reduction of 64.2 miles has been made; so that the mileage now carried as a State maintenance responsibility is 86,218 miles. Of this total, 2,205 miles were in process of further stage improvement or reconstruction at the close of the fiscal year, so that the mileage classified as improved was reduced to 84,013 miles. At the close of the preceding year the mileage similarly classified was 77,944. Hence the net addition of "improved" mileage was 6,069 miles.

Status of Appropriations

At the close of the fiscal year 1929 the balance of Federal-aid funds authorized and not expended in the earlier years of the road-building program had been exhausted. It therefore became necessary to shape the work in accordance with the amount of the authorized funds for the current year.

For several preceding years unused authorized funds made it possible to carry on a program calling for an annual Federal disbursement ranging from $80,000,000 to $95,000,000, though in 1925 and afterwards the total sum annually authorized was only $75,000,000. Out of this sum, after deduction of the administrative percentage, $73,125,000 was apportioned among the States.

In the fiscal year 1929, for the first time since 1923, the amount obligated for new projects was within the amount of the year's apportionment. Thus curtailment of the program for the ensuing year and for succeeding years was foreshadowed. Federal-aid funds paid to the States during the fiscal year 1930 were smaller in amount than in any year since 1925. The amount paid, $75,880,863, was more than $6,000,000 less than in the preceding year and more than $20,000,000 less than in 1925, when the accumulated balance of unobligated funds was greatest. As the rate of the initiation of projects had been reduced to the gauge set by the annual apportionments, the rate of payment upon projects was reduced accordingly. It was but little higher in 1930 than the $73,125,000 apportioned.

For the fiscal years 1930 and 1931 the authorizations originally provided by Congress were $75,000,000, the same as for the several years preceding. This sum established the rate of operation throughout the first half of the fiscal year. The apportionment in December of the $73,125,000 originally available for the fiscal year 1931 merely permitted a continuation of the work at the same rate.

Additional Funds for 1931

In April, 1930, however, Congress authorized an additional appropriation of $50,000,000 for the fiscal year 1931. It thus recognized the need of increased authorizations to restore the earlier rate of construction. Congress desired also to augment public work so as to provide employment. This additional sum, less the prescribed administrative percentage, was immediately apportioned among the States and was available at once for allotment to new projects. The States submitted projects at a materially increased rate. As a result the total obligation of Federal-aid funds during the fiscal year 1930 was $102,000,000, considerably more than the amount obligated in any year since 1925. The amount obligated exceeded the corresponding amount for the fiscal year 1929 by more than $32,000,000.

The effect of the increased authorizations in providing additional employment is indicated by the fact that in April, 1930, the number of men employed on Federal-aid road construction was 20,200, as compared with 16,200 in April, 1929. In May, 1930, the number employed was 31,400 and in June 35,800, as compared with 26,600 and 34,500, respectively, in May and June, 1929. In August, 1930, the number employed was 48,513. These figures represent only the men employed in the actual construction of the roads. They do not include the workers required to manufacture and prepare materials and equipment or those employed in transporting materials and equipment to the job.

Funds authorized for appropriation for the fiscal year 1932 were apportioned on September 1, 1930. Under ordinary circumstances this apportionment would not have been made until December. It was made earlier to provide increased employment for farmers and other sufferers from the effects of the drought. The newly apportioned funds are immediately available for allotment to new construction projects wherever such projects will furnish employment for drought sufferers.

Increase in Annual Mileage Indicated

The mileage initially improved during the past year was less than in any previous year since 1921. This was the natural consequence of the contraction of the program to the scale set by the $75,000,000 authorizations. That the enlargement of the authorization to $125,000,000 for the fiscal years 1931, 1932, and 1933 will be followed quickly by an increase in the mileage improved annually is indicated by the fact that the mileage of initial and stage construction already under way and approved is considerably greater than it was a year ago.

The mileage of initial and stage improvements under construction or reconstruction on June 30 was 9,915, as compared with 9,526 a year previous. The mileage of both classes of improvement approved for construction or reconstruction at the close of the year was 3,469, as compared with the corresponding figure for the previous year, which was 2,898.

The net increases in the several types of construction during the year were as follows: Graded and drained roads, 1,041 miles; untreated sand-clay roads, 117 miles; untreated gravel roads, 661 miles; treated gravel roads, 118 miles; untreated macadam roads,. 7 miles; low-cost bituminous mixed roads, 448 miles; bituminous macadam roads, 385 miles; bituminous concrete roads, 166 miles; Portland-cement concrete roads, 3,081 miles; block pavements, 38 miles; and bridges and their approaches, 43 miles. There was a net decrease in the mileage of treated macadam roads amounting to 36 miles, which made the total net increase 6,069 miles.

Total Improved Mileage

The total mileage classed as improved at the close of the year was as follows: Graded and drained roads, 12,449 miles; untreated sand-clay roads, 7,166 miles; treated sand-clay roads, 17 miles; untreated gravel roads, 28,608 miles; treated gravel roads, 482 miles; untreated macadam roads, 1,754 miles; treated macadam roads, 603 miles; low-cost bituminous mixed roads, 742 miles; bituminous macadam roads, 4,057 miles; bituminous concrete roads, 3,205 miles; Portland-cement concrete roads, 23,693 miles; block pavements, 905 miles; and bridges and their approaches, 332 miles; a total of 84,013 miles.

The total cost of the 7,317 miles of initial improvements and the 2,011 miles of secondary improvements completed during the year was $193,648,149, of which sum $82,158,757 was paid by the Federal Government. These payments extended over the period of between one and two years required to complete the improvements. In addition to the payments made during the year on the projects that were completed, payments were also made on other projects not completed. The total actual disbursements of Federal funds to the States amounted during the year to $75,880,863.

Mount Vernon Memorial Highway

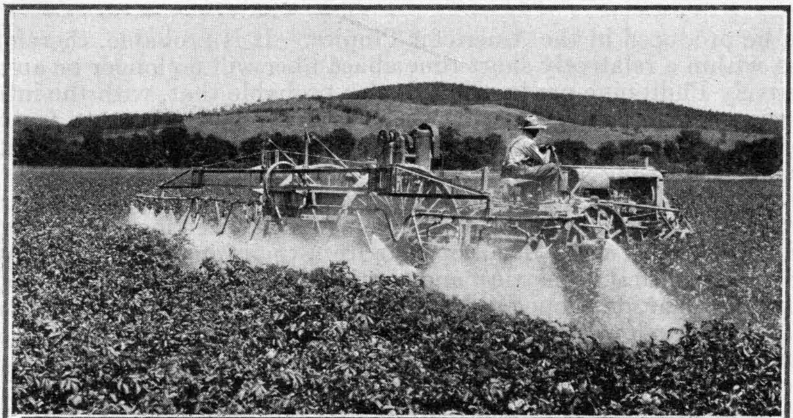
Construction of the Mount Vernon Memorial Highway from Washington to Mount Vernon, begun in September, 1929, was well advanced by the close of the fiscal year. The road should be ready for use in February, 1932, as planned.

Provision for the construction of the memorial road was made by an act of Congress approved May 23, 1928. This act authorized the Commission for the Celebration of the Two-hundredth Anniversary of the Birth of George Washington to select the route and approve the plans for the road. It directed the Secretary of Agriculture to cooperate in making the surveys, and to supervise the construction. The act authorized an appropriation of $4,500,000. The Bureau of Public Roads surveyed two feasible routes. The commission, on January 24, 1929, selected a route beginning at the Arlington Memorial Bridge on Columbia Island and following closely the Virginia shore of the Potomac, a distance of approximately 15½ miles, to Mount Vernon. The plans provide for a pavement 40 feet wide on a right of way of a minimum width of 200 feet, except through the city of Alexandria, Va. The grade and alignment are designed to permit a rapid and easy flow of traffic and a smooth blending of the highway into the natural roll of the land. This requires careful landscaping.

For the safety of traffic, all important crossroads are carried under or over the highway on grade-separating bridges. The minor roads intersecting at the grade will enter the highway from the two sides at points separated by a considerable distance, so as to avoid direct crossing of the principal traffic stream. At suitable points flared and divided roadways will facilitate the turning and parking of vehicles and permit visitors to halt for views of the river and the Capital City. A large terminal circle at Mount Vernon and tree-screened parking areas at this point will permit the expeditious loading and unloading and the orderly parking of many vehicles.

The first work was begun on the road in September, 1929, on a contract for the construction of a sea wall, the building of a cofferdam, and the supplying of stone for bridge facing. Contracts subsequently awarded provide for the construction of 2¼ miles of hydraulic fill, for 12½ miles of dry-land grading and small drainage structures and incidental construction, and for 12 major bridges. At the close of the fiscal year 1930 the sea wall had been completed, four of the five hydraulic fills were near completion, and excellent progress had been made in the dry-land grading and the construction of the bridges. Tenders for the construction of the pavement are to be invited shortly after January 1, 1931.

Arthur M. Hyde,
Secretary of Agriculture.



WHAT'S NEW IN AGRICULTURE

ABACÁ Growers in Philippines Face Outside Competition Abacá (Manila hemp), which is one of the so-called "hard" fibers, is produced by a plant that closely resembles the well-known banana plant. With the exception of small quantities produced in the Dutch East Indies, the entire world supply of abacá is obtained from the Philippine Islands. The approximate annual consumption of abacá fiber in the United States is 150,000,000 pounds.

This fiber is used principally for the manufacture of the superior grades of cordage. Its remarkable strength, elasticity, and resistance to the action of salt water make it a particularly suitable material for marine cordage. Manila rope is also used in large quantities for well drilling, heavy construction, transportation work, and for many other purposes where cordage of superior quality is required. During periods when there is a shortage of henequen fiber, or when the price of this fiber is unduly high, there is an increased use of abacá fiber for the manufacture of binder twine.

The fact that there is no entirely satisfactory substitute for abacá fiber, and the further fact that practically the entire world supply of this fiber is now produced in the Philippine Islands, indicate very clearly the need for maintaining the Philippine abacá industry in at least a reasonably healthful and prosperous condition.

During the period of American occupation of the Philippine Islands, and particularly during the last 15 years, there have been changes and developments in the abacá situation that promise to alter very materially the conditions under which this fiber is now produced. For nearly a century the Philippine Islands enjoyed a natural monopoly in the production of abacá, and there has existed a somewhat general opinion that abacá fiber of good quality could not be produced in any country other than the Philippines. In recent years, however, the production of abacá has been established on a commercial basis in the Dutch East Indies. It has also been demonstrated during the last two years that abacá fiber equal in quality to that produced in the Philippine Islands can be produced in the American Tropics. It is probable, therefore, that within a relatively short time abacá fiber will no longer be an exclusively Philippine product. It is also probable that, with the introduction of the competitive factor, it will become necessary for the Philippine planters to make some improvement in their present methods of production.

During the period from 1901 to 1907 abacá fiber was the leading export product of the Philippine Islands and constituted more than 66 per cent of the total value of all exports from the islands. Subsequently other agricultural industries, and particularly the production of coconuts and sugar, developed much more rapidly than the abacá industry. In 1928 the value of the abacá exported was only 17.1 per cent of the total value of all Philippine exports for that year.

Antiquated Methods Continued

With no direct competition from other countries, and with but relatively little competition from other industries in the islands, the Philippine abacá planters have been able to continue the use of antiquated and wasteful methods of production and still make a reasonable profit. In the older abacá provinces, in the southern part of the island of Luzon and in the Visayan Islands, abacá has been grown for generation after generation without cultivation and without the use of fertilizers. But little attention is given to the selection of the superior varieties, and the fiber is cleaned by the same old hand-stripping process that has been in general use for at least a century. In these provinces, and with these methods of production, the abacá industry is barely holding its own.

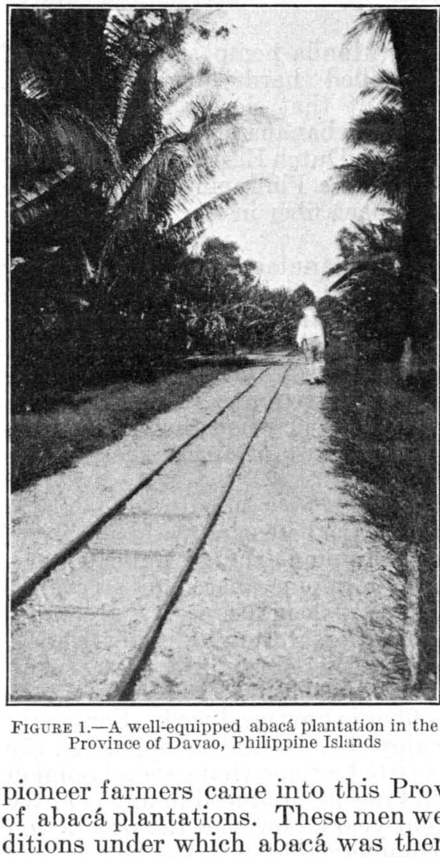


FIGURE 1.—A well-equipped abacá plantation in the Province of Davao, Philippine Islands

Fortunately for the future of Philippine abacá, the production of this crop has been established during recent years on a relatively efficient basis in the Province of Davao in the southern part of the island of Mindanao. (Figs. 1 and 2.) About 25 years ago a small group of American pioneer farmers came into this Province and started the development of abacá plantations. These men were determined to improve the conditions under which abacá was then being produced, and they immediately made improvements. The different varieties of abacá were observed and studied, and only the superior varieties were planted. A new system of planting was introduced, and an effort was made to obtain a machine that would satisfactorily clean the fiber. After experimenting for several years, a small fiber-cleaning machine was perfected, and this machine is now in general use throughout this Province.

Some years after the American plantations were established a group of Japanese planters became interested in the production of abacá, and the Japanese now control a large part of this industry in Davao. Numerous changes and improvements have been introduced by them. They have established an auction system that has greatly improved conditions for the local marketing of fiber; they are now conducting field experiments with different systems of planting, and with the use of cover crops and commercial fertilizers; and they are developing the production of machine-cleaned fiber.

The one thing that is now most urgently needed in the abacá industry is improvement in the present method of cleaning and drying the fiber. The small machine that is now used in Davao, although better than the old hand-stripping process, requires a large amount of labor and wastes about half of the product.

FIGURE 2.—Bundles of abacá fiber that have been brought from the plantations to the market in the town of Davao

Fiber-Cleaning Tests

Experimental fiber-cleaning tests made several years ago by the Bureau of Plant Industry of the United States Department of Agriculture indicated that abacá fiber could be cleaned with the large automatic machines that are used for cleaning sisal and henequen fiber. The preliminary experimental work of the Government was followed by a more elaborate series of tests, and subsequently a machine was installed on an abacá plantation in Davao. The production of machine-cleaned abacá fiber is now established on a commercial basis, with a current average monthly production of about 170,000 pounds. This machine-cleaned abacá is an excellent binder-twine fiber, and it has been used to some extent for the manufacture of the medium grades of cordage. Undoubtedly improvements will continue to be made not only in the cleaning but also in the methods of drying and handling this product. With these improvements it should be possible to produce machine-cleaned abacá fiber that will be entirely satisfactory for cordage purposes and that can be produced much more cheaply than the hand-cleaned product.

During the 15-year period from 1915 to 1929 there was an increase of 377,393 bales in the annual production of abacá fiber in this one district of southern Mindanao. The total annual increase in production for all of the other Provinces of the islands combined was only 201,011 bales of fiber.

The Province of Davao, with exceptionally favorable climatic and soil conditions, with 5,000,000 acres of agricultural land of which only 325,000 acres are now under cultivation, and with a group of abacá planters who are improving each year the conditions under which this crop is produced, should be able to furnish in the future any supply of abacá that may be required to meet a normal increase in the world demand for this fiber.

H. T. Edwards,
Senior Technologist, Bureau of Plant Industry.

ABORTION-DISEASE Tests Give Information on the Presence of this Malady

Infectious abortion is probably the most troublesome and costly disease with which dairymen and cattle breeders have to deal. Since it may spread rapidly throughout a herd, accurate means for its early detection are highly desirable. One would suppose that the appearance of its principal symptom, an abortion, would be sufficient for this purpose, but that does not imply definitely that the disease is present; neither does its absence insure that the herd is unaffected.

All abortions are by no means caused by what is known as infectious abortion, also called Bang's disease in recognition of the scientist, Bang, who discovered the causative organism. Some abortions are due to other infections, some possibly to deficiencies in iodine or other substances, and others to causes not yet understood. Any abortion should, however, lead to suspicion and the aborting animal should be kept in isolation and all the products of the abortion and the discharges following it destroyed. Immediate steps should then be taken to determine whether the herd is infected with the abortion microorganism. To the trained eye the appearance of the afterbirth gives some indication of whether the abortion is due to Bang's disease, but this indication is not entirely dependable. Several abortions occurring in succession strongly indicate the presence of this disease, but even such evidence is not conclusive.

The Nature of Abortion Tests

How, then, can the stock owner determine whether the disease is or is not present? Nearly all are familiar with the tuberculin test, by which the injection of a minute amount of tuberculin detects tuberculosis even in its very beginning. Efforts have been made to find a like substance, the injection of a small quantity of which would detect animals infected with abortion disease, but up to the present time substances of this kind have not proved wholly reliable for this purpose.

However, another kind of a test, known as the agglutination test, has proved to be reasonably reliable and is extensively used. In this test nothing is injected into the animal, but instead results depend on the satisfactory for cordage purposes and that can be produced much more cheaply than the hand-cleaned product.

During the 15-year period from 1915 to 1929 there was an increase of 377,393 bales in the annual production of abacá fiber in this one district of southern Mindanao. The total annual increase in production for all of the other Provinces of the islands combined was only 201,011 bales of fiber.

The Province of Davao, with exceptionally favorable climatic and soil conditions, with 5,000,000 acres of agricultural land of which only 325,000 acres are now under cultivation, and with a group of abacá planters who are improving each year the conditions under which this crop is produced, should be able to furnish in the future any supply of abacá that may be required to meet a normal increase in the world demand for this fiber.

H. T. EDWARDS,
Senior Technologist, Bureau of Plant Industry.

ABORTION-DISEASE Tests Give Information on the Presence of this Malady

Infectious abortion is probably the most troublesome and costly disease with which dairymen and cattle breeders have to deal. Since it may spread rapidly throughout a herd, accurate means for its early detection are highly desirable. One would suppose that the appearance of its principal symptom, an abortion, would be sufficient for this purpose, but that does not imply definitely that the disease is present; neither does its absence insure that the herd is unaffected.

All abortions are by no means caused by what is known as infectious abortion, also called Bang's disease in recognition of the scientist, Bang, who discovered the causative organism. Some abortions are due to other infections, some possibly to deficiencies in iodine or other substances, and others to causes not yet understood. Any abortion should, however, lead to suspicion and the aborting animal should be kept in isolation and all the products of the abortion and the discharges following it destroyed. Immediate steps should then be taken to determine whether the herd is infected with the abortion microorganism. To the trained eye the appearance of the afterbirth gives some indication of whether the abortion is due to Bang's disease, but this indication is not entirely dependable. Several abortions occurring in succession strongly indicate the presence of this disease, but even such evidence is not conclusive.

The Nature of Abortion Tests

How, then, can the stock owner determine whether the disease is or is not present? Nearly all are familiar with the tuberculin test, by which the injection of a minute amount of tuberculin detects tuberculosis even in its very beginning. Efforts have been made to find a like substance, the injection of a small quantity of which would detect animals infected with abortion disease, but up to the present time substances of this kind have not proved wholly reliable for this purpose.

However, another kind of a test, known as the agglutination test, has proved to be reasonably reliable and is extensively used. In this test nothing is injected into the animal, but instead results depend on the use of a small quantity of blood taken from the animal. There is also another blood test called the complement fixation test, but it is somewhat complicated and, since it is no more reliable than the agglutination test, is rarely used, except in experimental work.

The agglutination test for infectious abortion depends on the power of the animal body when it is invaded by the *Bact. abortus*, the germ that causes infectious abortion, to produce a substance that will cause these bacteria to be agglutinated or clumped when suspended in a saline solution. This agglutinating substance is present in the blood of animals affected with this disease and remains there as long as the animal is infected and for a considerable time afterward.

It seems that, once the body cells have been called on to make the agglutinating substances, they continue to do so in many cases to some extent for months or even years after the infection has disappeared. The amount of the agglutinating substance in the blood, to some extent, indicates the activity of the infection. Thus if one part of blood serum of the animal being tested is added to 200 parts of test fluid and agglutinates all of the bacteria in it (causing them to settle and leave the fluid clear), it is said to react in a titer of 1 to 200. The test fluid consists of a suspension of *Bact. abortus* in water containing a small amount of salt. If one part of the blood serum agglutinates all the abortion germs in 400 parts of test fluid it is said to react in a 1 to 400 titer, and so on. Reactions of 1 to 25 and 1 to 50 are usually regarded as suspicious; that is, they may be given by animals so recently infected that the agglutinating substances are just beginning to develop in their blood, or by animals that have lost their infection but have not entirely ceased to react. Later tests are necessary to determine to which class they belong. If animals have been recently infected a later test, made in two or three weeks, will in all probability show that the titer has increased, while if the animals are of the other class the titer will have remained stationary or fallen. Animals that continue to react in low titers, 1 to 50 or less, are probably safe animals, though it is not certain that all of them are. It is advisable to have the blood of such animals tested at least every six months to detect any that may possibly have developed a reaction of increased titer.

Calves' Resistance is High

New-born calves from infected cows seldom react to the agglutination test until after they have partaken of their dams' colostrum. After they have done this they react for a time in about the same titer as their dams, but the reactions gradually disappear, even though they continue to nurse infected milk from their dams. Occasionally a calf is found that fails to lose its reaction, but this is the exception and indicates that the animal is infected. As a rule, calves seem to be highly resistant to the disease.

The agglutination test has certain shortcomings which have led some persons to question its reliability. Perhaps the most serious of these is the tardiness with which some animals begin to react after becoming infected. In most animals the reactions begin to appear in a few weeks after infection but in some this does not occur until after several months, and occasionally, in pregnant animals, not until after their periods of gestation have been terminated by an abortion or parturition. A few cases of infected animals have been reported as never reacting, but it is believed that such animals are rare.

The tardiness with which the reactions sometimes appear is a rather serious failing because some infected animals may become spreaders of large amounts of infection before they can be detected. Moreover, the test does not tell whether an animal will abort or not and, as before stated, does not always sharply distinguish between present and past infection.

While it has these limitations it gives much valuable information as to whether infectious abortion is present in the herd and the extent of the infection, and points out those animals that are or may become dangerous. It has the advantage that it can be repeated as often as desired and by proper interpretation will greatly aid in combating the disease. Already it is rendering good service in aiding cattle owners to free their herds from the disease and in keeping them free. The test is not always successful in doing this but it goes a long way in the desired direction. Further experience should lead to a better understanding of the test and an increase in its efficiency.

A Promising New Method of Testing

Recently a modified method of making the agglutination test for infectious abortion has come into use and promises to become popular. This is the rapid method brought out by Huddleson and Carlson, of the Michigan Agricultural College. This test appears to compare favorably with the older and slower method and has the advantage of requiring much less apparatus and time. Most laboratories still prefer the slow method but if the rapid one stands the test of time it should prove very useful.

W. E. Cotton, *Superintendent,*
J. M. Buck, *Assistant Superintendent,*
Bureau of Animal Industry Experiment Station.

ALFALFA Acreage Shifts Much Annually Despite the Crop's Popularity

Constant shifts in alfalfa supplies within the various States and from State to State are revealed by even a casual glance at statistics on this most valuable forage crop. Although alfalfa is an extremely popular feed with dairymen and cattle feeders everywhere, the acreage devoted to it varies considerably from year to year. The causes of this gypsy-like wandering about are many, chief among which are plant diseases and insect enemies as well as efforts of overenthusiastic farmers who have introduced the plant, or poorly acclimated strains of it, into sections having light annual rainfall, severely low temperatures in winter, or an acid condition of the soil. Another very important cause of this shift in acreage, particularly eastward, is due to a desire to bring production nearer to the consumer and to more profitable markets.

The early history of alfalfa in this country is so well known that it is not necessary to go into detail here. Suffice it to say that the early colonists attempted to grow it in Virginia, North Carolina, Pennsylvania, and New York before the Revolutionary War. George Washington tried it at Mount Vernon with a fair degree of success, but his experiments were cut short by his death in 1799. Thomas Jefferson seems to have been even more successful than Washington, but the lack of sufficiently well-drained limestone soil greatly handicapped

The tardiness with which the reactions sometimes appear is a rather serious failing because some infected animals may become spreaders of large amounts of infection before they can be detected. Moreover, the test does not tell whether an animal will abort or not and, as before stated, does not always sharply distinguish between present and past infection.

While it has these limitations it gives much valuable information as to whether infectious abortion is present in the herd and the extent of the infection, and points out those animals that are or may become dangerous. It has the advantage that it can be repeated as often as desired and by proper interpretation will greatly aid in combating the disease. Already it is rendering good service in aiding cattle owners to free their herds from the disease and in keeping them free. The test is not always successful in doing this but it goes a long way in the desired direction. Further experience should lead to a better understanding of the test and an increase in its efficiency.

A Promising New Method of Testing

Recently a modified method of making the agglutination test for infectious abortion has come into use and promises to become popular. This is the rapid method brought out by Huddleson and Carlson, of the Michigan Agricultural College. This test appears to compare favorably with the older and slower method and has the advantage of requiring much less apparatus and time. Most laboratories still prefer the slow method but if the rapid one stands the test of time it should prove very useful.

W. E. Cotton, *Superintendent,*
J. M. Buck, *Assistant Superintendent,*
Bureau of Animal Industry Experiment Station.

ALFALFA Acreage Shifts Much Annually Despite the Crop's Popularity

Constant shifts in alfalfa supplies within the various States and from State to State are revealed by even a casual glance at statistics on this most valuable forage crop. Although alfalfa is an extremely popular feed with dairymen and cattle feeders everywhere, the acreage devoted to it varies considerably from year to year. The causes of this gypsy-like wandering about are many, chief among which are plant diseases and insect enemies as well as efforts of overenthusiastic farmers who have introduced the plant, or poorly acclimated strains of it, into sections having light annual rainfall, severely low temperatures in winter, or an acid condition of the soil. Another very important cause of this shift in acreage, particularly eastward, is due to a desire to bring production nearer to the consumer and to more profitable markets.

The early history of alfalfa in this country is so well known that it is not necessary to go into detail here. Suffice it to say that the early colonists attempted to grow it in Virginia, North Carolina, Pennsylvania, and New York before the Revolutionary War. George Washington tried it at Mount Vernon with a fair degree of success, but his experiments were cut short by his death in 1799. Thomas Jefferson seems to have been even more successful than Washington, but the lack of sufficiently well-drained limestone soil greatly handicapped farmers of that time, and alfalfa, or lucern as it was then called, was considered of little importance until about 1854, when it was introduced into California from Chile. Since that time the development of strains more or less adapted to various sections of the country and the introduction of the winter-hardy Grimm alfalfa in the extreme northern parts has led to a rather general spread of this valuable crop into practically every State.

Thrived on West Coast

Conditions being naturally more favorable for alfalfa growing on the west coast, it thrived and soon became an important crop there. By 1870 it had spread eastward as far as Kansas. Conditions in the central western States seemed to be even more favorable than on the Pacific coast. As a result, Kansas, Nebraska, Colorado, and Okla-

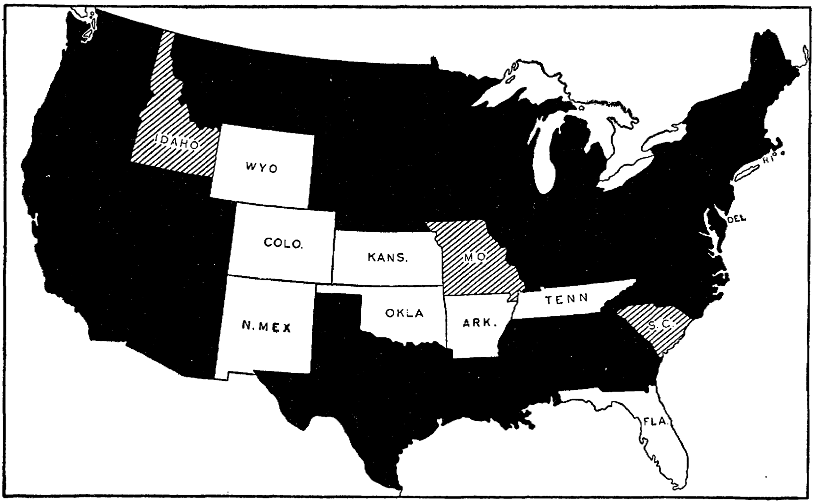


FIGURE 3.—Shifts in alfalfa production, 1920 to 1929. Heavily shaded portions indicate States having a 1929 acreage greater than that for 1920. Acreage continued about unchanged during this period in States shaded with lines. The acreage decreased rather steadily in the unshaded portions with the exception of the State of Florida where alfalfa production is negligible

homa soon became and still remain large alfalfa producing States and furnish the bulk of the market supplies. There has been considerable shifting of production within those States, however, as well as elsewhere in the United States, particularly within the past decade. Kansas had for many years the largest alfalfa acreage of any State in the Union, but about 1920 the lead was taken by Nebraska where the acreage is in turn declining at a rate that promises soon to let California take first place. Losses in these States, however, have been met by substantial increases in acreage in the Dakotas and Iowa, permitting a continuous gain in acreage for the central-western section as a whole until the present time, although this gain has been slower during the past few years. (Fig. 3.)

Alfalfa is again invading the Atlantic Seaboard States but this time with a greater degree of success, due to a better knowledge of the needs of the plant, improved methods of farming, and rather extensive educational campaigning on the part of the extension agents and others interested in more profitable farming practices. The acreage is still not great in most of these States, however, largely because of the lack of sufficient limestone soils and the difficulty of curing the hay in that area.

In the Southeastern States, with the exception of Florida where little if any alfalfa is grown, and South Carolina where the acreage has remained about constant for many years, there has been a gradual increase in acreage during the past decade. This increase has been due largely to greater interest in livestock production and better farming methods. Low cotton prices, particularly in 1920 and 1921, were also an important factor in inducing many cotton growers to increase their acreage of hay and forage crops as a matter of economy, although the acreage is still comparatively small in practically all these States. Production in Arkansas, Oklahoma, and Tennessee is now somewhat smaller than 10 years ago but it has made fair gains during the past five years.

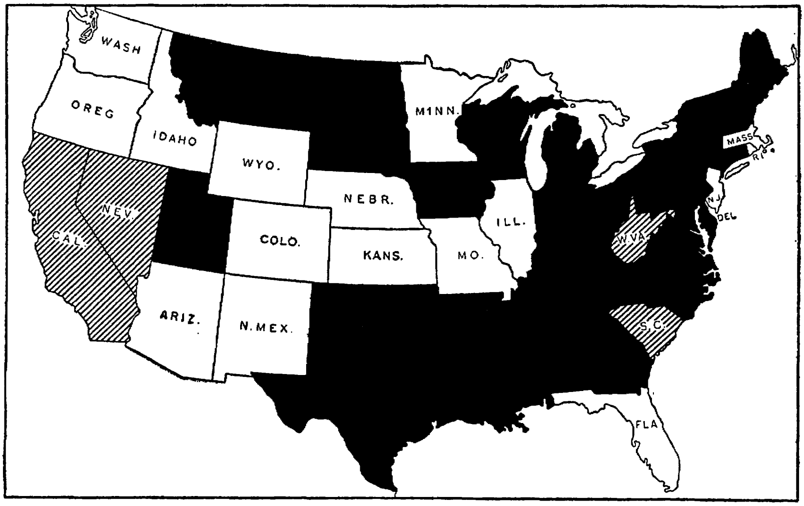


FIGURE 4.—Shifts in alfalfa production, 1925 to 1929. Heavily shaded portions indicate States having a 1929 acreage greater than that for 1925. Acreage was about unchanged during this period in States shaded with lines. Acreage decreased rather steadily in the unshaded portions with the exception of the State of Florida where alfalfa production is negligible

Adapted to Irrigation Farming

Although alfalfa is most highly adapted to irrigation farming in arid regions, Utah is the only State in the far-western section showing an increase in acreage to the present time. The acreage in California and Nevada was almost stationary during the past five years while the remainder of these States showed a decline.

Alfalfa acreage for the United States as a whole has increased constantly since the beginning of its migration eastward from California some 50 or 60 years ago but the gain in later years is not so great as formerly due to the recent more or less general falling off in production in the principal producing States. (Fig. 4.)

This constant shifting has been due quite largely to unique characteristics of the alfalfa plant itself. In the first place, the plant is a heavy and comparatively particular feeder with an unusually high water requirement. Under favorable conditions, it will send its roots down a considerable depth which often results in the using of such quantities of stored water in the drier sections that the plant can no longer survive. This alone has probably been the principal cause of the decreasing acreage in many nonirrigated sections of the West. Bacterial wilt and other diseases and insect pests have also been influential in reducing the acreage in several of the older and larger producing States. A third factor that has been important in some sections, is the introduction of seed of nonhardy strains or strains that were not capable of adjusting themselves to the soil and climate of the new location. A continuously good demand from eastern dairymen which has created and maintained comparatively high alfalfa prices at eastern markets has stimulated production in eastern sections. This, together with a desire on the part of many farmers to produce sufficient forage for their own use or to supply adequately local demand, has been responsible for a large part of the increased acreage east of the Mississippi River.

JOHN T. PEARSON,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

APPLE Market Supply is Composed Largely of a Few Varieties Hundreds of varieties of apples are grown in the United States but relatively few are of commercial importance. A survey in 41 leading markets in a recent season of generally heavy apple production showed considerable differences in varietal composition and source of market supplies. In planning for production and marketing, apple growers may benefit by considering the special requirements of their markets.

Fifteen varieties composed 83 per cent of the market supplies, according to the survey. In order of importance these were: Winesap, Jonathan, Baldwin, Rome Beauty, Delicious, Yellow Newtown, Stayman Winesap, Rhode Island Greening, McIntosh, Esopus Spitzenburg, Ben Davis, York Imperial, Gravenstein, Yellow Transparent, and Grimes Golden. Winesap and Jonathan were of nearly equal importance and together made up slightly more than one-fourth of the supply. Five varieties—Winesap, Jonathan, Baldwin, Rome Beauty, and Delicious—represented almost one-half of the total.

When considered by geographical groups and even by individual markets, there are pronounced differences in the varietal composition of the supplies. In six eastern cities as a group the Baldwin was the leading variety, representing 13 per cent, followed by the Winesap with 12 per cent, and the McIntosh with 9 per cent. In the group of 11 mid-western cities the Jonathan was far in the lead, composing 22 per cent of the supply, and was followed by the Winesap with 12 per cent and the Baldwin and Delicious with 10 per cent each. In five far-western cities the Yellow Newtown comprised one-fourth of the apples on the markets. Jonathan, Yellow Bellflower, Rome Beauty, and Winesap were also prominent in the markets in the far West. Slightly more than one-fourth of the quantity of apples in 19 southern markets was of the Winesap variety. The Delicious and Stayman Winesap were also popular in the South. The South is generally considered a good market for Ben Davis but this variety constituted only 3 per cent of the apples in southern markets.

down a considerable depth which often results in the using of such quantities of stored water in the drier sections that the plant can no longer survive. This alone has probably been the principal cause of the decreasing acreage in many nonirrigated sections of the West. Bacterial wilt and other diseases and insect pests have also been influential in reducing the acreage in several of the older and larger producing States. A third factor that has been important in some sections, is the introduction of seed of nonhardy strains or strains that were not capable of adjusting themselves to the soil and climate of the new location. A continuously good demand from eastern dairymen which has created and maintained comparatively high alfalfa prices at eastern markets has stimulated production in eastern sections. This, together with a desire on the part of many farmers to produce sufficient forage for their own use or to supply adequately local demand, has been responsible for a large part of the increased acreage east of the Mississippi River.

JOHN T. PEARSON,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

APPLE Market Supply is Composed Largely of a Few Varieties Hundreds of varieties of apples are grown in the United States but relatively few are of commercial importance. A survey in 41 leading markets in a recent season of generally heavy apple production showed considerable differences in varietal composition and source of market supplies. In planning for production and marketing, apple growers may benefit by considering the special requirements of their markets.

Fifteen varieties composed 83 per cent of the market supplies, according to the survey. In order of importance these were: Winesap, Jonathan, Baldwin, Rome Beauty, Delicious, Yellow Newtown, Stayman Winesap, Rhode Island Greening, McIntosh, Esopus Spitzenburg, Ben Davis, York Imperial, Gravenstein, Yellow Transparent, and Grimes Golden. Winesap and Jonathan were of nearly equal importance and together made up slightly more than one-fourth of the supply. Five varieties—Winesap, Jonathan, Baldwin, Rome Beauty, and Delicious—represented almost one-half of the total.

When considered by geographical groups and even by individual markets, there are pronounced differences in the varietal composition of the supplies. In six eastern cities as a group the Baldwin was the leading variety, representing 13 per cent, followed by the Winesap with 12 per cent, and the McIntosh with 9 per cent. In the group of 11 mid-western cities the Jonathan was far in the lead, composing 22 per cent of the supply, and was followed by the Winesap with 12 per cent and the Baldwin and Delicious with 10 per cent each. In five far-western cities the Yellow Newtown comprised one-fourth of the apples on the markets. Jonathan, Yellow Bellflower, Rome Beauty, and Winesap were also prominent in the markets in the far West. Slightly more than one-fourth of the quantity of apples in 19 southern markets was of the Winesap variety. The Delicious and Stayman Winesap were also popular in the South. The South is generally considered a good market for Ben Davis but this variety constituted only 3 per cent of the apples in southern markets.

Causes of Regional Preferences

Differences in the proportions of varieties of apples used in individual markets or in groups of markets in different areas may be due to such factors as proximity to areas where certain varieties are grown in large quantities or to customs and preferences of dealers and consumers. The relative demand for different varieties may change somewhat from year to year in response to changed conditions.

Market preferences, as indicated by the proportions of varieties in the supplies in different cities, are rather pronounced. New York City is our greatest market for the McIntosh variety in so far as actual quantity is concerned. In percentage of total supply for each city, however, Boston used about 16 per cent of McIntosh compared with 11 per cent in New York. In contrast, other important markets such as Philadelphia and Pittsburgh used so few McIntosh that they were not reported separately in the survey and probably were less than 1 per cent. This does not mean that there is no potential demand for the McIntosh variety in markets other than New York and New England cities but it indicates that introduction of the variety into other markets has not so far been necessary.

Philadelphia is the outstanding Stayman Winesap market. About 31 per cent of this city's apples were of this variety, compared with an average of 5 per cent for all cities included in the survey. The Rhode Island Greening, apparently, is not in demand on the Pittsburgh market. Only one-fifth of 1 per cent was of this variety in Pittsburgh compared with 9 per cent in New York and 6 per cent as an average for the group of six eastern cities. In Chicago and other mid-western cities the Jonathan is the market leader and in a number of cities in this region it comprised from 20 to 30 per cent of the receipts. This is in contrast with the East and South where only about 6 per cent was of the Jonathan variety.

As examples of peculiarities in individual city requirements in the South the cases of Spartanburg, S. C., and Savannah, Ga., are worthy of note. In the former city one-third of the apple receipts were Stayman Winesap with no York Imperial reported, whereas in the latter city, 22 per cent were York Imperial and only 11 per cent Stayman Winesap.

In all sections the trend seems to be toward the consumption of larger proportions of the so-called higher quality varieties. The demand for high quality as reflected in price is significant. In a recent season in New York, prices to jobbers for New York McIntosh averaged $9.14 per barrel and for Yellow Newtown $9.25 compared with $6.56 for York Imperial and $5.60 for Ben Davis. Delicious averaged $3.78 per box at auction compared with $2.87 for Winesap.

Apple Crop Widely Distributed

The wide distribution of the apple crop is illustrated by the fact that the carload supply of New York City during a recent full crop season was shipped an average distance of about 1,300 miles and more than half of this supply came from points over 2,000 miles distant. For Chicago, the average distance was more than 1,050 miles, with slightly over 50 per cent coming more than 1,500 miles. The average distance for Atlanta was more than 900 miles and 31 per cent was produced more than 2,000 miles away.

Western-grown apples are shipped to all parts of the country, whereas eastern apples are shipped as far west as cities in the Mississippi Valley. A comparison of the characteristics of northwestern apple supplies with those from the East and Middle West shows that many of the northwestern varieties, such as Winesap, Jonathan, Stayman Winesap, Rome Beauty, Yellow Newtown, and Delicious, are also grown extensively in the East and Middle West. The principal difference is that the northwestern apples are packed in boxes and are more closely graded and sized than are most apples from the East and Middle West, which are usually packed in barrels and bushel baskets.

Continued progress in the development and production of better varieties, changing consumer demands, and improvements in marketing methods, including better transportation and storage facilities, are causing gradual changes in the composition of the commercial apple supply.

J. W. PARK,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

APPLE-TREE Plantings Since 1920 Show Trend Toward Newer Varieties In a recent survey of apple orchards 243 varieties were reported by the commercial growers of Michigan and 241 by New York producers, whereas less than 75 varieties were reported by Washington growers. Although orchards throughout the United States contain hundreds of varieties, it is estimated that five varieties make up approximately 37 per cent of the total number of trees in commercial orchards and that the first 15 varieties include 71 per cent of the trees. Twenty-five varieties are listed in Figure 5 according to their importance in commercial orchards of the United States. They are shown by numbers of trees on January 1, 1928. The periods when they were set indicate the age of the trees and in a general way reflect changes in varieties planted from one period to the next in response to consumer preference.

Fifty-six per cent of the Delicious trees in commercial orchards were set in the period 1920–1927 while less than 7 per cent of the Ben Davis trees were planted during this period. Other varieties in which large proportions of the trees now standing were planted during this period are the Stayman Winesap, 38.5 per cent; McIntosh, 48.3 per cent; Yellow Transparent, 52.4 per cent; and the Golden Delicious, 94.4 per cent. Still other varieties of which more moderate percentages of the trees were planted from 1920–1927 are: Winesap, Jonathan, Rome Beauty, Grimes Golden, Wealthy, Rhode Island Greening, and Northern Spy. (Fig. 5.)

Only a relatively small percentage of the trees of such varieties as Baldwin, Ben Davis, York Imperial, Yellow Newtown (Albemarle Pippin), Gano, Arkansas (Mammoth Black Twig), Esopus Spitzenburg, and Stark were planted during the period 1920–1927. From 85 to 90 per cent of the trees of most of these varieties were planted before 1920, and for individual varieties the percentage of trees planted before 1910 varies from 35 to 77 per cent.

Trees of the four varieties—Delicious, Winesap, Jonathan, and Stayman Winesap—number about 25,000,000, or 31 per cent of the

Western-grown apples are shipped to all parts of the country, whereas eastern apples are shipped as far west as cities in the Mississippi Valley. A comparison of the characteristics of northwestern apple supplies with those from the East and Middle West shows that many of the northwestern varieties, such as Winesap, Jonathan, Stayman Winesap, Rome Beauty, Yellow Newtown, and Delicious, are also grown extensively in the East and Middle West. The principal difference is that the northwestern apples are packed in boxes and are more closely graded and sized than are most apples from the East and Middle West, which are usually packed in barrels and bushel baskets.

Continued progress in the development and production of better varieties, changing consumer demands, and improvements in marketing methods, including better transportation and storage facilities, are causing gradual changes in the composition of the commercial apple supply.

J. W. Park,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

APPLE-TREE Plantings Since 1920 Show Trend Toward Newer Varieties In a recent survey of apple orchards 243 varieties were reported by the commercial growers of Michigan and 241 by New York producers, whereas less than 75 varieties were reported by Washington growers. Although orchards throughout the United States contain hundreds of varieties, it is estimated that five varieties make up approximately 37 per cent of the total number of trees in commercial orchards and that the first 15 varieties include 71 per cent of the trees. Twenty-five varieties are listed in Figure 5 according to their importance in commercial orchards of the United States. They are shown by numbers of trees on January 1, 1928. The periods when they were set indicate the age of the trees and in a general way reflect changes in varieties planted from one period to the next in response to consumer preference.

Fifty-six per cent of the Delicious trees in commercial orchards were set in the period 1920–1927 while less than 7 per cent of the Ben Davis trees were planted during this period. Other varieties in which large proportions of the trees now standing were planted during this period are the Stayman Winesap, 38.5 per cent; McIntosh, 48.3 per cent; Yellow Transparent, 52.4 per cent; and the Golden Delicious, 94.4 per cent. Still other varieties of which more moderate percentages of the trees were planted from 1920–1927 are: Winesap, Jonathan, Rome Beauty, Grimes Golden, Wealthy, Rhode Island Greening, and Northern Spy. (Fig. 5.)

Only a relatively small percentage of the trees of such varieties as Baldwin, Ben Davis, York Imperial, Yellow Newtown (Albemarle Pippin), Gano, Arkansas (Mammoth Black Twig), Esopus Spitzenburg, and Stark were planted during the period 1920–1927. From 85 to 90 per cent of the trees of most of these varieties were planted before 1920, and for individual varieties the percentage of trees planted before 1910 varies from 35 to 77 per cent.

Trees of the four varieties—Delicious, Winesap, Jonathan, and Stayman Winesap—number about 25,000,000, or 31 per cent of the total number of apple trees in commercial orchards. These varieties are widely grown and occur in most of the important commercial apple-producing areas of the country.

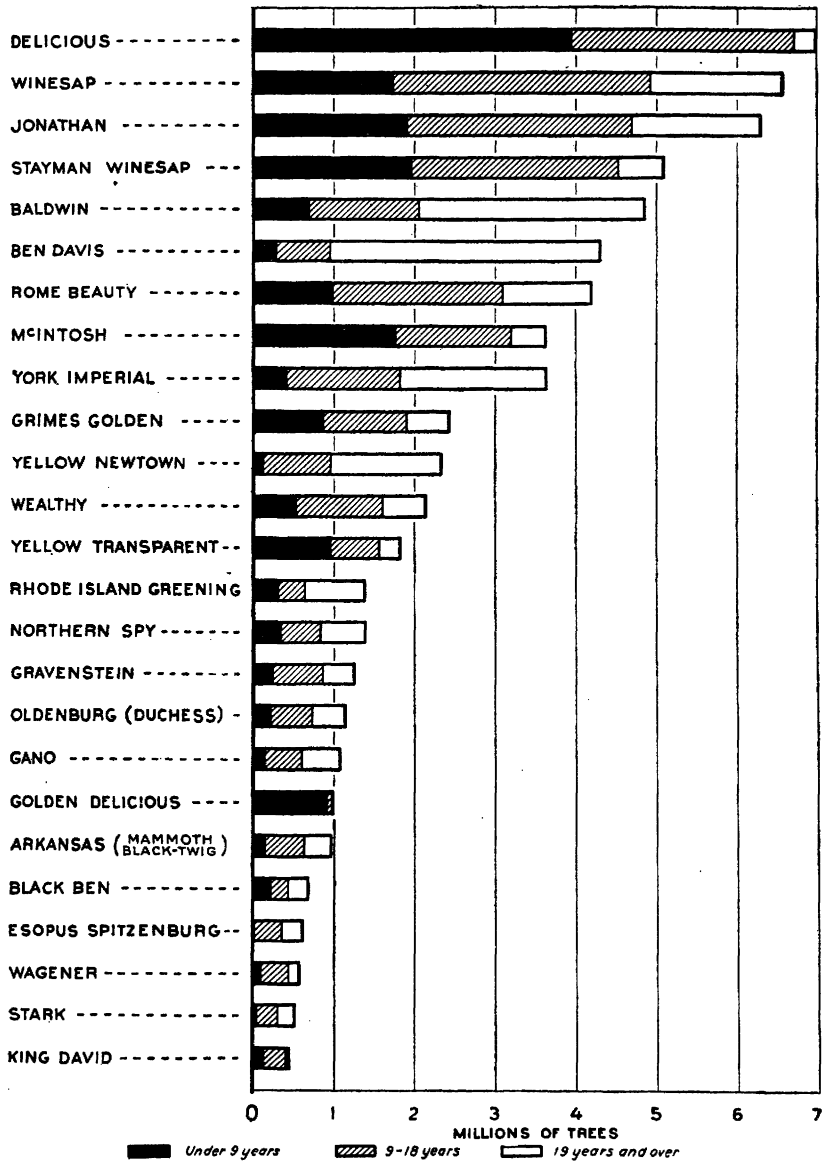


FIGURE 5.—Of 80,000,000 trees in commercial orchards, Delicious, Winesap, Jonathan, Stayman Winesap, Baldwin, and Ben Davis make up 42.6 per cent of all trees; 28.7 per cent of all trees were set during the period 1920–1927 and 38.7 per cent were set in the years 1910–1919. (Preliminary estimates. See also statistical section of this yearbook)

The Baldwin, Rhode Island Greening, and Northern Spy are confined largely to the Northeastern States. There are about 7,700,000 trees of these varieties in commercial orchards. These trees represent about 10 per cent of the total trees in the commercial orchards.

The Ben Davis, a widely distributed variety, has been only lightly planted during recent years.

The Rome Beauty has been planted commercially in certain localities throughout the country extending from coast to coast.

The McIntosh, like the Delicious, has been heavily planted during late years. The trees of this variety probably constitute 4½ per cent of all trees in commercial orchards and nearly 50 per cent of them have been planted since 1919. The McIntosh is grown extensively in New York and in the New England States and to a lesser extent in Michigan, the Cumberland-Shenandoah area, and Montana.

The Grimes Golden probably makes up 3 per cent of all apple trees in commercial orchards. Its popularity is evident in localities throughout much of the country extending from New Jersey to the Pacific coast.

Of the early varieties the Yellow Transparent and Gravenstein are most important. The Yellow Transparent has been planted rather freely during recent years in New Jersey, Maryland, Delaware, Tennessee, and Illinois. The Gravenstein is grown primarily in California and to a lesser extent in the New England States.

Varieties in Recent Plantings

Another indication of the widespread importance of some of the newer and more popular varieties is found in the fact that over 17 per cent of all trees now in commercial orchards that were planted during the period 1920–1927 were of the Delicious variety. Trees of Delicious, Jonathan, Stayman Winesap, Winesap, and McIntosh make up nearly 50 per cent of the trees now standing in commercial orchards that were planted during the years 1920–1927.

Space does not permit detail concerning the hundreds of varieties reported in the tree survey. Suffice it to say that many of the little known and none too popular varieties are giving way to the newer and more popular varieties in response to consumer demand.

Many varieties that are rather important in a given community are not listed in Figure 5 because of their unimportance from a national standpoint. For example, 95 per cent of the Cortland apple trees, a new variety as yet significant only in New York, where it ranks seventh, were planted during the years 1920–1927. Two other varieties that were planted commercially for the first time during the last 10 years and that promise to become commercially important are the Starking and the Richared (bud sports of the Delicious).

Many of the trees now in commercial orchards were planted 20 to 25 years ago. As a result of overexpansion of the industry at that time many orchards have been forced out of production and others have been neglected. In spite of this condition some of the more popular varieties have returned relatively favorable prices and during the period 1920–1925 a fairly heavy planting of these more popular varieties occurred. This accounts for the large numbers of young trees of varieties like the Delicious, McIntosh, Stayman Winesap, and Yellow Transparent. Trees of some of these varieties have been planted in new localities but are so young that it is not known to what extent they will succeed in their new environment. It is felt that if they thrive and bear well in all sections in which they have been planted, the relatively favorable price position of some of these varieties that has obtained for several years may not continue. It is probable that some of the less popular varieties will continue to give way and as production of these decrease there will be more room for any increase in production of the more popular varieties.

Corner Seems Turned

Taken all in all the apple industry has turned the corner and probably is in a better position now than for many years since the gross overplanting which occurred during the period 1905–1912. There is no indication that commercial production will decline, but rather that it will gradually work higher as the years go by but at a more moderate and uniform rate than the rate of increase that accompanied the expansion of the apple industry of 20 to 25 years ago.

W. H. YOUNGMAN,
Associate Agricultural Economist,
Bureau of Agricultural Economics.

AUSTRIAN Winter Pea Has Superior Value as a Green Manure

Of the many problems that perplex the farmer none is as ever present as that of maintaining soil fertility. The growing and removal of crops from the land depletes the available plant food, and this must be replaced by the breaking down of the soil particles already there or by additions of plant food from other sources. Furthermore it is not only desirable to maintain an average soil fertility, but everything possible should be done to assure the continuous production of maximum crops. Many plants, especially legumes, have been used for their benefit on succeeding crops, and the practice of using such crops in rotation as standard cash crops and also for green manure is not new. The search for new or superior crops for specific purposes, however, has attracted the attention of many experimental workers. In recent years, more particularly, efforts have been made to procure legumes that would make superior growth during the winter months, when growing conditions are unfavorable for most plants, and that would give superior benefits from their use in a crop rotation.

The Austrian winter pea has recently come into prominence in this rôle, and its favorable performance has resulted in its use being rapidly extended. As a winter green-manure crop in the Cotton Belt it has proved well adapted, and in the comparatively few years in which it has been used the area planted has increased to approximately 75,000 acres.

In experimental trials in Georgia, Florida, Alabama, and other States, greatly increased yields of cotton and corn have followed the use of this crop. Its value has been recognized by the pecan and citrus growers, although in the more southern area other winter legume crops have proved of apparent equal value. When planted in the early fall it will make a good growth for turning under, preceding the active growth of the trees in the late winter or early spring, and will supply readily available plant food to the growing trees. The maintenance of orchards in good condition is dependent largely on the supplying of organic matter to the soil, and where a green-manure crop can be grown during the more nearly dormant period of the tree and without interfering with cultural operations, it is one of the cheapest and most effective methods of supplying organic matter.

some of the less popular varieties will continue to give way and as production of these decrease there will be more room for any increase in production of the more popular varieties.

Corner Seems Turned

Taken all in all the apple industry has turned the corner and probably is in a better position now than for many years since the gross overplanting which occurred during the period 1905–1912. There is no indication that commercial production will decline, but rather that it will gradually work higher as the years go by but at a more moderate and uniform rate than the rate of increase that accompanied the expansion of the apple industry of 20 to 25 years ago.

W. H. YOUNGMAN,
Associate Agricultural Economist,
Bureau of Agricultural Economics.

AUSTRIAN Winter Pea Has Superior Value as a Green Manure

Of the many problems that perplex the farmer none is as ever present as that of maintaining soil fertility. The growing and removal of crops from the land depletes the available plant food, and this must be replaced by the breaking down of the soil particles already there or by additions of plant food from other sources. Furthermore it is not only desirable to maintain an average soil fertility, but everything possible should be done to assure the continuous production of maximum crops. Many plants, especially legumes, have been used for their benefit on succeeding crops, and the practice of using such crops in rotation as standard cash crops and also for green manure is not new. The search for new or superior crops for specific purposes, however, has attracted the attention of many experimental workers. In recent years, more particularly, efforts have been made to procure legumes that would make superior growth during the winter months, when growing conditions are unfavorable for most plants, and that would give superior benefits from their use in a crop rotation.

The Austrian winter pea has recently come into prominence in this rôle, and its favorable performance has resulted in its use being rapidly extended. As a winter green-manure crop in the Cotton Belt it has proved well adapted, and in the comparatively few years in which it has been used the area planted has increased to approximately 75,000 acres.

In experimental trials in Georgia, Florida, Alabama, and other States, greatly increased yields of cotton and corn have followed the use of this crop. Its value has been recognized by the pecan and citrus growers, although in the more southern area other winter legume crops have proved of apparent equal value. When planted in the early fall it will make a good growth for turning under, preceding the active growth of the trees in the late winter or early spring, and will supply readily available plant food to the growing trees. The maintenance of orchards in good condition is dependent largely on the supplying of organic matter to the soil, and where a green-manure crop can be grown during the more nearly dormant period of the tree and without interfering with cultural operations, it is one of the cheapest and most effective methods of supplying organic matter.

Withstands Extreme Changes of Temperature

The superior value of the Austrian winter pea lies largely in its ability to stand the extreme cold of winter and yet in the warmer spells to make enough growth to turn down in early spring preceding the planting of cotton and corn. The minimum temperature at which it will make growth is lower than that for hairy vetch or other legumes commonly used for green manure, and this fact, together with the fact that it is especially winter hardy, makes it of special worth. That the seeds germinate quickly, and good stands are usually secured, should also be noted. Furthermore, the root system is extensive, and the plant is succulent and decays quickly, thus making a large amount of plant food readily available.

Aside from these advantages there seem to be beneficial results following the use of Austrian winter peas as green manure which can not be explained in terms of measurable plant-food fertilizer. The benefit on succeeding crops, however, can be noted for several years, and after the fertilizing elements and organic matter seem to have disappeared.

To insure success with the Austrian winter pea several points should be specially noted. Seeding should be done in the Cotton Belt during the last of September or early October. Earlier plantings are likely to be damaged more or less by nematodes, and later plantings may give poor stands and light growth.

When planting on a field for the first time Austrian winter peas should always be inoculated with bacterial cultures to induce root nodulation and should be inoculated in subsequent years until it is known that the nodulation will be secured.

One of the most important things, both with reference to inoculation and good winter growth of the Austrian winter pea crop, is the use of commercial fertilizer or barnyard manure.

Superphosphate is Most Needed Fertilizer

Superphosphate is the most essential fertilizer compound for this crop, and where the preceding corn or cotton or other crop has not been well fertilized 400 pounds of superphosphate per acre should be used. Austrian winter peas may need little or no fertilizer when the preceding cotton or corn has been heavily fertilized. In planting Austrian winter peas for the first time, however, it is well to use at least 300 pounds of superphosphate and 50 pounds of nitrate of soda per acre, even though the preceding crop may have been heavily fertilized. Barnyard manure should be used whenever available, as it is especially valuable in insuring inoculation and greatly increases yields.

The quantity of seed needed per acre varies with latitude and soil conditions, but in general 30 pounds is recommended for the southern part of the Cotton Belt and 40 pounds for the northern part. Seeding is usually done broadcast, but the use of a drill when available is advised.

If the peas are seeded with Abruzzi rye, as is sometimes practiced on sandy lands, the full amount of pea seed should be used and about half the amount of rye that is commonly used in seeding rye alone. The use of rye in this combination is a good practice in building up poor sandy lands, since the rye is especially well suited to such conditions and will contribute more organic matter than any other winter crop. (Fig. 6.)

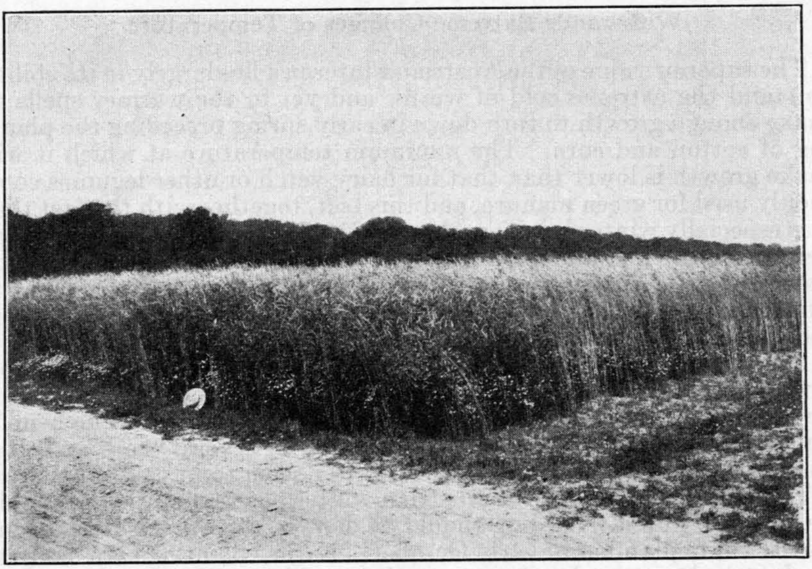


FIGURE 6.—Austrian winter peas and rye growing together. This is a good mixture for sandy lands

When Austrian winter peas as a green manure crop precede corn or cotton the peas should be plowed down two weeks before the corn and three weeks before the cotton is planted. If less time elapses the seedlings may sometimes be damaged.

ROLAND McKEE,
Senior Agronomist, Bureau of Plant Industry.

AZALEAS Introduced From Japan are Suited to Wide Area in U. S.

At the present time there are two distinct groups of azaleas that Japan has contributed for the use of gardeners in this country, the one characterized by deciduous foliage and a general habit of growth more or less resembling that of our native species, and the other with evergreen foliage, except in the extreme northern limits of their range, and flowers more like those of the tender Indian azaleas so largely grown for the florists' trade.

The first group is the less common at the present time and is marked chiefly by the Japanese azalea (*Rhododendron japonicum* Suring.). (Fig. 7, A.) This is more vigorous and hardier than the Chinese azalea (*R. molle* G. Don), which also is found in gardens and is the species most commonly found in cultivation together with numerous hybrids derived from the two species and from the crossing of these species and American natives.

For the ordinary garden the use of the Japanese azalea can be recommended wherever there is an acid soil suitable for such plants as far north as Boston near the coast and as far north as the central portion of the Corn Belt farther inland. From these points the plants are hardy but often suffer from the winterkilling of the flower buds.

The flowers are large and range in color from fairly light yellows to deep orange reds and are produced in large terminal heads appearing before the leaves have made any conspicuous growth.

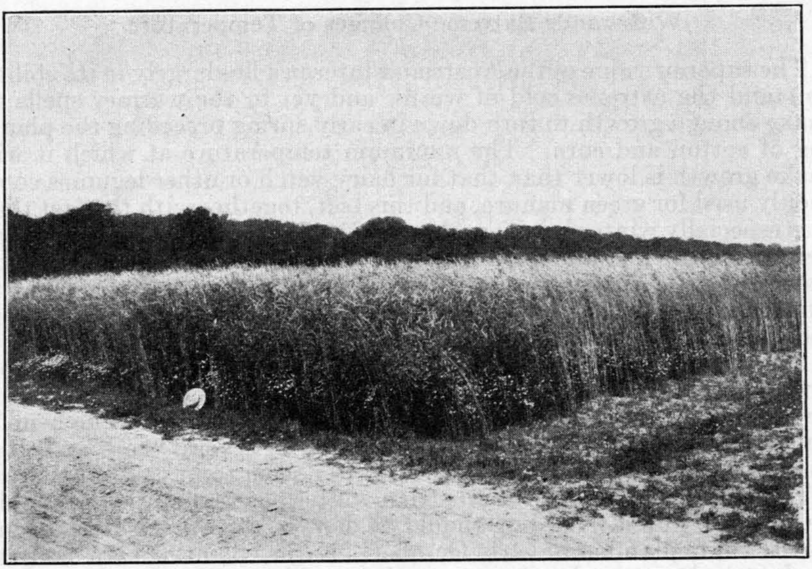


FIGURE 6.—Austrian winter peas and rye growing together. This is a good mixture for sandy lands

When Austrian winter peas as a green manure crop precede corn or cotton the peas should be plowed down two weeks before the corn and three weeks before the cotton is planted. If less time elapses the seedlings may sometimes be damaged.

ROLAND MCKEE,
Senior Agronomist, Bureau of Plant Industry.

AZALEAS Introduced From Japan are Suited to Wide Area in U. S. At the present time there are two distinct groups of azaleas that Japan has contributed for the use of gardeners in this country, the one characterized by deciduous foliage and a general habit of growth more or less resembling that of our native species, and the other with evergreen foliage, except in the extreme northern limits of their range, and flowers more like those of the tender Indian azaleas so largely grown for the florists' trade.

The first group is the less common at the present time and is marked chiefly by the Japanese azalea (*Rhododendron japonicum* Suring.). (Fig. 7, A.) This is more vigorous and hardier than the Chinese azalea (*R. molle* G. Don), which also is found in gardens and is the species most commonly found in cultivation together with numerous hybrids derived from the two species and from the crossing of these species and American natives.

For the ordinary garden the use of the Japanese azalea can be recommended wherever there is an acid soil suitable for such plants as far north as Boston near the coast and as far north as the central portion of the Corn Belt farther inland. From these points the plants are hardy but often suffer from the winterkilling of the flower buds.

The flowers are large and range in color from fairly light yellows to deep orange reds and are produced in large terminal heads appearing before the leaves have made any conspicuous growth.

Interest in the preceding group, however, has been much overshadowed in the last few years by the increase in cultivation of the various evergreen and semievergreen variations from the more southern portions of the Japanese islands.

Particular attention has been given to the so-called Kurume azaleas (fig. 7, C), which represent a strain rather than a species. The original wild plant of *Rhododendron obtusum* Planch., has been known for many years and was described in 1854, but apparently has not made any particular appeal to gardeners as its flowers are small and the colors are not particularly pleasing. There seems to have been considerable difference of opinion and experience as to the hardiness of the plant so that it is only within the last decade that it has been determined that this plant and its horticultural forms are hardy over a considerable area. Special attention has come to this group, once familiar only by the varieties Amœna, Hinodegiri, Benigiri, and Yayegiri, by the introduction of the Kurume azaleas mentioned before. This group represents largely the work of two Japanese amateurs who raised these plants from seed and selected the best color forms for propagation by cuttings. As a result of this raising of plants from seed and selection over a long period of years, one now may have any color from pure white (fig. 7, D), through rose pink to deep crimson to magenta, and through rather yellowish and flesh-colored pinks to scarlets. The Japanese have developed, in addition, varieties with flowers having a light ground, usually white, splashed with irregular stripes of darker colors. There are also forms in which the upper lobes of the corolla are more or less heavily blotched with varying shades of red, and others in which the calyx has been transformed into petallike tissue giving a hose-in-hose effect.

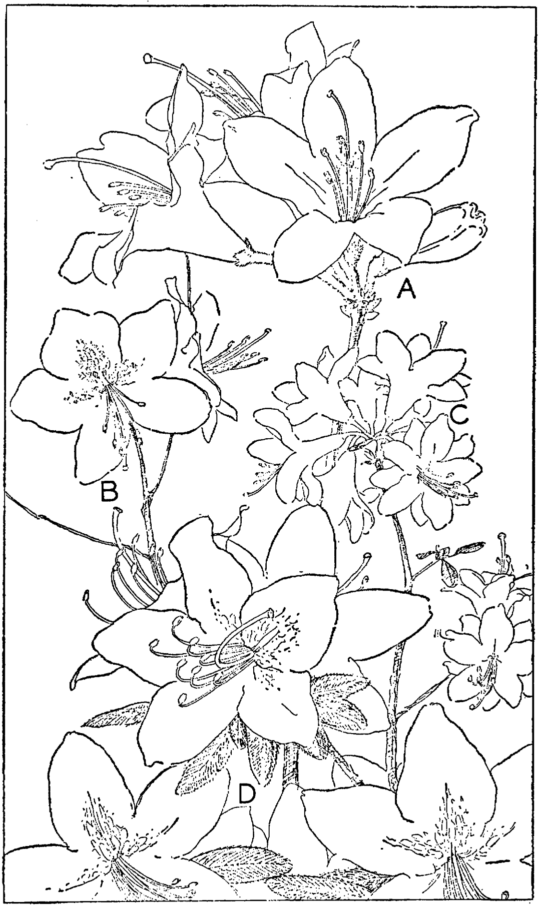


FIGURE 7.—Japanese garden azaleas: A, *Rhododendron japonicum;* B, *R. obtusum kaempferi;* C, *R. obtusum japonicum;* D, *R. mucronatum*

Whole Group Easy to Cultivate

As the exact parentage of the last is not absolutely certain, one is not surprised to find differences in habit and growth range, from a low prostrate form with small leaves to a tall, rather straggly growth suggesting Kaempfer azalea (fig. 7, B) that is believed by some botanists to be a distinct species and by others to be the northern representative of *Rhododendron obtusum*. The whole group is of the easiest culture, succeeding in soils of nominal acidity, producing great masses of rather small-sized flowers in such quantity as to hide the leaves in the spring. The one essential in their cultivation seems to be that the plants must be thoroughly matured before the beginning of cold weather and that new plantings should be made of 2-year-old plants rather than rooted cuttings. The reason for this in each case is that young growth produced late in the summer is almost never sufficiently ripened before freezing weather to survive the winter.

Kaempfer Azalea for Northern States

Kaempfer azalea, already mentioned, is the azalea that should be used in the more northern States. Its general appearance is much like that of Kurume azaleas except that the plant is very robust, making in time tall bushes up to 7 feet with as much spread. The flowers are larger than many of the Kurume varieties, but their color range is limited through various shades of rather salmon-tinted pinks and light reds.

Two other groups of evergreen and semievergreen azaleas from Japan have played a more important rôle in times past than at present. These are the large white-flowered azalea of the Orient, *Rhododendron mucronatum* G. Don, and the red-flowered *R. indicum* Sweet.

From the first of this pair we have numerous forms aside from the large-flowered white type. This albino was known many years before the discovery of the lavender-colored type of the species. Other forms have long been cultivated in Japan in which the corolla is variously tinted and blotched with rose and pale pink, in which the stamens have been transformed into petals, giving a semidouble bloom, and in which the corolla has also been split into separate linear petals, giving a curious tattered effect.

The second of this pair is not to be confused with the so-called Indian azalea of common cultivation, which is a tender plant. It is characterized by a very compact, twiggy growth, often of a widely spreading nature, with shining evergreen leaves and large flowers with salmon or light red color, produced usually in June after all the other oriental azaleas are passed.

Both these species at one time were used somewhat in the development of the hybrid strain of azalea commonly known as the Indian azalea, but as both of them give their seedlings certain characteristics, that were held to be undesirable by the florists of the time, their use was abandoned, and the present seedling of Indian azaleas represents in all probability only selections and interbreedings from *Rhododendron simsi* Planch., which is not a Japanese species in the strict sense of the word.

B. Y. Morrison,
Senior Horticulturist, Bureau of Plant Industry.

BEEF of Good Finish Is Produced by Mature Cattle on Grass Alone "Grassy" is a term which the wholesale beef trade has long used to describe a rather medium grade of beef that usually floods the market in summer and fall. The meat comes from all kinds of cattle, is usually underfinished, lacks bloom, and is often somewhat too soft and thin to store well. Since much of this beef comes from grass-fed cattle, it is natural that the trade should attribute the undesirable characteristics mentioned to the ration used.

Stockmen have long wondered, however, whether the lack of quality observed in this meat is the result of the grass itself or to its general lack of finish and the miscellaneous nature of the droves of pasture cattle that produce this meat.

In cooperation with the West Virginia Agricultural Experiment Station, the department recently completed a 3-year test to compare the composition and palatability of the beef from 3-year-old steers fed on luxuriant bluegrass pasture for 125 days with that from similar steers fed on similar pasture with a daily supplement of 7½ pounds of corn and cottonseed meal.

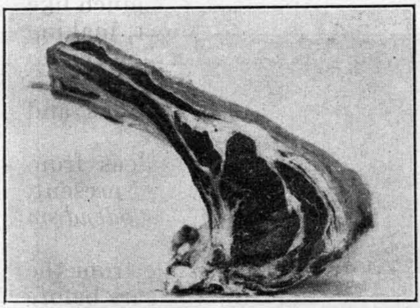


FIGURE 8.—Rib from 3½-year-old steer fattened on grass alone

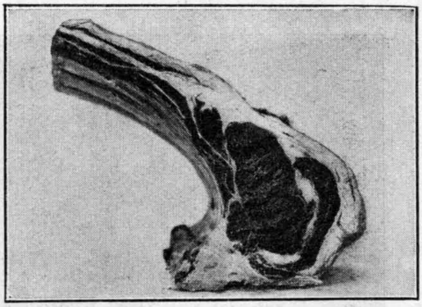


FIGURE 9.—Rib from 3½-year-old steer fattened on grass and a daily supplement of 7½ pounds of grain

Comparison of Palatability

Rib roasts from the two lots were cooked by the Bureau of Home Economics and compared for tenderness, flavor, and other characteristics by a committee representing that bureau and the Bureaus of Animal Industry and Agricultural Economics. Although the meat from the cattle that had received a supplement of grain was slightly more tender than that from cattle on pasture alone, the difference was small and the committee reported no distinct contrast in either flavor or juiciness. The ribs of cattle fed on pasture and grain supplement had an average fat content of 38.5 per cent and those from the pasture lots, 30 per cent. (Figs. 8 and 9.)

Neither grass alone nor grass with a supplemental feeding of 7½ pounds of grain daily is a highly concentrated ration, yet the carcasses of cattle fed on them had very satisfactory fat coverings. Even those fed on grass alone, which as noted had 30 per cent of fat in their rib cuts, were sufficiently fat to please the average consumer.

It should be remembered that these cattle were mature and that the pasture was good. The results were reasonably well-finished carcasses that compared favorably with carcasses from similar cattle that had received the grain supplement.

The question naturally arises whether younger cattle would be as well finished under the same conditions as were the mature steers. New trials, begun by both the West Virginia and Virginia experiment stations in cooperation with the department, have been designed to answer that question.

K. F. WARNER,
Animal Husbandman, Bureau of Animal Industry.

BEEF Cattle Tests Show Profits are Increased by Feeding Grain With Grass Feeding grains to fattening cattle on grass is a method of beef production to be recommended, particularly on farms having considerable land in pasture and a limited acreage in grain. Many farms in beef-producing areas have these conditions.

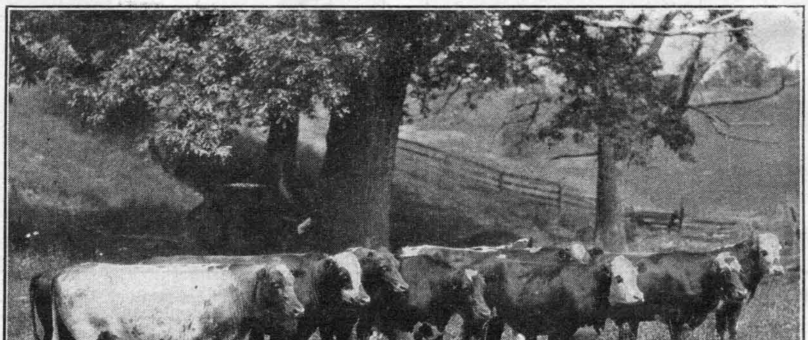


FIGURE 10.—Steers that were fed a grain supplement for 60 days, while on grass

Recent experiments conducted in the Appalachian region show rather conclusively that a 2-year-old or 3-year-old steer fed a ration of approximately 6 pounds of coarsely ground shelled corn and 1½ pounds of cottonseed meal in addition to good bluegrass pasture can be expected to gain 100 pounds more in four and a half months than a similar steer fed on grass alone.

The question naturally arises, Does this increased gain pay for the grain supplement? Under ordinary conditions it does. If market conditions are at all favorable, cattle that receive the supplemental feed (fig. 10) generally bring a greater net return than cattle fattened entirely on grass. In a 3-year experiment conducted cooperatively by the Bureau of Animal Industry and the West Virginia Agricultural Experiment Station, steers fed 13 bushels of corn and 200 pounds of cotton-

It should be remembered that these cattle were mature and that the pasture was good. The results were reasonably well-finished carcasses that compared favorably with carcasses from similar cattle that had received the grain supplement.

The question naturally arises whether younger cattle would be as well finished under the same conditions as were the mature steers. New trials, begun by both the West Virginia and Virginia experiment stations in cooperation with the department, have been designed to answer that question.

K. F. WARNER,
Animal Husbandman, Bureau of Animal Industry.

BEEF Cattle Tests Show Profits are Increased by Feeding Grain With Grass Feeding grains to fattening cattle on grass is a method of beef production to be recommended, particularly on farms having considerable land in pasture and a limited acreage in grain. Many farms in beef-producing areas have these conditions.

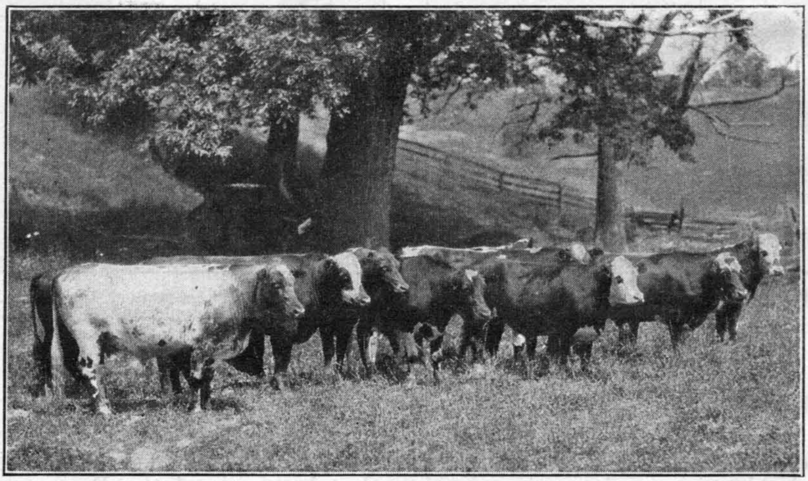


FIGURE 10.—Steers that were fed a grain supplement for 60 days, while on grass

Recent experiments conducted in the Appalachian region show rather conclusively that a 2-year-old or 3-year-old steer fed a ration of approximately 6 pounds of coarsely ground shelled corn and 1½ pounds of cottonseed meal in addition to good bluegrass pasture can be expected to gain 100 pounds more in four and a half months than a similar steer fed on grass alone.

The question naturally arises, Does this increased gain pay for the grain supplement? Under ordinary conditions it does. If market conditions are at all favorable, cattle that receive the supplemental feed (fig. 10) generally bring a greater net return than cattle fattened entirely on grass. In a 3-year experiment conducted cooperatively by the Bureau of Animal Industry and the West Virginia Agricultural Experiment Station, steers fed 13 bushels of corn and 200 pounds of cottonseed meal per head during a period of 125 days, returned $9.50 more profit per steer, after paying their feed cost of $17, than similar steers receiving grass alone. The steers fed the grain supplement made greater gains and showed more finish, both on the hoof and in the carcass. Their selling price was $1.25 per hundredweight more than that of the cattle fed grass alone, a fact which also indicated a higher degree of finish. The cattle fed grain with grass dressed 2 per cent higher than those fed grass alone. Although the carcasses of the steers fed grass alone showed considerable finish, experienced beef men could readily have selected the carcasses of the steers fed grain and grass by the deeper covering of fat over the carcass generally. Figure 11 shows a rib taken from a steer fed grass and grain; Figure 12 shows one taken from a steer fed grass alone. The two animals were very similar at the beginning of the grazing season.

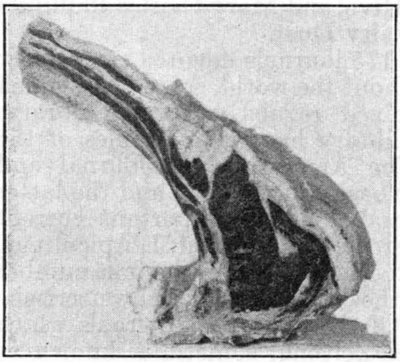


FIGURE 11.—Rib from a steer fed grass and grain

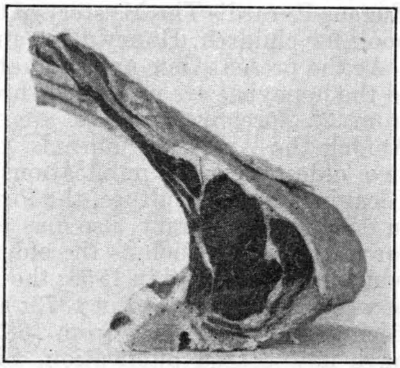


FIGURE 12.—Rib from a steer which received grass only

In more intensified farm areas, such as the Corn Belt, feeding a grain supplement to beef cattle on grass may be practical and fairly profitable, as shown by a 3-year experiment conducted cooperatively by the Bureau of Animal Industry and the University of Missouri on the Sni-a-Bar farms, Grain Valley, Mo. In this experiment beef calves on pasture with their dams were fed, previous to weaning, a grain mixture consisting of corn, oats, and linseed meal. After receiving an average daily ration, per head, of 4½ pounds of this mixture for 161 days, they gained, on the average, 373 pounds as compared with 269 pounds for calves receiving only pasture and their dams' milk. The average slaughter-appraisal value of the calves fed the grain mixture was $1.75 per hundredweight greater than that of calves not fed grain.

Feeding a grain supplement with grass pasture, whether to a fattening 2-year-old steer or to a nursing calf, tends to produce a heavier and more highly finished carcass in less time. Feeding grain to spring calves before weaning increases their weight and finish sufficiently to permit their sale as fat young beeves in the fall when they are about 8 months old. It is not possible to produce a desirable beef carcass at this age on grass and milk alone.

W. H. Black,

Senior Animal Husbandman, Bureau of Animal Industry.

BEEKEEPING Library in the Department Has About 2,000 Volumes At the headquarters of the Division of Bee Culture, Somerset, Md., is housed the beekeeping library and bibliography of the United States Department of Agriculture. The library consists of approximately 2,000 volumes, in addition to many pamphlets, devoted exclusively to the various phases of apiculture. It is unique in that it deals with but one insect—the honeybee. The library can not boast of any incunabula; however, it does possess some very old books, among which may be mentioned The Ordering of Bees (1634) by John Levett, Vande Byen (1648) by Dirck Outgertz Cluyt, A Theatre of Politicall Flying-Insects (1657) by Samuel Purchas, and A Further Discovery of Bees (1679) by Moses Rusden. Although the library contains principally works of scientific importance, it also has some of the recent classical books on bees, such as Maeterlinck's The Life of the Bee, Eugene Evrard's The Mystery of the Hive, and Mary Geisler Phillips's book for children, Honey Bees and Fairy Dust.

At the present time approximately 175 journals devoted exclusively to the honeybee are published throughout the world, some 80 of which from 22 foreign countries are received regularly by the library. Among the American journals, the library has complete files of the two oldest current publications, The American Bee Journal and Gleanings in Bee Culture, the former beginning in 1861 and the latter in 1873. The library also has a number of the important current foreign journals, such as the oldest French bee journal, L'Apiculteur, which first appeared in 1856; the British Bee Journal, the first number of which was published in 1873; and the Swiss journal, Schweizerische Bienen-Zeitung, dating from 1882. Of the important journals which have now ceased publication, Bienen-Zeitung, sometimes known as the Eichstädt Bienen-Zeitung, an outstanding German journal, might be mentioned, of which the library has an almost complete file.

An extensive bibliography consisting of approximately 75,000 references is maintained at the library of the bee culture laboratory. This is probably the largest and most complete bibliography on the subject of bees and honey. Since the standard systems of classification do not treat the subject of apiculture in sufficient detail adequately to serve a research staff, it became necessary some years ago for the staff of the laboratory to devise a system of classification of its own, which is now being used.

Catalogue of Beekeeping Literature

A catalogue of the beekeeping literature in the library of the Department of Agriculture and the Library of Congress has been issued as Bibliographical Contribution No. 21 of the Library of the United States Department of Agriculture. This catalogue lists all books, periodicals, pamphlets, etc., pertaining to apiculture. It also lists all of the beekeeping periodicals, together with the number of volumes of each now in the department library. The preparation of the catalogue was supervised by the library of the Department of Agriculture, with the assistance of the librarians of the Bureau of Entomology and the Division of Bee Culture. The catalogue will be distributed to the principal agricultural libraries and institutions engaged in apicultural research. This is the first comprehensive list of beekeeping literature published in this country, and it is hoped that it will serve as a guide for other institutions that are establishing separate beekeeping libraries, of which there are a number already in existence. Efforts are being made to procure the lacking volumes of journals and to obtain as many of the important books as possible, and it is hoped that the catalogue will be of material assistance in unearthing many volumes not now in the possession of the library.

ETHEL L. COON,
Library Assistant, Bureau of Entomology.

BEE-SHIPPING Industry Grows and New Ways of Packaging Are Devised Package bees in 2 or 3 pound combless packages are shipped into the Northern States and Canada from the Southern States for three principal reasons: (1) To replace winter losses; (2) to aid in strengthening weak colonies; and (3) to establish new apiaries at a minimum of expense.

The practice of shipping bees in small screened cages is not new, having first been successfully accomplished in the early eighties, but the real growth and extension of the industry have taken place within the last 15 years. It is estimated that between 250,000 and 300,000 pounds of bees were shipped from the South during 1929. Losses in shipment, which 15 years ago were so great as almost to prohibit shipping, have been materially reduced by careful methods of handling of the bees before and during shipment and by the use of improved cages and feeding methods. The progress which has been made in the shipping industry has been due largely to individual efforts of beekeepers and has resulted in a large variety of form and design in cage structure; it has also developed a practically uniform method of handling the bees, except as this method is varied in some details to suit certain localities.

The active shipping season for bees in the South begins about March 15 and is practically over by May 15. This is the busy season for the shipper because a large part of his success depends on his filling orders at the time specified by the northern beekeeper. At this time the colonies of bees are strong and are literally overflowing the hives with young bees. The shipper is careful to send as many young bees as possible, since they will give the best satisfaction in the honey-producing sections of the North. The bees are shaken from the comb directly into a large tin funnel and through this into the screen cage. (Fig. 13.) The queen bee in her small cage is next placed in the package suspended from a wire at the top, and the feed can, containing approximately 1 pound of feed for every pound of bees, is also placed into the package and the cover nailed on. The food used in the shipment is ordinarily composed of 1 part by weight of granulated sugar dissolved in 1 part by weight of water. In large shipments these individual cages are crated together with plaster laths or crating strips so that each cage is placed about 4 inches from its neighbor, with five or six cages in each crate.

With a large number of persons shipping packages each year, and with practically all the shippers manufacturing their own cages, it was to be expected that a large number of different types and sizes of cages would be found. The standardization of these shipping packages has been undertaken by the Southern States Bee Culture Field Station at Baton Rouge, La. Through the active cooperation of southern package shippers, as well as many beekeepers in the Northern States and Canada, standards will be submitted to the shippers for adoption.

ries, of which there are a number already in existence. Efforts are being made to procure the lacking volumes of journals and to obtain as many of the important books as possible, and it is hoped that the catalogue will be of material assistance in unearthing many volumes not now in the possession of the library.

ETHEL L. COON,
Library Assistant, Bureau of Entomology.

BEE-SHIPPING Industry Grows and New Ways of Packaging Are Devised Package bees in 2 or 3 pound combless packages are shipped into the Northern States and Canada from the Southern States for three principal reasons: (1) To replace winter losses; (2) to aid in strengthening weak colonies; and (3) to establish new apiaries at a minimum of expense.

The practice of shipping bees in small screened cages is not new, having first been successfully accomplished in the early eighties, but the real growth and extension of the industry have taken place within the last 15 years. It is estimated that between 250,000 and 300,000 pounds of bees were shipped from the South during 1929. Losses in shipment, which 15 years ago were so great as almost to prohibit shipping, have been materially reduced by careful methods of handling of the bees before and during shipment and by the use of improved cages and feeding methods. The progress which has been made in the shipping industry has been due largely to individual efforts of beekeepers and has resulted in a large variety of form and design in cage structure; it has also developed a practically uniform method of handling the bees, except as this method is varied in some details to suit certain localities.

The active shipping season for bees in the South begins about March 15 and is practically over by May 15. This is the busy season for the shipper because a large part of his success depends on his filling orders at the time specified by the northern beekeeper. At this time the colonies of bees are strong and are literally overflowing the hives with young bees. The shipper is careful to send as many young bees as possible, since they will give the best satisfaction in the honey-producing sections of the North. The bees are shaken from the comb directly into a large tin funnel and through this into the screen cage. (Fig. 13.) The queen bee in her small cage is next placed in the package suspended from a wire at the top, and the feed can, containing approximately 1 pound of feed for every pound of bees, is also placed into the package and the cover nailed on. The food used in the shipment is ordinarily composed of 1 part by weight of granulated sugar dissolved in 1 part by weight of water. In large shipments these individual cages are crated together with plaster laths or crating strips so that each cage is placed about 4 inches from its neighbor, with five or six cages in each crate.

With a large number of persons shipping packages each year, and with practically all the shippers manufacturing their own cages, it was to be expected that a large number of different types and sizes of cages would be found. The standardization of these shipping packages has been undertaken by the Southern States Bee Culture Field Station at Baton Rouge, La. Through the active cooperation of southern package shippers, as well as many beekeepers in the Northern States and Canada, standards will be submitted to the shippers for adoption.

At least three distinct types of cages will be recommended to the trade: (1) A 2-pound combless package; (2) a 3-pound combless package; and (3) a nucleus, or comb package. The adoption of these

FIGURE 13.—Shaking bees into a 3-pound package

standard cages will result in a great reduction in the number of types and sizes of packages that have been used by package shippers in the past.

WARREN WHITCOMB, Jr.,
Assistant Apiculturist, Bureau of Entomology.

BEET Leaf Hopper's Annual Migrations Studied in Desert Breeding Areas The spring of 1930 witnessed extensive migrations of the beet leaf hopper into many of the important sugar-beet growing areas of the Western States. The Sacramento Delta and other districts of California, southern Idaho, Utah, and western Colorado all received migrations of more or less severity, and all were accompanied by injury due to the curly-top disease which the beet leaf hopper transmits. A rather extensive migration also occurred in New Mexico from the insect's breeding area along the Rio Grande. These migrations are of interest to other than sugar-beet growers as the curly-top disease also affects other crops, including tomatoes, beans, tobacco, table beets, peppers, spinach, and various melons.

Inasmuch as the insects breed in tremendous numbers in desert areas and migrate under favorable conditions into the cultivated sections, a knowledge of the location of the desert regions involved and the cultivated sections infested from each area is highly important. More extensive desert surveys and studies of desert conditions have been made to obtain all the information possible which has any bearing on the habits and distribution of the insect in the desert.

At least three distinct types of cages will be recommended to the trade: (1) A 2-pound combless package; (2) a 3-pound combless package; and (3) a nucleus, or comb package. The adoption of these

FIGURE 13.—Shaking bees into a 3-pound package

standard cages will result in a great reduction in the number of types and sizes of packages that have been used by package shippers in the past.

WARREN WHITCOMB, Jr.,
Assistant Apiculturist, Bureau of Entomology.

BEET Leaf Hopper's Annual Migrations Studied in Desert Breeding Areas The spring of 1930 witnessed extensive migrations of the beet leaf hopper into many of the important sugar-beet growing areas of the Western States. The Sacramento Delta and other districts of California, southern Idaho, Utah, and western Colorado all received migrations of more or less severity, and all were accompanied by injury due to the curly-top disease which the beet leaf hopper transmits. A rather extensive migration also occurred in New Mexico from the insect's breeding area along the Rio Grande. These migrations are of interest to other than sugar-beet growers as the curly-top disease also affects other crops, including tomatoes, beans, tobacco, table beets, peppers, spinach, and various melons.

Inasmuch as the insects breed in tremendous numbers in desert areas and migrate under favorable conditions into the cultivated sections, a knowledge of the location of the desert regions involved and the cultivated sections infested from each area is highly important. More extensive desert surveys and studies of desert conditions have been made to obtain all the information possible which has any bearing on the habits and distribution of the insect in the desert.

Although this leaf hopper probably breeds in any place throughout the arid West where the winter climate and the host plants are favorable, there are certain regions more favorable for its abundant development than others. The host plants most favored in the desert are the mustards, filaree, Russian thistle, and annual Atriplex or saltbush. Other plants also are able to support the insect, but some combination of these favored plants appears to be important in producing the more extensive breeding areas. Such large regions favorable to abundant development are located in southern Idaho, in western Washington, in western Oregon, in southern and western Utah, in western Nevada, in California along the border ranges of some of the interior valleys, and along the Rio Grande in New Mexico and Texas.

The migratory movements are of a most concerted nature, tremendous numbers coming into a given area overnight. The insects are not discernible in the air at the time of flight, except in rare cases, the movement being detected by their discovery in cultivated areas where they were previously absent. The factors responsible for this concerted movement are under observation and are probably at least twofold. One stimulus to the movement, at least on some occasions, is the drying of the host plants so that those in the winged stage of development are impelled to move, because of the food scarcity, to more favorable host-plant locations. During the spring migrations of 1930 it appears that migrations occurred, in some instances at least, from places where the host plants were in excellent condition. The other stimulus likely to be found of importance is the mating urge, and some migrations possibly partake of the nature of a mating flight.

Height of Movement Important

There are a number of points concerning these annual spring movements which are not entirely clear and concerning which additional information is needed. The height of movement, for example, is of considerable importance in connection with ability to cross the barriers offered by high mountain ranges. Evidence obtained this year indicates that in at least one flight, probably a short one, the insects maintained a very low altitude. This was shown by traps devised for the purpose and placed at various heights on a pole support. The largest number of leaf hoppers were obtained at about 10 feet above the ground. There is good evidence, however, that in long-distance flights the insects reach high altitudes.

The distance covered by the migrating insects is also of importance in determining what areas are a potential menace to sugar-beet production. It is apparently certain that flights in the California area can be measured by 200 or 300 miles. Possibly some flights have considerably exceeded that. It appears quite likely, however, that the areas of a more local nature relative to a given beet region are of far greater significance than breeding areas at a distance.

In California there is a definite fall movement, correlated with plowing operations in the valleys and later drying of host plants, which results in repopulating the dry depopulated hills where filaree appears with the first rains. This return movement has not been recognized in other areas but its occurrence is a possibility. Its detection is more difficult where a fairly large population has been able to maintain itself in the desert all summer.

There is undoubtedly a close correlation between climatic conditions and the size of a migration and the time of its occurrence. In at least some areas this correlation can be used in predicting the probability of leaf-hopper damage with an excellent chance of accuracy. The degree of accuracy obtainable is dependent on the extent of the information available regarding both the size and location of the breeding areas involved and on observations of the effect of various weather types in previous years. The cumulative data obtained through successive years adds to the probability of accuracy in following seasons. Prediction of outbreaks is at best, however, only a palliative which gives the grower an opportunity to profit as far as possible by favorable years.

Direct Control Desirable

As far as the insect is concerned, permanent solution of the problem lies in the development of some method of direct control or in the destruction of the insect in the breeding areas through some of its parasitic enemies. Spraying of beets with various insecticides, including light emulsified oil, has again proved unsatisfactory as a method of control. The migration extended this season in Idaho from May 24 to at least as late as June 16. Control by spraying the beets would necessitate from two to four applications, even with 100 per cent kill, which has not been obtained as yet. If spraying were delayed until all leaf hoppers were in the field, many insects would have been feeding for nearly three weeks.

Breeding-area control offers possibilities in some instances where the areas are of a local nature. These possibilities, which are at present under investigation, include not only those of direct insecticidal operations, but the destruction of host plants by other means, both direct and through the association of insects occurring thereon.

A number of parasites of the leaf-hopper eggs and of the insect itself are known to exist in the territories infested. For some reason these are rarely effective in bringing about an appreciable reduction in the numbers involved in the spring migration. There is a possibility that where the factors responsible for this failure are known, selection of parasites not affected by these conditions will be possible. Investigations with this object in view are now under way. It is probably true that ultimate control where necessary will involve the utilization of both parasitic enemies and direct insecticidal operations.

P. N. Annand,
Entomologist, Bureau of Entomology.

BLACK Stem Rust Spores Combed from the Air by Fliers

The parasite black stem rust causes serious losses each year in some of the grain-growing regions of the United States. This rust depends for its development upon the presence of the tiny spores or reproductive bodies of the rust fungus together with warm, moist weather during the time grain crops are rapidly growing.

One of the activities of the Office of Barberry Eradication is to determine the source of the first stem-rust spores to appear in the northern spring wheat growing States. They may develop on the infected leaves of common barberry bushes growing on farms or city properties

There is undoubtedly a close correlation between climatic conditions and the size of a migration and the time of its occurrence. In at least some areas this correlation can be used in predicting the probability of leaf-hopper damage with an excellent chance of accuracy. The degree of accuracy obtainable is dependent on the extent of the information available regarding both the size and location of the breeding areas involved and on observations of the effect of various weather types in previous years. The cumulative data obtained through successive years adds to the probability of accuracy in following seasons. Prediction of outbreaks is at best, however, only a palliative which gives the grower an opportunity to profit as far as possible by favorable years.

Direct Control Desirable

As far as the insect is concerned, permanent solution of the problem lies in the development of some method of direct control or in the destruction of the insect in the breeding areas through some of its parasitic enemies. Spraying of beets with various insecticides, including light emulsified oil, has again proved unsatisfactory as a method of control. The migration extended this season in Idaho from May 24 to at least as late as June 16. Control by spraying the beets would necessitate from two to four applications, even with 100 per cent kill, which has not been obtained as yet. If spraying were delayed until all leaf hoppers were in the field, many insects would have been feeding for nearly three weeks.

Breeding-area control offers possibilities in some instances where the areas are of a local nature. These possibilities, which are at present under investigation, include not only those of direct insecticidal operations, but the destruction of host plants by other means, both direct and through the association of insects occurring thereon.

A number of parasites of the leaf-hopper eggs and of the insect itself are known to exist in the territories infested. For some reason these are rarely effective in bringing about an appreciable reduction in the numbers involved in the spring migration. There is a possibility that where the factors responsible for this failure are known, selection of parasites not affected by these conditions will be possible. Investigations with this object in view are now under way. It is probably true that ultimate control where necessary will involve the utilization of both parasitic enemies and direct insecticidal operations.

P. N. Annand,
Entomologist, Bureau of Entomology.

BLACK Stem Rust Spores Combed from the Air by Fliers

The parasite black stem rust causes serious losses each year in some of the grain-growing regions of the United States. This rust depends for its development upon the presence of the tiny spores or reproductive bodies of the rust fungus together with warm, moist weather during the time grain crops are rapidly growing.

One of the activities of the Office of Barberry Eradication is to determine the source of the first stem-rust spores to appear in the northern spring wheat growing States. They may develop on the infected leaves of common barberry bushes growing on farms or city properties and spread from there to near-by grains or grasses. The other possible source of this first inoculum is from the Southern States, where the red or repeating stage of the rust survives the winter on green grain and grasses and is carried north by the wind during the early summer. It is the first infection in the spring wheat States of the North that causes the most damage to crops, as the rust spreads rapidly when the grain is in the milk or soft dough stages.

One method of determining the source of the first spores to appear is to expose glass microscope slides from airplanes at several points in the spring wheat area. These slides are covered with a thin film of vaseline so that the rust spores will stick to them, and one or two are exposed by hand at each of several different altitudes. By making a microscopic examination of the slides one can determine how high the rust spores rise in the air, at what altitudes they are found most abundantly, and whether they come from barberry bushes or from wheat plants farther south.

By the use of airplanes it has been found that rust spores from barberry, as well as those from rusted grain or grasses, may be carried by the winds as high as 10,000 feet above the surface of the earth. From this height it takes some time for the spores to reach the earth. Investigators working with white-pine blister rust have found that spores of that rust falling in a perfectly still atmosphere from a height of one mile require 55 hours to reach the earth. As black stem rust spores are but slightly larger than those of blister rust, the time required for them to fall the same distance would be only slightly less. A hailstone, on the other hand, released a mile high would reach the earth in less than a minute. It is obvious, therefore, how easily rust spores are carried about in the air. Once these spores are carried into the air, unless brought down by rain or some other agency, they may be blown long distances before falling. (Fig. 14.)

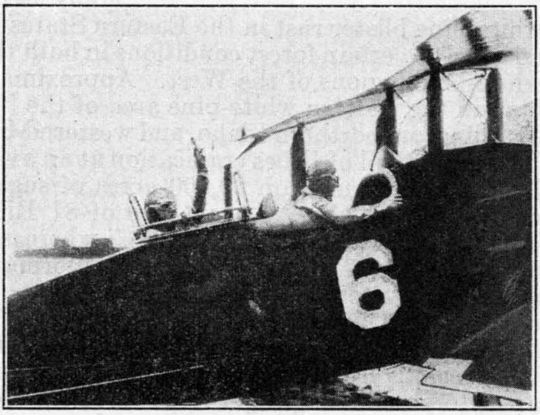


FIGURE 14.—Method of exposing microscope slides from an airplane for detecting rust spores in the air

Results of Airplane Observations

Special airplane flights in 1925 revealed the following facts: (1) No more spores were deposited on slides exposed during a rain than on those exposed on the same day when it was not raining. (2) Fewer spores were caught over Lake Michigan than over land in the same general region. (3) More spores were caught over areas in which barberry bushes were abundant than over areas in which barberries were few in number and scattered. This would indicate that rust on grains appeared first in those regions where barberry bushes were numerous. There is evidence that in spite of the slow fall of these spores they are not usually blown long distances, probably because of rains or downward air currents.

In several of the years during which observations have been made there was a close correlation between the first appearance of rust spores on slides exposed over a given area and the first appearance of rust in the grainfields of that area.

By the use of airplanes large areas can be explored and the more general movements of rust spores ascertained by the examination of slides exposed in this manner. At present this is one of the most reliable means of determining the extent of the movement of spores of disease-producing organisms from one locality to another.

R. U. Cotter,
Associate Pathologist, Bureau of Plant Industry.

BLISTER-RUST Control Is Aided by Power Devices for Spraying Host Plants

The eradication of Ribes (currant and gooseberry plants) by the hand-pulling and grubbing method generally used in work for the control of white-pine blister rust in the Eastern States has been found to be well adapted to certain forest conditions in both the sugar-pine and western white-pine regions of the West. Approximately 60,000 acres of pine-land in the western white-pine area of the "Inland Empire" (eastern Washington, northern Idaho, and western Montana) have been worked by this method of Ribes eradication at an average cost of $1.94. Similar work performed on 20,000 acres of sugar-pine land in California cost $1.92 per acre. An average of 81 Ribes bushes per acre were destroyed in the "Inland Empire," whereas the average number was 58 in California. The bushes in California were larger, spinier, and more firmly rooted, which largely accounts for the higher cost of 3.3 cents per bush compared with 2.4 cents in the "Inland Empire." These hand methods of eradication are satisfactory on the upland sites in both regions except where the plants are too deeply rooted in rocky areas to permit the proper removal of the crown without undue labor. In the latter case killing the plants by applying a toxic chemical may prove more effective and less costly.

In situations along stream courses, especially in the "Inland Empire," the Ribes plants occur abundantly within limited areas, commonly exceeding several hundred bushes per acre, and, as a result of prolific layering, develop such diffuse root systems that it is both difficult and costly to use hand-eradication methods. Considerable experimentation has been done in Idaho to develop an effective chemical method for eradicating Ribes in stream-type locations. The stream-type Ribes are often partly submerged in water during a greater part of the working season. This obviously limits chemical application to the aerial parts of the plants. In the stream-type areas of Idaho three Ribes species are present, *Ribes petiolare*, *R. lacustre*, and *R. inerme*. It has been found that one application of 10 per cent aqueous solution of sodium chlorate sprayed on the leaves and stems will completely kill the first species, while three applications of a stronger solution of the same chemical is required to kill all plants of the other two. It has been demonstrated that where the stream-type Ribes growth is composed chiefly of *R. petiolare* this method of treatment is from 49 to 56 per cent less costly than the hand method. In the case not usually blown long distances, probably because of rains or downward air currents.

In several of the years during which observations have been made there was a close correlation between the first appearance of rust spores on slides exposed over a given area and the first appearance of rust in the grainfields of that area.

By the use of airplanes large areas can be explored and the more general movements of rust spores ascertained by the examination of slides exposed in this manner. At present this is one of the most reliable means of determining the extent of the movement of spores of disease-producing organisms from one locality to another.

R. U. COTTER,
Associate Pathologist, Bureau of Plant Industry.

BLISTER-RUST Control Is Aided by Power Devices for Spraying Host Plants

The eradication of Ribes (currant and gooseberry plants) by the hand-pulling and grubbing method generally used in work for the control of white-pine blister rust in the Eastern States has been found to be well adapted to certain forest conditions in both the sugar-pine and western white-pine regions of the West. Approximately 60,000 acres of pineland in the western white-pine area of the "Inland Empire" (eastern Washington, northern Idaho, and western Montana) have been worked by this method of Ribes eradication at an average cost of $1.94. Similar work performed on 20,000 acres of sugar-pine land in California cost $1.92 per acre. An average of 81 Ribes bushes per acre were destroyed in the "Inland Empire," whereas the average number was 58 in California. The bushes in California were larger, spinier, and more firmly rooted, which largely accounts for the higher cost of 3.3 cents per bush compared with 2.4 cents in the "Inland Empire." These hand methods of eradication are satisfactory on the upland sites in both regions except where the plants are too deeply rooted in rocky areas to permit the proper removal of the crown without undue labor. In the latter case killing the plants by applying a toxic chemical may prove more effective and less costly.

In situations along stream courses, especially in the "Inland Empire," the Ribes plants occur abundantly within limited areas, commonly exceeding several hundred bushes per acre, and, as a result of prolific layering, develop such diffuse root systems that it is both difficult and costly to use hand-eradication methods. Considerable experimentation has been done in Idaho to develop an effective chemical method for eradicating Ribes in stream-type locations. The stream-type Ribes are often partly submerged in water during a greater part of the working season. This obviously limits chemical application to the aerial parts of the plants. In the stream-type areas of Idaho three Ribes species are present, *Ribes petiolare*, *R. lacustre*, and *R. inerme*. It has been found that one application of 10 per cent aqueous solution of sodium chlorate sprayed on the leaves and stems will completely kill the first species, while three applications of a stronger solution of the same chemical is required to kill all plants of the other two. It has been demonstrated that where the stream-type Ribes growth is composed chiefly of *R. petiolare* this method of treatment is from 49 to 56 per cent less costly than the hand method. In the case of the two species of Ribes that require several applications of the chlorate it has not yet been fully determined whether this chemical method is economical. (Fig. 15.)

For use in applying toxic sprays to Ribes, two types of spraying equipment were developed, namely, knapsack and power. The knapsack unit consisted of a 5-gallon tank fitted to a pack frame and held in place by adjustable straps, a double-action hand pump, and a short extension fitted with a suitable nozzle. This type of equipment is designed for general use in all stream-type sites but is most effective where Ribes occur in comparatively thin concentrations or in scattered clumps.

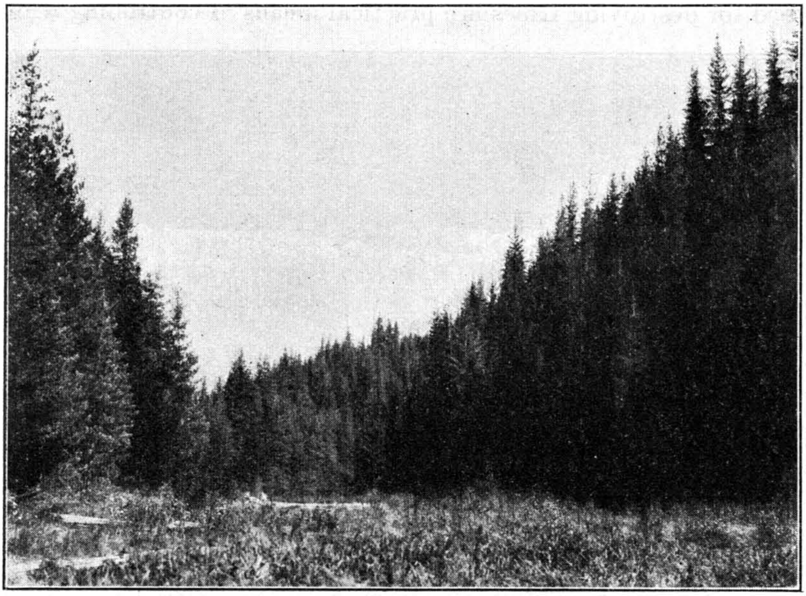


FIGURE 15.—A typical stand of young western white pine (*Pinus monticola*) with stream-type site in the foreground

Long Series of Tests Made

The adaptation of power equipment to the spraying of wild Ribes has necessitated a long series of tests with portable motors, hose, couplings, and nozzles. At the present time power-spraying units have been so organized and equipment so improved that this method of spraying Ribes gives greater promise of minimum blister-rust protection costs than does the knapsack-spraying method on extensive areas having heavy or moderately heavy concentrations of Ribes. The power plant is a specially adapted, small-capacity, forest-fire pumper with a sufficiently large by-pass to take care of surplus liquid passing through the pump and not needed at the nozzles. One of these motors will maintain sufficient pressure to produce a good film of spray when 20 nozzles are wide open and liquid is being pumped through 2,000 feet of ½-inch main line and 3,000 feet of ¼-inch lateral hose. However, it has been found not economically feasible to employ more than 10 nozzles on any one unit, and future experiments may point to a further reduction. (Fig. 16.)

Still smaller and lighter motors have been extensively used, but with unsatisfactory results. The lighter motors loaded to capacity show the effects of the load and begin to give trouble early. The heavier motors with a relatively easy load run along smoothly day after day and even week after week without giving serious trouble. The success of this type of work is dependent upon continuous operation of the motor.

Where the power unit is employed on heavy concentrations of Ribes, the average area sprayed per man per day is three-fourths of an acre. Where knapsack spraying is done on lighter concentrations the average area sprayed per man per day is 1¼ to 2 acres.

Both the hand-pulling and chemical methods that have been described for destroying Ribes are practical means of controlling white-

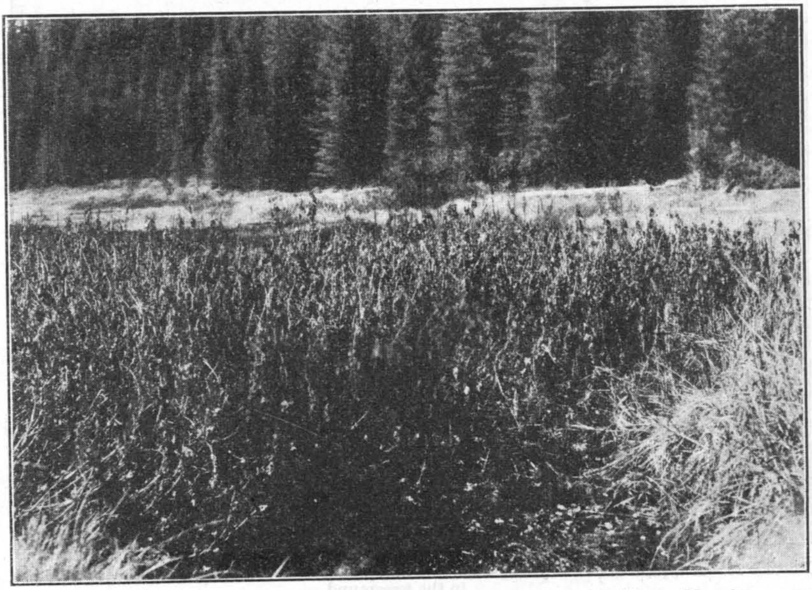


FIGURE 16.—A close-up view of a patch of *Ribes petiolare* in its natural habitat. The picture was taken shortly after the bushes had been sprayed in 1929. Note the dead leaves. In June, 1930, all the stems and roots of the sprayed bushes were dead

pine blister rust in the West. Should a chemical spray or a chemical dust be developed, however, which will be completely effective on the other species of Ribes found in the western white and sugar pine forests, hand pulling may in the future be much less extensively employed, since chemical treatment is generally a quicker and less costly method.

C. C. STRONG,
Associate Forester, Bureau of Plant Industry.

BLISTER-RUST Control Is Effective With Public's Cooperation The cooperation of the public in the campaign to control the white-pine blister rust in the Eastern States is primarily responsible for the success of this work. The campaign is led jointly by the States concerned and the United States Department of Agriculture. Labor is fur-

Still smaller and lighter motors have been extensively used, but with unsatisfactory results. The lighter motors loaded to capacity show the effects of the load and begin to give trouble early. The heavier motors with a relatively easy load run along smoothly day after day and even week after week without giving serious trouble. The success of this type of work is dependent upon continuous operation of the motor.

Where the power unit is employed on heavy concentrations of Ribes, the average area sprayed per man per day is three-fourths of an acre. Where knapsack spraying is done on lighter concentrations the average area sprayed per man per day is 1¼ to 2 acres.

Both the hand-pulling and chemical methods that have been described for destroying Ribes are practical means of controlling white-

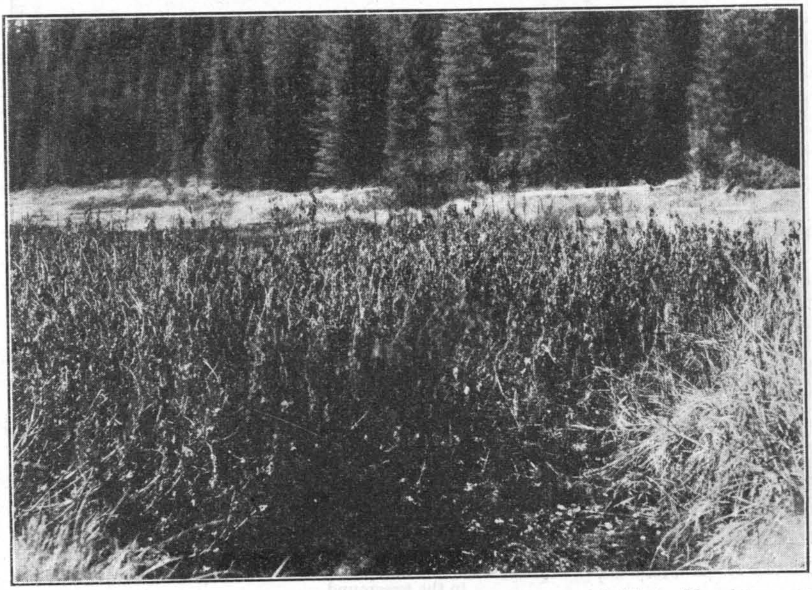


FIGURE 16.—A close-up view of a patch of *Ribes petiolare* in its natural habitat. The picture was taken shortly after the bushes had been sprayed in 1929. Note the dead leaves. In June, 1930, all the stems and roots of the sprayed bushes were dead

pine blister rust in the West. Should a chemical spray or a chemical dust be developed, however, which will be completely effective on the other species of Ribes found in the western white and sugar pine forests, hand pulling may in the future be much less extensively employed, since chemical treatment is generally a quicker and less costly method.

C. C. Strong,
Associate Forester, Bureau of Plant Industry.

BLISTER-RUST Control Is Effective With Public's Cooperation The cooperation of the public in the campaign to control the white-pine blister rust in the Eastern States is primarily responsible for the success of this work. The campaign is led jointly by the States concerned and the United States Department of Agriculture. Labor is furnished by the pine owners, trained foremen by the State, and district leaders by the department. The laborers, working systematically in crew formation, do the actual control work, and the trained foremen supervise and check the work of the crews, insuring effective results. The district leaders are stationed in the white-pine districts to demonstrate the control of the disease, stimulate cooperation, and give general oversight to the practical field work. All these men work under the direction of the State regulatory agency responsible for the conduct of the work. This plan of controlling a very destructive new forest disease has produced excellent results because of prompt and generous cooperation by the public.

The blister-rust disease is caused by a parasitic fungus which lives alternately on white pines and Ribes (currant and gooseberry plants). Several kinds of wild Ribes are commonly found in forested areas along with the white pines. The rust is communicated from infected pines to Ribes and from infected Ribes to pines by means of wind-borne spores. It is not communicable between pines. The spores from diseased pines may infect Ribes many miles distant, but the spores that cause the rust on pines are very short-lived, consequently the distance of spread of the disease from Ribes to pines is usually limited to a few hundred feet. This distance varies locally, but under average eastern forest conditions adequate protection is obtained by destroying all Ribes within 900 feet of the pines.

The blister rust has spread through the white-pine regions of New England and New York and is intensifying in Pennsylvania, New Jersey, and the Lake States. The severity of damage to the pines depends upon the length of time the disease has been established in the locality and upon the abundance of Ribes. The continued production of white pine as a profitable timber crop appears to be assured as a result of coordinated State and Federal effort. The infested States all have under way comprehensive blister-rust control programs which have met with a ready and generous response from the public.

In addition to the protection of native pine areas and plantations, special measures are applied to safeguard nurseries that grow white-pine stock for forest and ornamental planting. A number of States are also systematically eliminating the European black currant (*Ribes nigrum* L.). This species is especially susceptible to the rust, causing destruction to adjacent pine stands and greatly hastening the spread and establishment of the rust. Its affinity for the rust is so great that it constitutes a plant nuisance, and the United States Department of Agriculture recommends that the growing of this currant be discontinued.

White Pine Very Valuable

The white pine is one of America's finest and most valuable forest trees. This basic fact has been responsible for the prompt and effective application of blister-rust control by pine owners, since failure to do this would mean a catastrophe to the white pine comparable to that which befell the chestnut.

Over 30,000 individual pine owners have protected their pine areas from blister rust. In some States the townships actively cooperate on a community basis by appropriating funds for the control work. These funds are used to pay for labor engaged in eradicating Ribes on white-pine areas within the township. The funds are expended under State supervision. The area to be eradicated each year is selected by the town officials and the district blister-rust leader. Local labor, working under trained foremen and supervised by the district leader, is then employed to eradicate the Ribes. In this manner a definite acreage is protected each year and the work continued annually until all of the white pine within the township has been safeguarded. Nearly 1,200 separate appropriations by townships have been made for this type of cooperation. (Fig. 17.)

In many instances cultivated Ribes plants are found within infecting distance of white pines. Over 460,000 such plants growing in such situations have been eradicated. These plants belonged to several thousand owners, who cooperated in their eradication to aid the

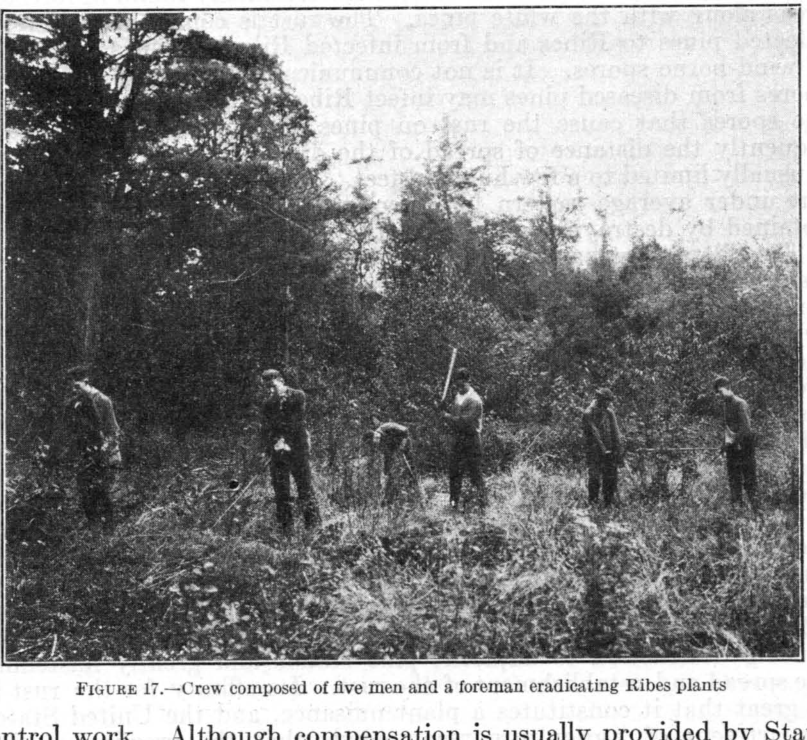


FIGURE 17.—Crew composed of five men and a foreman eradicating Ribes plants

control work. Although compensation is usually provided by State law for the loss of such plants, claims for compensation were made by the owners of only 5 per cent of these bushes. This kind of cooperation by thousands of individuals, many of whom did not own white pine, has been very helpful in establishing general control of the disease.

The cooperative application of control measures since 1918 in New England and New York has resulted in 7,757,140 acres being cleared of over 75,000,000 Ribes at an average cost of about 20 cents an acre. The cost varies considerably with local conditions, depending chiefly on the number and size of the Ribes plants, the density of the undergrowth, and the roughness of the ground. Control of the disease has been established on about 80 per cent of the major white-pine area needing protection in New England and New York. It will be necessary, however, to maintain this control by systematically reworking these lands at intervals of from 5 to 10 years, in order to destroy any regrowth of Ribes, particularly in open situations such as swamps, recent cut-over or burned areas, pastures, and along stream courses, roadways, and fence rows. In protected areas very slight or no increase can be found in the amount of disease on pine. On the other hand, it is easy to demonstrate the rapid increase of pine infection in unprotected areas and the need for prompt cooperation by the owners in the application of control measures.

E. C. FILLER,
Senior Pathologist, Bureau of Plant Industry.

BREEDING Studies at Experiment Stations Show Genetic Factors

Although no one questions the use of sound breeding methods in a system of successful livestock production, investigators in the field of animal breeding and animal genetics often are criticized for having contributed little of practical application to the subject. There is perhaps some justification for this criticism owing to the time and funds required in conducting breeding experiments with the domestic animals. The State experiment stations have, however, made distinct progress in explaining how different characteristics are inherited and in pointing out how certain undesirable qualities may be eliminated from the breeding stock.

The presentation of the results of all the contributions to the field is not attempted in this brief article, which is intended to give a general idea of the type and application of the work. Important contributions have been made in studies of different breeding practices, including the use and limitations of inbreeding, linebreeding, and crossbreeding. Investigations at the Connecticut, Delaware, California, Maine, Massachusetts, and Wisconsin Experiment Stations with swine and poultry show that inbreeding tends to concentrate the qualities present in the stock, whether they be good or poor. Consequently undesirable as well as desirable individuals may be produced. The purification of strains through inbreeding frequently results in the production of abnormalities and loss of vigor. The latter, however, may be restored by subsequent crossing. Close inbreeding is a dangerous practice in the hands of the uninformed, but it is a valuable tool when intelligently used for the concentration of qualities of superior individuals.

The inheritance of production characteristics in the different classes of animals has been an interesting subject of investigation at many of the stations. The Illinois, Maine, Wisconsin, and other stations have demonstrated that the mode of inheritance of milk and butterfat production is not simple. For example, as many as 10 genetic factors have been indicated for milk yield and 14 for fat percentage. The factors for high yield appear to be dominant, permitting a high-yielding animal to carry factors for lower production which may be transmitted to her progeny. The many factors responsible make the identification of individual factors very complicated. Studies of the inheritance of wool characters, carcass conformation, and the like in sheep at the New Hampshire, Ohio, Texas, and Wyoming stations indicate that these will be necessary, however, to maintain this control by systematically reworking these lands at intervals of from 5 to 10 years, in order to destroy any regrowth of Ribes, particularly in open situations such as swamps, recent cut-over or burned areas, pastures, and along stream courses, roadways, and fence rows. In protected areas very slight or no increase can be found in the amount of disease on pine. On the other hand, it is easy to demonstrate the rapid increase of pine infection in unprotected areas and the need for prompt cooperation by the owners in the application of control measures.

E. C. Filler,
Senior Pathologist, Bureau of Plant Industry.

BREEDING Studies at Experiment Stations Show Genetic Factors Although no one questions the use of sound breeding methods in a system of successful livestock production, investigators in the field of animal breeding and animal genetics often are criticized for having contributed little of practical application to the subject. There is perhaps some justification for this criticism owing to the time and funds required in conducting breeding experiments with the domestic animals. The State experiment stations have, however, made distinct progress in explaining how different characteristics are inherited and in pointing out how certain undesirable qualities may be eliminated from the breeding stock.

The presentation of the results of all the contributions to the field is not attempted in this brief article, which is intended to give a general idea of the type and application of the work. Important contributions have been made in studies of different breeding practices, including the use and limitations of inbreeding, linebreeding, and crossbreeding. Investigations at the Connecticut, Delaware, California, Maine, Massachusetts, and Wisconsin Experiment Stations with swine and poultry show that inbreeding tends to concentrate the qualities present in the stock, whether they be good or poor. Consequently undesirable as well as desirable individuals may be produced. The purification of strains through inbreeding frequently results in the production of abnormalities and loss of vigor. The latter, however, may be restored by subsequent crossing. Close inbreeding is a dangerous practice in the hands of the uninformed, but it is a valuable tool when intelligently used for the concentration of qualities of superior individuals.

The inheritance of production characteristics in the different classes of animals has been an interesting subject of investigation at many of the stations. The Illinois, Maine, Wisconsin, and other stations have demonstrated that the mode of inheritance of milk and butterfat production is not simple. For example, as many as 10 genetic factors have been indicated for milk yield and 14 for fat percentage. The factors for high yield appear to be dominant, permitting a high-yielding animal to carry factors for lower production which may be transmitted to her progeny. The many factors responsible make the identification of individual factors very complicated. Studies of the inheritance of wool characters, carcass conformation, and the like in sheep at the New Hampshire, Ohio, Texas, and Wyoming stations indicate that these qualities also are controlled by a large number of factors. Specific genetic factors influencing egg production and broodiness have been discovered in investigations at a number of the stations, particularly Kansas, Maine, Massachusetts, and New Jersey. All of these experiments dealing with the inheritance of production characters have indicated that the only satisfactory measure of the ability of an individual to transmit desirable qualities to its offspring must depend on a record of the performance of the progeny.

Inheritance of Abnormalities

The mode of inheritance of many abnormalities and undesirable characteristics has been established. For example, the Ohio and Wisconsin stations found that the tendency to produce swine with inguinal hernias was hereditary. The Texas and Ohio stations also observed that the ridgling characteristic in goats was inherited. The findings showed that these tendencies could be eliminated from the herd by intelligent selection and by discarding all animals which produced defective offspring.

Investigations with plants indicate that variations in the resistance to certain diseases are hereditary, and likewise in animals different degrees of resistance to diseases appear to be hereditary. Variations in the resistance of chicks to bacillary white diarrhea were found by the Illinois station to be hereditary. The Iowa station also reported the inheritance of resistance to Danysz bacillus in the rat and to fowl typhoid in poultry. Studies at Wisconsin indicated that resistance to contagious abortion was hereditary in rabbits. The Illinois and Iowa stations also have investigated the inheritance of resistance to cholera in hogs. Although the studies made thus far have not developed any practicable means of combating, by breeding, the diseases named, they represent interesting scientific observations.

The basic factors controlling color in farm animals have been largely established or confirmed by investigations of the inheritance of coat color in horses by the experiment stations in Kansas and Kentucky; cattle in Connecticut, Illinois, Iowa, Kansas, Maine, Texas, and Wisconsin; swine in Illinois, Iowa, Kansas, and Wisconsin; and poultry by the experiment stations in Connecticut, Kansas, Maine, Massachusetts, and Wisconsin. A practical application of these findings is the recognition that in the black breeds of cattle red animals are only produced in cases where both the sire and dam carry red. Thus, if red is to be eliminated from the herd it is necessary to discard for breeding purposes the parents of red animals, at the same time appreciating that black progeny may carry red if they are the produce of a sire or dam that have produced any red offspring. Another application of the results of color studies is the determination of the sex of crossbred chicks at hatching.

Experiments in Fertility

A wide variety of experiments have been conducted which deal with fertility and fecundity and the control of sex. It is difficult to obtain clear-cut results in studies of fertility and fecundity owing to the complication of environment and the fact that the different elements of which these characters are composed may tend to offset each other. Much progress has, however, been made in carefully controlled investigations dealing with the physiological factors influencing the viability of spermatozoa under different environmental conditions and after frequent matings. In attempts to throw light on the factors influencing the occurrence of heat in sows and the determination of the proper time for breeding, the Missouri station has observed the changes in the genital organs associated with heat, to obtain information essential for improvement in breeding practices. Progress has already been made in inducing heat in sows, increasing the number of eggs produced at a heat period, and in the isolation of hormones associated with pregnancy and the initiation of lactation following calving in dairy cattle. Although the factors influencing sex determination have been studied frequently, attempts to control the sex of the offspring have given negative results.

Investigations in animal breeding at the State experiment stations have been quite widely distributed geographically, and practically all phases of the subject have been considered. In their preliminary stages the results of many of the more thorough investigations have been fundamental in character, but it is the carefully planned investigations which tend to give conclusive results and play an important rôle in guiding the practices of the modern livestock breeder.

GEORGE HAINES,
Senior Animal Husbandman, Office of Experiment Stations.

CANNING Grades in Increased Demand as Their Utility Is Seen Since the practicability of standard grades for fresh tomatoes for canning has been conclusively demonstrated under commercial operations, there has been a considerable demand for United States grades for fruits and other vegetables intended for cannery purposes.

The principle of buying and selling on the basis of standard grades has come to be looked upon as very essential to successful merchandising. The adoption of this principle in transactions in farm produce has eliminated much of the source of misunderstanding and dissatisfaction. It seems logical, therefore, that this principle which has met with so much success in connection with the merchandising of fruits and vegetables marketed for consumption in the fresh state may also be applied to such products when grown for cannery use.

It is recognized that there are differences in quality, condition, size, color, maturity, etc., and that these differences vary in different fields under changing weather conditions. On account of these differences it is impossible to establish a flat price for such a crop as canning tomatoes that will be just to both canner and grower under all conditions. Uniform grades provide a common language with which to describe these differences. The use of standard grades offers certain very definite advantages to both grower and manufacturer. Clear-cut grades based on variations in quality provide a practical basis for contracts and purchases upon which the buyer and seller can deal with mutual confidence and understanding. Agreements can be made definite, with gradations in price corresponding with variations in the quality of the stock delivered, thereby assisting in placing transactions in raw stock upon a plane of equality and fairness. Tomatoes may be bought and sold on a grade basis at prices commensurate with their actual value for canning purposes. The incentive for the grower to strive to deliver a high-grade product in order to secure the attendant premium

40442°—31——9

of spermatozoa under different environmental conditions and after frequent matings. In attempts to throw light on the factors influencing the occurrence of heat in sows and the determination of the proper time for breeding, the Missouri station has observed the changes in the genital organs associated with heat, to obtain information essential for improvement in breeding practices. Progress has already been made in inducing heat in sows, increasing the number of eggs produced at a heat period, and in the isolation of hormones associated with pregnancy and the initiation of lactation following calving in dairy cattle. Although the factors influencing sex determination have been studied frequently, attempts to control the sex of the offspring have given negative results.

Investigations in animal breeding at the State experiment stations have been quite widely distributed geographically, and practically all phases of the subject have been considered. In their preliminary stages the results of many of the more thorough investigations have been fundamental in character, but it is the carefully planned investigations which tend to give conclusive results and play an important rôle in guiding the practices of the modern livestock breeder.

George Haines,
Senior Animal Husbandman, Office of Experiment Stations.

CANNING Grades in Increased Demand as Their Utility Is Seen Since the practicability of standard grades for fresh tomatoes for canning has been conclusively demonstrated under commercial operations, there has been a considerable demand for United States grades for fruits and other vegetables intended for cannery purposes.

The principle of buying and selling on the basis of standard grades has come to be looked upon as very essential to successful merchandising. The adoption of this principle in transactions in farm produce has eliminated much of the source of misunderstanding and dissatisfaction. It seems logical, therefore, that this principle which has met with so much success in connection with the merchandising of fruits and vegetables marketed for consumption in the fresh state may also be applied to such products when grown for cannery use.

It is recognized that there are differences in quality, condition, size, color, maturity, etc., and that these differences vary in different fields under changing weather conditions. On account of these differences it is impossible to establish a flat price for such a crop as canning tomatoes that will be just to both canner and grower under all conditions. Uniform grades provide a common language with which to describe these differences. The use of standard grades offers certain very definite advantages to both grower and manufacturer. Clear-cut grades based on variations in quality provide a practical basis for contracts and purchases upon which the buyer and seller can deal with mutual confidence and understanding. Agreements can be made definite, with gradations in price corresponding with variations in the quality of the stock delivered, thereby assisting in placing transactions in raw stock upon a plane of equality and fairness. Tomatoes may be bought and sold on a grade basis at prices commensurate with their actual value for canning purposes. The incentive for the grower to strive to deliver a high-grade product in order to secure the attendant premium

40442°—31——9

will tend to encourage the production of larger crops of superior quality. Waste and losses will be materially reduced. The price gradations will induce the grower to discard culls and unmarketable stock in the field, thus saving handling costs.

Basis for Sampling Provided

The United States grades which have been issued simply provide a basis for sampling loads of fruits and vegetables as they are delivered to the canneries. It is not intended that these products be sorted into different grades by the grower but that all usable stock should be delivered, leaving the culls in the field.

Progressive growers, who deliver good quality stock to the canneries, justly contend that they should receive more money for their products than the indifferent grower who delivers inferior fruits and vegetables which entail considerably more waste in preparation for use.

Canners who receive high-quality fresh stock are in a better position to manufacture their products economically. Labor costs in trimming green, decayed, or otherwise defective parts of the fruit or vegetables can be reduced. Other overhead expenses can also be held to a minimum by the increased capacity of the plant when culls are prevented from slowing up the quantity of stock run through the factory. This is particularly true during the peak of the season.

Increased profits for the canner eventually should mean more money for the grower. As a matter of fact many canners are already paying growers more money for their tomatoes, since they have been using the Federal-State inspection service as a neutral agency to determine the quality of various growers' loads of produce.

During 1930 approximately 90 Federal-State inspectors were stationed at canneries and loading stations in 10 States for the purpose of reporting the quality of loads of tomatoes, apples, spinach, cherries, and green beans. Although United States grades for cannery cherries and green beans had not been recommended at that time, the inspectors reported the percentages of various defects and secured information upon which a practical set of grades for each product might be based. Intensive studies were also begun with a view to establishing Federal grades for green peas and raspberries for canning, and cabbage for sauerkraut manufacture.

William E. Lewis,
Marketing Specialist, Bureau of Agricultural Economics.

CASEIN of High Quality Increases Profits of the Dairy Industry

Casein, a product of skim milk, is used in the United States to the extent of about 50,000,000 pounds annually. In the period 1920–1929 the annual imports of casein exceeded the amount produced in the United States by approximately 5,000,000 pounds. The amount manufactured in the United States fluctuates within rather wide ranges from year to year, depending largely upon prevailing market prices. For the 5-year period 1920–1924 the average domestic production was 12,367,000 pounds, and for the 5-year period 1925–1929 it was 20,867,000 pounds. In 1929, 30,535,000 pounds was produced in 214 American factories, and 27,583,000 pounds was imported, making the total supply for that will tend to encourage the production of larger crops of superior quality. Waste and losses will be materially reduced. The price gradations will induce the grower to discard culls and unmarketable stock in the field, thus saving handling costs.

Basis for Sampling Provided

The United States grades which have been issued simply provide a basis for sampling loads of fruits and vegetables as they are delivered to the canneries. It is not intended that these products be sorted into different grades by the grower but that all usable stock should be delivered, leaving the culls in the field.

Progressive growers, who deliver good quality stock to the canneries, justly contend that they should receive more money for their products than the indifferent grower who delivers inferior fruits and vegetables which entail considerably more waste in preparation for use.

Canners who receive high-quality fresh stock are in a better position to manufacture their products economically. Labor costs in trimming green, decayed, or otherwise defective parts of the fruit or vegetables can be reduced. Other overhead expenses can also be held to a minimum by the increased capacity of the plant when culls are prevented from slowing up the quantity of stock run through the factory. This is particularly true during the peak of the season.

Increased profits for the canner eventually should mean more money for the grower. As a matter of fact many canners are already paying growers more money for their tomatoes, since they have been using the Federal-State inspection service as a neutral agency to determine the quality of various growers' loads of produce.

During 1930 approximately 90 Federal-State inspectors were stationed at canneries and loading stations in 10 States for the purpose of reporting the quality of loads of tomatoes, apples, spinach, cherries, and green beans. Although United States grades for cannery cherries and green beans had not been recommended at that time, the inspectors reported the percentages of various defects and secured information upon which a practical set of grades for each product might be based. Intensive studies were also begun with a view to establishing Federal grades for green peas and raspberries for canning, and cabbage for sauerkraut manufacture.

WILLIAM E. LEWIS,
Marketing Specialist, Bureau of Agricultural Economics.

CASEIN of High Quality Increases Profits of the Dairy Industry

Casein, a product of skim milk, is used in the United States to the extent of about 50,000,000 pounds annually. In the period 1920–1929 the annual imports of casein exceeded the amount produced in the United States by approximately 5,000,000 pounds. The amount manufactured in the United States fluctuates within rather wide ranges from year to year, depending largely upon prevailing market prices. For the 5-year period 1920–1924 the average domestic production was 12,367,000 pounds, and for the 5-year period 1925–1929 it was 20,867,000 pounds. In 1929, 30,535,000 pounds was produced in 214 American factories, and 27,583,000 pounds was imported, making the total supply for that year slightly more than 58,000,000 pounds. The best grades of casein have been selling recently for 3 to 4 cents more per pound than the average grades. Imported casein, which comes mostly from Argentina, is more uniform in quality than most of the domestic casein which is not sold according to grade.

Investigations made by the Bureau of Dairy Industry show that while our best grades are equal or superior to the best imported products, there are great differences in the quality and uniformity of domestic brands.

Standardization of manufacturing methods and the introduction of better methods will enable dairy-products plants to make a more uniform, higher-grade product which can be more readily marketed, at a price higher than that paid for casein of inferior quality.

Many of the leading dairy plants throughout the country have already adopted manufacturing methods recommended by the bureau, and are producing casein which brings premium prices. There are many other plants, which, by adopting better manufacturing methods, will likewise be able to improve the quality of their casein and market it to better advantage.

With improvement in quality will come a greater demand for domestic casein and the extension of casein manufacture to new sections. Within the last year several new casein plants have been started in Minnesota and Idaho, and these now have profitable casein business.

Casein is used principally as a binder in coated paper, and for making glue, as well as in numerous other commodities where its adhesive and waterproof qualities are of value.

Casein, as commonly made, is not a food product, and oftentimes is made only as a means of utilizing surplus skim milk. Many casein-plant operators become careless in their manufacturing methods and assign unskilled and inefficient labor to do the work. Under such conditions the finished casein lacks uniformity and is usually of inferior quality. With casein, as with other dairy products, the more exact and careful the manufacturing methods are, the better the product will be. When casein is made in the right way, casein manufacture can be not merely a means of utilizing surplus skim milk, at small profit to the manufacturer, but can be a profitable undertaking.

Profitably Utilizes Skim Milk

By making high-grade casein, which brings good prices, dairy-products plants can not only use up their surplus milk, but can profitably utilize more of their available skim milk in casein manufacture throughout the year. For example, when market conditions are unfavorable for converting skim milk into one or more of its usual by-products, its manufacture into high-grade casein may be profitable. The diversion of definite amounts of skim milk into casein of high quality would tend to stabilize the by-products branch of the dairy industry.

Casein properly made by the grain-curd method, which was developed in the research laboratories of the Bureau of Dairy Industry, is a casein of very high quality and uniformity, and has properties which the users of casein demand. Grain-curd casein is now being made in a number of plants in various parts of the country, with very satisfactory results.

In connection with the improvement in the quality of casein, better equipment has been developed for making casein in large quantities.

Although the grain-curd method has special advantages, casein of good quality can be made by any of the customary methods with proper manufacturing care. Regardless of the type of casein produced, exactness in manufacturing methods is essential for the production of a high-grade casein for any commercial use.

In field studies made by the Bureau of Dairy Industry in the last year, in Vermont, Pennsylvania, New York, Maine, Wisconsin, Minnesota, Massachusetts, Montana, Washington, Oregon, Idaho, and California, it was found that there has been no uniformity in manufacturing methods, even in plants making the same type of casein. The great differences in quality of caseins of the same type and of different types are largely due to variations in manufacturing methods. Any type of casein that is made right should have about the same desirable commercial properties as any other type, and the different types, as far as their practical utilization is concerned, should be interchangeable.

The general adoption of the methods of manufacture recommended by the Bureau of Dairy Industry should result in an increase in casein production, and be of great value to the dairy industry in producing high-grade casein suitable for all commercial purposes.

C. S. Trimble,
Associate Manufacturing Specialist,
Bureau of Dairy Industry.

CATTLE Often Killed by Nails, Wire, Etc., Eaten With the Feed In the dairy herd at the United States Dairy Experiment Station at Beltsville, Md., among animals more than a year old, 38 deaths have occurred in the last four years. Eighteen, or 47.36 per cent, of these were due to foreign bodies eaten by the animal with the feed. In addition to these, 22 animals were seriously affected by foreign bodies. Also, numerous minor injuries and adhesions occurred in other cows which were due to foreign bodies. In a good commercial dairy herd these losses would have included the deaths of animals ranging in value from one hundred to several thousand dollars each and the decreasing of profits in milk production and breeding.

The foreign bodies most frequently found in Beltsville animals were pieces of wire and nails. In 12 of the 18 cases resulting in death the diaphragm had been pierced. In 3 cows wires were found in the liver. One cow died as the result of wire passing from the stomach through the abdominal wall. Another died from bloat caused by an abscess due to a foreign body that pierced the diaphragm and entered the lung. In still another case the animal had swallowed a metal burr which ruptured the fourth compartment of the stomach.

Other foreign bodies, such as needles, splintered wood, and knives, are sometimes found in cows. Such objects as stones, sand, bolts, money, and watches have been found in the digestive tracts of cattle. Pieces of wire from baled hay or from fences and construction work and nails are the foreign bodies that are most commonly found. Pieces of wire and nails may easily be swallowed with the feed, for cattle chew their feed only superficially before swallowing it. The many strong papillae (pronglike projections) which are on the tongue and point backward, prevent the foreign bodies from falling out of the mouth. While the feed is being tossed about in the stomach these heavier objects fall to the bottom of the second division of the stomach, known

Although the grain-curd method has special advantages, casein of good quality can be made by any of the customary methods with proper manufacturing care. Regardless of the type of casein produced, exactness in manufacturing methods is essential for the production of a high-grade casein for any commercial use.

In field studies made by the Bureau of Dairy Industry in the last year, in Vermont, Pennsylvania, New York, Maine, Wisconsin, Minnesota, Massachusetts, Montana, Washington, Oregon, Idaho, and California, it was found that there has been no uniformity in manufacturing methods, even in plants making the same type of casein. The great differences in quality of caseins of the same type and of different types are largely due to variations in manufacturing methods. Any type of casein that is made right should have about the same desirable commercial properties as any other type, and the different types, as far as their practical utilization is concerned, should be interchangeable.

The general adoption of the methods of manufacture recommended by the Bureau of Dairy Industry should result in an increase in casein production, and be of great value to the dairy industry in producing high-grade casein suitable for all commercial purposes.

C. S. Trimble,
Associate Manufacturing Specialist,
Bureau of Dairy Industry.

CATTLE Often Killed by Nails, Wire, Etc., Eaten With the Feed

In the dairy herd at the United States Dairy Experiment Station at Beltsville, Md., among animals more than a year old, 38 deaths have occurred in the last four years. Eighteen, or 47.36 per cent, of these were due to foreign bodies eaten by the animal with the feed. In addition to these, 22 animals were seriously affected by foreign bodies. Also, numerous minor injuries and adhesions occurred in other cows which were due to foreign bodies. In a good commercial dairy herd these losses would have included the deaths of animals ranging in value from one hundred to several thousand dollars each and the decreasing of profits in milk production and breeding.

The foreign bodies most frequently found in Beltsville animals were pieces of wire and nails. In 12 of the 18 cases resulting in death the diaphragm had been pierced. In 3 cows wires were found in the liver. One cow died as the result of wire passing from the stomach through the abdominal wall. Another died from bloat caused by an abscess due to a foreign body that pierced the diaphragm and entered the lung. In still another case the animal had swallowed a metal burr which ruptured the fourth compartment of the stomach.

Other foreign bodies, such as needles, splintered wood, and knives, are sometimes found in cows. Such objects as stones, sand, bolts, money, and watches have been found in the digestive tracts of cattle. Pieces of wire from baled hay or from fences and construction work and nails are the foreign bodies that are most commonly found. Pieces of wire and nails may easily be swallowed with the feed, for cattle chew their feed only superficially before swallowing it. The many strong papillae (pronglike projections) which are on the tongue and point backward, prevent the foreign bodies from falling out of the mouth. While the feed is being tossed about in the stomach these heavier objects fall to the bottom of the second division of the stomach, known as the reticulum or honeycomb, and remain in the stomach when the feed is regurgitated for mastication.

Foreign bodies rarely lodge in the esophagus of cows, and they are seldom found in the digestive tract beyond the reticulum, but sometimes straw or small splinters of wood get into the bronchial tubes of cattle and cause irritation.

Various Injuries Caused

On account of the contraction of the powerful muscles of the stomach, diaphragm, and abdominal walls, sharp-pointed foreign bodies are forced through the wall of the stomach. Usually they travel forward but they may move in any direction. As the heart is adjacent to the reticulum it frequently is injured.

Foreign bodies have been known to pass through the abdominal wall to the outside, making a pus canal as they went. Abscesses usually form in the organs injured by the foreign bodies and sometimes severe hemorrhages occur. The liver, spleen, diaphragm, and lungs are sometimes destroyed by such abscesses.

When a foreign body passes forward through the diaphragm it comes into contact with the heart sack and sometimes even enters the heart. The type of wound made depends to some extent upon the speed with which the object travels. If passage is slow, pus is formed, even to the extent of several gallons, around the heart. Abscesses may develop in the heart muscle. If passage is more rapid, it may tear a hole through the heart muscle and death occur before there is time for pus formation.

Frequently the symptoms of the presence of foreign bodies in cows appear after some great exertion, such as giving birth to young or fighting. An illustration is that of a cow that died two days after her rumen had been vigorously massaged.

A cow with a foreign body may appear normal, then suddenly refuse to eat, stand in one position for long periods, look distressed, breathe cautiously, move stiffly, and give less milk. The stomach works slowly and the conjunctiva and body fluids may appear yellow if the liver is involved. Usually the temperature is elevated in very acute or prolonged cases, and there may be considerable pain, depending upon the location of the foreign body.

The cow may recover in a day or so only to show similar symptoms again within a few weeks. Thus the symptoms may come and go over a period of several months before death. At times the symptoms may come on suddenly and the animal die within a week. Oftentimes in the latter stages of a long siege when the foreign body has penetrated the heart sack, the splashing of fluid around the heart may be heard.

Swelling of the joints of the legs, and a change of the milk to a gray watery fluid, with enlargement of the udder, may occur in cases of long duration. When the circulation is disturbed, edematous swellings may appear along the lower parts of the body.

Many of these symptoms are present in other digestive disturbances and ailments of the internal organs. However, where baled hay is being fed, or construction work is going on near the herd, foreign bodies may be suspected.

Medicinal treatment is of little or no value. Surgical interference has been successful in some cases when resorted to early. This consists of opening the abdominal cavity and removing the foreign body.

Methods of Prevention

Prevention is decidedly more profitable than treatment. Before baled hay is fed all wire should be accounted for and should be moved to a safe distance from the cows. The same precautions should be taken with baled straw and other baled material. It is advisable to have fences around the barn lots made of material other than wire; at least badly rusted wire fences should be replaced. Likewise, all rubbish and litter should be moved from the lots, yards, stables, and barns. It is poor practice to mend broken stanchions and equipment with baling wire, because the wire may break and fall into the feed. For removing certain kinds of metal from the grain a magnet may serve.

F. W. MILLER,
Senior Veterinarian and Physiologist,
Bureau of Dairy Industry.

CATTLE Ticks Can Be Eradicated by System of Vacating Pastures Although it is generally understood by cattlemen of the South that the cattle-fever tick may be readily starved to death if deprived of the opportunity of getting on cattle, horses, mules, or asses, this method of eradicating ticks is comparatively little used. Under proper conditions this plan, which is commonly referred to as the pasture-vacating method, is rapid and sure in its results, and eradication is brought about with a minimum of work and expense. This method is particularly adaptable in much of the large range country of the Southwest remaining in the quarantined area. Here the spring movement of cattle to pastures in Northern States and to market points often reduces the number remaining on the ranches to a point where a part of the range can easily be vacated. In many such cases the method can be made to fit in with the regular ranch operations with little loss of feed, or in the number of cattle carried throughout the year.

This method of eliminating fever ticks is based on knowledge of the time that ticks survive in a pasture after the removal of all cattle, horses, mules, and asses. The length of this starvation period at various seasons of the year has been determined by experiments conducted by the Bureau of Animal Industry, and the results of these experiments have been verified in many practical applications of this knowledge in tick-eradication work in the field.

Time Required to Free Pastures

The dates when a pasture will be tick free after removal of the livestock are as follows:

Date of vacating pasture	Date when pasture will be free from ticks
July 1	March 1.
August 1	May 1.
September 1	July 1.
October 1 to November 1, inclusive	August 1.
December 1	August 15.
December 15 to March 15, inclusive	September 1.
April 1	September 15.
April 15	October 15.
May 1 to June 15, inclusive	November 1.

Methods of Prevention

Prevention is decidedly more profitable than treatment. Before baled hay is fed all wire should be accounted for and should be moved to a safe distance from the cows. The same precautions should be taken with baled straw and other baled material. It is advisable to have fences around the barn lots made of material other than wire; at least badly rusted wire fences should be replaced. Likewise, all rubbish and litter should be moved from the lots, yards, stables, and barns. It is poor practice to mend broken stanchions and equipment with baling wire, because the wire may break and fall into the feed. For removing certain kinds of metal from the grain a magnet may serve.

F. W. Miller,
Senior Veterinarian and Physiologist,
Bureau of Dairy Industry.

CATTLE Ticks Can Be Eradicated by System of Vacating Pastures Although it is generally understood by cattlemen of the South that the cattle-fever tick may be readily starved to death if deprived of the opportunity of getting on cattle, horses, mules, or asses, this method of eradicating ticks is comparatively little used. Under proper conditions this plan, which is commonly referred to as the pasture-vacating method, is rapid and sure in its results, and eradication is brought about with a minimum of work and expense. This method is particularly adaptable in much of the large range country of the Southwest remaining in the quarantined area. Here the spring movement of cattle to pastures in Northern States and to market points often reduces the number remaining on the ranches to a point where a part of the range can easily be vacated. In many such cases the method can be made to fit in with the regular ranch operations with little loss of feed, or in the number of cattle carried throughout the year.

This method of eliminating fever ticks is based on knowledge of the time that ticks survive in a pasture after the removal of all cattle, horses, mules, and asses. The length of this starvation period at various seasons of the year has been determined by experiments conducted by the Bureau of Animal Industry, and the results of these experiments have been verified in many practical applications of this knowledge in tick-eradication work in the field.

Time Required to Free Pastures

The dates when a pasture will be tick free after removal of the livestock are as follows:

Date of vacating pasture	Date when pasture will be free from ticks
July 1	March 1.
August 1	May 1.
September 1	July 1.
October 1 to November 1, inclusive	August 1.
December 1	August 15.
December 15 to March 15, inclusive	September 1.
April 1	September 15.
April 15	October 15.
May 1 to June 15, inclusive	November 1.

From this tabulation it will be seen that the time necessary to kill ticks by starvation is shortest in summer and that the best time to vacate pastures, as a rule, is between March 15 and June 15. It will then be necessary to lose the use of the range for only about six months.

Feed Not Wasted—Rest Improves Range

The time that a pasture is left idle should not be charged up as a total loss. The range improves as a result of the rest and the chance to reseed, and it will be in a condition to carry an additional number of cattle when it is ready for restocking.

Close attention to a few simple details are important in the successful application of this plan. The most important of these are: Good fencing, the removal and exclusion of all livestock, and eventual restocking with tick-free animals.

The fences inclosing the pasture to be vacated must be good enough to keep out livestock and should be regularly patrolled and kept in good repair. In dividing or cross fencing large ranges for the purpose of tick eradication by this method, the new fences should be built, when possible, through rough, inaccessible land where feed is short and where cattle will consequently be less inclined to stray up to the fence line.

It is necessary that all cattle, horses, mules, and asses be removed from the pasture and the time that it is to remain idle should be calculated from the day the last animal is removed.

Riders patrolling the fences should also examine the watering places to make doubly sure that the pasture remains vacant. The horses used by the riders doing this work must be kept tick free and regularly dipped to avoid the possibility of carrying ticks into the vacated pasture. If the pasture is crossed by a private road, this should be closed except to automobile travel.

When the starvation period is ended, every precaution must be taken to see that the pasture is restocked with tick-free animals. A safe plan is to require that all animals to be placed in the free pasture be found apparently tick free on a careful chute inspection and then be dipped and moved to the free pasture without exposure. These operations should be supervised by an official cattle inspector.

The fear is sometimes expressed that deer that may be on the vacated pasture will serve to continue tick infestation when the livestock is removed. This has not been found to be the case. Many large pastures in which deer were numerous have been made tick free by the vacating method and have remained so, in spite of the presence of deer in them.

Method Should Be Officially Supervised

When planning to free a ranch or pasture of ticks by the method described, it is advisable to notify and secure the advice of the official having charge of tick eradication in your locality. This will insure official supervision of the work and result in the keeping of records that are used in connection with the removal of quarantine restrictions when the ticks are eradicated.

For further information concerning cattle-tick eradication ask for Farmers' Bulletin 1057, Cattle-Fever Ticks and Methods of Eradication and consult State livestock sanitary officials or the United States Department of Agriculture, Washington, D. C.

W. M. MacKellar,
Senior Veterinarian, Bureau of Animal Industry.

CATTLE Tick's Passing in South Carolina Has Brought Early Benefits Although less than four years have elapsed since South Carolina was released from Federal quarantine imposed because of cattle ticks, the benefits derived from the eradication of this pest are already evident throughout the State.

It is true that in South Carolina, as in many other parts of the country, the number of cattle has decreased somewhat in recent years, but the increase in quality in this State more than compensates for the loss in numbers. The net benefit amounts to about $2,000,000 annually. It is noteworthy also that purebred and high-grade cattle in South Carolina are steadily increasing in number and value.

Since tick eradication was completed in 1927, nearly a thousand purebred bulls of both beef and dairy types have been brought into the State for use as herd sires. As a consequence, cattle owners are now not only improving their own herds but are also supplying animals for both breeding and utility purposes to other areas that have more recently won their freedom from cattle ticks. Records of sales held by State and county breeders' associations show that South Carolina has likewise supplied purebred cattle to Middle Western and Northern States. The increased production of milk and cream as a result of the great expansion in the dairy industry is taken care of by creameries, cheese factories, and ice-cream plants located at advantageous points throughout the State. (Fig. 18.)

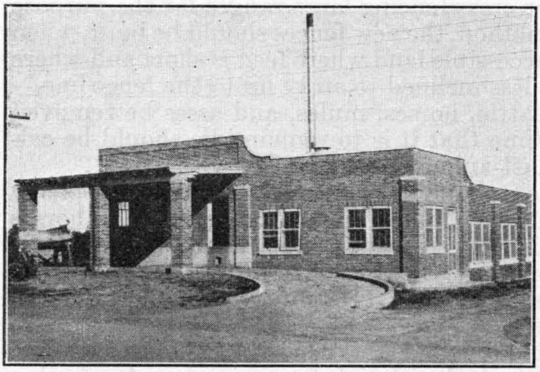


FIGURE 18.—A modern cheese factory, typical of the industrial development that has followed tick eradication

These developments illustrate the value of two factors which are commonly recognized as essential to the success of any industry. The first is good quality of products, and the second is an unrestricted market. These factors apply as much to the production of cattle as to commodities of various kinds. Because of its effect on the quality of the animals raised and on markets, the cattle-fever tick for many years was the greatest known menace to the cattle-raising industry in the South.

It is perhaps difficult for residents of other States where cattle ticks have never occurred or where they have long been prevalent to realize the change that the eradication of such a parasite can bring about. The prevalence of splenetic fever carried from animal to animal by the cattle tick and the irritation and blood loss due to the attack of great numbers of these ticks result in an inferior quality of cattle. This, together with quarantine measures imposed by the Federal Government and various States, restricted sales to designated markets, with the result that comparatively low prices were obtained. For many years these conditions prevailed and reduced returns from cattle to the extent of about $1,500,000 annually. The solution of the problem, therefore, was to remove the cause by taking advantage of early experimental work that showed the feasibility of eradicating ticks on cattle, while still allowing the use of infested pastures and premises.

Entire State Infested in 1906

The entire area of the State was tick infested when in 1906 systematic eradication was begun cooperatively between the United States Bureau of Animal Industry and the State of South Carolina through Clemson Agricultural College. Because of insufficient funds for carrying on the work and lack of cooperation on the part of the cattle owners, the results obtained at first were meager. But after ample proof of the feasibility of eradicating ticks from a given area was demonstrated, adequate funds were provided and plans were perfected for conducting the work on a larger scale.

A vigorous campaign ensued, and although numerous difficulties were encountered, public sentiment supported the work, which went steadily forward. On September 22, 1927, the last fever tick was found, and on December 1, 1927, the entire State was released from Federal quarantine. Of the States whose entire area was placed under fever-tick quarantine, South Carolina was the first to be freed from the ravages of this parasite.

Although cotton is still the chief staple crop and its price controls, in large measure, the interest taken in livestock raising, many farmers now see that their diversification plan must be put on a more permanent general program of farming. This plan includes livestock, particularly cattle. With thousands of undeveloped acres in South Carolina that can be used for stock raising, there are excellent prospects for deriving still greater benefits from tick eradication.

The steady progress of freeing the entire South from ticks and the fever which they transmit will probably cause a general readjustment in the areas of cattle production throughout the country. Accordingly, it is advisable for persons engaged or interested in that industry to make a close study of the trends and developments in States like South Carolina where noteworthy changes are now occurring.

W. K. LEWIS,
Veterinarian, Bureau of Animal Industry.

CATTLE Tuberculosis in Range Areas Is Yielding to Eradication Methods

Since 1884, when the Federal Bureau of Animal Industry was established, the United States Department of Agriculture has assisted the various States in conquering outbreaks of infectious livestock diseases. Accordingly, when in 1917 the time became ripe to wage a relentless campaign against tuberculosis in livestock, the department, in cooperation with the States, undertook to eradicate this insidious infectious disease which in some areas had gained a strong foothold.

The undertaking is commonly recognized by livestock sanitarians as the most stupendous task of its kind. The campaign was directed particularly against bovine tuberculosis, though attention has been directed likewise to the suppression of the same disease in swine and the problem, therefore, was to remove the cause by taking advantage of early experimental work that showed the feasibility of eradicating ticks on cattle, while still allowing the use of infested pastures and premises.

Entire State Infested in 1906

The entire area of the State was tick infested when in 1906 systematic eradication was begun cooperatively between the United States Bureau of Animal Industry and the State of South Carolina through Clemson Agricultural College. Because of insufficient funds for carrying on the work and lack of cooperation on the part of the cattle owners, the results obtained at first were meager. But after ample proof of the feasibility of eradicating ticks from a given area was demonstrated, adequate funds were provided and plans were perfected for conducting the work on a larger scale.

A vigorous campaign ensued, and although numerous difficulties were encountered, public sentiment supported the work, which went steadily forward. On September 22, 1927, the last fever tick was found, and on December 1, 1927, the entire State was released from Federal quarantine. Of the States whose entire area was placed under fever-tick quarantine, South Carolina was the first to be freed from the ravages of this parasite.

Although cotton is still the chief staple crop and its price controls, in large measure, the interest taken in livestock raising, many farmers now see that their diversification plan must be put on a more permanent general program of farming. This plan includes livestock, particularly cattle. With thousands of undeveloped acres in South Carolina that can be used for stock raising, there are excellent prospects for deriving still greater benefits from tick eradication.

The steady progress of freeing the entire South from ticks and the fever which they transmit will probably cause a general readjustment in the areas of cattle production throughout the country. Accordingly, it is advisable for persons engaged or interested in that industry to make a close study of the trends and developments in States like South Carolina where noteworthy changes are now occurring.

W. K. Lewis,
Veterinarian, Bureau of Animal Industry.

CATTLE Tuberculosis in Range Areas Is Yielding to Eradication Methods

Since 1884, when the Federal Bureau of Animal Industry was established, the United States Department of Agriculture has assisted the various States in conquering outbreaks of infectious livestock diseases. Accordingly, when in 1917 the time became ripe to wage a relentless campaign against tuberculosis in livestock, the department, in cooperation with the States, undertook to eradicate this insidious infectious disease which in some areas had gained a strong foothold.

The undertaking is commonly recognized by livestock sanitarians as the most stupendous task of its kind. The campaign was directed particularly against bovine tuberculosis, though attention has been directed likewise to the suppression of the same disease in swine and poultry. Through harmony and uniformity of effort, the cooperative campaign has brought about a steady decline in the prevalence of the disease. Whereas in 1920 the infection among cattle was 4.9 per cent, the corresponding figure in 1930 was 1.7 per cent. These percentages represent the average extent of the disease found in the tuberculin testing of both dairy and beef herds.

A New Undertaking in Range Livestock Areas

In the Eastern and Central States the use of the tuberculin test was already familiar to cattle owners when the cooperative campaign was launched. But in many of the Western States, especially in the extensive range areas, little had previously been done toward the control of the disease. In Idaho, for instance, the only tuberculin tests conducted had been made by private veterinarians within their own communities. This testing was performed either as a basis for interstate shipments of cattle or to comply with ordinances requiring the annual testing of dairy herds furnishing the milk supply. There had been little tuberculin testing among the herds of range cattle.

As systematic tuberculosis eradication progressed in other States there developed among livestock breeders' associations in Idaho a sentiment for the active suppression of the disease on a more extensive scale than in the past. Accordingly, the Idaho Legislature, on appeal by breeders, dairymen, and others interested, enacted suitable laws for State cooperation with the Federal Government and also made adequate provisions for operating expenses and indemnity funds.

Early in 1919 the Federal and Idaho Departments of Agriculture began a vigorous campaign which involved first the testing of individual herds under the so-called accredited-herd plan. Briefly, this plan involved Federal and State recognition of herds as being free of tuberculosis when they had successfully passed two annual or three semiannual tuberculin tests. The circulation of accredited-herd agreements among herd owners brought a remarkable response, especially from dairymen who wished to have their herds accredited. After about three years of operation, this plan was found to be inadequate to bring about the expected degree of success. Since all herds in a neighborhood were not tested, there was difficulty in preventing reinfection of the accredited herds. Moreover, the accredited-herd plan was costing an average of 43 cents a head for the test, and it seemed desirable to reduce this cost if possible.

Range Herds Sometimes Infected Seriously

In 1922 the Federal and State Government forces adopted the county-wide or area plan, which involved the testing of all cattle within a designated area or county. This plan of eradication was accepted as a forward step by all cattlemen, except a number of range cattle owners who objected on the grounds that tuberculosis was not prevalent in range herds. However, these objectors failed to alter the program of the work outlined and, in a short time after area testing began, the results fully demonstrated that bovine tuberculosis existed among range cattle to an alarming extent. In fact, some of the range herds were affected more seriously than the dairy cattle in the same locality.

In a county-wide test conducted in October, 1922, the results revealed 93 infected range herds, containing 599 tuberculous animals, as compared with 4 infected dairy herds showing but 7 tuberculous animals. One herd of 368 range cattle contained 118 reactors to the tuberculin test, or approximately 32 per cent infection. On post-mortem, 12 of the reactors were found to be generalized cases or probable spreaders of the disease. In the same county another range herd, containing 898 cattle, had 122 reactors, or about 14 per cent infection. Of these animals 41 were found to be generalized cases of tuberculosis. These herds, of course, do not represent the general condition among range herds, but they demonstrated to the range cattlemen of Idaho that it is unsafe to consider range cattle free of the disease unless proved to be so by the tuberculin test.

In county-wide area testing, clearly defined plans are mapped out by the cooperating forces. Literature is distributed, and newspapers are furnished press articles concerning the program of work. Owing

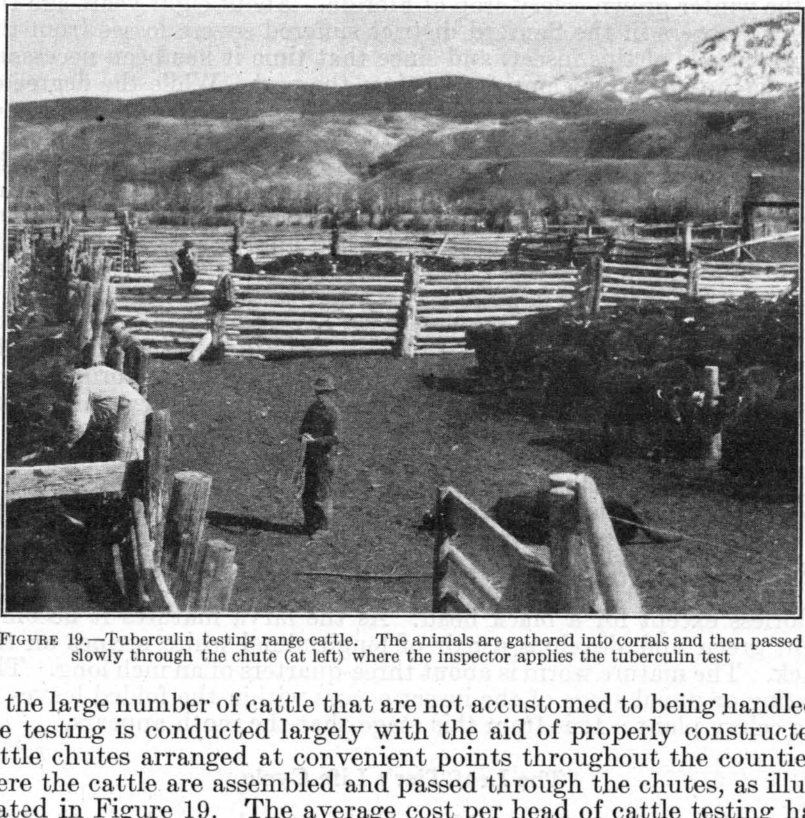


FIGURE 19.—Tuberculin testing range cattle. The animals are gathered into corrals and then passed slowly through the chute (at left) where the inspector applies the tuberculin test

to the large number of cattle that are not accustomed to being handled, the testing is conducted largely with the aid of properly constructed cattle chutes arranged at convenient points throughout the counties. Here the cattle are assembled and passed through the chutes, as illustrated in Figure 19. The average cost per head of cattle testing has been reduced from 43 cents per head, the figure under the accredited-herd plan, to 23 cents a head under the area plan.

This discussion has centered largely on developments of the work in Idaho, since that State has been one of the most successful in the systematic eradication of bovine tuberculosis in the range area. Of the 44 counties in the State, 35 have already been officially recognized as modified accredited areas, signifying the reduction of bovine tuberculosis to not over one-half of 1 per cent of all cattle.

From present indications Idaho will be practically free of bovine tuberculosis within a short time and will be the first of the Northwestern States to attain this goal. The livestock industry of the State recognizes that success in the production of animal products depends on healthy animals of high quality.

W. A. SULLIVAN,
Associate Veterinarian, Bureau of Animal Industry.

CELERY Leaf Tier Has Become Serious Pest in Parts of Florida

The celery leaf tier, *Phlyctaenia rubigalis* Hbn., a widely distributed native insect, has long been recognized as a pest of many greenhouse plants, but only in comparatively recent years has it attracted attention as a pest of the winter-grown celery crop of Florida. About eight years ago the celery growers in the Sanford district suffered severe losses from the depredations of this insect, and since that time it has been necessary to wage an intensive campaign against the pest. While the degree of infestation has varied from year to year, the presence of the insect has caused considerable concern to the celery industry.

The damage to the celery crop by the celery leaf tier is due to the feeding of the larvae or worms on the leaves and stalks of the plant. During the early development of the insect most of the feeding is done on the undersides of the leaves, but when approaching maturity the worms may devour the whole leaf. When about one-third grown they begin to knit or tie one or more leaves together. They prefer the most succulent parts of the plant and do a considerable amount of the feeding on the central leaves, thus causing ragged, unsightly stalks bearing considerable frass. Stripping to remove the worm-injured leaves is often necessary in order to obtain marketable plants, and many otherwise marketable stalks are discarded during harvest.

The adult of the celery leaf tier is a small brown moth, the female of which deposits its small, almost transparent eggs on the undersides of the leaves of the plant. The eggs may be deposited singly or in groups of 2 to 15 and slightly overlapping one another, having an arrangement and appearance in the larger groups simliar to that of a number of fish scales. When the worm first emerges from the egg it is almost colorless except for a black head. As the larva matures it becomes light green and develops a pair of longitudinal white stripes on the back. The mature worm is about three-quarters of an inch long. The resting or pupal stage of the insect occurs within the folded leaves of the celery plant. It is from this stage that the moth appears.

The Leaf Tier's Life Cycle

Under exceptionally favorable conditions for the development of the insect its life cycle may be completed in about 25 days. During the cooler months it may require a period of nearly three months from egg to adult. During the spring and late fall a generation of the worms will develop in a little over a month. The celery leaf tier usually disappears in late May or early June and does not appear again in the Sanford district until early in October, when fresh moths make their appearance in the earliest planted seed beds. Their appearance usually follows the first sudden drop in temperature after the mean tem-

From present indications Idaho will be practically free of bovine tuberculosis within a short time and will be the first of the Northwestern States to attain this goal. The livestock industry of the State recognizes that success in the production of animal products depends on healthy animals of high quality.

W. A. SULLIVAN,
Associate Veterinarian, Bureau of Animal Industry.

CELERY Leaf Tier Has Become Serious Pest in Parts of Florida

The celery leaf tier, *Phlyctaenia rubigalis* Hbn., a widely distributed native insect, has long been recognized as a pest of many greenhouse plants, but only in comparatively recent years has it attracted attention as a pest of the winter-grown celery crop of Florida. About eight years ago the celery growers in the Sanford district suffered severe losses from the depredations of this insect, and since that time it has been necessary to wage an intensive campaign against the pest. While the degree of infestation has varied from year to year, the presence of the insect has caused considerable concern to the celery industry.

The damage to the celery crop by the celery leaf tier is due to the feeding of the larvae or worms on the leaves and stalks of the plant. During the early development of the insect most of the feeding is done on the undersides of the leaves, but when approaching maturity the worms may devour the whole leaf. When about one-third grown they begin to knit or tie one or more leaves together. They prefer the most succulent parts of the plant and do a considerable amount of the feeding on the central leaves, thus causing ragged, unsightly stalks bearing considerable frass. Stripping to remove the worm-injured leaves is often necessary in order to obtain marketable plants, and many otherwise marketable stalks are discarded during harvest.

The adult of the celery leaf tier is a small brown moth, the female of which deposits its small, almost transparent eggs on the undersides of the leaves of the plant. The eggs may be deposited singly or in groups of 2 to 15 and slightly overlapping one another, having an arrangement and appearance in the larger groups simliar to that of a number of fish scales. When the worm first emerges from the egg it is almost colorless except for a black head. As the larva matures it becomes light green and develops a pair of longitudinal white stripes on the back. The mature worm is about three-quarters of an inch long. The resting or pupal stage of the insect occurs within the folded leaves of the celery plant. It is from this stage that the moth appears.

The Leaf Tier's Life Cycle

Under exceptionally favorable conditions for the development of the insect its life cycle may be completed in about 25 days. During the cooler months it may require a period of nearly three months from egg to adult. During the spring and late fall a generation of the worms will develop in a little over a month. The celery leaf tier usually disappears in late May or early June and does not appear again in the Sanford district until early in October, when fresh moths make their appearance in the earliest planted seed beds. Their appearance usually follows the first sudden drop in temperature after the mean temperature of the season has fallen to 77° F. or below. Sudden drops in temperature at this time of the year almost always follow rainstorms, so the celery leaf tier may be expected to appear when the mean temperature has fallen to 77° or below and is followed by rain. In an exceptionally hot and dry fall the moths may not appear until November and in an equally hot spring they may disappear early in May. It appears, therefore, that the most favorable conditions for the development of the insect are those which are favorable for the best growth of the celery plant.

There are normally four generations annually of the celery leaf tier in the Sanford district. When conditions are unusually favorable there may be an increase in the rapidity of development with an additional generation as the result. During the harvest of the crop, which extends from February to the middle of May, there is naturally a gradual concentration of the moths in the unharvested fields. If the development of the leaf tier is sufficiently rapid at this time to produce a generation of from one-half to full-grown worms in these fields before they in turn are harvested, economic damage results. Under average weather conditions at Sanford, the celery leaf tier is not expected to be an economic factor in the production of celery, but during periods of unusually high temperature during the winter and early spring months injury is serious.

In addition to the effect of temperature, there are other natural factors which are responsible for the limitation of the pest, such as parasites and migratory birds. The most effective parasite is an egg parasite (*Trichogramma minutum* Riley) which is active during the summer, fall, and spring. Its most valuable contribution to the control of the leaf tier is made during the first generation in the fall and again during the spring when the population of moths is at its peak. There is a succession of birds in the celery fields and they account for a large number of larvae and moths. This is especially true of the migratory birds which pass through in the spring of the year. There are cases where birds are plentiful enough to keep the celery tier entirely under control in a normal year in the isolated fields, especially those adjoining woodlands.

Control Measures Often Necessary

In addition to the natural factors which function to keep the celery leaf tier under control, it is often necessary to resort to artificial measures in order to prevent severe damage to the crop. Much can be accomplished by a systematic scheme of planting and harvesting with the object of avoiding the usual concentrations of moths in the later harvested fields. Many growers now recognize this possibility and plan their plantings so that the crop can be harvested in such a way that there will be intervening harvested fields between the celery being harvested and that to be cut later. If the season has been warm and the pest has developed in large enough numbers to cause economic loss to the late celery, it is necessary to employ some means of reducing the infestations. Arsenical poisons are not recommended because of the possibility of excessive residues on the marketable product and the difficulty of reaching the worms with these poisons. Dusting with finely ground pyrethrum dust of a good quality has given excellent results, when this dust is applied in such a way that it is distributed in the central parts of the plants. In order to obtain a satisfactory distribution of the dust it is necessary to place the nozzles of the duster so that they will pass through the plants and deposit the dust on the innermost leaves. The treatments should be directed at the immature worms, as they are more susceptible to the action of the pyrethrum than the mature ones. Treatment for the celery leaf tier should consist of two applications about 30 minutes apart, each requiring 25 pounds of the dust per acre. The dust is usually employed without dilution, but equally good results may be obtained with equal parts of pyrethrum and lime, provided the mixture is made just before the dusting is done.

W. E. STONE, *Associate Entomologist,*
C. B. WISECUP, *Assistant Entomologist,*
Bureau of Entomology.

CHAYOTE, Tropic Cucurbit, Finds Wider Market as It Becomes Better Known Increasing interest in the growing of chayotes for home use and for local markets has been noted during the last few years in the lower South, especially Florida. Stimulated by the efforts of home demonstration workers, housewives are finding this cucurbit native of Central America, which has adapted itself to our Gulf coast and southern California, a welcome addition to the table. Food caterers in general, too, are becoming better acquainted with this little-known vegetable that comes on the market at a season when the usual variety is somewhat reduced.

The marketing of the increasing crops of chayotes has not been unattended with difficulties for the producer. Their efforts, though, are being rewarded, for chayotes now are appearing in season in northern as well as in southern markets. A growing acquaintance among consumers has brightened the market outlook for the crop, and the chayote is now winning for itself a place that is likely to be permanent in the public esteem.

The chayote (pronounced chī-ō′tĭ—ch as in chime) is usually a late autumn crop, though sometimes a late spring crop also is produced. It is unique in form and structure, and, what is much to the point in a food product, it is attractive in appearance as well as pleasing in texture and of delicate flavor. Botanically the chayote is related to the squashes and the cucumber, but from the mature fruit alone one would not suspect the relationship. The "fruit" is more or less pear shaped and is somewhat flattened laterally. The vegetable has long been grown in a small way in a number of localities in the South and in southern California, where it has been known under different names, such as mirliton, vegetable pear, and mango squash.

Has Varied Table Uses

The adaptability of the chayote as a table vegetable is one of its outstanding characteristics. It lends itself to a wider range of methods of preparation than most of the more familiar vegetables. Chayotes usually are more easily pared after slicing, crosswise or lengthwise. The single large seed is usually cooked and eaten with the rest of the vegetable. In slices or cut into dice, the vegetable is cooked in not exceeding 15 or 20 minutes. It is best boiled in just enough salted water to cook it. A little sugar is sometimes added. Two popular that they will pass through the plants and deposit the dust on the innermost leaves. The treatments should be directed at the immature worms, as they are more susceptible to the action of the pyrethrum than the mature ones. Treatment for the celery leaf tier should consist of two applications about 30 minutes apart, each requiring 25 pounds of the dust per acre. The dust is usually employed without dilution, but equally good results may be obtained with equal parts of pyrethrum and lime, provided the mixture is made just before the dusting is done.

W. E. Stone, *Associate Entomologist,*
C. B. Wisecup, *Assistant Entomologist,*
Bureau of Entomology.

CHAYOTE, Tropic Cucurbit, Finds Wider Market as It Becomes Better Known Increasing interest in the growing of chayotes for home use and for local markets has been noted during the last few years in the lower South, especially Florida. Stimulated by the efforts of home demonstration workers, housewives are finding this cucurbit native of Central America, which has adapted itself to our Gulf coast and southern California, a welcome addition to the table. Food caterers in general, too, are becoming better acquainted with this little-known vegetable that comes on the market at a season when the usual variety is somewhat reduced.

The marketing of the increasing crops of chayotes has not been unattended with difficulties for the producer. Their efforts, though, are being rewarded, for chayotes now are appearing in season in northern as well as in southern markets. A growing acquaintance among consumers has brightened the market outlook for the crop, and the chayote is now winning for itself a place that is likely to be permanent in the public esteem.

The chayote (pronounced chī-ō̆′tĭ—ch as in chime) is usually a late autumn crop, though sometimes a late spring crop also is produced. It is unique in form and structure, and, what is much to the point in a food product, it is attractive in appearance as well as pleasing in texture and of delicate flavor. Botanically the chayote is related to the squashes and the cucumber, but from the mature fruit alone one would not suspect the relationship. The "fruit" is more or less pear shaped and is somewhat flattened laterally. The vegetable has long been grown in a small way in a number of localities in the South and in southern California, where it has been known under different names, such as mirliton, vegetable pear, and mango squash.

Has Varied Table Uses

The adaptability of the chayote as a table vegetable is one of its outstanding characteristics. It lends itself to a wider range of methods of preparation than most of the more familiar vegetables. Chayotes usually are more easily pared after slicing, crosswise or lengthwise. The single large seed is usually cooked and eaten with the rest of the vegetable. In slices or cut into dice, the vegetable is cooked in not exceeding 15 or 20 minutes. It is best boiled in just enough salted water to cook it. A little sugar is sometimes added. Two popular ways of serving diced chayotes are with butter melted over them and with a prepared sauce. They may also be mashed and served like squash. Mashed or in slices they are used in various types of fritters, and when sliced—either raw or previously boiled—may be plain fried.

The chayote has a remarkable texture for a vegetable of the squash family, in that it still holds its form perfectly after being cooked. The distinctive texture is, of course, lost in the mashed vegetable. The flavor of the fresh-cooked chayote is delicate and resembles that of summer squash. Some persons detect in it a flavor suggestive of stewed oysters.

Besides being prepared in the ways already mentioned, the chayote may be stuffed and baked, or, after boiling, used cold in salads. A delectable sweet pickle is made from it, and exhaustive tests have shown the young chayote fruits to be well adapted for commercial dill pickling. A much larger supply will be necessary, however, before commercial pickling is possible.

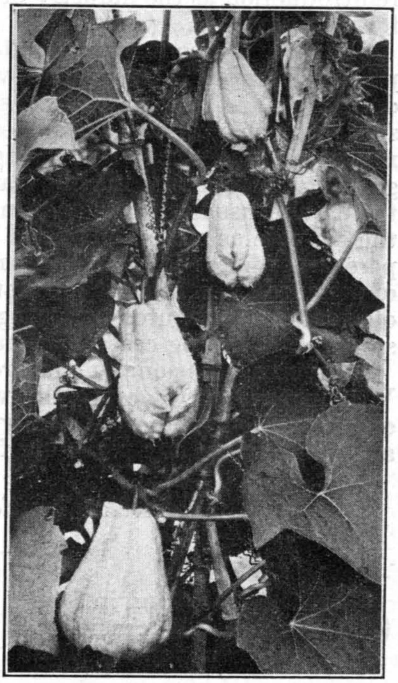


FIGURE 20.—Ivory white chayotes in different stages of growth. The largest is mature and is about 5 inches in length

The typical form of the chayote is pear shaped, but the deviation from the typical among the varieties known is quite as great as among varieties of pears. The range is from nearly spherical to slender pyriform. The surface may be more or less deeply corrugated or perfectly even and may vary from "as smooth as an apple" to "as spiny as a hedgehog." Needless to say, the spiny or deeply corrugated varieties are undesirable from the standpoint of convenience in handling and preparation for cooking, and so are not commonly cultivated. Indeed, few of the many types are as yet in regular cultivation in this country.

The diversity in shape and character of fruit is no greater than that in size. Varieties with mature fruits as small as 3 ounces each and others with individual weights up to 3 pounds are known, and some of these have been grown in Florida.

In color, chayotes are usually light green, but there are varieties that are ivory white (fig. 20) and also dark green. The flesh is always light colored but tends to follow the color of the skin.

Not a New Crop

What has been said of range in chayote fruit characters—especially when it is added that the different types originated under very primitive methods of culture—will suggest a comparative antiquity for the crop. It may fairly be assumed to be as old as the oldest civilization of the Central American region, which may be at least two or three milleniums. It is evident, then, that this "new" vegetable is new only because our acquaintance with it here is short. It is grown throughout the American Tropics and in many of the warmer parts of the Old World. Chayotes constitute a staple food for many people in Guatemala and other Central American countries. The root, which becomes tuberlike after the first season, is starchy and is boiled and eaten. It is called "ichintal" in Guatemala and "chinchayote" in Mexico.

Encouragement to the chayote industry has been given by the United States Department of Agriculture in former years by introducing and furnishing to interested farmers and gardeners many superior types of chayotes. Most of these have since been lost and will require reintroduction as the industry in the South grows and a need develops for new varieties.

Chayotes are commonly planted in the spring. The entire fruit is placed shallowly in the ground, with the broad (blossom) end slanting downward and with part of the stem end left above the surface of the soil. The chayote leaf resembles that of the cucumber or the muskmelon, but the vine is a more vigorous grower and is a climber. It is grown on a trellis and may be trained on a porch. As the plant is frost tender and usually fruits only in the fall, the successful cultivation of the chayote as a crop is limited to the far South. The fleshy root is perennial where the ground does not freeze, and it increases to a number of pounds in weight after the first year. When early vine growth from old roots is not injured by spring frost, a crop may be produced in the spring. Flowering ceases as a rule during the summer.

Chayotes occasionally mature in small numbers as far north as Washington, D. C., especially when the first autumn frost does not occur until November. Usually, however, in such localities the vines are killed before any fruits are fully grown.

ROBERT A. YOUNG,
Associate Horticulturist, Bureau of Plant Industry.

CHEESE Making in Some Sections Necessitates Pasteurization of Milk

The importance of pasteurization of milk for cheese making was not generally recognized in a commercial way until the manufacture of cheese was taken up in the Southern and some of the Western States. Cheese of good quality is being made from pasteurized milk in these sections where it would not be practical to operate cheese factories if milk were not pasteurized. Practically all of the larger factories are using the flash pasteurizer and regenerative heater and cooler. During the summer months, to get the best results, milk is heated to 165° F. and occasionally to 170°. In some instances, when starting the pasteurizer the first milk which goes through is not heated to the proper temperature. Unless the pasteurizer is equipped with an automatic control oftentimes the temperature drops below pasteurizing temperature if not watched constantly. In either case the milk is not all pasteurized and the result is a gassy cheese if the raw milk happened to be contaminated with gas-producing organisms. When using a flash pasteurizer it is important to know that the milk has all been heated to the proper temperature.

of the Central American region, which may be at least two or three milleniums. It is evident, then, that this "new" vegetable is new only because our acquaintance with it here is short. It is grown throughout the American Tropics and in many of the warmer parts of the Old World. Chayotes constitute a staple food for many people in Guatemala and other Central American countries. The root, which becomes tuberlike after the first season, is starchy and is boiled and eaten. It is called "ichintal" in Guatemala and "chinchayote" in Mexico.

Encouragement to the chayote industry has been given by the United States Department of Agriculture in former years by introducing and furnishing to interested farmers and gardeners many superior types of chayotes. Most of these have since been lost and will require reintroduction as the industry in the South grows and a need develops for new varieties.

Chayotes are commonly planted in the spring. The entire fruit is placed shallowly in the ground, with the broad (blossom) end slanting downward and with part of the stem end left above the surface of the soil. The chayote leaf resembles that of the cucumber or the muskmelon, but the vine is a more vigorous grower and is a climber. It is grown on a trellis and may be trained on a porch. As the plant is frost tender and usually fruits only in the fall, the successful cultivation of the chayote as a crop is limited to the far South. The fleshy root is perennial where the ground does not freeze, and it increases to a number of pounds in weight after the first year. When early vine growth from old roots is not injured by spring frost, a crop may be produced in the spring. Flowering ceases as a rule during the summer.

Chayotes occasionally mature in small numbers as far north as Washington, D. C., especially when the first autumn frost does not occur until November. Usually, however, in such localities the vines are killed before any fruits are fully grown.

ROBERT A. YOUNG,
Associate Horticulturist, Bureau of Plant Industry.

CHEESE Making in Some Sections Necessitates Pasteurization of Milk

The importance of pasteurization of milk for cheese making was not generally recognized in a commercial way until the manufacture of cheese was taken up in the Southern and some of the Western States. Cheese of good quality is being made from pasteurized milk in these sections where it would not be practical to operate cheese factories if milk were not pasteurized. Practically all of the larger factories are using the flash pasteurizer and regenerative heater and cooler. During the summer months, to get the best results, milk is heated to 165° F. and occasionally to 170°. In some instances, when starting the pasteurizer the first milk which goes through is not heated to the proper temperature. Unless the pasteurizer is equipped with an automatic control oftentimes the temperature drops below pasteurizing temperature if not watched constantly. In either case the milk is not all pasteurized and the result is a gassy cheese if the raw milk happened to be contaminated with gas-producing organisms. When using a flash pasteurizer it is important to know that the milk has all been heated to the proper temperature.

The advantages of a flash pasteurizer are that as soon as the milk starts coming in the pasteurizer can be started, and the acidity does not have a chance to develop while the rest of the milk is being received. Also, more milk can be handled in less time than when the holder method is used. The surface heater regenerative type of pasteurizer is not practical in parts of the country where occasionally the acidity of the milk will exceed 0.22 or 0.23 per cent. In such cases the milk will cook on the surface of the heater and form an insulation, after which it is difficult to heat the milk to the proper temperature.

Some of the smaller factories are pasteurizing in the cheese vat. The vat system is very satisfactory and there is no additional expense for pasteurizing equipment unless the water is so warm that it is necessary to use a surface cooler. In such cases it is necessary to pump the milk from the cheese vat over the cooler, allowing it to run from the cooler back to the cheese vat and continue this process until the milk is cooled to setting temperature. When milk is pasteurized in the vat it is heated to 145° F. and held for 30 minutes. To save time heat may be turned on the vat soon enough so that when the last batch of milk is dumped the temperature of the milk in the vat is at 145°. It is then held at this temperature for 30 minutes before starting to cool. Some cheese makers waste their efforts by starting to cool as soon as the milk is all in, because the temperature has been up to 145° for 30 minutes. When this is done the milk that was dumped last is not pasteurized. This is about the only thing that can happen when pasteurizing in a vat which may cause a gassy or fast-working curd. The vat system of pasteurization makes it possible for small factories to operate in sections where it is not practical to manufacture cheese from unpasteurized milk. It is very important that all the milk be held at a temperature of 145° for the full 30 minutes.

Amount of Starter Required

The amount of starter to use depends upon the acidity of the milk and the time allowed from time of adding starter until setting. Usually 0.75 to 2 per cent is sufficient, if added from 30 to 60 minutes before setting. The acidity of the milk at setting depends upon the acidity of the milk before any starter was added. The acidity of the milk at setting should be 0.01 per cent to 0.02 per cent higher than it was before starter was added. In other words if the unripened milk has 0.18 per cent acidity it should be ripened to 0.19 or 0.20 per cent before adding rennet. If the unripened milk has 0.22 per cent acidity the rennet should not be added until the acidity has increased to 0.23 or 0.24 per cent. This, of course, depends upon the amount of starter used and the time allowed from time of adding starter to setting. Only enough starter should be used to develop from 0.24 to 0.26 per cent acidity in the whey draining from the curd at packing, which should be about 2 hours and 40 minutes from time of adding rennet. The amount of acid in whey at dipping depends upon the amount of milk in the vat and the time required to draw it off. It usually should have from 0.15 to 0.18 per cent. After the milk has been properly ripened the same method that makes a good cheese from unpasteurized milk will make a good quality of cheese from pasteurized milk.

Add enough rennet to make curd ready to cut in 20 to 30 minutes, usually from 3 to 4 ounces per 1,000 pounds of milk. Two and one-

40442°—31——10

half times the time from adding rennet until first signs of coagulation will equal the time the curd should stand from the time the rennet was added until cutting.

H. L. Wilson,
Associate Manufacturing Specialist,
Bureau of Dairy Industry.

CHICKS May Be Fed Soon After Hatching, Thereby Aiding Yolk Absorption During its development in the egg, the chick embryo uses only a part of the yolk. Just before the chick emerges from the shell, it takes the remainder into its body and then gradually assimilates it. Although the time required to absorb the yolk varies somewhat with the individual, most healthy chicks complete this process by the eleventh day after hatching.

Before fowls were domesticated, it is possible that the baby chick was unable to obtain any other food, and the assimilation of the yolk prevented starvation for several days. This provision of nature is one of the principal factors making possible the development of mammoth hatcheries. As chicks need not be fed for two or three days after hatching, they may be shipped long distances.

It has been generally believed that chicks not only do not require food for some time after hatching, but also that early feeding interferes with the normal assimilation of the egg yolk. This belief has been fostered by the discovery of unabsorbed yolks in chicks which had been fed early, and which had subsequently died or were experiencing digestive troubles. These observations led to definite recommendations that chicks should not be fed until they were from 36 to 72 hours old.

Experimental data that substantiate or refute these recommendations, however, have been meager. Accordingly, an experiment was conducted at the United States Poultry Experiment Station, Glendale, Ariz., to determine whether the age at which chicks were first fed influenced yolk absorption. Different groups of chicks were first fed mash or grain 24, 48, and 72 hours, respectively, after hatching. The results obtained showed no significant difference among the chicks in these groups. It was noted, however, that early feeding tended slightly to stimulate yolk assimilation.

The results obtained are in general accordance with those obtained elsewhere. Roberts, an investigator at Purdue University, found that chicks may be fed as soon as they are fluffed out without influencing either the rate of growth or the mortality. At the University of California, Parker found no significant difference in the rate of yolk absorption between groups of chicks first fed when 24 and 72 hours old.

Practical experience has shown that it is not harmful to withhold feed from baby chicks for two or three days, as often happens when they are shipped. However, when conditions permit it, it is advisable to feed chicks earlier.

Burt W. Heywang,
Associate Poultry Husbandman, Bureau of Animal Industry.

half times the time from adding rennet until first signs of coagulation will equal the time the curd should stand from the time the rennet was added until cutting.

H. L. Wilson,
Associate Manufacturing Specialist,
Bureau of Dairy Industry.

CHICKS May Be Fed Soon After Hatching, Thereby Aiding Yolk Absorption During its development in the egg, the chick embryo uses only a part of the yolk. Just before the chick emerges from the shell, it takes the remainder into its body and then gradually assimilates it. Although the time required to absorb the yolk varies somewhat with the individual, most healthy chicks complete this process by the eleventh day after hatching.

Before fowls were domesticated, it is possible that the baby chick was unable to obtain any other food, and the assimilation of the yolk prevented starvation for several days. This provision of nature is one of the principal factors making possible the development of mammoth hatcheries. As chicks need not be fed for two or three days after hatching, they may be shipped long distances.

It has been generally believed that chicks not only do not require food for some time after hatching, but also that early feeding interferes with the normal assimilation of the egg yolk. This belief has been fostered by the discovery of unabsorbed yolks in chicks which had been fed early, and which had subsequently died or were experiencing digestive troubles. These observations led to definite recommendations that chicks should not be fed until they were from 36 to 72 hours old.

Experimental data that substantiate or refute these recommendations, however, have been meager. Accordingly, an experiment was conducted at the United States Poultry Experiment Station, Glendale, Ariz., to determine whether the age at which chicks were first fed influenced yolk absorption. Different groups of chicks were first fed mash or grain 24, 48, and 72 hours, respectively, after hatching. The results obtained showed no significant difference among the chicks in these groups. It was noted, however, that early feeding tended slightly to stimulate yolk assimilation.

The results obtained are in general accordance with those obtained elsewhere. Roberts, an investigator at Purdue University, found that chicks may be fed as soon as they are fluffed out without influencing either the rate of growth or the mortality. At the University of California, Parker found no significant difference in the rate of yolk absorption between groups of chicks first fed when 24 and 72 hours old.

Practical experience has shown that it is not harmful to withhold feed from baby chicks for two or three days, as often happens when they are shipped. However, when conditions permit it, it is advisable to feed chicks earlier.

Burt W. Heywang,
Associate Poultry Husbandman, Bureau of Animal Industry.

CHILD-WELFARE Studies Important in Work of Home Economics Bureau The work of the Bureau of Home Economics makes an important contribution to child welfare. This is a natural result of the interrelationship between the care of children and other phases of the homemaker's responsibilities. As an agency dealing with homemaking problems, the Bureau of Home Economics logically concerns itself with the needs of children. Members of its staff contributed to the deliberations of committees and subcommittees of the recent White House Conference on Child Health and Protection. An outline of their contributions to these discussions will indicate the scope of the bureau's child-welfare work.

For example, material was furnished on budgeting for the needs of children of different ages. Data on this subject were obtained from surveys made by the bureau and from standards proposed by home-demonstration leaders in conference with community women. It is well established that budgeting, besides promoting economy, enables the home maker to satisfy more adequately the family's requirements. Budgeting for the children is an important part of the budgeting task. Typical budgets for the different needs of children are being prepared by the bureau for the President's Committee on Unemployment.

Besides planning the expenditure of money for the needs of children, the home maker must consider also the time she must expend in their care. Time schedules have been drawn up in the bureau to provide for the care of children based on detailed information obtained in hundreds of homes. Planning the expenditure of time is as great an aid to economy and efficiency as planning the expenditure of money. Representatives of the bureau worked with the White House conference committee on housing to establish standards for housing which would safeguard and promote the health and development of young children. House plans and equipment were suggested for the typical home to simplify the work of the mother with young children. Also, changes were suggested for the equipment in the home already established which would make possible the larger participation of children in the home activities and make that home a more comfortable and happy place for the younger members of the family.

The studies reported by the White House conference emphasize the importance of satisfactory environmental conditions as a factor in child welfare. They show that it is important, but it is not enough, that the home should be smoothly managed. Esthetic values play a part in the personality development of the child. A home background that satisfies the demands of good taste as well as the demands of efficiency may contribute to the development of both parents and children. The bulletins on home furnishing from the bureau have been prepared to do just this.

Relation of Clothing to Health

Other material gathered in the bureau was put before the conference in discussions of the relation of clothing to the health and training of children. A monograph on this subject will shortly be published, but further research is needed, especially on the relation of clothing to health. The bureau has prepared simple designs for children's clothes. These designs combine what is known about health needs in clothing with simplicity and artistic qualities. They help children to become independent in dressing and undressing at an early age. Circulars written on this subject by members of the bureau are available.

Aided by a research assistant and a secretary made available by the conference, the bureau worked with other agencies in a broad study of home activities in relation to child development. One result of this study is a bibliography on the family, which will be published shortly. This bibliography will be issued in a series of similar publications prepared in the Bureau of Home Economics. The conference's committee on family and parent education is preparing, with the assistance of members of the bureau, a number of monographs on the family and on home activities in relation to child development. It has drawn up a plan for the study of family functions and activities. This is a field of research in which home economics must participate if these studies are to develop better homes and better family relationships.

It was repeatedly emphasized at meetings of the conference committees that better facilities are necessary for informing parents as to the results of child-welfare research. The Bureau of Home Economics has done what it could in this direction. Especially in the field of child training it is important to make available to the mother results of the findings of psychology and sociology as they apply to child training. A start has been made, as for example, in a study recently completed by the bureau on children's food habits. In child nutrition psychology as well as diet is important. In the last resort the child-welfare problem comes to embrace the larger problem of establishing satisfactory home conditions and family relationships. This might be said to be the center toward which all the work of the bureau is aiming.

LOUISE STANLEY,
Chief, Bureau of Home Economics.

CHOCOLATE Processing Regulated By U. S. Under Pure Food Law

There were imported into the United States in 1929 over one-half billion pounds of cacao beans, the raw material of the chocolate industry. This enormous volume represents some 40 per cent of the world's production and marks an increase of about one-third in American consumption since 1924.

Control of Imports

From Africa, Asia, South and Central America, and the West Indies come shiploads of cacao beans, and it is at the debarkation point that the Department of Agriculture starts its regulatory supervision. If the beans have been improperly handled during the fermentation process, which develops the characteristic flavor, they become moldy. More rarely, they may be infested with the larvae of the cocoa moth, or other vermin. Such infestation may occur either in the country of origin or in American storage warehouses. All such shipments are detained until they are made fit for food by sorting, or else they are destroyed or reexported. During the year 1929, over 138,000,000 pounds of cacao beans were examined by department inspectors at Atlantic-coast ports alone, and about 4.3 per cent of the total were denied entry because of a wormy or moldy condition.

with simplicity and artistic qualities. They help children to become independent in dressing and undressing at an early age. Circulars written on this subject by members of the bureau are available.

Aided by a research assistant and a secretary made available by the conference, the bureau worked with other agencies in a broad study of home activities in relation to child development. One result of this study is a bibliography on the family, which will be published shortly. This bibliography will be issued in a series of similar publications prepared in the Bureau of Home Economics. The conference's committee on family and parent education is preparing, with the assistance of members of the bureau, a number of monographs on the family and on home activities in relation to child development. It has drawn up a plan for the study of family functions and activities. This is a field of research in which home economics must participate if these studies are to develop better homes and better family relationships.

It was repeatedly emphasized at meetings of the conference committees that better facilities are necessary for informing parents as to the results of child-welfare research. The Bureau of Home Economics has done what it could in this direction. Especially in the field of child training it is important to make available to the mother results of the findings of psychology and sociology as they apply to child training. A start has been made, as for example, in a study recently completed by the bureau on children's food habits. In child nutrition psychology as well as diet is important. In the last resort the child-welfare problem comes to embrace the larger problem of establishing satisfactory home conditions and family relationships. This might be said to be the center toward which all the work of the bureau is aiming.

LOUISE STANLEY,
Chief, Bureau of Home Economics.

CHOCOLATE Processing Regulated By U. S. Under Pure Food Law

There were imported into the United States in 1929 over one-half billion pounds of cacao beans, the raw material of the chocolate industry. This enormous volume represents some 40 per cent of the world's production and marks an increase of about one-third in American consumption since 1924.

Control of Imports

From Africa, Asia, South and Central America, and the West Indies come shiploads of cacao beans, and it is at the debarkation point that the Department of Agriculture starts its regulatory supervision. If the beans have been improperly handled during the fermentation process, which develops the characteristic flavor, they become moldy. More rarely, they may be infested with the larvae of the cocoa moth, or other vermin. Such infestation may occur either in the country of origin or in American storage warehouses. All such shipments are detained until they are made fit for food by sorting, or else they are destroyed or reexported. During the year 1929, over 138,000,000 pounds of cacao beans were examined by department inspectors at Atlantic-coast ports alone, and about 4.3 per cent of the total were denied entry because of a wormy or moldy condition.

Regulation of Manufacturing Process

The cacao beans are first screened to remove gross débris, such as sticks, stones, etc., and then roasted, crushed into nibs, and winnowed or fanned to remove excess shell. It is important that manufacturers see to it that the winnowing process is so conducted, especially with regard to the adjustment of the winnowing machine, that excess shell will be removed.

Cacao shell has a market value of about $5 a ton and is used chiefly as a conditioner for commercial fertilizers and in the preparation of proprietary feed mixtures. Some is used for fuel. About 51,000,000 pounds of cacao shell are estimated to be produced in the United States annually. This estimate is based on an assumed shell content in the bean of 10 per cent, with no allowance for shell contained in cocoa press cake, a by-product resulting from the pressing of the cacao bean without removal of the shell. When efficient machinery is used and proper control is exercised, the shell content of the winnowed cacao nibs will be negligible. Both chemical and microscopical methods are employed in determining, by laboratory examination, the proportion of shell in cacao products. Those found to contain excess shell, whether due to improper adjustment of the winnowing machine or to deliberate addition, are subject to action under the food and drugs act, which provides for criminal prosecution of the shipper and seizure of the adulterated food products themselves. Several shipments of cocoa containing excess shell were the subject of regulatory action in 1929.

After the cacao nibs are cleaned, they go through various grinding and milling processes which result in the production of plain chocolate, sweet chocolate, milk chocolate, and cocoa products. The chocolate products are of two general classes: Those used directly for eating and cooking purposes, and the so-called coatings, used to coat candy centers, such as cream, nougat, caramel, marshmallow, fruit jelly, and nuts. Coating is done by hand dipping or by a machine known as an enrober.

Required Fat Percentage

These chocolate products must contain not less than 50 per cent of cacao butter, or fat, in the chocolate ingredient. Breakfast cocoa must contain at least 22 per cent of cacao fat. Since cacao butter is a valuable food, it is important that manufactured cacao products contain their full complement of this ingredient. Cacao butter is sometimes replaced in part by a cheaper vegetable oil, such as hydrogenated coconut oil, especially in chocolate coatings. When the coconut oil, or other foreign fat, is pure and wholesome, there is no objection to its use, provided the manufacturer plainly discloses this fact on the label. Occasionally the manufacturer neglects to make this declaration. In 1929, ten instances of the use of undeclared foreign fat were uncovered and appropriate measures taken to correct the violations.

Dutch Process

"Dutching" has become a very popular trade practice in the chocolate industry. It consists of treating cacao beans, nibs, chocolate liquor, and cocoa with alkalies. The finished products are called "Dutch-process chocolate (cocoa)" or "alkalized chocolate (cocoa)." The alkalies used are potassium carbonate or some other similar substance. These alkalies may be added at various stages of manufacture.

The treatment darkens the chocolate and cocoa. The alkali is neutralized and does not appear as such in the treated chocolate or cocoa, which has an acid reaction. But because the alkali treatment materially changes the character of chocolate and cocoa, consumers are entitled to know when alkalies have been used. The words "Dutch" or "Dutched" are the consumers' guide. "Dutched" chocolate and cocoa contain, under the Department of Agriculture standard, no more than 3 parts, by weight, of potassium carbonate, or the neutralizing equivalent thereof in other alkaline substances, in each 100 parts, by weight, of cacao nibs. When more alkali than this is used, the label must state this fact. It was once erroneously believed that alkalies increased the solubility of cocoa or chocolate. This has not proved to be the case.

Mixtures of Cacao and Milk Products

Under the department's standards and definitions for sweet milk chocolate and sweet milk cocoa, these products should contain not less than 12 per cent of whole-milk solids. As in the case of cacao butter, milk solids are a comparatively expensive ingredient, and commercial samples of milk chocolate and sweet milk cocoa are sometimes found containing less than 12 per cent of milk solids. Skim-milk solids are also occasionally substituted for whole-milk solids. This latter form of adulteration is especially prevalent in the powdered beverage preparations used in the making of so-called hot chocolate, which is really hot cocoa in most instances. Skim-milk powder when pure is, of course, a wholesome ingredient, and its use is legitimate under proper labeling. Nor is there any objection to the use of cocoa in place of chocolate, if the label shows the product's true character. Cocoa is chocolate deprived of a portion of its fat, and pulverized. The department holds that the labeling should clearly distinguish between the two products.

Net Weight of Chocolate Candy

Chocolate candy is a relatively high-priced food commodity, and since enormous quantities of it are sold, it is important that the accuracy of the statement of quantity of net contents, which must appear on the package, be checked frequently. The food inspector can do this best in the candy factory, where dozens of individual packages can be weighed without the necessity of buying them on the open market. If the inspector finds short-weight packages, he locates interstate shipments of the misbranded products with a view to legal action.

J. W. Sale,
Senior Chemist, Food and Drug Administration.

CLOTHING Costs Among 1,425 Farm Families Reported in Survey

"Clothes for every occasion" becomes a complicated problem when there are growing children in the family and many demands on the family pocketbook. The only way of solving the clothes problem so that things seem fair to everybody is to make careful plans, taking into consideration the total amount of money the family will have to spend not only on clothing needs but on other urgent needs before the actual purchasing is done.

The treatment darkens the chocolate and cocoa. The alkali is neutralized and does not appear as such in the treated chocolate or cocoa, which has an acid reaction. But because the alkali treatment materially changes the character of chocolate and cocoa, consumers are entitled to know when alkalies have been used. The words "Dutch" or "Dutched" are the consumers' guide. "Dutched" chocolate and cocoa contain, under the Department of Agriculture standard, no more than 3 parts, by weight, of potassium carbonate, or the neutralizing equivalent thereof in other alkaline substances, in each 100 parts, by weight, of cacao nibs. When more alkali than this is used, the label must state this fact. It was once erroneously believed that alkalies increased the solubility of cocoa or chocolate. This has not proved to be the case.

Mixtures of Cacao and Milk Products

Under the department's standards and definitions for sweet milk chocolate and sweet milk cocoa, these products should contain not less than 12 per cent of whole-milk solids. As in the case of cacao butter, milk solids are a comparatively expensive ingredient, and commercial samples of milk chocolate and sweet milk cocoa are sometimes found containing less than 12 per cent of milk solids. Skim-milk solids are also occasionally substituted for whole-milk solids. This latter form of adulteration is especially prevalent in the powdered beverage preparations used in the making of so-called hot chocolate, which is really hot cocoa in most instances. Skim-milk powder when pure is, of course, a wholesome ingredient, and its use is legitimate under proper labeling. Nor is there any objection to the use of cocoa in place of chocolate, if the label shows the product's true character. Cocoa is chocolate deprived of a portion of its fat, and pulverized. The department holds that the labeling should clearly distinguish between the two products.

Net Weight of Chocolate Candy

Chocolate candy is a relatively high-priced food commodity, and since enormous quantities of it are sold, it is important that the accuracy of the statement of quantity of net contents, which must appear on the package, be checked frequently. The food inspector can do this best in the candy factory, where dozens of individual packages can be weighed without the necessity of buying them on the open market. If the inspector finds short-weight packages, he locates interstate shipments of the misbranded products with a view to legal action.

J. W. Sale,
Senior Chemist, Food and Drug Administration.

Clothing Costs Among 1,425 Farm Families Reported in Survey

"Clothes for every occasion" becomes a complicated problem when there are growing children in the family and many demands on the family pocketbook. The only way of solving the clothes problem so that things seem fair to everybody is to make careful plans, taking into consideration the total amount of money the family will have to spend not only on clothing needs but on other urgent needs before the actual purchasing is done.

The Bureau of Home Economics has made a detailed analysis of the yearly clothing purchases of 1,425 farm families in different parts of the United States. The figures were collected in cooperation with the State colleges of agriculture in 11 States in 1922–1924. Though the average practice of a large number of farm families will not, perhaps, fit any particular family's problem, at least it is valuable to know how the plans of any one family differ from the practices of families in general.

The average annual clothing expenditures of all the families from whom figures were collected represented $222, or 25 per cent of the total amount of money spent by those families in the given year, not taking into account the money value of food, fuel, and rent furnished by the farm. There were, however, important variations in the proportion of the family funds going to clothes. In families of husband and wife only $127, or 19 per cent of the total expenditure, was used on the average to buy clothes. In families of husband and wife and one to three children under 21, average expenditures for clothing rose to $209, or 25 per cent of the total. Whereas in families of husband and wife and four or more children the figure is $275, or 27 per cent of the total expenditures. In families of five persons or less that included one or more adults besides the operator and home maker as part of the family group, clothing expenditures averaged only $244, but the proportion of the total money expenditure spent for clothing was also 27 per cent. The proportion rose to 33 per cent in families of this type when the number of persons in the family increased to six or more, and expenditures increased to an average of $380.

Clothing Ratio Less as Income Increases

As the income increases, it is natural to find the number of dollars spent for clothing increasing also. But there are so many other claims upon the added income that clothing expenditures do not increase so rapidly as other items in the family budget.

For instance, there are reports from 611 families of father, mother, and one to three children. Among families of this size, the group reporting the lowest incomes spent on the average 26 per cent of the total amount of money used by the family for clothes, while the group with the highest incomes spent only 22 per cent for clothes. The amount of money spent had increased, but the proportion had somewhat declined.

The highest proportion shown for any one group occurs in the case of 40 families with an average size of seven persons, each family including at least one adult beside the farm operator and home maker. For these families total money expenditures averaged $779, and 37 per cent of this amount ($292) went for clothing.

Homemade Clothing

In 5 of the 11 States included in the study (Alabama, Massachusetts, Nebraska, New Hampshire, and Vermont), the reports show for the year the number of new garments purchased ready to wear and the number made at home. The prices paid for the ready-to-wear garments and the cost of the materials for the garments made at home are also given.

Very few garments are being made at home for the men and older boys of these families and not many for boys from 6 to 14 years old.

A considerable number are reported as homemade for small boys, however, and for women and girls. The garments made most frequently for the larger boys are school, work, and play blouses. The proportion of new blouses which were homemade for boys between 12 to 14 declines from 80 per cent in the lowest income group to 10 per cent for boys the same age in the highest income group. For boys 3 to 5 years of age the report shows that more than half of the blouses, rompers, suits, and underwaists were being made at home, but 82 per cent of their overcoats and 91 per cent of their overalls were purchased ready to wear.

A majority of the garments for babies and for children of both sexes under 3 years of age were reported as made at home. At least half of their caps, suits, cotton dresses, silk dresses, panties, and underwaists were made at home for the babies and very small children, and almost half of their coats and capes and rompers.

The output of factory-made clothing for women has increased tremendously since 1900. Nevertheless home makers still find making a large proportion of their clothes one of the best ways of utilizing home skills to increase the number of things the family can have on a given amount of money income. The kinds of new garments for women and girls made at home in half or more of the cases reported, are as follows: Aprons, cotton and wool dresses, slips and petticoats, chemises and combinations, drawers and bloomers, nightgowns, pajamas, and kimonos. Almost half (49 per cent) of all new silk dresses were also reported as homemade.

Money Cost of Garments Made at Home

The reports from which these figures are taken give no indication of the relative quality of material, or of the cut and fit of the homemade as compared with the ready-to-wear garments, or of the time consumed by the women who made clothes for themselves and their children. It is possible, however, from the figures available to compare the average money cost to the family of homemade and factory-made clothes of different types. In general, as might be expected, the money cost of the homemade garments was much less than of those purchased ready to wear. In some few cases, however, the average cost of materials for garments made at home was greater than the average cost of purchased garments of the same kind for women and for girls of a given age. In these instances it seemed clear that the persons who had made the garments at home had secured clothes of quite different material from that utilized in the garments of the same type purchased ready to wear. Silk dresses made at home averaged in money cost a little more than half the average price paid for silk dresses factory made. Garments for which the average cost of materials was 45 to 75 per cent of the average price paid for the same kind of articles purchased ready to wear are as follows: Aprons, cotton, wool, and silk dresses, blouses, outer bloomers and knickers, brassières and underwaists, chemises and combinations, and kimonos. The average cost of materials for cotton and wool skirts, nightgowns and pajamas, and underbloomers was from 75 to 90 per cent of the average prices for ready-made articles of the same kind.

In planning the family clothing budget, it seems obvious from these comparisons that it is worth while considering the sewing abilities of the women and girls of the family, and the amount of their time available for sewing, before deciding whether to purchase ready to wear or whether to make at home a certain proportion of the new garments needed.

FAITH M. WILLIAMS,
Senior Economist, Bureau of Home Economics.

COMMUNITY Development in Lake States Aided by National Forests Any community-development program must take into account the relation of the community to the natural resources of the surrounding region. The community develops as the region develops. Regional progress and the proper development of natural resources are interdependent.

Idle acres with the attendant tax delinquency and consequent slowing up of industrial development is one of the growing problems of the Lake States. This is a direct result of handling the natural resources of the region with no regard for the future. The 1930 census figures and tax levies reflect this influence very materially.

The forests of the Lake States with their varied resources will figure largely in any regional-development program. They furnish playgrounds for thousands of vacationists and nature lovers and are the storehouse of waters that feed our lakes and streams. If properly handled they will be the home of our fish and game forever. They furnish lumber, pulp for paper, and many other necessities of life. These resources must be perpetuated if Lake States communities are to prosper and develop.

The national forests of the Lake States are part and parcel of the community. They assert their influence directly or indirectly upon every individual and industry and upon the communities in general.

Stability is Promoted

Stability is essential for any community. The national forests, while they cover but a very small portion of the Lake States, demonstrate what can be done when idle lands are placed upon a productive basis. The timber is cut no more rapidly than it is grown, thus producing an annual crop, giving permanent industry requiring labor in the woods and at the mills, and creating additional markets for the products of agricultural lands. In addition, the timber is so harvested that the esthetic qualities and social values of the forest are not impaired, as these values are considered in the development plan of the forest. Planting is resorted to where fires have done irreparable damage.

Permanence is the byword of the forest officer in charge of the handling of this public property—a permanent supply of timber, permanent industry, permanent markets for agricultural products, permanent recreational values for the development of resorts, permanent areas where man may camp out in the open, and, last but not least, a permanent home for wild life.

The national forests of the Lake States permit of regional plans of development on a permanent basis and are a very important factor in the conservation program of the Lake States region which is now going ahead in a plan-wise manner.

ALBIN G. HAMEL,
Supervisor, Forest Service.

able for sewing, before deciding whether to purchase ready to wear or whether to make at home a certain proportion of the new garments needed.

FAITH M. WILLIAMS,
Senior Economist, Bureau of Home Economics.

COMMUNITY Development in Lake States Aided by National Forests

Any community-development program must take into account the relation of the community to the natural resources of the surrounding region. The community develops as the region develops. Regional progress and the proper development of natural resources are interdependent.

Idle acres with the attendant tax delinquency and consequent slowing up of industrial development is one of the growing problems of the Lake States. This is a direct result of handling the natural resources of the region with no regard for the future. The 1930 census figures and tax levies reflect this influence very materially.

The forests of the Lake States with their varied resources will figure largely in any regional-development program. They furnish playgrounds for thousands of vacationists and nature lovers and are the storehouse of waters that feed our lakes and streams. If properly handled they will be the home of our fish and game forever. They furnish lumber, pulp for paper, and many other necessities of life. These resources must be perpetuated if Lake States communities are to prosper and develop.

The national forests of the Lake States are part and parcel of the community. They assert their influence directly or indirectly upon every individual and industry and upon the communities in general.

Stability is Promoted

Stability is essential for any community. The national forests, while they cover but a very small portion of the Lake States, demonstrate what can be done when idle lands are placed upon a productive basis. The timber is cut no more rapidly than it is grown, thus producing an annual crop, giving permanent industry requiring labor in the woods and at the mills, and creating additional markets for the products of agricultural lands. In addition, the timber is so harvested that the esthetic qualities and social values of the forest are not impaired, as these values are considered in the development plan of the forest. Planting is resorted to where fires have done irreparable damage.

Permanence is the byword of the forest officer in charge of the handling of this public property—a permanent supply of timber, permanent industry, permanent markets for agricultural products, permanent recreational values for the development of resorts, permanent areas where man may camp out in the open, and, last but not least, a permanent home for wild life.

The national forests of the Lake States permit of regional plans of development on a permanent basis and are a very important factor in the conservation program of the Lake States region which is now going ahead in a plan-wise manner.

ALBIN G. HAMEL,
Supervisor, Forest Service.

CONCRETE Impaired in Quality if Sand Used Is Not Clean

In making concrete, consideration must be given a number of factors if the finished product is to give satisfactory service. Cleanness of the sand is one very important item that too often is overlooked, particularly in making concrete on the farm where the sand is used as it comes from a shallow local pit in which may be roots and more or less top soil.

A sand in which is evident much dirt, shale, or foreign material of any kind is undesirable for concrete although small quantities of finely divided silt and clay may or may not seriously affect its concrete-making qualities, depending upon the presence of other and more objectionable impurities.

Impurities in a sand that are sure to cause trouble are those of organic origin, either vegetable or animal matter. Unfortunately these may be present in sand that looks clean. Impurities of this nature prevent the proper setting of cement with the result that the concrete hardens very slowly or, in extreme cases, does not harden at all. Even though it hardens reasonably well, such concrete may never attain full strength and the surface will scale and wear away if it is used for a floor or walk. The blame for such difficulties is often wrongfully placed on the cement, the workmen, or the weather, when it may have been due entirely to impurities in the sand. Trouble of this type is readily preventable by properly testing the sand before mixing the concrete.

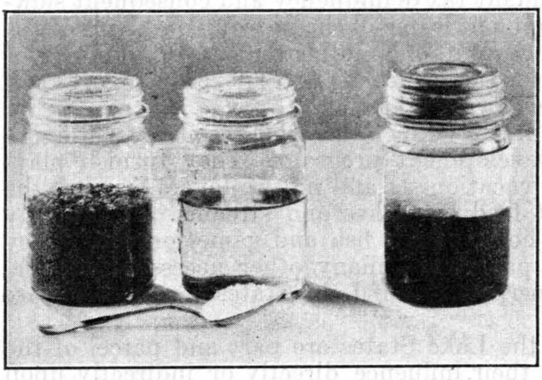


FIGURE 21.—Equipment and materials for testing concrete sand for impurities. Pint jar at left contains one-half pint of dry sand to be tested. Pint jar at center contains one-half pint of clear water. Teaspoon is heaping full of lye. Pint jar at right contains the three materials combined

Simple Test for Impurities in Sand

The following very simple test for organic impurities in sand may be made by anyone at practically no cost. It is believed the test is sufficiently reliable for ordinary practical purposes on the farm.

The necessary equipment consists of two 1-pint fruit jars with cover and rubber for one, and one teaspoon. (Fig. 21.) It is better to select jars of clear glass rather than that of a greenish or bluish cast.

The materials needed are as follows: (1) One can of household lye consisting, according to the label, of at least 94 per cent sodium hydroxide. It is desirable that the lye used be from a freshly opened can, although this is not absolutely necessary; (2) one-half pint of clean water, preferably some of the same water as will be used in mixing the concrete; (3) one-half pint of the dry sand to be tested. A half pint of water or sand will fill an ordinary pint Mason fruit jar to a depth of 2 inches.

Measure out 1 heaping teaspoon of lye and stir it into the half pint of water. The lye will thoroughly dissolve after stirring for a minute or two. Then pour the half pint of sand into the jar containing the half pint of water with the dissolved lye, put on the fruit jar rubber and cap and shake the sand and water vigorously for a minute or so and set aside to settle. Twenty-four hours later, examine in a good light the color of the water standing over the sand. If the water is clear, as will be the case if the sand is entirely free of organic impurities, or if discolored no darker than apple-cider vinegar, the sand is suitable for concrete while if the color is as dark as, or darker than, coffee as ordinarily made, the sand is unsuitable for concrete unless washed until the color is satisfactorily improved as indicated by testing again.

In judging the color, it is well to keep in mind that any such liquid as vinegar or coffee, viewed in a pint fruit jar of clear glass, will appear several shades lighter than as ordinarily viewed. If any doubt exists as to the color of the water standing over the sand as tested, fill one fruit jar of clear glass with vinegar and another with coffee and use for color comparisons. Use reasonable care in measuring all quantities as too great a variation from those given might appreciably change the results of the color test.

Washing Sand

If the local sand requires washing, and any considerable quantity is to be used, it will be cheaper and much more satisfactory in practically all settled communities to buy well-graded washed sand from a near-by commercial concern, than to attempt to wash the local supply, particularly if not well graded for concrete as is often the case.

If, however, it is desired to use the sand at hand, and a power-driven concrete mixer is to be used on the job, the mixer may be used to first wash the sand. To do so, a quantity of sand should be placed in the mixer, plenty of clean water added, and the mixer run for a few revolutions. The dirty water should then be run off. Ordinarily one washing will suffice but the operations may be repeated as often as necessary. Sand so washed may be dumped on to a stock pile to be used as required.

Washing sand for small quantities of hand-mixed concrete may be accomplished by liberally applying water at the upper end of an inclined platform of rough lumber on which the sand is spread in a thin layer. Such a platform may be 8 or 10 feet long with side and bottom boards 6 or 8 inches high and the upper end elevated 2 or 3 feet. This method is laborious and, except under special conditions, is suitable only for very small jobs.

Sand can not be washed satisfactorily by pouring water on it as it lies in the pile unless it be a very small pile on a platform from which the water can drain freely, as otherwise objectionable matter will only be transferred from one part of the pile to another. Washing sand in this manner rarely accomplishes the desired results.

Regardless of the method used, washing must continue until the sand passes the color test, for durable concrete can not be made unless the sand is clean.

DALTON G. MILLER,
Senior Drainage Engineer, Bureau of Public Roads.

COOKING Time Varies With Style in Which Beef Roasts Are Cut The style of cutting rib roasts of beef affects their shape and the amount of bone. Standing roasts contain more or less bone and are either rangy or chunky in shape, depending on the way the meat dealer saws off the rib ends. There are, moreover, many rolled roasts prepared from which the bones are completely removed. Whether the ribs are cut short or left long or are taken out altogether, it is the "eye," or the heavy meat portion, that has to be roasted to just the desired turn. Time and temperature are at the command of the cook, but how much time, even with a well-regulated oven, is not so easy for her to say.

The Bureau of Home Economics, working in cooperation with the Bureaus of Animal Industry and Agricultural Economics together with 25 State agricultural experiment stations, has detailed records on the cooking of 850 standing rib roasts of beef. Data are on hand covering the weight of each, a description of its appearance, the oven temperature used, the stage of cooking as shown by a thermometer in the meat itself, and the time each roast stayed in the oven. These records show considerable variation in the number of minutes per pound necessary to roast standing beef ribs to the stage of rare (140° F.), medium (160° F.), or well done (180° F.) at any given oven temperature.

To find how much cooking time varies with the style of the cut six pairs of 2-rib roasts were chosen and cooked. Three pairs were used in a comparison of length of rib bones, and the other three in a comparison of standing versus boned and rolled roasts. Before cooking, all the cuts were graded by representatives of the Bureau of Agricultural Economics. Two pairs of 2-rib roasts from one carcass were graded low medium, two pairs from another high medium, on the basis of the ribs only, and two pairs were cut from a carcass, stamped "U. S. Choice Steer."

All 12 roasts were cooked fat side up in open pans without added water. After 20 minutes searing in a hot oven (500° F.) the oven temperature was rapidly reduced to 300° F. and each roast cooked until it was rare, then medium, and finally well done. Time records were kept for each roast.

Standing Roasts With Short and With Long Ribs

Three pairs of the roasts were standing 12–13 ribs. The lefts were cooked as received from the market, with the ribs about average in length. From the corresponding right roasts several inches of bone were sawed off making them short and chunky. The comparative length of the ribs and the differences in weight of corresponding roasts are illustrated in Figure 22.

When the figures were averaged, the short cut roasts weighing 6 pounds were found to require 105 minutes to be rare, 143 medium, and 192 well done, while the corresponding long-ribbed roasts which weighed 7 pounds, cooked to the same stages in 103, 139, and 184 minutes, respectively. The small variations of 2 minutes at rare, 4 at medium, and 8 at the well-done stage are believed to be due to slightly different locations of meat thermometers in paired roasts. Apparently then, the length of the ribs had nothing to do with the total time required to cook these three pairs of standing roasts. When however, the cooking time was calculated as so many minutes to the pound, there was a difference.

The roasts which had been sawed off short required on the average 17 minutes to be rare, 24 medium, and 32 well done, against 15, 20, and 27 minutes per pound, respectively, for the corresponding roasts with long rib bones. These figures indicate that the time required to cook the heavy meat part of a standing roast is independent of the length of the ribs. The weight of the roast, however, is influenced by the way the ribs are cut, and so, other things being equal, short and chunky standing roasts require several more minutes to the pound than the long and rangy kind.

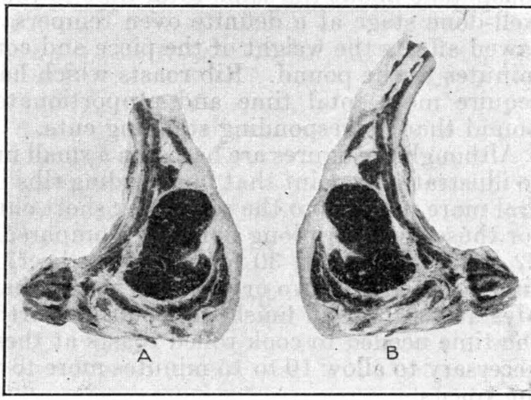


FIGURE 22.—A pair of corresponding right and left 2-rib standing beef roasts, A and B, respectively, which required practically the same total cooking time: A, with the short-cut rib bones, weighed almost 1 pound less than B. The number of minutes per pound cooking time was consequently greater for A than for B

Standing Roasts and Rolled Roasts

Of three pairs of 10–11 rib roasts from the same three carcasses as the 12–13 ribs above, the lefts were cut as standing roasts, and the rights were boned and rolled. (Fig. 23.)

The weights of the standing 10–11 rib roasts averaged 7.2 pounds. For the corresponding rolled roasts the average weight was 5.8 pounds. The standing cuts required 116 minutes to cook rare, 160 medium, and 228 well done, against 157, 206, and 289 minutes, respectively, for the corresponding rolled cuts. When the time is calculated as minutes to the pound, the standing roasts reached the rare stage in 16 minutes, medium in 23, and well-done in 33, in striking contrast to the rolled roasts, which required respectively 27, 37, and 51 minutes to the pound. These figures show a significant increase in the time required to cook rolled roasts, as compared with standing roasts, both as total time and as minutes to the pound.

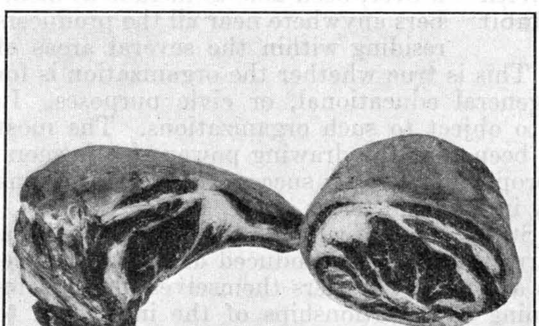


FIGURE 23.—The left rib roast standing, A, and the corresponding right ribs boned and rolled, B. Much shorter time was required to cook A than B, both in the total number of minutes and in the number of minutes per pound

Just why rolled roasts should cook so much more slowly than their corresponding standing roasts needs further study. It may be due in part to the greater thickness of meat in rolled roasts than in standing roasts.

Anyway the results of this study show that cooking time is influenced by the style of cutting rib roasts. While corresponding standing roasts take about the same total time to cook to the rare, medium, or well-done stage at a definite oven temperature, the way the ribs are sawed affects the weight of the piece and consequently the number of minutes to the pound. Rib roasts which have been boned and rolled require more total time and proportionately much more time per pound than corresponding standing cuts.

Although the figures are based on a small number of roasts they serve to illustrate the point that for standing ribs it is advisable to allow several more minutes to the pound for short chunky cuts and several less for those with very long bones, as compared with 16 minutes for rare, 22 for medium, and 30 for well-done beef, recommended as average time for standing two or three rib roasts that are seared 20 to 30 minutes at 500° F. and finished at 300°. Furthermore, when estimating the time needed to cook rolled roasts at these oven temperatures it is necessary to allow 10 to 15 minutes more to the pound than for standing roasts.

This simple illustration of a common source of variation in the time required to cook beef ribs furnishes a strong argument for a roast-meat thermometer. Whereas so many minutes per pound or so many minutes total time is not a sure guide to the stage of doneness of a roast, a thermometer properly placed in the meat itself and kept there during the cooking shows exactly when the meat is rare, medium, or well done.

LUCY M. ALEXANDER,
Associate Specialist in Foods,
Bureaus of Home Economics and Animal Industry.

COOPERATIVE Spirit of Farmers Varies With Schooling and Habit Farmers' organizations have seldom, if ever, been able to include as members anywhere near all the producers residing within the several areas of activity of these bodies. This is true whether the organization is for marketing, purchasing, general educational, or civic purposes. In fact some farmers seem to object to such organizations. The most frequent explanation has been that the drawing power of a farmers' organization is roughly proportional to its success, the success being interpreted almost wholly in financial terms.

Recent surveys in five States, some of which were made in cooperation with the Federal Farm Board, have produced definite evidence, however, that differences among the farmers themselves play an important part in determining the relationships of the individual to farmers' organizations. These surveys include two farmers' associations that market potatoes and small quantities of other vegetables, two cooperative cotton-marketing associations, and one State farm bureau federation. The following summary gives some of the more significant findings concerning the human factor as related to these organizations. Unless otherwise stated, the situation is substantially the same for each of these organizations.

The greatest single difference among the farmers who were studied, when classified by their membership relations (members, ex-members, and nonmembers) to these organizations, is found in the amount of

Anyway the results of this study show that cooking time is influenced by the style of cutting rib roasts. While corresponding standing roasts take about the same total time to cook to the rare, medium, or well-done stage at a definite oven temperature, the way the ribs are sawed affects the weight of the piece and consequently the number of minutes to the pound. Rib roasts which have been boned and rolled require more total time and proportionately much more time per pound than corresponding standing cuts.

Although the figures are based on a small number of roasts they serve to illustrate the point that for standing ribs it is advisable to allow several more minutes to the pound for short chunky cuts and several less for those with very long bones, as compared with 16 minutes for rare, 22 for medium, and 30 for well-done beef, recommended as average time for standing two or three rib roasts that are seared 20 to 30 minutes at 500° F. and finished at 300°. Furthermore, when estimating the time needed to cook rolled roasts at these oven temperatures it is necessary to allow 10 to 15 minutes more to the pound than for standing roasts.

This simple illustration of a common source of variation in the time required to cook beef ribs furnishes a strong argument for a roast-meat thermometer. Whereas so many minutes per pound or so many minutes total time is not a sure guide to the stage of doneness of a roast, a thermometer properly placed in the meat itself and kept there during the cooking shows exactly when the meat is rare, medium, or well done.

LUCY M. ALEXANDER,
Associate Specialist in Foods,
Bureaus of Home Economics and Animal Industry.

COOPERATIVE Spirit of Farmers Varies With Schooling and Habit

Farmers' organizations have seldom, if ever, been able to include as members anywhere near all the producers residing within the several areas of activity of these bodies. This is true whether the organization is for marketing, purchasing, general educational, or civic purposes. In fact some farmers seem to object to such organizations. The most frequent explanation has been that the drawing power of a farmers' organization is roughly proportional to its success, the success being interpreted almost wholly in financial terms.

Recent surveys in five States, some of which were made in cooperation with the Federal Farm Board, have produced definite evidence, however, that differences among the farmers themselves play an important part in determining the relationships of the individual to farmers' organizations. These surveys include two farmers' associations that market potatoes and small quantities of other vegetables, two cooperative cotton-marketing associations, and one State farm bureau federation. The following summary gives some of the more significant findings concerning the human factor as related to these organizations. Unless otherwise stated, the situation is substantially the same for each of these organizations.

The greatest single difference among the farmers who were studied, when classified by their membership relations (members, ex-members, and nonmembers) to these organizations, is found in the amount of formal schooling that these groups of farmers have had. Thus, farmers who did not finish country school are much more likely to be nonmembers of local organizations. Those farmers who have obtained a high-school education or better are, on the whole, decidedly more likely to be members. Among the ex-members, or those who once joined these organizations but later ceased to be members, are but few who have received as much as high-school training. The majority of ex-members are men of very limited education. This situation is most marked in areas where differences in the schooling received by farmers are the greatest. Where but few farmers have even completed country school (as is true in some localities surveyed) the differences are not so striking, but they are present just the same.

Renters Less Cooperative-Minded

Renters, as a rule, are not as likely to be found on the membership rosters of the organizations surveyed as are owners. This is more characteristic of the farmers' marketing associations studied than it is of the general farmers' organization included in one of the surveys. Renters who are related by kinship ties to their landlords are, as a group, about as likely to join these organizations as are landowners. It is clearly at the lower rung of the so-called agricultural ladder that tenancy is the greatest handicap to organization membership.

Operators of larger farms are more likely to be members of these organizations than are those who farm smaller units. This trend holds true for both owners and tenants.

In two States, those farmers who are most aggressive in adopting modern farm practices and those who make most use of their county agricultural agents are lined up with the farmers' organizations to a considerably larger extent than are those individuals in the same localities who do not evidence such flexibility in farm-management operations and who rarely consult the county agents. In a third State, of all farmers studied those rated by local citizens as being the most progressive in their farm-production activities are organization members to a much larger extent than the group classified as least progressive.

Memberships in lodges, social clubs, civic organizations, and church societies are most frequent among the members of the farmers' organizations selected for study. In view of the fact that a large proportion of these other organization memberships began some time prior to memberships in the farmers' organizations, it is to be suspected at least that memberships in the first-mentioned organizations afforded experiences and contacts in working together that made joining and cooperating in the work of the latter organizations easier and more satisfactory to these farmers.

Among the ex-members was found a more-than-average proportion of men of longest farm experience. Most of these farmers joined the farmers' organizations for the minimum periods possible under the membership contracts then in force, and they ceased to be members at the first opportunity that came their way. In the case of the farmers' marketing associations, some basis may be found in this fact for believing that individualistic habits formed by long experience with traditional marketing methods proved so strong that these older farmers were not able to readjust themselves to the new methods demanded by cooperative effort. In the general farmers' organization, this trend among farmers of long experience was found to exist although differences in membership relations are not so pronounced as is true of the farmers' marketing associations.

Significance of the Findings

What is the significance of these findings for farmers' organizations, particularly cooperative business enterprises? In the first place, the leadership in such organizations will come to a fuller realization of the importance of past experiences, habits, viewpoints, and desires as forces that influence each farmer's response to the appeals of any and all organizations. Solicitation methods, means of disseminating information, membership contracts, relationships between members and management, and methods of promoting esprit de corps among the members will be developed so as to recognize these influences which so greatly affect the human factor.

In the second place, farmers' organizations will make increasing demands that the public-school opportunities of farm boys and girls be made more nearly equivalent to those afforded urban children by means of State equalization of existing inequalities and handicaps, and in other ways. This educational emphasis appears to be the greatest source of hope for the organizations from a long-time point of view.

Finally, it seems evident that a good many of the older farmers especially those whose methods of operation class them as unprogressive and unlearned, can never be depended upon to make successful cooperators. Nor should organization leaders and members feel defeated when time and energy does not cause these impossibles to join. The transition to the cooperative way of doing things is simply beyond them. Their gradual replacement by a younger, better trained, and more easily approachable generation, is the only satisfactory solution of this problem. Organizational pressure brought to bear in favor of adequate rural schools is usually better spent than is an equal amount of effort used in trying to get people who are unable to cooperate successfully to join these organizations.

Granting the importance of efficiency in business management, the study of the human factor as it relates to all forms of cooperation, and the development of organizational policy to correspond with its limitations and capacities, are of equal importance with business activities in determining the degree of success that can be secured in the future through cooperative activity.

THEO. B. MANNY,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

CORN-BORER Control by Machinery Facilitated Through Seasonal Plan

In the area where only one brood of European corn borers occurs each year (western area), controlling this pest by mechanical means may be greatly facilitated if the recognized control practices be worked into the farm operating schedule, the requirements for control having been developed by the Bureau of Entomology. By carefully planning and executing, little extra work will be required and yet the ravages of the insect will be held in check and better farming result. To make the program effective each farmer should carry it through to the best among farmers of long experience was found to exist although differences in membership relations are not so pronounced as is true of the farmers' marketing associations.

Significance of the Findings

What is the significance of these findings for farmers' organizations, particularly cooperative business enterprises? In the first place, the leadership in such organizations will come to a fuller realization of the importance of past experiences, habits, viewpoints, and desires as forces that influence each farmer's response to the appeals of any and all organizations. Solicitation methods, means of disseminating information, membership contracts, relationships between members and management, and methods of promoting esprit de corps among the members will be developed so as to recognize these influences which so greatly affect the human factor.

In the second place, farmers' organizations will make increasing demands that the public-school opportunities of farm boys and girls be made more nearly equivalent to those afforded urban children by means of State equalization of existing inequalities and handicaps, and in other ways. This educational emphasis appears to be the greatest source of hope for the organizations from a long-time point of view.

Finally, it seems evident that a good many of the older farmers especially those whose methods of operation class them as unprogressive and unlearned, can never be depended upon to make successful cooperators. Nor should organization leaders and members feel defeated when time and energy does not cause these impossibles to join. The transition to the cooperative way of doing things is simply beyond them. Their gradual replacement by a younger, better trained, and more easily approachable generation, is the only satisfactory solution of this problem. Organizational pressure brought to bear in favor of adequate rural schools is usually better spent than is an equal amount of effort used in trying to get people who are unable to cooperate successfully to join these organizations.

Granting the importance of efficiency in business management, the study of the human factor as it relates to all forms of cooperation, and the development of organizational policy to correspond with its limitations and capacities, are of equal importance with business activities in determining the degree of success that can be secured in the future through cooperative activity.

THEO. B. MANNY,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

CORN-BORER Control by Machinery Facilitated Through Seasonal Plan

In the area where only one brood of European corn borers occurs each year (western area), controlling this pest by mechanical means may be greatly facilitated if the recognized control practices be worked into the farm operating schedule, the requirements for control having been developed by the Bureau of Entomology. By carefully planning and executing, little extra work will be required and yet the ravages of the insect will be held in check and better farming result. To make the program effective each farmer should carry it through to the best of his ability; otherwise, neglected cornfields will nullify the control measures practiced on near-by fields.

Beginning in the spring, in fields where the corn has been hogged down or the stalks grazed, the practice of carefully plowing under the stalks should be followed. The ground should be clean and no pieces of stalk should be left exposed on the surface as a refuge for a borer which might crawl to the surface after being plowed under. (Fig. 24.) This means, when possible, the plowing of stalks under to a depth of 6 inches—8 inches would be better. With no shelter available the borer can not then continue its life cycle, as it will either die of exposure or be attacked and destroyed by birds and other natural enemies.

If standing stalks are left after the corn has been picked, and if soil conditions permit, the stalks may be plowed under in the spring by using a wide-furrow plow equipped with colters, jointers, and trash

FIGURE 24.—A clean job of plowing for corn-borer control

wires. If care is used almost a perfect job of coverage can be obtained with 16-inch plows and larger, and a good job can be done with 14-inch plows if in good adjustment and properly equipped. Late plowing in the fall, after the corn has been harvested, is about equally effective but often is impossible because of unfavorable field conditions.

Where the field is not to be plowed but is to be sown to small grain a careful job of stalk shaving, raking, and burning will dispose of the majority of the borers. The shaving is accomplished by either a sled-type or a wheel-type stalk shaver. The former consists of a sled to each runner of which a diagonal knife is attached, as described in Miscellaneous Publication No. 69. This will cut two rows of stalks flush with the ground. A wheel-type shaver which consists of an attachment for a single-row cultivator works equally satisfactorily and will cut three rows at one time. (Fig. 25.) The sled-type shavers may be hitched two abreast and cut four rows of stalks at one time. (Fig. 26.)

After the stalks are carefully severed, raking and cross raking into piles or windrows by special cornstalk rakes collect the stalks for burning. A specially adapted side-delivery rake, which is also capable of

FIGURE 25.—A wheel-type stalk shaver cutting three rows at a time

raking hay equally well, will accomplish the result in one operation. (Fig. 27.)

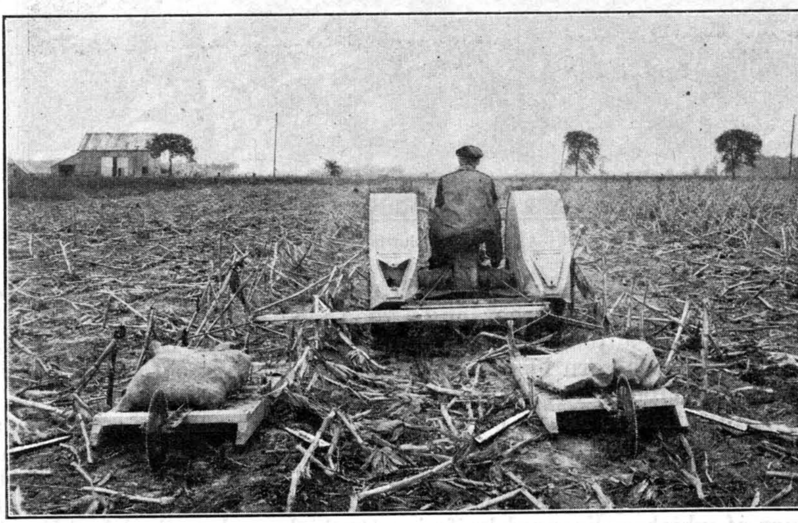


FIGURE 26.—Two sled-type shavers hitched abreast and cutting four rows

The burning operation then follows and should be carefully watched so that all outlying stalks may be raked into the flames to destroy any straggling borers. This done, small grain can be safely sown.

Preparing the Seed Bed

In preparing the seed bed after plowing care must be used in the selection and use of tillage tools so as not to bring any plowed-under stalks to the surface, as this would nullify the good job of plowing already done.

When planting corn, if conditions are favorable for the practice, the work of subsequent control machinery will be greatly facilitated if the corn is drilled rather than checked. The individual stalks are easier to cut or shave than stalks grouped in hills. Likewise, in cultivating, the operation of control machinery will be eased if the corn is laid by with the ground ridged as little as possible. This reduces the strain and racking on corn binders, rakes, and other machinery, which all function better on smooth ground.

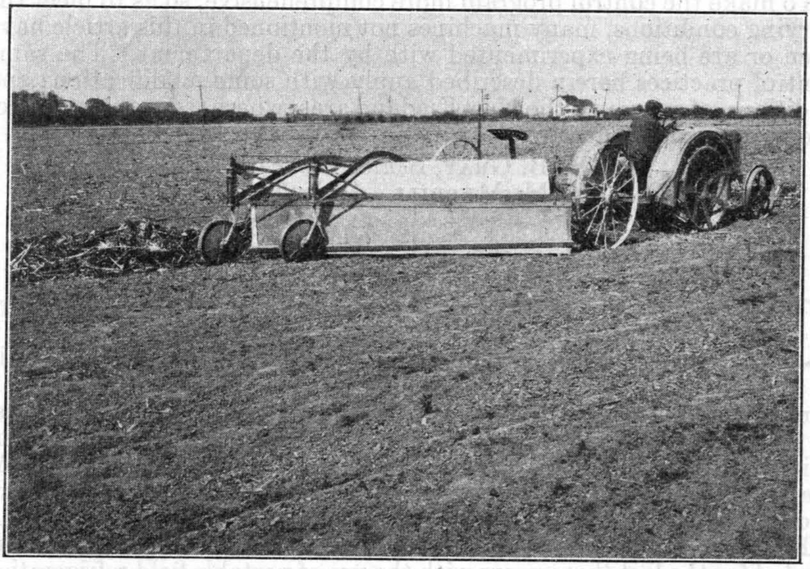


FIGURE 27.—A side-delivery rake in operation. Note absence of débris on the ground raked

If the corn is to be harvested by removing the whole crop from the field, the stalks should be cut flush with the ground surface, thereby permitting the removal of the majority of the borers from the field in the stalks. For accomplishing this, any make of binder now being manufactured may be equipped with the stationary low-cutting knife attachment. This attachment may be made up by the farmer himself according to instructions in Miscellaneous Publication No. 56, or it may be purchased at a nominal cost from the manufacturer of the particular binder in use.

Where the corn is to be cut by hand a special low-cutting hoe should be used. One type is described in the publication mentioned.

If the corn thus cut is to be ensiled, careful operation of the silage cutter with special attention to cleaning up trash around the machine after each operation will make for good control. What borers may not be destroyed in the silage cutter will be killed during the fermentation process in the silo. The silage harvester, when equipped with a low-cutting knife attachment, accomplishes practically the same result as the silage cutter.

In case the corn is to be handled by a husker-shredder, careful feeding, proper adjustment of the snapping roll pressure to a safe maximum, and the practice of cleaning up around the machine after each operation will destroy a large percentage of borers. If the shredded fodder is put into the mow or fed to the stock, the remaining live borers will perish from dessication, be eaten by the stock, or be tramped into the manurial juices. Therefore, fodder passing through a properly adjusted shredder may be spread on the fields with little danger of being a source of infestation.

When fodder is to be fed whole to the stock, or where hand husking from the shock is done, care must be exercised in cleaning up feed lots and destroying the stalks before the pupation time of the borers.

To make the control program more comprehensive, so as to meet the varying conditions, many machines not mentioned in this article have been or are being experimented with by the department. The same control practices herein described apply with some modifications and additions, of course, to the New England area, where two generations of the borer occur annually.

R. B. Gray, *Senior Agricultural Engineer*,
R. M. Merrill, *Agricultural Engineer*,
Bureau of Public Roads.

CORN More Resistant to Cold When Grown on Soil Rich in Plant Food

The problem of reducing the hazard of untimely frosts to the corn crop is seriously complicated by reduction in soil fertility. One of the most important factors influencing the extent of injury following frosts and freezes in the late spring and early fall is the quantity and balance of soil fertility available for use by the growing corn plants. The encouraging feature is that this factor is more or less under the control of the corn grower.

Field studies on cold injury in both spring and fall have been conducted for the last three years with the use of portable field refrigeration chambers to produce chilling temperatures and frosts. The planting arrangement and a general view of the experimental field in 1930 are shown in Figure 28. Part of the plantings were made on soil cropped since 1921, prior to which time the soil was virgin prairie sod. Comparable plantings were made on closely adjacent soil that was plowed from virgin sod in the fall of 1929.

A comparison of the reaction to freezing temperatures, 28° to 29° F., for two hours, of five strains of corn growing on the soil cropped since 1921, and of the same strains growing on the newly plowed virgin soil, is shown in Figure 29. The greater resistance to injury from cold of the plants growing on the virgin soil is very marked.

On part of the soil cropped since 1921, plant nutrients were applied, singly and in combination, and at different rates of application. The applications were made in such a way that one of the field refrigeration chambers would cover at the same time corn growing on unfertilized soil and corn on soil that had received each of three different fertilizer treatments. Both cold-resistant and cold-susceptible strains of corn were grown on each soil treatment. (Fig. 30.)

cutting knife attachment, accomplishes practically the same result as the silage cutter.

In case the corn is to be handled by a husker-shredder, careful feeding, proper adjustment of the snapping roll pressure to a safe maximum, and the practice of cleaning up around the machine after each operation will destroy a large percentage of borers. If the shredded fodder is put into the mow or fed to the stock, the remaining live borers will perish from dessication, be eaten by the stock, or be tramped into the manurial juices. Therefore, fodder passing through a properly adjusted shredder may be spread on the fields with little danger of being a source of infestation.

When fodder is to be fed whole to the stock, or where hand husking from the shock is done, care must be exercised in cleaning up feed lots and destroying the stalks before the pupation time of the borers.

To make the control program more comprehensive, so as to meet the varying conditions, many machines not mentioned in this article have been or are being experimented with by the department. The same control practices herein described apply with some modifications and additions, of course, to the New England area, where two generations of the borer occur annually.

R. B. GRAY, *Senior Agricultural Engineer*,
R. M. MERRILL, *Agricultural Engineer*,
Bureau of Public Roads.

CORN More Resistant to Cold When Grown on Soil Rich in Plant Food

The problem of reducing the hazard of untimely frosts to the corn crop is seriously complicated by reduction in soil fertility. One of the most important factors influencing the extent of injury following frosts and freezes in the late spring and early fall is the quantity and balance of soil fertility available for use by the growing corn plants. The encouraging feature is that this factor is more or less under the control of the corn grower.

Field studies on cold injury in both spring and fall have been conducted for the last three years with the use of portable field refrigeration chambers to produce chilling temperatures and frosts. The planting arrangement and a general view of the experimental field in 1930 are shown in Figure 28. Part of the plantings were made on soil cropped since 1921, prior to which time the soil was virgin prairie sod. Comparable plantings were made on closely adjacent soil that was plowed from virgin sod in the fall of 1929.

A comparison of the reaction to freezing temperatures, 28° to 29° F., for two hours, of five strains of corn growing on the soil cropped since 1921, and of the same strains growing on the newly plowed virgin soil, is shown in Figure 29. The greater resistance to injury from cold of the plants growing on the virgin soil is very marked.

On part of the soil cropped since 1921, plant nutrients were applied, singly and in combination, and at different rates of application. The applications were made in such a way that one of the field refrigeration chambers would cover at the same time corn growing on unfertilized soil and corn on soil that had received each of three different fertilizer treatments. Both cold-resistant and cold-susceptible strains of corn were grown on each soil treatment. (Fig. 30.)

Plants growing in the soil to which fertilizers had been applied were more resistant to cold than the plants of the same strain growing in the untreated soil. Some cold-susceptible strains when grown in the unfertilized soil were killed in the young plant stage by exposure for a few minutes to a temperature of 33° to 34° F. These same strains were resistant to any visible injury from an exposure of four hours to a

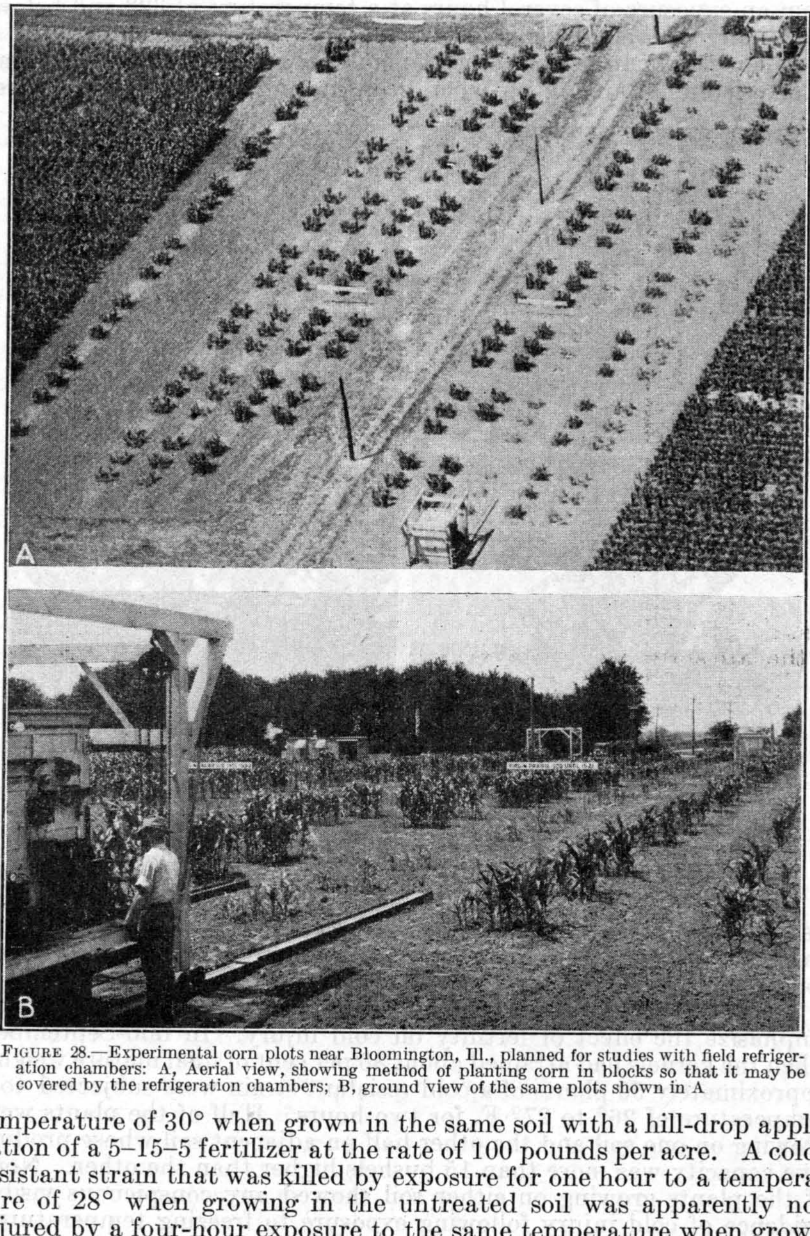


FIGURE 28.—Experimental corn plots near Bloomington, Ill., planned for studies with field refrigeration chambers: A, Aerial view, showing method of planting corn in blocks so that it may be covered by the refrigeration chambers; B, ground view of the same plots shown in A

temperature of 30° when grown in the same soil with a hill-drop application of a 5–15–5 fertilizer at the rate of 100 pounds per acre. A cold-resistant strain that was killed by exposure for one hour to a temperature of 28° when growing in the untreated soil was apparently not injured by a four-hour exposure to the same temperature when grown in the same soil with a 5–15–5 fertilizer added at the rate of 200 pounds per acre.

Cold Resistance in the Fall

Differences in the cold resistance and cold susceptibility of different strains of corn grown with and without fertilizers also have been very marked in the fall. Some cold-susceptible strains whose leaves and stalks were killed by exposure to temperatures of 40° to 42° F., when growing on untreated soil, three weeks later were resistant to injury from an exposure of several hours at a temperature of 32° and below, the difference being due to the resistant plants having received a broadcast application of 400 to 600 pounds of a 5–15–5 fertilizer. Some cold-resistant strains, even when growing on the untreated soil, re-

FIGURE 29.—Corn grown on new soil has been found to be more resistant to injury from cold, both in spring and fall, than corn grown on comparable soil of a lower level of productivity. The same five strains of corn, *a, b, c, d, e,* were planted in each of the four blocks May 12, 1930. Soil moisture in the four blocks was comparable, being approximately 45 per cent of the moisture-holding capacity of the soil. The plants were photographed July 5, 1930, 24 days after exposure in the field refrigeration chambers for two hours to a temperature of 28° to 29° F., following a prehardening period of eight hours

sisted injury from exposure to temperatures of 32° and below, but these same strains were more resistant when growing on the fertilized soil.

The results from an experiment conducted in the fall of 1929 will emphasize the effect of fertility on cold injury. In mid-September, when the kernels had attained about 80 per cent of final mature weight, approximately 50 plants of a cold-resistant strain were subjected to a temperature of 26° to 27° F. for two hours. Half of the plants were growing on one soil and the other half on adjacent soil whose productive capacity was more than 15 bushels higher than the other. None of the plants growing on either soil showed any conspicuous visible evidence of cold injury following exposure to freezing temperatures. When the corn was harvested, however, it was found that the ears from the plants on the less productive soil had not increased in weight after

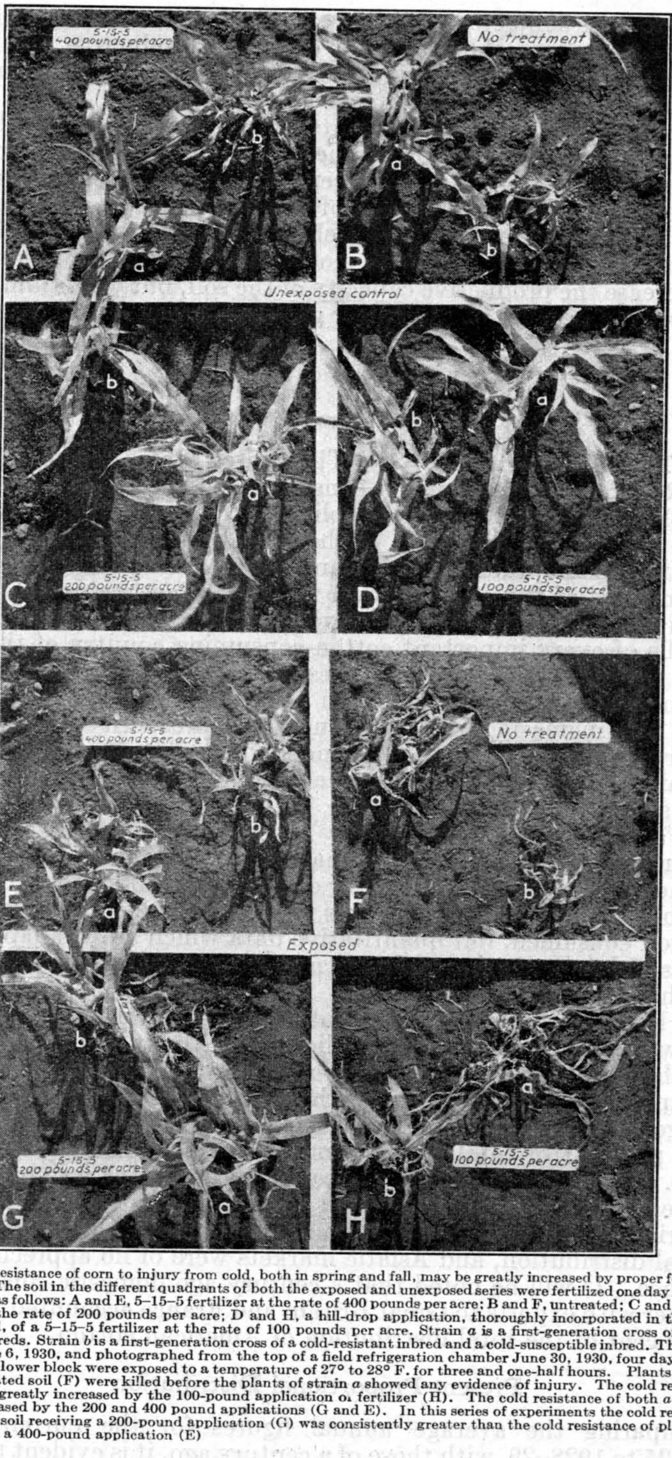


FIGURE 30.—Resistance of corn to injury from cold, both in spring and fall, may be greatly increased by proper fertilization of the soil. The soil in the different quadrants of both the exposed and unexposed series were fertilized one day in advance of planting, as follows: A and E, 5–15–5 fertilizer at the rate of 400 pounds per acre; B and F, untreated; C and G, 5–15–5 fertilizer at the rate of 200 pounds per acre; D and H, a hill-drop application, thoroughly incorporated in the upper 4 inches of soil, of a 5–15–5 fertilizer at the rate of 100 pounds per acre. Strain *a* is a first-generation cross of two cold-resistant inbreds. Strain *b* is a first-generation cross of a cold-resistant inbred and a cold-susceptible inbred. The corn was planted June 6, 1930, and photographed from the top of a field refrigeration chamber June 30, 1930, four days after the plants in the lower block were exposed to a temperature of 27° to 28° F. for three and one-half hours. Plants of strain *b* in the untreated soil (F) were killed before the plants of strain *a* showed any evidence of injury. The cold resistance of strain *b* was greatly increased by the 100-pound application of fertilizer (H). The cold resistance of both *a* and *b* was greatly increased by the 200 and 400 pound applications (G and E). In this series of experiments the cold resistance of the plants in soil receiving a 200-pound application (G) was consistently greater than the cold resistance of plants in the soil receiving a 400-pound application (E)

the plants were subjected to the freezing temperatures. On the other hand, the ears from the plants on the more productive soil had increased in weight and were almost as heavy as the ears from comparable plants not exposed to the freezing temperatures.

There is no doubt that corn plants are more resistant to cold, both in the young plant stage and in the maturing stage, when grown on more productive soil. An intelligent soil-improvement program to increase the productive capacity of the soil helps to reduce the loss hazard to the corn crop from untimely frosts. The growing of legumes and, where needed, the application of fertilizers in proper amounts not only increase the productive capacity of the soil, but yields and quality are improved because of the longer growing season for the corn.

J. R. Holbert,
Senior Agronomist, Bureau of Plant Industry.

COTTON Exports of U. S. Reflect Continuously Shifting World Market The United States has been the leading source of the world's cotton supplies for the last century. Although there has been a rapid increase in the domestic consumption of American cotton during this period, more than one-half of the cotton grown in the United States continues to find an outlet through foreign markets. American cotton is used in the mills of every important cotton-consuming country of the world, and in a majority of these countries more than one-half of all cotton consumed is American. Although domestic markets for American cotton are increasing in importance, the prosperity of the cotton industry in this country is dependent, among other things, upon maintaining extensive foreign markets for the sale of this raw material.

The several market outlets for American cotton are continually changing in importance. These changes usually affect both the quantity and quality of cotton taken or consumed. Sufficient data are not available to determine the changes which have taken place in quality of cotton consumed, but quantitative data which are available on the exports and consumption of American cotton reveal some rather significant shifts.

One hundred years ago, when total domestic consumption plus exports were only about one-half million bales, Great Britain and France were the only markets of any consequence to which American cotton was exported. (Fig. 31.) During the 5-year period 1824–25 to 1828–29 average annual exports of American cotton to Great Britain made up 60 per cent of total distribution (domestic consumption plus exports). During this same period about 20 per cent was exported to France, 1 per cent to Germany, and about 3 per cent to other European countries. Domestic consumption at that time was about 16 per cent of total distribution, and Asiatic markets were of no appreciable consequence. It will be noted that a century ago domestic consumption together with exports to Great Britain and France accounted for about 95 per cent of the total distribution of American cotton.

Present Proportional Distribution

Comparing the average annual figures for the current period, 1924–25 to 1928–29, with those of a century ago, it is evident that some the plants were subjected to the freezing temperatures. On the other hand, the ears from the plants on the more productive soil had increased in weight and were almost as heavy as the ears from comparable plants not exposed to the freezing temperatures.

There is no doubt that corn plants are more resistant to cold, both in the young plant stage and in the maturing stage, when grown on more productive soil. An intelligent soil-improvement program to increase the productive capacity of the soil helps to reduce the loss hazard to the corn crop from untimely frosts. The growing of legumes and, where needed, the application of fertilizers in proper amounts not only increase the productive capacity of the soil, but yields and quality are improved because of the longer growing season for the corn.

J. R. Holbert,
Senior Agronomist, Bureau of Plant Industry.

COTTON Exports of U. S. Reflect Continuously Shifting World Market

The United States has been the leading source of the world's cotton supplies for the last century. Although there has been a rapid increase in the domestic consumption of American cotton during this period, more than one-half of the cotton grown in the United States continues to find an outlet through foreign markets. American cotton is used in the mills of every important cotton-consuming country of the world, and in a majority of these countries more than one-half of all cotton consumed is American. Although domestic markets for American cotton are increasing in importance, the prosperity of the cotton industry in this country is dependent, among other things, upon maintaining extensive foreign markets for the sale of this raw material.

The several market outlets for American cotton are continually changing in importance. These changes usually affect both the quantity and quality of cotton taken or consumed. Sufficient data are not available to determine the changes which have taken place in quality of cotton consumed, but quantitative data which are available on the exports and consumption of American cotton reveal some rather significant shifts.

One hundred years ago, when total domestic consumption plus exports were only about one-half million bales, Great Britain and France were the only markets of any consequence to which American cotton was exported. (Fig. 31.) During the 5-year period 1824–25 to 1828–29 average annual exports of American cotton to Great Britain made up 60 per cent of total distribution (domestic consumption plus exports). During this same period about 20 per cent was exported to France, 1 per cent to Germany, and about 3 per cent to other European countries. Domestic consumption at that time was about 16 per cent of total distribution, and Asiatic markets were of no appreciable consequence. It will be noted that a century ago domestic consumption together with exports to Great Britain and France accounted for about 95 per cent of the total distribution of American cotton.

Present Proportional Distribution

Comparing the average annual figures for the current period, 1924–25 to 1928–29, with those of a century ago, it is evident that some marked changes have taken place in the quantities of American cotton exported to various markets. Great Britain and France no longer hold the predominant positions which they once enjoyed as export markets. The proportional distribution to Great Britain during the last century has declined from about 60 per cent to 14 per cent; to France, from 21 per cent to 6 per cent. These decreases have been absorbed largely by domestic mills, Germany, Italy, other European countries, and Japan. During the century the average annual consumption in domestic mills increased from 16 per cent to 43 per cent; Germany, from 1 per cent to 13 per cent; Italy, from practically nothing to 5 per cent; other European countries, from 3 per cent to 8 per cent. Japan was taking no American cotton a century ago, as compared to takings amounting to 8 per cent of total distribution at the present time.

Marked changes have also occurred in the importance of the different countries with respect to mill consumption of American cotton since

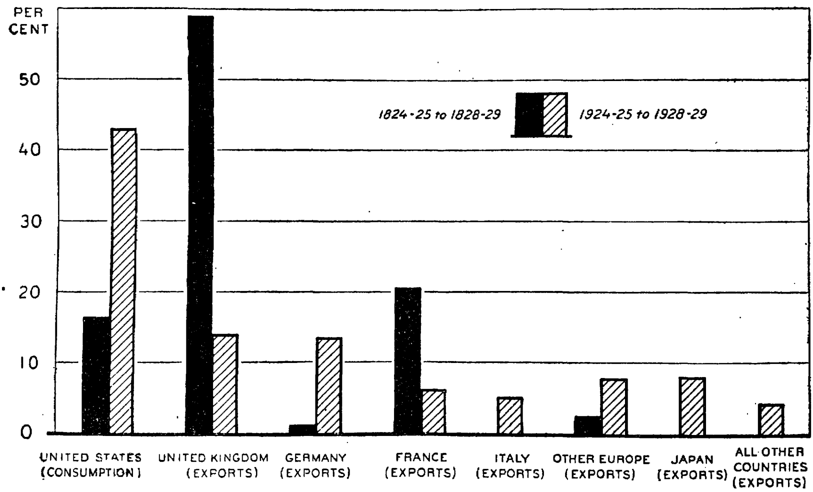


FIGURE 31.—Percentage distribution of American cotton, specified countries, average annual 1824–25 to 1828–29 and 1924–25 to 1928–29

the period immediately preceding the World War. (Fig. 32.) Average annual world consumption of American cotton between the periods 1909–10 to 1912–13 and 1925–26 to 1928–29 increased about 1,800,000 bales, reaching the highest level on record. Comparing recent years with pre-war years, the losses and gains in consumption of American cotton outside the United States practically balance each other, leaving the increases in domestic consumption as a net gain.

Comparing recent years with pre-war years, consumption of American cotton in Great Britain has declined about 1,400,000 bales, or from 26 to 13 per cent of total world consumption. Other marked changes in consumption of American cotton have occurred in the United States and Japan. Consumption in the United States has increased about 1,800,000 bales, or from 36 to 44 per cent of total world consumption. Consumption in Japan has increased almost 800,000 bales, or from 2 per cent to 7 per cent of the total. Smaller changes in the consumption of American cotton have occurred in other countries during the period under review.

The last two or three years have witnessed significant shifts in the consumption of American cotton, some of which may prove to be permanent. Following the high level reached in 1926–27 there was a general decline in world consumption of American cotton. This decline has been especially marked during 1929–30. While nearly all important cotton-consuming countries have shared in this decline, it has been much more severe in some countries than in others.

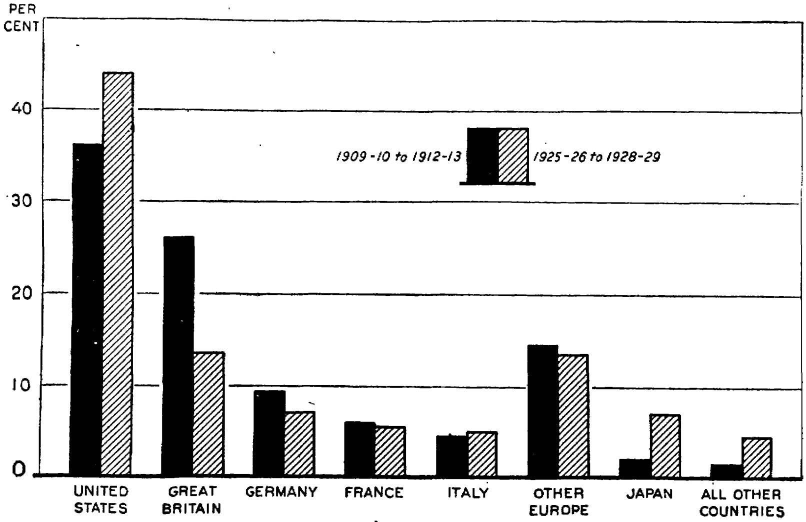


FIGURE 32.—Percentage of world consumption of American cotton in specified countries, average annual 1909–10 to 1912–13 and 1925–26 to 1928–29

Decreased Consumption in United States

Consumption of American cotton in the United States decreased about 350,000 bales in 1927–28, regained most of this loss in 1928–29, and decreased considerably in 1929–30. In Great Britain each of the last four years has shown a decrease from the preceding year in American cotton consumption. There was a slight increase in the amount of American cotton consumed in Germany during 1927–28, but decreases have occurred during the last two years. Japan, like the United States, shows a decline in 1927–28, a slight increase in 1928–29, and a decrease during 1929–30.

TABLE 1.—*Distribution of American cotton in specified countries (average annual 1824–25 to 1828–29 and 1924–25 to 1928–29)*

Country	1824-25 to 1828-29		1924-25 to 1928-29	
	Bales	*Per cent*	*Bales*	*Per cent*
Consumption, United States	[1] 90, 946	16. 5	6, 457, 000	43. 0
Exports to—				
United Kingdom	324, 677	58. 9	2, 114, 752	14. 1
Germany	6, 520	1. 2	2, 003, 399	13. 4
France	113, 313	20. 6	889, 086	5. 9
Italy	645	. 1	732, 067	4. 9
Other Europe	14, 753	2. 7	1, 154, 421	7. 7
Japan	----------	----------	1, 174, 226	7. 8
All other countries	383	(2)	483, 552	3. 2
Total	551, 237	100. 0	15, 008, 000	100. 0

[1] 3-year average. [2] Less than 0.1 per cent.

TABLE 2.—*Bales and percentage of world consumption of American cotton in specified countries (average annual 1909–10 to 1912–13 and 1925–26 to 1928–29)*

Country	1909-10 to 1912-13		1925-26 to 1928-29	
	1,000 bales	*Per cent*	*1,000 bales*	*Per cent*
United States	4,740	36.0	6,592	44.0
Great Britain	3,368	25.6	2,007	13.4
Germany	1,259	9.6	1,009	7.3
France	775	5.9	828	5.5
Italy	594	4.5	711	4.7
Other Europe	1,940	14.7	2,045	13.6
Japan	272	2.1	1,048	7.0
All other countries	214	1.6	666	4.5
Total	13,162	100.0	14,996	100.0

Very little fluctuation has occurred in the amount of American cotton consumed in France during the last four years, and consumption of this growth in Italy has been maintained at a relatively high level during recent years. The textile industries of France and Italy experienced somewhat less depression during 1929–30 than did most of the other important consumers of American cotton. Russia, Czechoslovakia, Spain, and Poland are among the countries which have shown decreased consumption of American cotton during the last two or three years; while Belgium, the Netherlands, and Canada are among those in which, until 1929–30 at least, American cotton consumption has been maintained or increased.

W. W. FETROW,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

COTTON More Productive When Thick Spaced for Small Upright Plants "Thick spacing" is the farmer's expression of the contrast between the present practice in thinning cotton and that of the early years of the weevil invasion, when wide spacing or checkrowing was considered desirable, with the plants 2 or 3 feet apart. Much closer spacing is now advised, with the plant separated only a few inches, or with two to four plants left in hills at 12 or 14 inches. Several times as many plants are left in the fields as formerly, 30,000 to 60,000 plants per acre instead of 5,000 or 6,000. Closer spacing than a "hoe width" between the hills encounters difficulties of thinning by hand or of special methods of seeding. Moderate "natural stands," with the plants averaging 2 to 4 inches apart in the rows, often do not need to be thinned, so that in some districts the labor and expense of "chopping" are avoided. The method is of general application where cotton is grown as an annual, but adjustments to local conditions require further investigation. Thus in dry districts a wider separation of the rows is indicated, but with the plants close in the rows.

An agricultural invention was made by learning how the form and size of the plants could be controlled, and how small upright plants could be used to better advantage than large spreading plants, under the short-season conditions imposed by the boll weevil. The early indications of larger yields from thick-spaced cotton have been confirmed by many tests at State experiment stations, which have served

TABLE 2.—*Bales and percentage of world consumption of American cotton in specified countries (average annual 1909–10 to 1912–13 and 1925–26 to 1928–29)*

Country	1909–10 to 1912–13		1925–26 to 1928–29	
	1,000 bales	*Per cent*	*1,000 bales*	*Per cent*
United States	4,740	36.0	6,592	44.0
Great Britain	3,368	25.6	2,007	13.4
Germany	1,259	9.6	1,009	7.3
France	775	5.9	828	5.5
Italy	594	4.5	711	4.7
Other Europe	1,940	14.7	2,045	13.6
Japan	272	2.1	1,048	7.0
All other countries	214	1.6	666	4.5
Total	13,162	100.0	14,996	100.0

Very little fluctuation has occurred in the amount of American cotton consumed in France during the last four years, and consumption of this growth in Italy has been maintained at a relatively high level during recent years. The textile industries of France and Italy experienced somewhat less depression during 1929–30 than did most of the other important consumers of American cotton. Russia, Czechoslovakia, Spain, and Poland are among the countries which have shown decreased consumption of American cotton during the last two or three years; while Belgium, the Netherlands, and Canada are among those in which, until 1929–30 at least, American cotton consumption has been maintained or increased.

W. W. FETROW,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

COTTON More Productive When Thick Spaced for Small Upright Plants

"Thick spacing" is the farmer's expression of the contrast between the present practice in thinning cotton and that of the early years of the weevil invasion, when wide spacing or checkrowing was considered desirable, with the plants 2 or 3 feet apart. Much closer spacing is now advised, with the plant separated only a few inches, or with two to four plants left in hills at 12 or 14 inches. Several times as many plants are left in the fields as formerly, 30,000 to 60,000 plants per acre instead of 5,000 or 6,000. Closer spacing than a "hoe width" between the hills encounters difficulties of thinning by hand or of special methods of seeding. Moderate "natural stands," with the plants averaging 2 to 4 inches apart in the rows, often do not need to be thinned, so that in some districts the labor and expense of "chopping" are avoided. The method is of general application where cotton is grown as an annual, but adjustments to local conditions require further investigation. Thus in dry districts a wider separation of the rows is indicated, but with the plants close in the rows.

An agricultural invention was made by learning how the form and size of the plants could be controlled, and how small upright plants could be used to better advantage than large spreading plants, under the short-season conditions imposed by the boll weevil. The early indications of larger yields from thick-spaced cotton have been confirmed by many tests at State experiment stations, which have served as the basis of advice to the farmers, but giving more attention to the peculiarities of the cotton plant is also to be urged, for effective application of the new method. Scientific improvements of agriculture can be used to some extent by farmers who are not aware of the underlying facts, but the best use of any practical discovery is to be expected from those who understand it. Not only are the returns from the crops increased, but the interest and satisfactions of farming are enriched by every additional insight into the habits and peculiarities of the plants that receive the farmer's care.

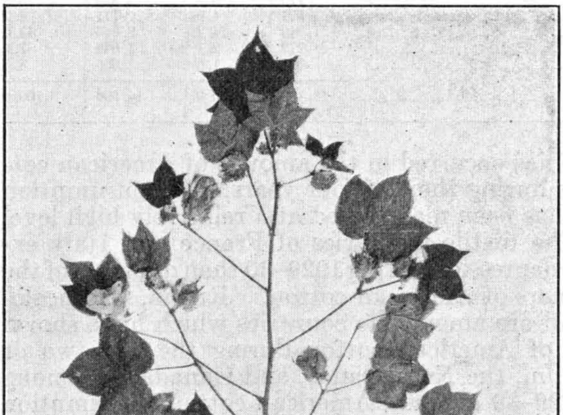


FIGURE 33.—Narrow, upright, single-stalk Acala cotton plant, grown in a thick-spaced row, showing only one small dwarfed vegetative branch at base

Nature of the Spacing Problem

The spacing problem is not so simple as appeared at first, when it was thought that the proper distances could be determined merely by trying experiments with different spacings, to see which gave the largest yields. Practical conclusions were not reached, as the agronomic results were too varied and conflicting, until it was discovered that the cotton plant has two kinds of branches which are different and distinct in their structure and functions. The recognition of the two kinds of branches brought to light a new principle which determines the space requirements of the cotton plants and is an indispensable key to an adequate understanding and use of better spacing methods.[1]

The conflicting results of the earlier experiments are explained when the branching habits are considered. The spacing problem has its joker in the different forms of the plants and their different space requirements, as determined by the formation of the branches. Plants a foot apart may be too close in one season or in one field, but too wide in another. With long seasons and equable conditions, close spacing may show no advantage. Spacing experiments may miscarry in several

[1] COOK, O. F. DIMORPHIC BRANCHES IN TROPICAL CROP PLANTS: COTTON, COFFEE, CACAO, THE CENTRAL AMERICAN RUBBER TREE, AND THE BANANA. U. S. Dept. Agriculture, Bur. Plant Indus. Bul. 198. 1911.

ways, notably where heavy stands are thinned too late, and especially where thinning is followed by dry weather, so that the plants remain stunted.

No simple agronomic solution could have been reached, because essentially different conditions were confused, until the principle of branch control was recognized. A bimodal curve of space effects might have been worked out if the full range of spacings had been tested, but spacings less than a foot were not included in the older agronomic experiments. For plants with vegetative branches the limit is above a foot, while for narrow single-stalk plants only a few inches of row-space are required. The closer spacings are safer and more practicable, because the vegetative branches are suppressed. Growing the plants closer together keeps them from being injuriously crowded.

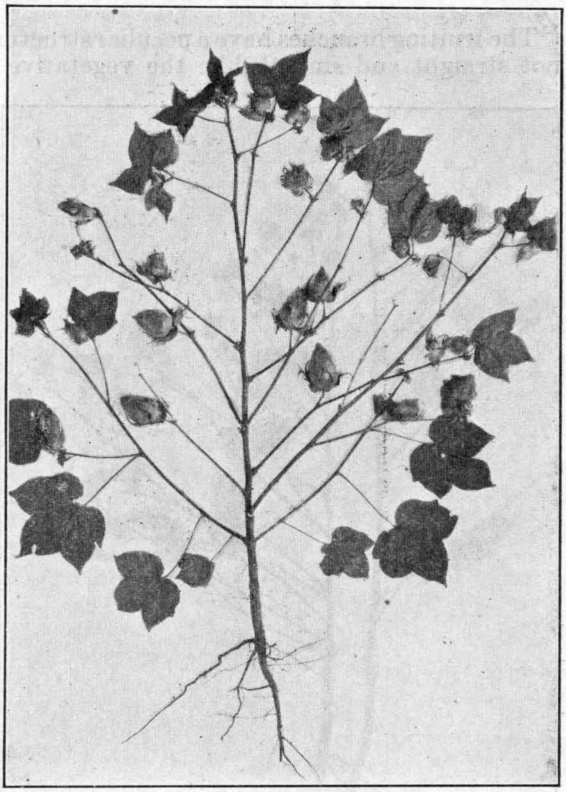


FIGURE 34.—Spreading Acala cotton plant grown in wide-spaced row showing three vegetative branches or side stalks at base. Compare with Figure 33

Two Forms of Plants

The cotton plant can grow in two different forms, depending upon whether one kind of branches or two kinds are produced. Plants that have only fruiting branches are of the simple single-stalk form, narrow and erect. (Fig. 33.) The lower joints of single-stalk plants are without branches, though vegetative sprouts may appear late in the season or after the plants have been checked by dry weather.

The other form of plant is broad and spreading, if room is allowed, and is characterized by large vegetative branches or "side stalks," produced from the lower joints of the main stalk, below the fruiting branches. (Fig. 34.) Thick spacing restricts the formation of vegetative branches and effects a substitution of several small single-stalk plants for one of the large plants with spreading side stalks. The smaller individual plants growing on their own roots have advantages over the side stalks of the large plants in maturing larger crops of bolls early in the season, as required under weevil conditions. The plants yield less individually, but usually produce more cotton per row, often 20, 30, or 50 per cent more, or even twice as much, when the period of setting the crop is very short. Many comparisons in alternating 4-row blocks have shown notable advantages for close spacings.

The control of branching becomes effective on plants less than 6 inches apart in the rows. It is possible to grow single-stalk plants a foot or more apart by later thinning, but if cotton is thinned late it should be left closer together. The seedlings give mutual protection against wind and cold, and usually grow better when not thinned too early, that is, before they are 5 or 6 inches high. The former practice of "chopping" cotton as soon "as the rows can be followed" is seldom maintained.

Two Kinds of Branches

The fruiting branches have a peculiar structure and manner of growth, not straight and smooth like the vegetative branches, but with the joints angled and zigzag. Also, the basal joint of a fruiting branch is very long, in contrast with much shorter basal joints on vegetative branches. Every joint of a fruiting branch has its floral bud or square, while vegetative branches have no flower buds. Even if all the buds are shed, the fruiting branches are permanently marked by the bud scars, though "doubtful branches" have been reported by some of the agronomic writers. (Fig. 35.)

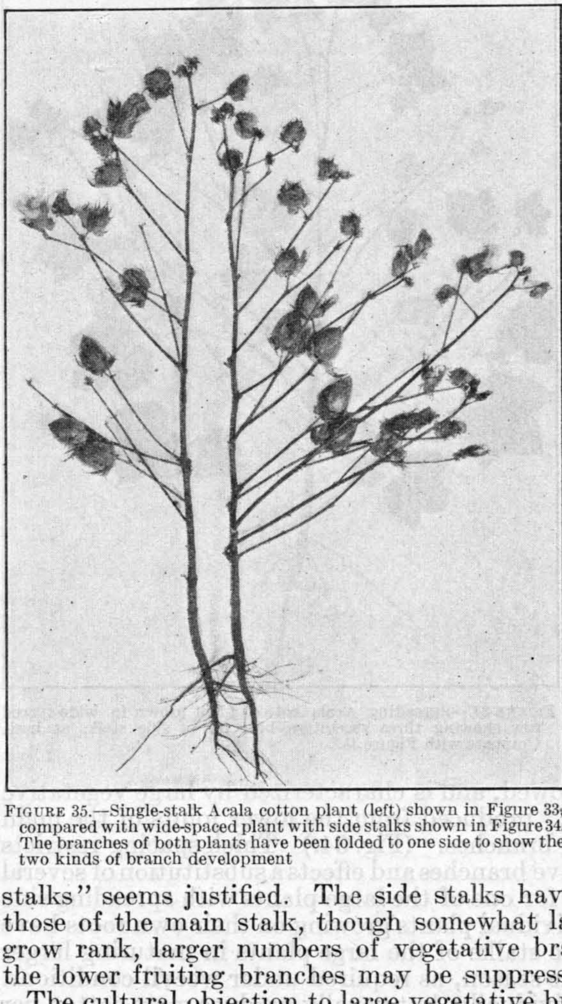


FIGURE 35.—Single-stalk Acala cotton plant (left) shown in Figure 33, compared with wide-spaced plant with side stalks shown in Figure 34. The branches of both plants have been folded to one side to show the two kinds of branch development

The vegetative branches usually are confined to the lower joints of the main stalk, below the fruiting branches. The structure and functions of the vegetative branches are the same as those of the main stalk of the plant, so that the name "side stalks" seems justified. The side stalks have fruiting branches like those of the main stalk, though somewhat later. Where the plants grow rank, larger numbers of vegetative branches are formed, and the lower fruiting branches may be suppressed or aborted.

The cultural objection to large vegetative branches is that the lanes between the rows of cotton are filled with the extra growth. A continuous canopy of foliage is formed, the ground is completely shaded, and a moist atmosphere is retained, so that the field conditions invite weevil injury and boll rot. Even where there are no boll weevils, as in the irrigated valleys of the Southwestern States, the lanes between the rows need to be kept open. Otherwise few bolls are produced on the lower parts of the plants, and the "top crop" often is too late to open before frost.

O. F. Cook,
Principal Botanist, Bureau of Plant Industry.

COTTON Prices to Growers Do Not Reflect Accurately Variations in Quality Large quantities of cotton with a staple shorter than seven-eighths of an inch are produced annually in the United States, and occasionally a considerable proportion of the crop is of very low grade. The proportion of the crop which was untenderable on futures contracts because of short staple amounted to 2,051,100 bales, or 14.3 per cent, in 1928 and to 2,920,200 bales, or 20.1 per cent, in 1929; and because of low grade amounted to 756,800 bales, or 5.3 per cent, in 1928 and to 880,100 bales, or 6.1 per cent, in 1929.

This very short-staple cotton competes directly with cotton grown in India and China where, it is asserted the cost of production is much less than in the United States. Competition with cotton grown in India and China, along with the large quantities of short-staple cotton produced, is causing public attention to be directed to the advisability of improving the staple length of the cotton grown in the United States.

Farmers are inclined to produce the kind of cotton which, at prices received in local markets, brings them the greatest net returns. The prices paid in these markets indicate to growers the qualities of cotton which are more profitable for them to produce. Where an averaged price is paid for all grades and staple lengths grown in a community, farmers tend to grow the kind of cotton which can be produced at the least cost per pound regardless of the grade and staple length. On the other hand, where growers receive prices which vary appreciably with the grade and staple length, they tend to produce cotton of superior quality.

As a means of determining to what extent the prices paid to growers in local markets in the United States reflect the differences in spinning utility of the various grades and staple lengths of cotton, data on prices paid and on the classification of 107,247 bales sold during the season of 1928–29 in 143 local markets, representing as nearly as possible a cross section of the types of local markets in the United States, were collected and analyzed.

These data show that prices paid for cotton of the same grade and staple length varied widely; and that prices paid for cotton of different grades and staple lengths varied so irregularly that it was not unusual to find that some growers received less for cotton of higher grade and longer staple than others received for cotton of lower grade and shorter staple in the same market on the same day. These wide and irregular variations indicate that differences in the bargaining power of farmers or other factors were, at times, of more importance in determining the prices received by growers than were differences in grade and staple length.

and a moist atmosphere is retained, so that the field conditions invite weevil injury and boll rot. Even where there are no boll weevils, as in the irrigated valleys of the Southwestern States, the lanes between the rows need to be kept open. Otherwise few bolls are produced on the lower parts of the plants, and the "top crop" often is too late to open before frost.

O. F. Cook,
Principal Botanist, Bureau of Plant Industry.

COTTON Prices to Growers Do Not Reflect Accurately Variations in Quality Large quantities of cotton with a staple shorter than seven-eighths of an inch are produced annually in the United States, and occasionally a considerable proportion of the crop is of very low grade. The proportion of the crop which was untenderable on futures contracts because of short staple amounted to 2,051,100 bales, or 14.3 per cent, in 1928 and to 2,920,200 bales, or 20.1 per cent, in 1929; and because of low grade amounted to 756,800 bales, or 5.3 per cent, in 1928 and to 880,100 bales, or 6.1 per cent, in 1929.

This very short-staple cotton competes directly with cotton grown in India and China where, it is asserted the cost of production is much less than in the United States. Competition with cotton grown in India and China, along with the large quantities of short-staple cotton produced, is causing public attention to be directed to the advisability of improving the staple length of the cotton grown in the United States.

Farmers are inclined to produce the kind of cotton which, at prices received in local markets, brings them the greatest net returns. The prices paid in these markets indicate to growers the qualities of cotton which are more profitable for them to produce. Where an averaged price is paid for all grades and staple lengths grown in a community, farmers tend to grow the kind of cotton which can be produced at the least cost per pound regardless of the grade and staple length. On the other hand, where growers receive prices which vary appreciably with the grade and staple length, they tend to produce cotton of superior quality.

As a means of determining to what extent the prices paid to growers in local markets in the United States reflect the differences in spinning utility of the various grades and staple lengths of cotton, data on prices paid and on the classification of 107,247 bales sold during the season of 1928–29 in 143 local markets, representing as nearly as possible a cross section of the types of local markets in the United States, were collected and analyzed.

These data show that prices paid for cotton of the same grade and staple length varied widely; and that prices paid for cotton of different grades and staple lengths varied so irregularly that it was not unusual to find that some growers received less for cotton of higher grade and longer staple than others received for cotton of lower grade and shorter staple in the same market on the same day. These wide and irregular variations indicate that differences in the bargaining power of farmers or other factors were, at times, of more importance in determining the prices received by growers than were differences in grade and staple length.

Premiums and Discounts

A weighted average of the prices paid shows that growers actually received for White grades above Middling an average premium per bale of 60 cents for Strict Middling, 95 cents for Good Middling, and 50 cents for Strict Good Middling. The discounts per bale paid for White grades below Middling averaged $1.55 for Strict Low Middling, $4.35 for Low Middling, $7.95 for Strict Good Ordinary, and $12.30 for Good Ordinary. Using Middling White cotton as a basis, a weighted average of the prices paid for Spotted cotton showed an average premium of 60 cents per bale for Good Middling, and average discounts per bale of $1.50 for Middling, $5.35 for Strict Low Middling, and $7.40 for Low Middling. (Fig. 36.)

Similar comparisons for different staple lengths show that the average discount in the prices paid to growers for cotton with a staple of 13/16 inch and shorter was only 30 cents per bale less than that paid for 7/8-inch cotton of the same grade. The average premiums per bale

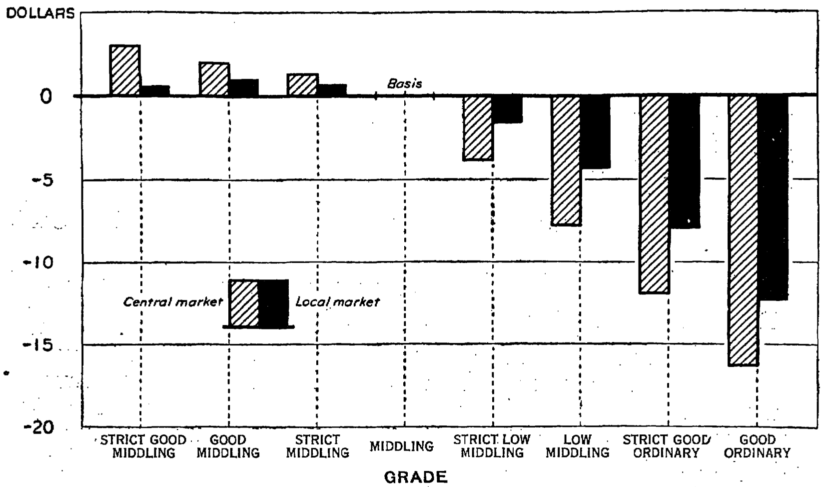


FIGURE 36.—Average grade differences in dollars per bale of 500 pounds paid for White cotton in local markets and in central markets in the United States, season 1928–29

paid for the longer staple lengths amounted to only 20 cents for 15/16 inch, 60 cents for 1 to 1 1/32 inches, $2.05 for 1 1/16 to 1 3/32 inches, $3.85 for 1 1/8 to 1 5/32 inches, $5.15 for 1 3/16 to 1 7/32 inches, and $4.50 for 1 1/4 inches and longer. (Fig. 37.)

Comparisons of the staple premiums and discounts paid in local markets with those paid in central markets show that the average discounts paid to growers for cotton with a staple of thirteen-sixteenths of an inch and shorter amounted to only 12 per cent of those paid in the central markets; and the average premiums paid for the longer staple lengths varied from 14 to 37 per cent of those paid in the central markets. The average grade differences were relatively greater than the staple premiums and discounts, as already indicated, but were considerably less than those paid in the central markets. (Figs. 36 and 37.) The relatively small variations in the prices of the different qualities of cotton in the same market at the same time, mean that, on the average, producers of high grades and long staples were penalized and that producers of low grades and short staples were paid comparatively more than their cotton was worth.

Benefits of Better Adjustment

The failure of the prices paid to individual growers to reflect accurately the grade differences and staple premiums and discounts quoted in central markets, coupled with the belief on the part of many farmers that the shorter staples can be produced at a lower cost per pound than can the longer staples, tend to stimulate production out of line with consumer demand in the direction of too much short-staple cotton. So long as the consumer demand is not reflected in the local markets in the form of differences in prices paid to individual growers, we may reasonably expect that the quality of cotton produced will

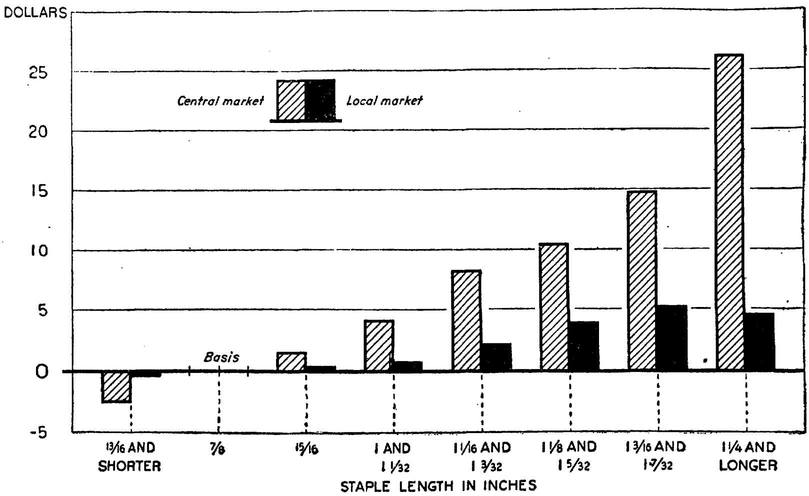


FIGURE 37.—Average staple premiums and discounts in dollars per bale of 500 pounds paid for White and Spotted cotton in local markets and in central markets in the United States, season 1928–29

continue to be out of line with consumer demand. A better adjustment of the quality of cotton produced to the demands of consumers would tend both to increase the returns to growers and to decrease the cost to consumers.

L. D. HOWELL,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

COTTONSEED Flour Rich in Vitamin G, Experiments Show Cottonseed meal has had an important place in livestock feeding for more than a quarter of a century. When properly treated and refined it is a useful feed. Recent research in the department has demonstrated that cottonseed is a valuable source of the pellagra-preventing vitamin. Accordingly, the Bureau of Home Economic is studying the possibilities of cottonseed as a food for human beings.

Cottonseed, in the form of meal, is not a desirable human food. Cottonseed flour is better adapted to human requirements. It is more finely ground and more highly purified than the meal. Cottonseed flours were first manufactured and put on the market about 1910.

Benefits of Better Adjustment

The failure of the prices paid to individual growers to reflect accurately the grade differences and staple premiums and discounts quoted in central markets, coupled with the belief on the part of many farmers that the shorter staples can be produced at a lower cost per pound than can the longer staples, tend to stimulate production out of line with consumer demand in the direction of too much short-staple cotton. So long as the consumer demand is not reflected in the local markets in the form of differences in prices paid to individual growers, we may reasonably expect that the quality of cotton produced will

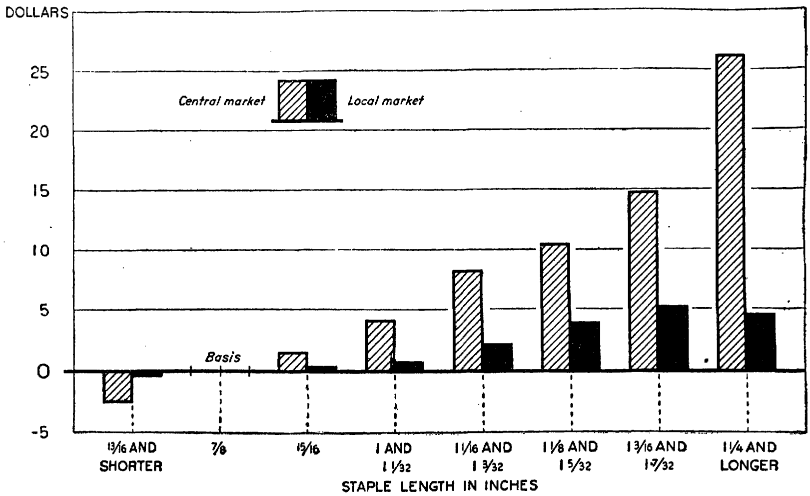


FIGURE 37.—Average staple premiums and discounts in dollars per bale of 500 pounds paid for White and Spotted cotton in local markets and in central markets in the United States, season 1928–29

continue to be out of line with consumer demand. A better adjustment of the quality of cotton produced to the demands of consumers would tend both to increase the returns to growers and to decrease the cost to consumers.

L. D. HOWELL,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

COTTONSEED Flour Rich in Vitamin G, Experiments Show

Cottonseed meal has had an important place in livestock feeding for more than a quarter of a century. When properly treated and refined it is a useful feed. Recent research in the department has demonstrated that cottonseed is a valuable source of the pellagra-preventing vitamin. Accordingly, the Bureau of Home Economic is studying the possibilities of cottonseed as a food for human beings.

Cottonseed, in the form of meal, is not a desirable human food. Cottonseed flour is better adapted to human requirements. It is more finely ground and more highly purified than the meal. Cottonseed flours were first manufactured and put on the market about 1910.

Their use increased during the war and has been continued in certain sections of the country. Cottonseed flour has high food value and palatable products can be made therewith. As it does not contain the gluten-forming constituents that give bread-making value to wheat flour, it is generally used in combinations with bolted wheat flour. Cottonseed flour can be substituted for about one-fifth of the wheat flour in various kinds of bread and baked products. This combination makes a darker bread than does white flour. The bread has a nutty flavor.

Composition of Cottonseed Flour

The composition of these flours varies with the source and method of preparation. They have been shown to contain from 50 to 58 per cent of protein and about 12 per cent of fat. About 6 per cent is ash, consisting chiefly of phosphorus and potassium. About 22 per cent of the flour is a mixture of sugar, gums, and resins. Cottonseed flour manufacturing processes eliminate lint and hulls and a large proportion of the resins. Feeding tests with small experimental animals were undertaken to ascertain the vitamin content of this cottonseed flour. The results showed that the flour is a good source of vitamins B and G. It contains from one-half to one-third as much vitamin G as yeast. At its present price of less than 10 cents a pound, cottonseed flour is a relatively cheap source of these vitamins and also contains other valuable nutrients.

Louise Stanley,
Chief, Bureau of Home Economics.

CRANBERRY Industry in Critical State Through False-Blossom Disease

As late as 1919 the disease of cranberries known as false blossom was so rare as to be a curiosity in the important cranberry-producing States of Massachusetts and New Jersey. Ten years later (in 1929) it was generally recognized as the most serious disease ever known on cranberries in those States, and its practical control constituted the outstanding problem of commercial cranberry culture.

Enough information is available regarding the introduction and spread of the disease in the eastern United States to give an unusually detailed picture of the spread of a disease on a cultivated crop and to furnish an important chapter in the history of the cranberry industry.

False Blossom a Virus Disease

False blossom is now known to be a disease of the virus type and to be transmitted by a leaf hopper, *Euscelis striatulus*.

The most easily recognized symptom of the disease is the one from which its common name is derived, that is, the development of abnormal flowers. The blossoms of diseased plants may be nearly normal in appearance but produce only small misshapen berries, or they may be so modified that all the flower parts have become merely green scalelike bracts. Another conspicuous symptom is the development of clusters of upright sterile branches in the place of the long trailing runners characteristic of the healthy cranberry. (Fig. 38.)

The disease causes a marked reduction of the crop, but usually does not cause the death of the plants unless accompanied by insect injury.

Their use increased during the war and has been continued in certain sections of the country. Cottonseed flour has high food value and palatable products can be made therewith. As it does not contain the gluten-forming constituents that give bread-making value to wheat flour, it is generally used in combinations with bolted wheat flour. Cottonseed flour can be substituted for about one-fifth of the wheat flour in various kinds of bread and baked products. This combination makes a darker bread than does white flour. The bread has a nutty flavor.

Composition of Cottonseed Flour

The composition of these flours varies with the source and method of preparation. They have been shown to contain from 50 to 58 per cent of protein and about 12 per cent of fat. About 6 per cent is ash, consisting chiefly of phosphorus and potassium. About 22 per cent of the flour is a mixture of sugar, gums, and resins. Cottonseed flour manufacturing processes eliminate lint and hulls and a large proportion of the resins. Feeding tests with small experimental animals were undertaken to ascertain the vitamin content of this cottonseed flour. The results showed that the flour is a good source of vitamins B and G. It contains from one-half to one-third as much vitamin G as yeast. At its present price of less than 10 cents a pound, cottonseed flour is a relatively cheap source of these vitamins and also contains other valuable nutrients.

LOUISE STANLEY,
Chief, Bureau of Home Economics.

CRANBERRY Industry in Critical State Through False-Blossom Disease

As late as 1919 the disease of cranberries known as false blossom was so rare as to be a curiosity in the important cranberry-producing States of Massachusetts and New Jersey. Ten years later (in 1929) it was generally recognized as the most serious disease ever known on cranberries in those States, and its practical control constituted the outstanding problem of commercial cranberry culture.

Enough information is available regarding the introduction and spread of the disease in the eastern United States to give an unusually detailed picture of the spread of a disease on a cultivated crop and to furnish an important chapter in the history of the cranberry industry.

False Blossom a Virus Disease

False blossom is now known to be a disease of the virus type and to be transmitted by a leaf hopper, *Euscelis striatulus.*

The most easily recognized symptom of the disease is the one from which its common name is derived, that is, the development of abnormal flowers. The blossoms of diseased plants may be nearly normal in appearance but produce only small misshapen berries, or they may be so modified that all the flower parts have become merely green scalelike bracts. Another conspicuous symptom is the development of clusters of upright sterile branches in the place of the long trailing runners characteristic of the healthy cranberry. (Fig. 38.)

The disease causes a marked reduction of the crop, but usually does not cause the death of the plants unless accompanied by insect injury.

The cranberry of commerce is native to North America, and the commercial cranberry-producing areas, with the exception of those in Washington and Oregon, are within the natural range of the wild cranberry.

Massachusetts and New Jersey together produce approximately 90 per cent of the cranberry crop of the United States. The most important varieties in both States are of Massachusetts origin. These are the Early Black, which makes up about 50 per cent of the crop of Massachusetts and 20 per cent in New Jersey, and the Howes, which constitutes about one-third of the crop in each State. The Howes has been for many years the standard late variety of cranberry which is

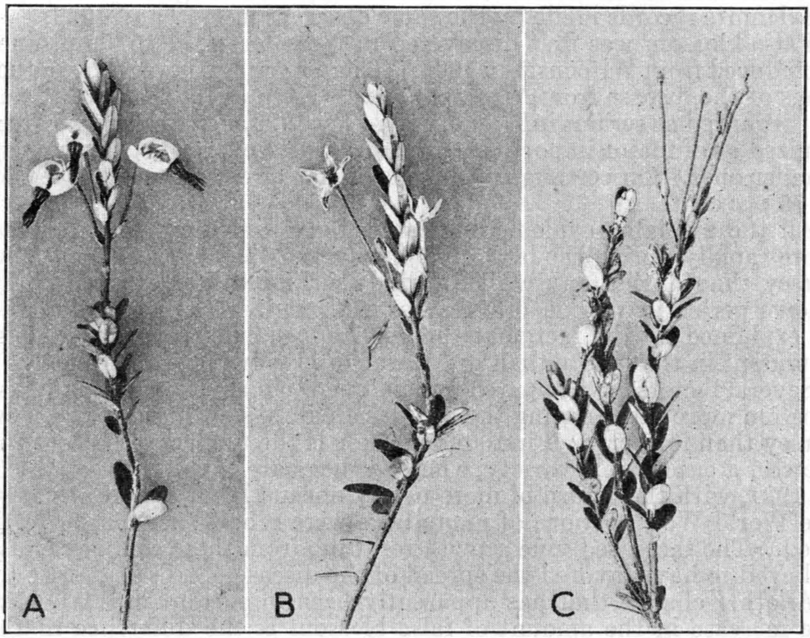


FIGURE 38.—A, Healthy cranberry "upright," showing normal flowers and growth; B and C, uprights affected with false blossom, showing distorted flowers and a small witches'-broom

held for the Christmas and later market. The extreme susceptibility of this important variety to false blossom makes the present situation a critical one for the cranberry industry.

The Spread of False Blossom

The available evidence indicates that false blossom first appeared on cranberries in Wisconsin and from there spread to other cranberry-growing States in shipments of diseased vines. Published reference to the disease in Wisconsin was first made in 1918, but it was certainly present in the State in 1895 and is believed to have been there at least 10 years earlier. Indeed, false blossom has been present so long in Wisconsin that the industry has become in a large degree adjusted to it. In those parts of Wisconsin where the disease has been severe the most susceptible varieties have been taken out because no longer profitable and the areas largely replanted to resistant varieties, notably the McFarlin.

Quite the opposite condition exists in Massachusetts and New Jersey, where the introduction of the disease is recent and where the adjustments are proving both difficult and expensive. Vines affected with false blossom are known to have been introduced into Massachusetts from Wisconsin in 1895, 1902, 1904, and 1910. The first survey for the disease was made in 1914, and it was found to some extent on five bogs. Another survey in 1919 showed that the disease was present on several other bogs, but in most of them it appeared to be of little commercial importance. In 1924 false blossom was known on 52 bogs in Massachusetts, and in 1929 it was the outstanding cranberry disease in that State. The increase was not only in the number of bogs known to be infected but in the amount of false blossom on bogs of which there are definite records made by the same observer in 1919 and 1929.

False blossom was first discovered in New Jersey in 1915 on vines introduced from Wisconsin in 1909. There were also several introductions of the disease from Massachusetts. Even as late as 1923 it was not regarded as serious in New Jersey. By 1929, however, it was recognized as of major importance on almost all the large bogs and many smaller ones. On certain areas the crop has already been reduced 50 to 75 per cent.

All the available evidence indicates that false blossom has spread more rapidly during the last 5 to 10 years in Massachusetts and New Jersey than during any earlier period in these States or during any known period in Wisconsin. Its slower spread in Wisconsin seems to be explained by the fact that the leaf hopper which carries it is less abundant in that State than in Massachusetts or New Jersey.

Several factors have apparently combined to make the spread of false blossom more rapid during the last decade in Massachusetts and New Jersey than formerly. First among these is the tendency to plant the Howes, a susceptible variety, wherever bogs are rebuilt. About 1920 or 1921, with the return of more nearly normal labor conditions after the World War, portions of many bogs were rebuilt, sanded, or fertilized. The increased vine growth resulting from these changes is also believed to have favored the spread of the disease.

Another change that has apparently been important in relation to the increase in the amount of false blossom is the difference in the method of handling the water. The most favorable time for flooding to control leaf hoppers is the latter part of June, too late, perhaps, for most effective fireworm control. During the spring of 1912 there was in Massachusetts marked and disastrous injury from flooding operations designed to control the black-headed fireworm. Following this there was much interest in problems relating to water injury. The result was a natural tendency to earlier flooding, which was safer for the plants but no doubt less effective for hopper control.

NEIL E. STEVENS,
Senior Pathologist, Bureau of Plant Industry.

CREAMERY Industry in South is Solving Its Development Problems

Creameries are now established in all of the Southern States. Practically all the farmers in the South can now market their cream, either by direct delivery or by shipping to one or more of these creameries. The people of the South have progressed far beyond the point of establishing the

Quite the opposite condition exists in Massachusetts and New Jersey, where the introduction of the disease is recent and where the adjustments are proving both difficult and expensive. Vines affected with false blossom are known to have been introduced into Massachusetts from Wisconsin in 1895, 1902, 1904, and 1910. The first survey for the disease was made in 1914, and it was found to some extent on five bogs. Another survey in 1919 showed that the disease was present on several other bogs, but in most of them it appeared to be of little commercial importance. In 1924 false blossom was known on 52 bogs in Massachusetts, and in 1929 it was the outstanding cranberry disease in that State. The increase was not only in the number of bogs known to be infected but in the amount of false blossom on bogs of which there are definite records made by the same observer in 1919 and 1929.

False blossom was first discovered in New Jersey in 1915 on vines introduced from Wisconsin in 1909. There were also several introductions of the disease from Massachusetts. Even as late as 1923 it was not regarded as serious in New Jersey. By 1929, however, it was recognized as of major importance on almost all the large bogs and many smaller ones. On certain areas the crop has already been reduced 50 to 75 per cent.

All the available evidence indicates that false blossom has spread more rapidly during the last 5 to 10 years in Massachusetts and New Jersey than during any earlier period in these States or during any known period in Wisconsin. Its slower spread in Wisconsin seems to be explained by the fact that the leaf hopper which carries it is less abundant in that State than in Massachusetts or New Jersey.

Several factors have apparently combined to make the spread of false blossom more rapid during the last decade in Massachusetts and New Jersey than formerly. First among these is the tendency to plant the Howes, a susceptible variety, wherever bogs are rebuilt. About 1920 or 1921, with the return of more nearly normal labor conditions after the World War, portions of many bogs were rebuilt, sanded, or fertilized. The increased vine growth resulting from these changes is also believed to have favored the spread of the disease.

Another change that has apparently been important in relation to the increase in the amount of false blossom is the difference in the method of handling the water. The most favorable time for flooding to control leaf hoppers is the latter part of June, too late, perhaps, for most effective fireworm control. During the spring of 1912 there was in Massachusetts marked and disastrous injury from flooding operations designed to control the black-headed fireworm. Following this there was much interest in problems relating to water injury. The result was a natural tendency to earlier flooding, which was safer for the plants but no doubt less effective for hopper control.

NEIL E. STEVENS,
Senior Pathologist, Bureau of Plant Industry.

CREAMERY Industry in South is Solving Its Development Problems

Creameries are now established in all of the Southern States. Practically all the farmers in the South can now market their cream, either by direct delivery or by shipping to one or more of these creameries. The people of the South have progressed far beyond the point of establishing the fact that butter manufacturing is practical in the South, yet the progress thus far made is only a step in the direction of the possibilities that lie open for development.

Tick eradication made possible the creamery industry in the South. It was practically impossible to make any progress in creamery development while the tick scourge raged. There are yet other problems to contend with in the South that are peculiar to the region, but the greatest difficulties are those that are part of the establishment of the industry wherever it is started, difficulties which older, well-established dairy sections have met and overcome. These difficulties must be met, and some have been, and others will be met and mastered by the South.

One of the difficulties to be encountered when the creamery industry is first established is to find enough dairying in the territory covered to

FIGURE 39.—In many cases in the South, when new creameries were started in new dairy territory, the farmers wanted to be sure that the new creamery industry would succeed before they invested their money in standard creamery equipment. This picture shows a collection of miscellaneous containers at a new creamery, used by patrons during that period when they were trying to find out whether it would pay them to buy the more expensive standard cream cans

keep down to a reasonable figure the overhead costs of operating a creamery. In possibly every well-established creamery territory premature starts have been made. The South has had its share of premature starts and consequent failures; other undertakings have won out against heavy odds by intelligent efforts, persistence, and strict economy. Figure 39 illustrates the conservatism and caution that have preceded success in many communities in the South when the dairy industry was new to the people.

It is not now necessary, however, to go through the hardships of a premature start; farmers can patronize creameries already established until dairying has developed sufficiently to warrant the establishment of a creamery in their territory. Furthermore, the creameries already established can be used as a source of information and an example for anyone who wants to start a creamery in a new territory.

In spite of the fact that information may be obtained from the older creameries, and that free information and assistance, too, may be obtained from State and Federal extension services, still there are some who make starts which are bound to fail. This has proved to be the case in older dairy sections, and it has happened and will very likely continue to happen in the South.

Some Initial Difficulties

Undercapitalization is a difficulty closely allied with the premature starts. In fact, it may be possible with abundant capital to override a short period after a premature start, during which time dairying may develop and place the creamery on a paying basis.

Poorly planned, poorly constructed, and poorly equipped buildings add to the hardships of the new creamery industry. In such plants losses are incurred from unduly high costs, insanitary conditions, and wasteful machinery or machinery with which it is impossible for an operator, no matter how well trained, to apply his skill and scientific training.

Then also, creamery operators must be trained. Attempts are made to bring them from some well-established creamery section. However, the man who is skilled and capable usually has a good position at home; and many times men brought in do not have the necessary qualifications. Many, however, not only know their business and give the creamery the benefit of it, but also take a live interest in the development of the new creamery industry. They render valuable service in the establishment of creameries in the South.

Progress in the old-established creamery sections has been greatly influenced by men who have been educated in creamerymen's short courses and trained in actual creamery work. The Southern States are gradually providing short courses. Oklahoma, Mississippi, Arkansas, and Tennessee have done so. Alabama is to have a course.

Men trained and educated in their own State not only are equipped with technical knowledge, plant experience, and knowledge of the local conditions, but have an interest in their own community and State. This is an important qualification which can not always be expected from an outsider.

The conditions mentioned above are only a few of those directly affecting the creamery development and the trend of the butter manufacturing industry in the South. There are also influences of much importance which affect this industry as soon as the butter leaves the creamery and is on its way to the consumer. In the well-developed creamery sections refrigerated freight service is provided at the door of the creamery, and the butter goes under refrigeration all the way to far-off markets, a condition which did not exist in any creamery district in the early pioneering days.

Many southern creameries are shipping butter in large quantities to near and far markets without refrigeration, a large proportion of it by express at a much higher transportation rate than by freight. Only those creameries which manufacture sufficient butter to ship carload lots can avoid this difficulty of shipment without refrigeration and they are handicapped by inadequate facilities for distribution in local or near-by markets.

There are already indications of a solution to this problem in that several lots of butter from different creameries have been shipped to a point in central Tennessee and consolidated into carload lots. The

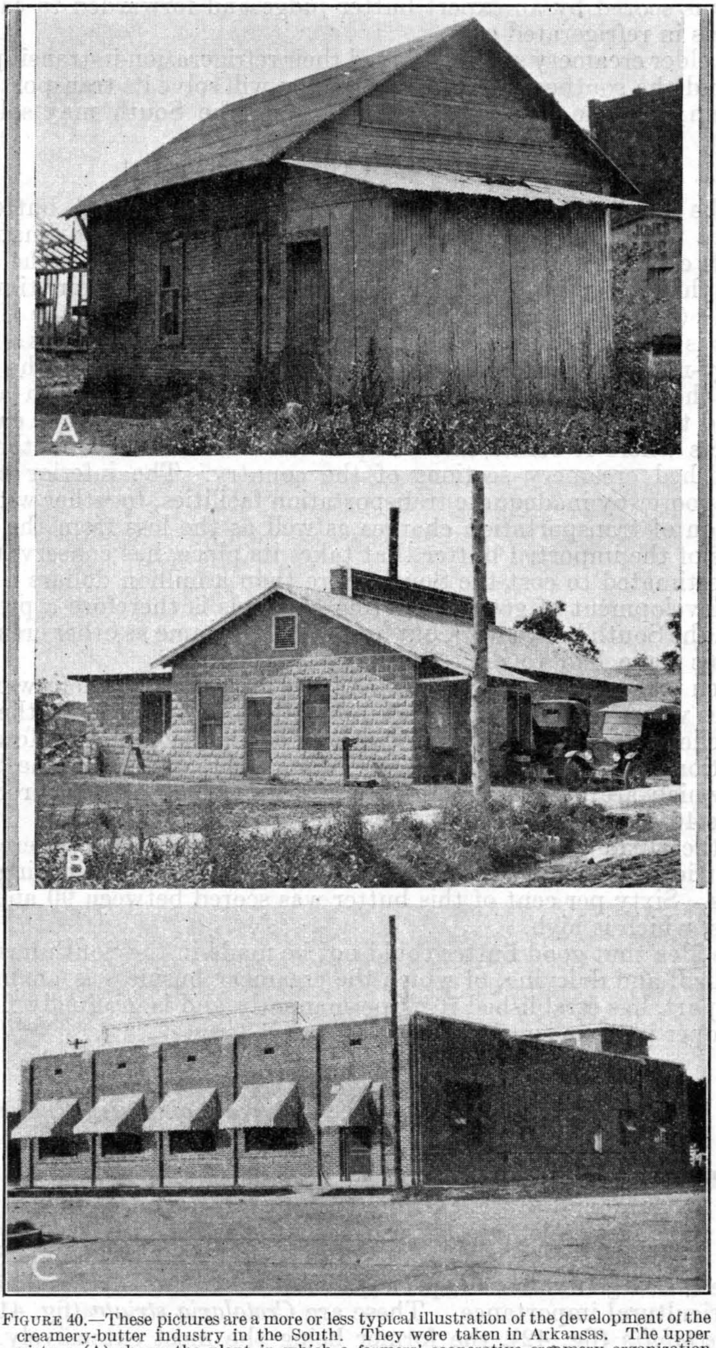


FIGURE 40.—These pictures are a more or less typical illustration of the development of the creamery-butter industry in the South. They were taken in Arkansas. The upper picture (A) shows the plant in which a farmers' cooperative creamery organization started operations in April, 1921. The middle (B) shows the plant in use in 1925–1929. The lower (C) is the plant occupied in 1929. The organization is now a stock company, and most of the stockholders are farmers, including nearly all of the original members

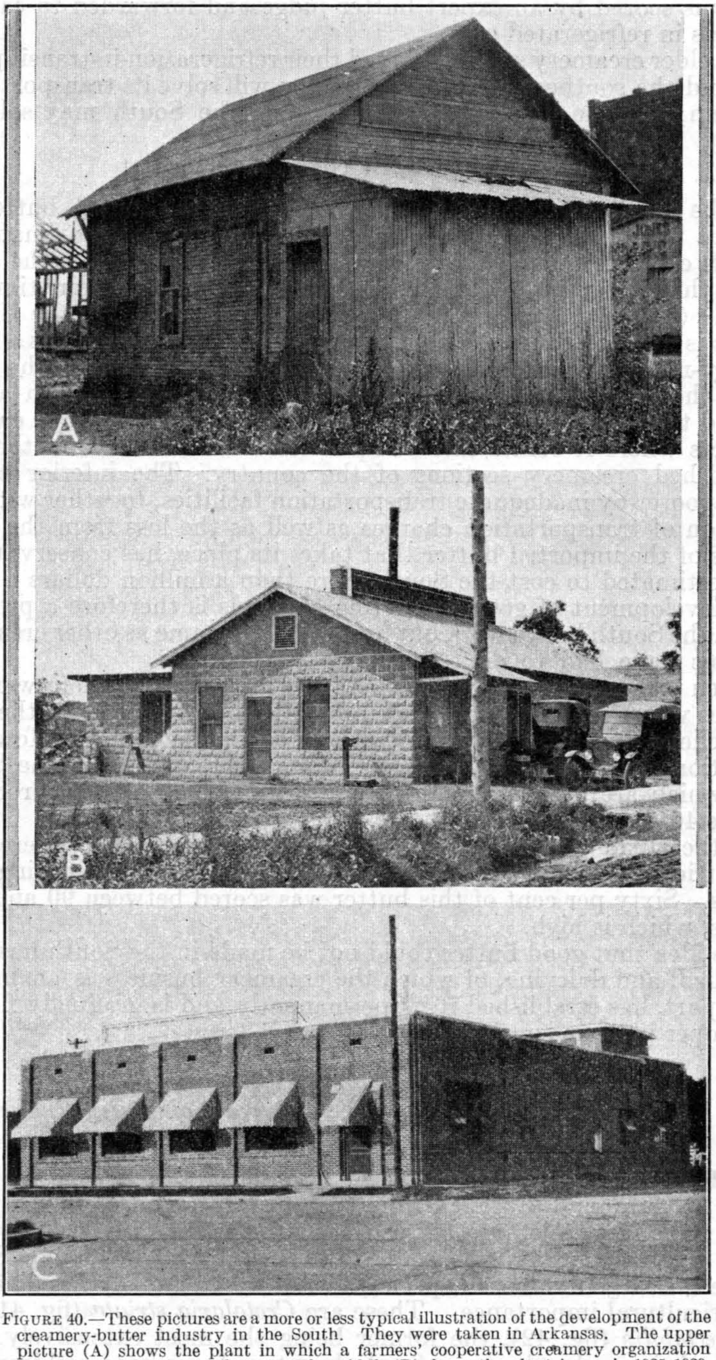


FIGURE 40.—These pictures are a more or less typical illustration of the development of the creamery-butter industry in the South. They were taken in Arkansas. The upper picture (A) shows the plant in which a farmers' cooperative creamery organization started operations in April, 1921. The middle (B) shows the plant in use in 1925–1929. The lower (C) is the plant occupied in 1929. The organization is now a stock company, and most of the stockholders are farmers, including nearly all of the original members

butter is scored by an expert butter judge and forwarded to eastern markets in refrigerated cars.

The older creamery sections solved their refrigeration-in-transit problem, and the southern creamery industry will solve its transportation problem; with the aid of modern inventions the South may solve it better.

Marketing Channels Need Development

In the South the channels for the marketing of the South's butter are not yet very well developed. The South produces approximately 3 pounds of butter per capita of its population per year. On the other hand, the consumption of butter in the South is about four times as much. (The average consumption of butter per capita in the United States is approximately 17 pounds per year.) The South has a large hungry-mouthed market at home, yet, in certain seasons of the year, when the flush is on, the channels of the marketing stream are so flooded that the southern butter runs over and into the large eastern markets where it comes into competition with butter from the old-established creamery sections of the country. The inferior butter made poorer by inadequate transportation facilities, together with the addition of transportation charges as well as the loss from the same causes of the imported butter that takes its place, has conservatively been estimated to cost the South more than a million dollars a year. The development of good marketing channels is therefore a problem which the South has to work out for itself—the same as other creamery sections have had to do.

When creameries first began operation in the South there were instances where merchants refused to handle the butter made; they did not believe that good butter could be made in the South. However, conditions have changed. There are many creameries in the South now which are doing substantial business in high-quality products. Figure 40 shows an example.

At the Dixie butter-scoring contest in September, 1930, there were 53 entries of creamery butter from 53 creameries representing nine States. Sixty per cent of this butter was scored between 90 and 93.5 points, which is high.

The idea that good butter could not be made in the South has been dispelled, and dairying, of which the creamery business is an inseparable part, has established itself permanently and is gradually finding its proper place in southern agriculture.

J. G. Winkjer,
Associate Manufacturing Specialist,
Bureau of Dairy Industry.

CROTALARIA, a New Green Manure and Forage Crop, Promises Well in South

Crotalaria, a new summer cover and green-manure crop, is proving to be especially well suited to the sandy lands of the South. There is a large number of species, two of which already have become of agricultural importance. These are *Crotalaria striata* (fig. 41) and *C. spectabilis* (fig. 42), the former being the most extensively used. So far their use has been confined almost exclusively to soil improvement, but they also give promise of being of value for forage. Both species are moderately branched, upright growing annuals, attaining a height of from 3 to 6 feet. The leaves of the two species mentioned, while comparatively large, are numerous, and the plants can well be described as leafy

Other species have been used in experimental work, and some of these give potential promise, but further work will be necessary to determine their real value.

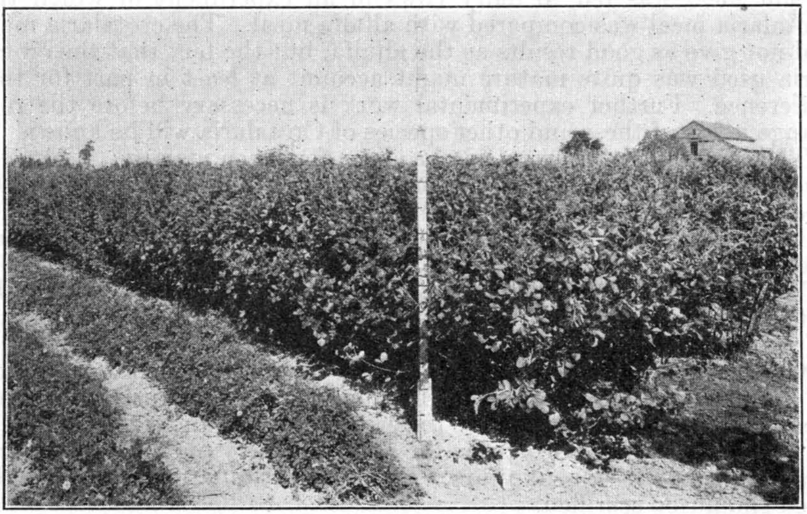


FIGURE 41.—*Crotalaria striata* planted in rows at McNeill, Miss. Plants with pods well developed

Most of the species of Crotalaria require warm climatic conditions. *C. striata* has matured seed as far north as North Carolina, while *C. spectabilis* has matured but little seed at Columbia, S. C. In 1930 the latter matured no seed at Columbia, while the former matured a heavy crop. *C. striata* matures seed farther north than *C. spectabilis*, but the latter species grows much larger in northern latitudes than the former.

FIGURE 42.—*Crotalaria spectabilis* in row plantings at McNeill, Miss. Plants in full bloom

While many Crotalaria species are native to tropical regions with heavy rainfall, none so far as tested in experimental plantings give promise of being adapted to wet or heavy soils. They make their best growth in rich sandy loam, but also do well on soils that are made up largely of sand. In the poor sandy lands of the coastal plains area of the southeastern United States, both *C. striata* and *C. spectabilis* have proved to be better adapted than the commonly cultivated crops, and it is for this region that they seem to hold the greatest promise.

Many species of Crotalaria have a bitter taste in the green state and seem to be avoided by livestock. *C. spectabilis* seems to be more palatable than *C. striata* and is eaten to some extent by stock after they have acquired a taste for it.

At the Florida Agricultural Experiment Station at Gainesville, *C. striata* meal was fed to dairy cows in an experiment in which the crotalaria meal was compared with alfalfa meal. The crotalaria meal did not give as good results as the alfalfa, but the fact that the crotalaria used was quite mature might account at least in part for this difference. Further experimental work is necessary before the real forage value of these and other species of Crotalaria will be known.

The greatest use of crotalaria has been for green manure. *C. striata* has been used most extensively in the citrus groves of Florida and *C. spectabilis* in the pecan groves.

In experimental plantings at Gainesville, Fla., greatly increased yields of corn and sweetpotatoes have followed the use of crotalaria.

While but few chemical analyses of Crotalaria have been reported, the information available indicates that it is high in protein and is similar to many other legumes in this respect.

Crotalaria seed stored under favorable conditions has a long period of viability. The percentage of hard seed is high, ordinarily ranging from 60 to 90 per cent. Where the crop is to be volunteered from year to year this is an advantage, as the seed will carry over in the soil and germinate in subsequent years. If a high germination is desired the seed should be scarified.

The organism that inoculates crotalaria seems to be present in all our soils, so that artificial inoculation is not necessary.

Commercial fertilizer has been used in experimental work to increase the yield of crotalaria, but the growth without fertilizer is sufficiently large so that probably it seldom can be used profitably.

All species of Crotalaria should be sown in the late spring. Warm weather is essential for their rapid development. For green manure or forage, seedings should be broadcast or sown in close drills, using about 15 pounds of scarified seed per acre. For seed production plantings should be in wide rows and given cultivation. Yields of seed obtained from experimental plantings have ranged from 300 to 900 pounds per acre, while forage yields have ranged from 2 to 6 tons.

Crotalaria seems to have but few enemies. All species have been immune to the root-knot nematode, and no fungous disease has done serious damage. The bella moth attacks the seed and does some damage and may be serious with further development of the crop. No method of control is known. Another insect, the pumpkin bug, feeds upon the green pods of crotalaria, but does little damage to the crop. Trouble may be encountered, however, when crotalaria is used in citrus orchards. The pumpkin bug, which is harbored by crotalaria when in the green-pod stage, may attack the citrus fruit if for any reason the crotalaria is destroyed after the pumpkin bugs have become numerous. To cut the crotalaria in the citrus groves before it comes into pod is therefore essential.

Aside from their use as field crops, several species of Crotalaria have ornamental value and can be used for both cut flowers or to beautify the out of doors. *C. spectabilis*, *C. retusa*, and *C. usaramoensis* are especially well suited for this purpose.

Roland McKee,
Senior Agronomist, Bureau of Plant Industry.

DAIRY-BULL Associations Increasing and Building Up Herds' Production Cooperative dairy-bull associations are organized by farmers for the purpose of jointly owning, using, and exchanging meritorious purebred dairy bulls. The typical association consists of at least five divisions, called blocks. Each block has one or more members, and one bull is assigned to each block.

To prevent inbreeding, each bull is moved to the next block every two years. If there are five blocks and all the bulls live until they have made one complete circuit, new bulls need not be purchased for 10 years. This systematic exchange of bulls makes it possible for a dairyman with a small or medium-sized herd to have the use of several good purebred bulls for a number of years, at a cost amounting to only a small part of the cost of one good bull. As the purchase price of the bulls and the cost of maintaining them are prorated according to the

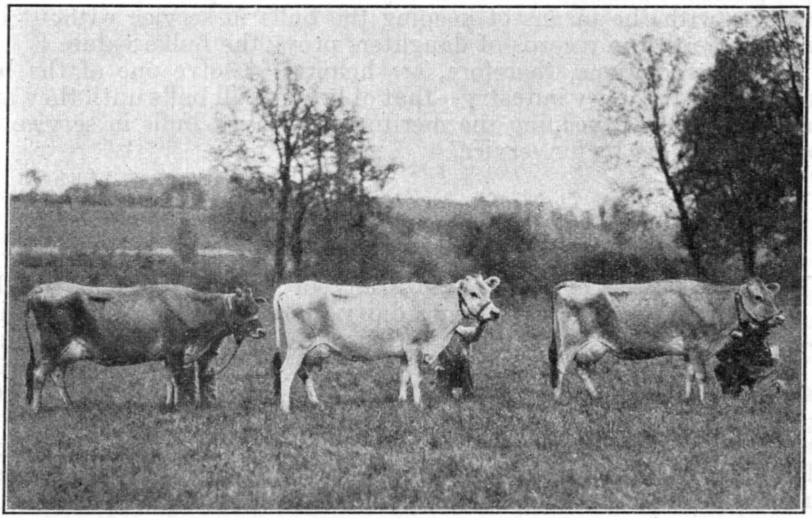


FIGURE 43.—Daughters of three bull-association bulls. Each of these daughters has produced more than 500 pounds of butterfat in one year

number of cows owned by the member, it oftentimes costs a member less to own a share in a number of good purebred bulls than to own one scrub or grade bull with himself as the sole owner. Bull associations are finding favor among not only the owners of small and medium sized herds but also the owners of the larger herds.

Growth of Associations

The first cooperative bull association in the United States was organized in Michigan in 1908. Since then the number of associations has grown steadily, until on January 1, 1930, there were 296 active associations in 26 States, with a membership of 6,930 dairymen owning 44,578 cows, and jointly owning 1,280 purebred dairy bulls.

The only way to determine whether bull associations are accomplishing the purpose for which they were organized, namely, the building of better dairy herds, is by comparing the yearly records of the daughters of the bulls with the yearly records of the dams of the daughters. On

June 30, 1930, the Bureau of Dairy Industry had compared the yearly records of 583 daughters of 72 bull-association bulls, with the records of their dams. Before doing this the records of all immature cows were figured to maturity. The dams produced, on an average, 9,602 pounds of milk and 383 pounds of butterfat. The daughters produced, on an average, 10,047 pounds of milk and 413 pounds of butterfat. The daughters produced 445 pounds of milk and 30 pounds of butterfat more than their dams, which were themselves high producers. This higher production of daughters over such high-producing dams is convincing evidence that the bull associations are helping to build better dairy herds. Figure 43 shows daughters of three bull-association bulls. Each of these daughters has produced more than 500 pounds of butterfat in a year, which was more than their respective dams ever produced.

Bull associations provide farmers not only with the service of high-class purebred bulls for a number of years at a comparatively low cost, but also with the means of keeping the bulls in service without inbreeding until the records of daughters prove the bull's value.

These associations, therefore, are helping to solve one of the big problems of the dairy industry—that of keeping all bulls until they are proved, and then keeping the meritorious proved bulls in service as long as they are fit for service.

W. E. Wintermeyer,
Associate Dairy Husbandman, Bureau of Dairy Industry.

DAIRY Bulls Proved by Herd Associations Often Fall Below Requirements Many of the proved bulls in the dairy herd-improvement associations are not increasing the production of the herds in which they are used. Up to June 30, 1930 the Bureau of Dairy Industry had proved 1,100 bulls, by comparing the yearly milk and butterfat records of five or more unselected daughters of each bull with the records of the dams of the daughters. Table 3 shows the influence which 1,000 of these proved bulls have had on the herds in which they were used.

Table 3.—*Bulls grouped according to gain or loss in butterfat of daughters as compared with dams of daughters*

Sires	Gain or loss in butterfat production
Number	*Pounds*
366	−248 to −1
7	0 to 0
313	+1 to +53
314	+54 to +324

According to Table 3, about one-third of the bulls sired daughters whose butterfat production was less than that of their dams, about one-third sired daughters with a butterfat production very little more than that of their dams, and the other third sired daughters producing considerably more butterfat than their dams.

Table 4 gives the records of two of the bulls proved. These bulls were purebreds of the same breed. Each bull had 10 daughters whose yearly production records were compared with the records of their

June 30, 1930, the Bureau of Dairy Industry had compared the yearly records of 583 daughters of 72 bull-association bulls, with the records of their dams. Before doing this the records of all immature cows were figured to maturity. The dams produced, on an average, 9,602 pounds of milk and 383 pounds of butterfat. The daughters produced, on an average, 10,047 pounds of milk and 413 pounds of butterfat. The daughters produced 445 pounds of milk and 30 pounds of butterfat more than their dams, which were themselves high producers. This higher production of daughters over such high-producing dams is convincing evidence that the bull associations are helping to build better dairy herds. Figure 43 shows daughters of three bull-association bulls. Each of these daughters has produced more than 500 pounds of butterfat in a year, which was more than their respective dams ever produced.

Bull associations provide farmers not only with the service of high-class purebred bulls for a number of years at a comparatively low cost, but also with the means of keeping the bulls in service without inbreeding until the records of daughters prove the bull's value.

These associations, therefore, are helping to solve one of the big problems of the dairy industry—that of keeping all bulls until they are proved, and then keeping the meritorious proved bulls in service as long as they are fit for service.

W. E. WINTERMEYER,
Associate Dairy Husbandman, Bureau of Dairy Industry.

DAIRY Bulls Proved by Herd Associations Often Fall Below Requirements Many of the proved bulls in the dairy herd-improvement associations are not increasing the production of the herds in which they are used. Up to June 30, 1930 the Bureau of Dairy Industry had proved 1,100 bulls, by comparing the yearly milk and butterfat records of five or more unselected daughters of each bull with the records of the dams of the daughters. Table 3 shows the influence which 1,000 of these proved bulls have had on the herds in which they were used.

TABLE 3.—*Bulls grouped according to gain or loss in butterfat of daughters as compared with dams of daughters*

Sires	Gain or loss in butterfat production
Number	*Pounds*
366	−248 to −1
7	0 to 0
313	+1 to +53
314	+54 to +324

According to Table 3, about one-third of the bulls sired daughters whose butterfat production was less than that of their dams, about one-third sired daughters with a butterfat production very little more than that of their dams, and the other third sired daughters producing considerably more butterfat than their dams.

Table 4 gives the records of two of the bulls proved. These bulls were purebreds of the same breed. Each bull had 10 daughters whose yearly production records were compared with the records of their dams. The daughters of bull A (fig. 44) averaged 114 pounds of butterfat per year more than their dams, whereas the daughters of bull B averaged 50 pounds of butterfat per year less than their dams. There is a big difference, even in dairy bulls of the same breed.

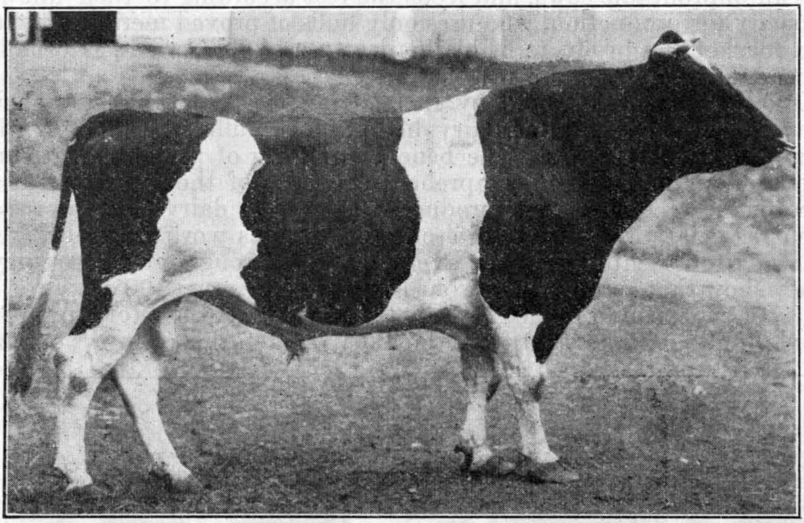


FIGURE 44.—A proved bull whose 10 daughters averaged 114 pounds more butterfat per year than their dams

Individual Bulls

Table 4 gives the records of two of the bulls proved.

TABLE 4.—*Records of two bulls proved in dairy herd-improvement associations*

Sire A		Sire B	
Butterfat production of—		Butterfat production of—	
Dam	Daughter	Dam	Daughter
Pounds	*Pounds*	*Pounds*	*Pounds*
423.9	710.6	359	300
426.9	681.0	486	470
508.6	592.0	426	338
451.6	561.0	537	361
410.8	540.0	517	571
410.8	502.0	537	428
434.0	479.5	426	509
349.1	463.0	396	299
459.0	461.6	549	329
359.8	399.7	231	356
[1] 424	[1] 538	[1] 446	[1] 396

[1] Average.

The study of the bulls that are being proved in dairy herd-improvement associations indicates that if the average production of the cows in these associations is to be increased or even maintained, only those bulls can be depended upon to do this which have already sired a number of daughters that excel or equal high-producing dairy cows.

W. E. WINTERMEYER,
Associate Dairy Husbandman, Bureau of Dairy Industry.

DAIRY-COW Culling Often Profitable in Herds of High-Average Production Success in dairy farming depends primarily upon four things: Culling, feeding, breeding, and marketing. The dairyman who culls out all unprofitable cows, and feeds the rest according to their known capacity for production, who uses only bulls of proved merit, and who can market the products of his herd at reasonable prices, is usually successful or well on the way toward success.

Investigations conducted by the Bureau of Dairy Industry show that in most commercial dairy herds, close culling should greatly increase the net profits. The beneficial effects of proper culling are brought out in a recent comprehensive study of the individual cow records in herds of average production on test in dairy herd-improvement associations. The results obtained in this work may be taken as being representative of the average herds throughout the country. They show that culling out the one lowest producer per 100 dairy cows, or 1 per cent, would reduce by only 0.4 of 1 per cent the total production of milk and butterfat from the dairy cows in this country; culling

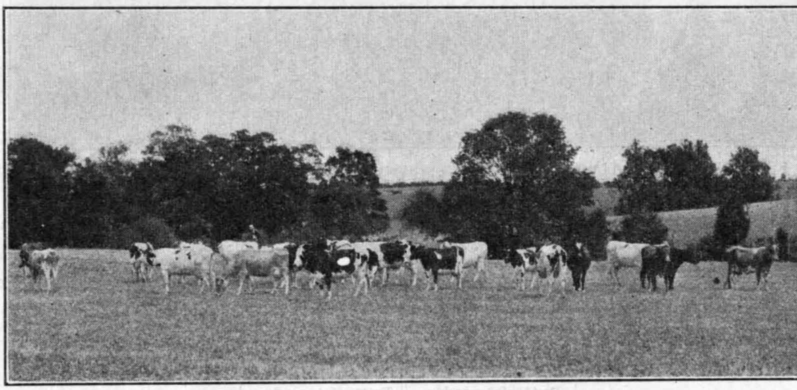


FIGURE 45.—Dairy herd in the Fairfax Dairy Herd-Improvement Association, Fairfax, Va. This herd has been so improved by close culling that the lowest producer in 1929 yielded as much as 5,958 pounds of milk containing 309.1 pounds of butterfat

out the lowest-producing 3 per cent of the cows would eliminate approximately 1 per cent of the total production; and culling out 10 per cent would eliminate only about 5 per cent of the total production.

The 10 per cent that were culled out in the herd-improvement tests averaged only 96 pounds of butterfat per cow, which is too low a production for profit. The owner of a commercial dairy herd of average production can well afford to cull out the lowest-producing 10 per cent of his cows. There are a few very high-producing herds in which the lowest producers exceed 300 to 400 pounds of butterfat annually. (Fig. 45.) Such herds are usually profitable and require little or no culling. On the other hand there are many low-producing herds which have no cows that produce more than 200 pounds of butterfat a year. With a herd made up of such low producers it might be well to sell the whole herd, buy some good cows, and start a new herd.

Closer culling might pay even in purebred dairy herds. The lowest-producing 10 per cent of the mature registered Guernseys, Jerseys, and Holsteins on test in 1928 averaged 170 pounds of butterfat per cow. The average income over cost of feed for the lowest-producing 10 per cent of the registered cows of these three breeds was only $50 per cow.

Certainly that is too low an income above cost of feed for a mature registered dairy cow.

In 10 typical herds of 20 cows each, the lowest-producing cows in each herd were compared with the highest producers in the same herd. On an average, the two lowest producers both gave less milk and butterfat than the one highest producer in the same herd. The two lowest producers together ate approximately 50 per cent more feed than the one highest producer, yet she excelled them by 62 per cent in production. In fact, it required the three lowest producers to bring in as much income above the cost of feed as was brought in by the one highest producer. If it be assumed that there is no net profit from a cow until she returns $2 for each dollar spent for feed, the highest-producing cow in the 20-cow herd brought in more net profit than the seven lowest producers in the same herd.

In herds smaller than 20 cows there would normally be less difference between the lowest and the highest producing cows, but even in herds as small as 10 cows there is a wide spread between the production and income from the lowest producer in the herd as compared with the production and income from the highest producer.

These figures indicate that even in most dairy herd-improvement associations, closer culling would generally increase the net profits. If the best cow in the herd produces more milk and butterfat than the two poorest cows, and brings in more income over cost of feed than the three poorest cows, it seems clear that it would pay the dairyman to replace the three poorest cows with one high producer, thereby culling the herd at the bottom and building it up at the top.

Culling, therefore, should be accompanied by buying better cows, and also by better breeding, in order that improvement may be progressive and permanent. Although culling will raise the quality of nearly any dairy herd and increase its production per cow, for continuous improvement good sires must be used.

Good feeding, too, is very important. After the lowest producers are culled out, the improved herd should usually have more feed per cow than the original herd. Large producers are always large eaters, but they require less feed per pound of milk or butterfat produced. A very good slogan for the dairy farm may be expressed in these words: "Breed the best, feed the best, keep the best, and cull the rest."

J. C. McDowell,
Senior Dairy Husbandman, Bureau of Dairy Industry.

DAIRY Earnings Larger if Cream Is Marketed While Fresh and Sweet The aggregate loss of income to creamery patrons through deterioration in the quality of cream before it reaches the creamery amounts to an enormous amount of money. The earnings of many dairy herds can be increased by using the best methods of producing and caring for cream and marketing it fresh and sweet. A farmer who owns 10 cows may receive more money for his cream, if it is of good quality, than a neighbor who owns 11 cows and delivers cream of poor quality, if the average production of the cows in both herds is the same. High-quality cream from 10 cows will return more profit than low-quality cream from 11 cows, when both products are sold to a creamery that pays for cream on a basis of the grade of butter that can be made from it, if the

Certainly that is too low an income above cost of feed for a mature registered dairy cow.

In 10 typical herds of 20 cows each, the lowest-producing cows in each herd were compared with the highest producers in the same herd. On an average, the two lowest producers both gave less milk and butterfat than the one highest producer in the same herd. The two lowest producers together ate approximately 50 per cent more feed than the one highest producer, yet she excelled them by 62 per cent in production. In fact, it required the three lowest producers to bring in as much income above the cost of feed as was brought in by the one highest producer. If it be assumed that there is no net profit from a cow until she returns $2 for each dollar spent for feed, the highest-producing cow in the 20-cow herd brought in more net profit than the seven lowest producers in the same herd.

In herds smaller than 20 cows there would normally be less difference between the lowest and the highest producing cows, but even in herds as small as 10 cows there is a wide spread between the production and income from the lowest producer in the herd as compared with the production and income from the highest producer.

These figures indicate that even in most dairy herd-improvement associations, closer culling would generally increase the net profits. If the best cow in the herd produces more milk and butterfat than the two poorest cows, and brings in more income over cost of feed than the three poorest cows, it seems clear that it would pay the dairyman to replace the three poorest cows with one high producer, thereby culling the herd at the bottom and building it up at the top.

Culling, therefore, should be accompanied by buying better cows, and also by better breeding, in order that improvement may be progressive and permanent. Although culling will raise the quality of nearly any dairy herd and increase its production per cow, for continuous improvement good sires must be used.

Good feeding, too, is very important. After the lowest producers are culled out, the improved herd should usually have more feed per cow than the original herd. Large producers are always large eaters, but they require less feed per pound of milk or butterfat produced. A very good slogan for the dairy farm may be expressed in these words: "Breed the best, feed the best, keep the best, and cull the rest."

J. C. McDowell,
Senior Dairy Husbandman, Bureau of Dairy Industry.

DAIRY Earnings Larger if Cream Is Marketed While Fresh and Sweet

The aggregate loss of income to creamery patrons through deterioration in the quality of cream before it reaches the creamery amounts to an enormous amount of money. The earnings of many dairy herds can be increased by using the best methods of producing and caring for cream and marketing it fresh and sweet. A farmer who owns 10 cows may receive more money for his cream, if it is of good quality, than a neighbor who owns 11 cows and delivers cream of poor quality, if the average production of the cows in both herds is the same. High-quality cream from 10 cows will return more profit than low-quality cream from 11 cows, when both products are sold to a creamery that pays for cream on a basis of the grade of butter that can be made from it, if the per-cow production of the two herds is the same. If this fact were more generally realized by creamery patrons, many of them would be making more money from their cows and more creameries would be paying for cream on a quality basis.

The average wholesale price of high-quality butter (93 score) on the New York market for the three years 1927, 1928, and 1929, was 47.5 cents a pound. The average price of low-quality butter (88 score) was 43 cents, a difference of 4.5 cents a pound.

Ten cows producing an average of 200 pounds of butterfat a year, selling at the high-quality price of 47.5 cents a pound, would return $950. Eleven cows averaging 200 pounds of butterfat, selling at the low-quality price of 43 cents a pound would return $946.

For cream to bring the higher price, it must be delivered at the creamery fresh, sweet, and fine in flavor. This requires cleanliness of cows and utensils; cooling the cream promptly and keeping it cold; and frequent delivery of the cream, that is, four times a week if the cream is kept cold on the farm, or daily if necessary. These items involve a certain amount of labor and labor is an item of expense.

But if selling cream at the low-quality price necessitates keeping an extra cow in order to get the same income, this requires an investment of money to buy one more cow. It also requires additional barn space, additional labor to clean and feed one more cow, additional labor for milking, additional time and labor to separate the milk, and, above all, additional feed.

The expense incurred in keeping that eleventh cow is greater than the expense involved in the delivery of fresh, sweet cream from 10 cows.

Many cream producers may find that this does not apply to them because they live too far from a creamery, or do not produce much cream, or do not have cold water for keeping the cream sweet—conditions which make it impracticable for them to deliver cream in sweet condition. However, many small cream producers can make more effective use of the cooling water available. They can cooperate with their neighbors in hauling cream to the creamery or can organize a cream-gathering route. Such a route can usually be operated profitably when a truck load of cream can be picked up at the rate of not less than 8 pounds of butterfat per mile traveled.

In many communities the delivery of cream in sweet and fresh condition can be effected by the exercise of initiative, energy, and cooperation.

WILLIAM WHITE,
Senior Manufacturing Specialist,
Bureau of Dairy Industry.

DAIRY Records Indicate Needed Margin Between Costs and Production Culling out unprofitable cows from the dairy herd is a problem that confronts every progressive dairy farmer. In order to cull intelligently, the dairyman must, of course, take into consideration the production of the cow, the cost of feed, labor, and overhead and the selling price of the product.

Feed cost, for the average dairy cow, is about 50 per cent of the total cost of milk production. The ratio of cost of feed to total cost varies considerably, however, in different sections of the country. A cow whose production might be too low to make her profitable in one per-cow production of the two herds is the same. If this fact were more generally realized by creamery patrons, many of them would be making more money from their cows and more creameries would be paying for cream on a quality basis.

The average wholesale price of high-quality butter (93 score) on the New York market for the three years 1927, 1928, and 1929, was 47.5 cents a pound. The average price of low-quality butter (88 score) was 43 cents, a difference of 4.5 cents a pound.

Ten cows producing an average of 200 pounds of butterfat a year, selling at the high-quality price of 47.5 cents a pound, would return $950. Eleven cows averaging 200 pounds of butterfat, selling at the low-quality price of 43 cents a pound would return $946.

For cream to bring the higher price, it must be delivered at the creamery fresh, sweet, and fine in flavor. This requires cleanliness of cows and utensils; cooling the cream promptly and keeping it cold; and frequent delivery of the cream, that is, four times a week if the cream is kept cold on the farm, or daily if necessary. These items involve a certain amount of labor and labor is an item of expense.

But if selling cream at the low-quality price necessitates keeping an extra cow in order to get the same income, this requires an investment of money to buy one more cow. It also requires additional barn space, additional labor to clean and feed one more cow, additional labor for milking, additional time and labor to separate the milk, and, above all, additional feed.

The expense incurred in keeping that eleventh cow is greater than the expense involved in the delivery of fresh, sweet cream from 10 cows.

Many cream producers may find that this does not apply to them because they live too far from a creamery, or do not produce much cream, or do not have cold water for keeping the cream sweet—conditions which make it impracticable for them to deliver cream in sweet condition. However, many small cream producers can make more effective use of the cooling water available. They can cooperate with their neighbors in hauling cream to the creamery or can organize a cream-gathering route. Such a route can usually be operated profitably when a truck load of cream can be picked up at the rate of not less than 8 pounds of butterfat per mile traveled.

In many communities the delivery of cream in sweet and fresh condition can be effected by the exercise of initiative, energy, and cooperation.

William White,
Senior Manufacturing Specialist,
Bureau of Dairy Industry.

Dairy Records Indicate Needed Margin Between Costs and Production

Culling out unprofitable cows from the dairy herd is a problem that confronts every progressive dairy farmer. In order to cull intelligently, the dairyman must, of course, take into consideration the production of the cow, the cost of feed, labor, and overhead and the selling price of the product.

Feed cost, for the average dairy cow, is about 50 per cent of the total cost of milk production. The ratio of cost of feed to total cost varies considerably, however, in different sections of the country. A cow whose production might be too low to make her profitable in one section might furnish an excellent market outlet for feed in another section where good roughage is grown and where other market outlets are not available.

Although, on an average, the expense for labor and overhead about equals the cost of feed, these items may be considerably below the average for farms where family labor is utilized and for farms located in a section of low-priced land.

When the price of butterfat goes down, the production per cow must go up, if a satisfactory profit is to be made. Assuming that it costs $90 a year to feed a dairy cow, the cow that is producing only 180 pounds of butterfat a year is just paying for her feed if the butterfat is bringing 50 cents a pound. If the butterfat sells for 45 cents a pound a cow must produce 200 pounds of butterfat to pay for her feed. And if butterfat is selling at 36 cents she must produce 250 pounds; and if at 30 cents, she must produce 300 pounds.

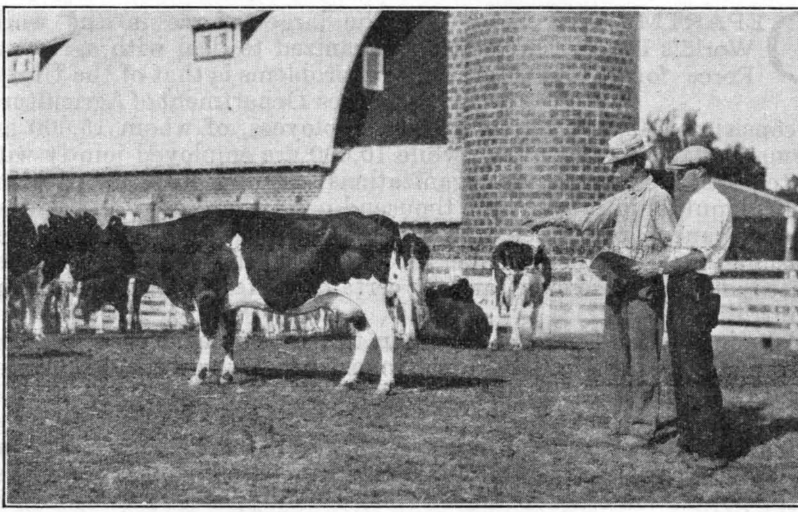


FIGURE 46.—Tester and dairyman looking over herd in barnyard

The records of more than 200,000 cows tabulated by the Bureau of Dairy Industry in 1928 show that, on the average, the dairy herd-improvement association cows returned a good profit over all items of expense. Table 5 shows the 1928 records of the average dairy herd-improvement association cow and the records of three lower-producing cows taken at random from a report.

TABLE 5.—*Average dairy herd-improvement association cow compared with three lower-producing cows*

Cow	Milk	Butterfat	Value of product	Feed cost	Income returned over cost of feed
	Pounds	*Pounds*			
A[1]	7,464	295	$193.00	$77.00	$116.00
B	5,400	216	140.40	70.20	70.20
C	4,000	160	104.00	64.00	40.00
D	3,000	100	65.00	65.00	

[1] Average of 200,000 cows.

The average dairy herd-improvement association cow paid her feed bill of $77, which may be estimated as half of the total cost of production, with a balance of $116 over the cost of feed. The cow B paid for her feed, $70.20, with an equal amount above that for labor and overhead. The cow C, although she returned $40 over her feed costs, which were $64, was not profitable unless the labor and overhead expenses were considerably below the average. There is no question about the cow D being a good example of a cull cow.

Almost every dairy herd in the country would be benefited by culling out the lowest producers. Intelligent culling, however, requires good judgment and a thorough knowledge of the production records and of the feed requirements of the individual cow.

J. E. Dorman,
Senior Dairy Husbandman, Bureau of Dairy Industry.

DEPARTMENT'S Staff Is World's Largest Organized Force for Aiding Farmer

The largest force in the world organized to deal with agricultural problems is that of the United States Department of Agriculture. It consists of approximately 25,000 employees, of whom 15,000 are permanent full-time workers, while 10,000 are employed jointly with State governments or civic organizations to study problems in which there is mutual interest. Five thousand persons or about one-third of the permanent personnel of the department have headquarters in Washington; the other members are stationed throughout the United States and its possessions and at certain strategic points in foreign countries.

Appointments of persons to aid in the development of agriculture were made by the United States Government as early as 1839 when Congress appropriated $1,000 for the purpose. From a nucleus of a few persons working under the jurisdiction of the Commissioner of Patents, the agricultural staff of the Federal Government has grown until at the present time its 25,000 members equal what is recognized as the population of a substantial American city, such as Concord, the capital of New Hampshire. The staff exceeds the population of approximately 16,000 cities in this country. In Washington alone, it occupies the whole or a part of more than 57 buildings in various sections of the city. Its annual pay roll is approximately $36,000,000.

The personnel of the department is selected through established civil service procedure. Carefully standardized assembled examinations conducted by the Civil Service Commission are the rule, but applicants for scientific positions are not usually required to assemble at a given place but are rated on education, training and experience, and on an original thesis. In line with the movement for improving the technic of employment, the commission in special cases—that of bureau chief, for instance—gives an oral examination or personal interview. From the list of eligibles thus obtained the department selects those it considers best qualified to fill the vacancies.

Education and Training of Staff

The education and training of the members of the department staff show wide variations. Some individuals have as many as six degrees from accredited colleges, whereas others have training acquired through practical experience and perhaps only a grade-school educa-

The average dairy herd-improvement association cow paid her feed bill of $77, which may be estimated as half of the total cost of production, with a balance of $116 over the cost of feed. The cow B paid for her feed, $70.20, with an equal amount above that for labor and overhead. The cow C, although she returned $40 over her feed costs, which were $64, was not profitable unless the labor and overhead expenses were considerably below the average. There is no question about the cow D being a good example of a cull cow.

Almost every dairy herd in the country would be benefited by culling out the lowest producers. Intelligent culling, however, requires good judgment and a thorough knowledge of the production records and of the feed requirements of the individual cow.

J. E. Dorman,
Senior Dairy Husbandman, Bureau of Dairy Industry.

DEPARTMENT'S Staff Is World's Largest Organized Force for Aiding Farmer

The largest force in the world organized to deal with agricultural problems is that of the United States Department of Agriculture. It consists of approximately 25,000 employees, of whom 15,000 are permanent full-time workers, while 10,000 are employed jointly with State governments or civic organizations to study problems in which there is mutual interest. Five thousand persons or about one-third of the permanent personnel of the department have headquarters in Washington; the other members are stationed throughout the United States and its possessions and at certain strategic points in foreign countries.

Appointments of persons to aid in the development of agriculture were made by the United States Government as early as 1839 when Congress appropriated $1,000 for the purpose. From a nucleus of a few persons working under the jurisdiction of the Commissioner of Patents, the agricultural staff of the Federal Government has grown until at the present time its 25,000 members equal what is recognized as the population of a substantial American city, such as Concord, the capital of New Hampshire. The staff exceeds the population of approximately 16,000 cities in this country. In Washington alone, it occupies the whole or a part of more than 57 buildings in various sections of the city. Its annual pay roll is approximately $36,000,000.

The personnel of the department is selected through established civil service procedure. Carefully standardized assembled examinations conducted by the Civil Service Commission are the rule, but applicants for scientific positions are not usually required to assemble at a given place but are rated on education, training and experience, and on an original thesis. In line with the movement for improving the technic of employment, the commission in special cases—that of bureau chief, for instance—gives an oral examination or personal interview. From the list of eligibles thus obtained the department selects those it considers best qualified to fill the vacancies.

Education and Training of Staff

The education and training of the members of the department staff show wide variations. Some individuals have as many as six degrees from accredited colleges, whereas others have training acquired through practical experience and perhaps only a grade-school education. Some combine both the higher education and the practical experience. Of the permanent full-time personnel of 15,000, over two-thirds had scientific or technical training before they came to the department. Among this number are included many outstanding scientists and economists.

The highly trained workers furnish the leadership that is essential to the conduct of the department's program. Under their direction less adequately trained workers carry on investigations and experiments, thus acquiring experience which leads toward advancement. It is from the ranks of well-trained assistants that the future leaders of agriculture are recruited.

Advancement within the department comes through the assumption and discharge of increased responsibilities. Continued education and increasing familiarity with technical details of the work point the way for those in the lower grades, to an improved status. The department has a number of outstanding illustrations of gradual advancement of its members from some of the lowest positions to positions of responsibility and leadership.

To stimulate its workers to increased effort to obtain advanced training, the department in 1921 organized what is known as the Graduate School of Agriculture. Undergraduate as well as graduate courses are given by department scientists and economists, most of whom have had teaching experience in at least one of our leading agricultural colleges. Classes meet in department buildings for regular periods immediately after office hours, but individual work on definite problems is frequently done by adequately prepared students under supervision in the research laboratories. That department workers avail themselves of the opportunity for advanced training at nominal expense is shown by the fact that in the nine years the school has been functioning 1,633 have registered for the courses offered. The result has been not only a higher morale among these workers but a marked increase in their efficiency.

All positions in the department are classified in accordance with the salary classification act of 1923 and amendments. The duties of each position are carefully evaluated and the position is allocated to an appropriate grade. The distinction between grades is based upon differences in the importance, difficulty, responsibility, and value of the work. As in other Government departments, the rates of compensation, hours of work, leave of absence for sickness or for play, and retirement annuities are determined by law.

The staff of the department may be grouped roughly into five classes: (1) Research, (2) service and regulatory, (3) educational and informational, (4) administrative and clerical, and (5) mechanical.

Workers engaged in fundamental research are responsible for the increase of scientific knowledge. These are the chemists, biologists, physicists, entomologists, and other scientists, and economists who pave the way for much of the practical work carried on by the department.

The second group puts the scientific knowledge into practice. These workers develop and carry on the many and varied economic services, such as crop, market, and weather reporting, and they administer approximately 50 regulatory laws among which the meat inspection act, the plant and animal quarantine laws, the food and drugs act, and the commodity standards acts are perhaps best known.

The third group assists in making available the results of all the department's activities. Through the press, bulletins, periodicals, motion pictures, exhibits, and radio, timely information is disseminated to the public, and by personal contacts in the States the information is carried direct to the individual farm and home.

The fourth group is made up of business executives, clerks, technicians, and accountants who perform work commonly associated with the conduct of any business.

In the fifth group are the artisans trained in some mechanical art or trade. They are the workers such as are found in the department's shops, where exhibits are prepared for display at fairs and where scientific or mechanical equipment is made or repaired. They also are the gardeners and other skilled workers at the experimental greenhouses and at the six experimental farms near Washington.

Much is frequently written about the head of a department or a bureau, or of a famous scientist or economist, but often too little credit is given to the painstaking, efficient endeavor of the well-trained laboratory or office assistant. These workers compile and correlate much of the data upon which conclusions are drawn, and upon the individual's efficiency, therefore, depend in large measure the accuracy and timeliness of many reports.

Opportunity for Public Service

Opportunity for public service is responsible for holding many workers in the department against flattering offers from other institutions and commercial businesses. Many of the men and women of the department are interested primarily in their work. Because of this spirit, their capacity for serving the Nation appears to be unlimited.

For the servants of agriculture, no piece of work is too large to tackle nor too small to be overlooked. The inauguration of the several national services now conducted by the department, such as aid in Federal road construction, conservation of timber resources, and conservation and control of bird and wild animal life, are examples of tremendous undertakings which the vision, planning, and industry of the workers have brought to the present successful basis of operation. On the other hand, the invention of a small implement, perhaps a simple piece of work in itself, often improves a farm practice that has stood for years.

Whether in research, or service, or in the application of both, each worker contributes his part to the building of a permanent agriculture. Workers come together in the department for the performance of a task difficult of accomplishment by other than a thoroughly unified, well-managed, efficient organization. These hired servants are sowing for a harvest to be reaped by the Nation in the form of a better agriculture.

F. J. Hughes,
Business Manager, Bureau of Agricultural Economics.
W. W. Stockberger,
Director, Personnel and Business Administration.

DISINFECTANT'S Action Depends on Conditions in Which It Is Used

Most persons seem to think that a disinfectant acts in some magic way, and that all that is necessary to do is to apply it and all will be well. Practically everyone knows that disinfectants have something to do with controlling or killing germ life. But how many people know motion pictures, exhibits, and radio, timely information is disseminated to the public, and by personal contacts in the States the information is carried direct to the individual farm and home.

The fourth group is made up of business executives, clerks, technicians, and accountants who perform work commonly associated with the conduct of any business.

In the fifth group are the artisans trained in some mechanical art or trade. They are the workers such as are found in the department's shops, where exhibits are prepared for display at fairs and where scientific or mechanical equipment is made or repaired. They also are the gardeners and other skilled workers at the experimental greenhouses and at the six experimental farms near Washington.

Much is frequently written about the head of a department or a bureau, or of a famous scientist or economist, but often too little credit is given to the painstaking, efficient endeavor of the well-trained laboratory or office assistant. These workers compile and correlate much of the data upon which conclusions are drawn, and upon the individual's efficiency, therefore, depend in large measure the accuracy and timeliness of many reports.

Opportunity for Public Service

Opportunity for public service is responsible for holding many workers in the department against flattering offers from other institutions and commercial businesses. Many of the men and women of the department are interested primarily in their work. Because of this spirit, their capacity for serving the Nation appears to be unlimited.

For the servants of agriculture, no piece of work is too large to tackle nor too small to be overlooked. The inauguration of the several national services now conducted by the department, such as aid in Federal road construction, conservation of timber resources, and conservation and control of bird and wild animal life, are examples of tremendous undertakings which the vision, planning, and industry of the workers have brought to the present successful basis of operation. On the other hand, the invention of a small implement, perhaps a simple piece of work in itself, often improves a farm practice that has stood for years.

Whether in research, or service, or in the application of both, each worker contributes his part to the building of a permanent agriculture. Workers come together in the department for the performance of a task difficult of accomplishment by other than a thoroughly unified, well-managed, efficient organization. These hired servants are sowing for a harvest to be reaped by the Nation in the form of a better agriculture.

F. J. Hughes,
Business Manager, Bureau of Agricultural Economics.
W. W. Stockberger,
Director, Personnel and Business Administration.

DISINFECTANT'S Action Depends on Conditions in Which It Is Used

Most persons seem to think that a disinfectant acts in some magic way, and that all that is necessary to do is to apply it and all will be well. Practically everyone knows that disinfectants have something to do with controlling or killing germ life. But how many people know anything about the scientific facts behind the use of disinfectants; and how many know that an understanding of these facts would make it possible to buy and use disinfectants more economically and more effectively?

It is not, for example, common knowledge that the concentration at which a disinfectant application is made is extremely important—in fact, this may be the deciding factor in the power of the disinfectant to kill germs. Disinfectants also vary in character, and should be selected for use according to their fitness for the purpose in view. All disinfectants are not alike. All are not designed for the same kind of bacteria or the same method of usage.

A disinfectant is an agent which will kill the vegetative forms of disease germs but which will not necessarily kill spores. Spores are resistant forms in the life cycle of certain bacteria and other microorganisms. Fortunately, only a few species of germs produce spores. The term "disinfection" should not be confused with "sterilization," which means the killing of all forms of life, including spores.

The Process of Killing Germs

Scientists have found that all germicidal substances do not kill germs in the same way. The process of killing germs is not a simple one, and many factors are involved.

Contact is of primary importance. In order for a chemical disinfectant to kill germs the chemical must come into close contact with them. If a germ is protected by a film of grease or albuminous matter, or if it is deeply embedded in the material to be disinfected, the disinfectant will probably not come into contact with it and, hence, will have no germicidal action in that particular case. This means, in most cases, that surfaces to be disinfected must be mechanically or physically clean before effective action can be expected.

The concentration of a disinfectant is also to be considered. Carbolic acid in weak solutions will retard the growth of bacteria, and in strong solutions will kill them, but such weak concentrations of carbolic acid can be made that the disinfectant has no effect whatever. Certain disinfectants in very weak solutions are actually stimulating to bacterial life. As a matter of fact, alleged disinfectants containing living germs have been found upon the market.

The Time Element

Another deciding factor in the effective use of disinfectants is the time element. We find that at a certain concentration a disinfectant fails to kill certain bacteria in 5 minutes but does kill in 10 minutes. A disinfectant in another concentration may kill in 5 minutes but fail in its effect in 4 minutes, or in 1 minute.

Very often the temperature at which the disinfection takes place has a marked influence upon the mortality rate of the bacteria treated.

Probably few people know that disinfection is more effective in the presence of water than in the dry state. This is true whether the process is accomplished by the application of heat or of chemicals. Some manufacturers do not realize this, and they may recommend kerosene solutions of chemicals for disinfecting purposes, whereas the product happens to contain a chemical which is a disinfectant when properly dissolved or emulsified in water, but which has no such power when dissolved in kerosene.

Some disinfectants are markedly affected by the presence of organic matter. Hypochlorites and soluble salts of mercury, for example, are effective disinfectants in very weak solution when there is a practical absence of organic matter, but they possess little disinfectant value in the presence of such matter.

The selection of a suitable disinfectant is no easy matter. Sometimes the selection is complicated by purely outside considerations. A disinfectant may have a vile odor, and therefore be of questionable use in connection with foods or utensils used for food production. Many disinfectants corrode metal and can not be used on metals. Many are caustic and burn the skin or tissues of the body. Practically all of them are poisonous when used carelessly.

Need for Proper Labeling

Some manufacturers who do not maintain research laboratories do not thoroughly understand the limitations of their own products. Because of this, and because of the complicated factors to be considered by the one who uses the disinfectant, it has become necessary to have some disinterested agency see that disinfectants are properly labeled. This work is done by the Food and Drug Administration and by different State and city health officials. The administration has no jurisdiction over articles manufactured and sold wholly within a single State or over disinfectant advertising matter in newspapers, magazines, or broadcast by radio.

The Federal law says that the labeling of disinfectants shall contain no statement, design, or device which is false, fraudulent, or misleading in any particular. Chemists, bacteriologists, and medical officers who test disinfectants know what substances are present and the amount of each, and they also have before them the results of bactericidal tests. With all this information before them, they are able to form a very good idea of the value of the product tested. When testing a particular disinfectant, Federal drugs officials consider every statement on the label very carefully in order to pick out false or misleading statements. The opinion of one expert is substantiated by the opinions of others, in order that a fair conclusion may be reached. When adulterated or misbranded disinfectants are encountered, proper corrective action is instituted under the Federal food and drugs law. Since the present Federal insecticide law went into effect, in 1910, thousands of samples of commercial disinfectants have been collected and tested.

G. L. A. Ruehle,
Senior Bacteriologist, Food and Drug Administration.

Drought in 1930 Worst on Record in Duration, Extent, and Damage Done

A comparison of the details of the 1930 drought—its long duration, the large area involved, the economic loss sustained, particularly to agriculture, the general failure and consequent inconvenience and suffering due to the failure of the local water supply in many places in the drought-stricken region—all tend to place the 1930 drought in the first place in the drought history of the country.

The beginning of the drought is not easy to fix; it may have been a carry-over from the severe drought that was experienced in the far

Some disinfectants are markedly affected by the presence of organic matter. Hypochlorites and soluble salts of mercury, for example, are effective disinfectants in very weak solution when there is a practical absence of organic matter, but they possess little disinfectant value in the presence of such matter.

The selection of a suitable disinfectant is no easy matter. Sometimes the selection is complicated by purely outside considerations. A disinfectant may have a vile odor, and therefore be of questionable use in connection with foods or utensils used for food production. Many disinfectants corrode metal and can not be used on metals. Many are caustic and burn the skin or tissues of the body. Practically all of them are poisonous when used carelessly.

Need for Proper Labeling

Some manufacturers who do not maintain research laboratories do not thoroughly understand the limitations of their own products. Because of this, and because of the complicated factors to be considered by the one who uses the disinfectant, it has become necessary to have some disinterested agency see that disinfectants are properly labeled. This work is done by the Food and Drug Administration and by different State and city health officials. The administration has no jurisdiction over articles manufactured and sold wholly within a single State or over disinfectant advertising matter in newspapers, magazines, or broadcast by radio.

The Federal law says that the labeling of disinfectants shall contain no statement, design, or device which is false, fraudulent, or misleading in any particular. Chemists, bacteriologists, and medical officers who test disinfectants know what substances are present and the amount of each, and they also have before them the results of bactericidal tests. With all this information before them, they are able to form a very good idea of the value of the product tested. When testing a particular disinfectant, Federal drugs officials consider every statement on the label very carefully in order to pick out false or misleading statements. The opinion of one expert is substantiated by the opinions of others, in order that a fair conclusion may be reached. When adulterated or misbranded disinfectants are encountered, proper corrective action is instituted under the Federal food and drugs law. Since the present Federal insecticide law went into effect, in 1910, thousands of samples of commercial disinfectants have been collected and tested.

G. L. A. RUEHLE,
Senior Bacteriologist, Food and Drug Administration.

DROUGHT in 1930 Worst on Record in Duration, Extent, and Damage Done

A comparison of the details of the 1930 drought—its long duration, the large area involved, the economic loss sustained, particularly to agriculture, the general failure and consequent inconvenience and suffering due to the failure of the local water supply in many places in the drought-stricken region—all tend to place the 1930 drought in the first place in the drought history of the country.

The beginning of the drought is not easy to fix; it may have been a carry-over from the severe drought that was experienced in the far

Northwest in 1929; it may be remembered that the Pacific Coast States, including Idaho and western Montana, experienced very dry weather and a very large fire loss of timber during the summer and autumn of that year. January, 1930, was dry in Washington, and the succeeding February was the warmest February in the United States probably in a century; it was also dry, as is generally the case.

February, 1930, was dry in Arizona, New Mexico, and Kansas in the West and in the Carolinas, Virginia, Georgia, and Alabama in the East. No drought can at any time be considered as an entity that preserves its characteristics and definitely moves from one place to another. On the contrary, a drought, which from the information at hand is now seemingly fortuitous, may eventually be found to be the orderly expression of natural laws.

In March the drought embraced a solid block of States that included North Dakota, Minnesota, South Dakota, Iowa, Nebraska, Kansas, Missouri, Oklahoma, Arkansas, Illinois, Indiana, and Kentucky.

In April the droughty States were Arkansas, Louisiana, Alabama, Mississippi, Kentucky, and Tennessee. In May the droughty States were Illinois, Indiana, and Ohio. In June two of the Plains States again became dry—viz, Kansas and Colorado—and the southeastern block of States that were dry in April again passed into the droughty class. The greatest geographic extension of the drought occurred in July, 1930, when severe drought prevailed in Maryland, Virginia, West Virginia, Kentucky, Ohio, Illinois, Missouri, Arkansas, Oklahoma, Nebraska, Iowa, and the Dakotas. In August moderate rains had relieved the situation in many of the western and southwestern group of States, but dry weather still prevailed in Minnesota, Wisconsin, and Michigan, and also in Pennsylvania, Delaware, Maryland, Virginia, the Carolinas, and Georgia. In September dry weather continued in the East and spread into New England, a district that had hitherto escaped.

Renewed Dry Weather In the Fall

Following a brief period of rains in September in the Ohio Valley, lack of rain in the late fall months brought a renewal of inconvenience and suffering for lack of water.

Maryland and Virginia, in the East, continued to suffer from drought throughout the autumn, and it was not until December 26 and 27 that a substantial rainfall (1.05 inches) was received. The rains of those dates were quite general throughout the Atlantic Coast States from the Carolinas northward.

The essential features of the rainfall distribution, January to October, 1930, with respect to the actual amounts and the departures from normal are graphically presented in Figure 47.

Other Outstanding Droughts

Owing to the very great natural variations in rainfall both in time and space, scarcely a year passes in an area so large as continental United States without more or less severe drought in some locality for a period of three weeks to a month or longer.

Fortunately, however, the rainfall over the vastly greater remaining area generally averages close to normal except in very abnormal years. A record of the local droughts experienced in Washington, D. C., and the immediately surrounding country for the 60 years 1871–1930 reveals the fact that during those years 93 more-or-less-severe droughts prevailed. Further investigation shows that in a large number of the recorded droughts substantial rains had fallen in the period immediately preceding the beginning of the rainless period. In these cases the severity of the drought was greatly minimized. The 1930 drought was different from previous droughts in that the end of the dry period did not come in one heavy downpour, but in the form of light drizzles, until finally, as previously stated, a rainfall of slightly more than an inch occurred on part of two days.

At Washington, D. C., during the 115 days between July 8 and October 31, rain fell on 39 days; the amount of the daily rains on 14 of the 39 days ranged from 0.02 to half an inch; on the remaining 25 days

% OF NORMAL MONTHLY PRECIPITATION, 1930

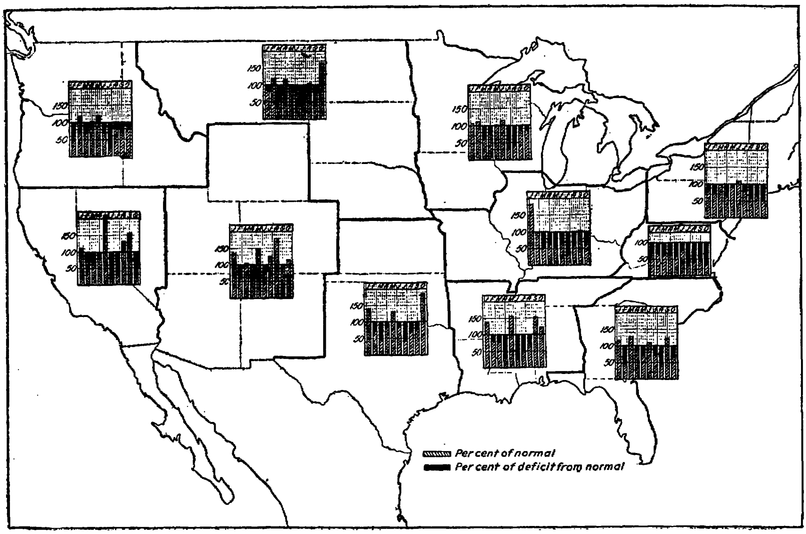


FIGURE 47.—This map shows the percentage of normal monthly precipitation from January to October, inclusive, by areas, the light shading of the respective bars indicating the percentage of normal for the successive months and the dark portions the monthly deficiencies for the several areas. In the Middle Atlantic area precipitation was deficient for all of the months, while in the Ohio Valley the shortage began somewhat later. In the Southern States, especially the lower Mississippi Valley, there was an abrupt change from wetness to dryness beginning with June, while in some Northern, Northeastern, and Southeastern States marked deficiencies did not begin until later in the season. In several of the more Western States the summer season was abnormally wet, as shown by the regional graphs for those sections

the daily rainfall was too small to measure and was therefore recorded as a "trace." Had the rainfall on these days been up to the normal expectancy, the average rainfall divided by the average number of rainy days, the total rainfall for the period would have been 76 per cent of the normal instead of 18 per cent, as was actually the case.

The drought record of the nineteenth century in the United States is far from complete. Severe droughts occurred in 1854; 1856–57; 1860; 1863–64; 1870; 1881; 1893–1895; 1901; 1911; 1916; and 1924.

The 1854 drought: The 1854 drought was most severe in Iowa, Kansas, Missouri, Arkansas, and the present State of Oklahoma; although it extended eastward, it was not especially severe east of the Mississippi. This was a midsummer and autumn drought.

The drought of 1856–57: This was not a widespread drought.

The drought of 1860: This was the most severe drought yet recorded; it was characterized by a very dry spring extending well into May and covered Kansas, Missouri, Minnesota, Wisconsin, and Indiana. In Missouri, April and May were very dry, but enough rain fell in June to save the crops.

The drought of 1863–64: This drought was confined to eastern Iowa, southern Minnesota, southern Wisconsin, and portions of Missouri and Kansas; while they were more or less summer droughts, yet they caused the lowest water hitherto recorded in the Mississippi between Dubuque and Burlington, Iowa. In Wisconsin practically no rain fell in June and August, 1864.

The drought of 1870: This was a more or less local drought in Illinois, Iowa, and Missouri.

The drought of 1881: This drought affected practically the whole country east of the Mississippi River and lasted from July to September. Its most striking characteristics was its duration and the attendant high temperature. Vegetation and the staple crops were seriously damaged, and in the later stages of the drought there was a scarcity of water for domestic purposes and for manufacturing purposes. Scores of shops and factories were obliged to shut down for lack of water.

The drought of 1893–1895: This was one of the outstanding droughts of the nineteenth century as measured by its duration, the extent of the area involved, and the shortage in rainfall. It was not particularly intense for any consecutive period but may be characterized as being a 3-year period of generally deficient rainfall throughout the country; its manifestations began in 1893 (summer months); there was some relief from the shortage of rainfall in the autumn months, but as a whole the year was one of deficient rains except in New England, the Lake region, and North Dakota. The summer months of 1894 were very dry, especially July and August; September, however, yielded substantial rains, and soil moisture was held up by fairly ample precipitation in the winter months of 1894–95. The months, July and August, 1894, were especially dry in the Ohio Valley, the South Atlantic States and Florida, the Gulf States, the Missouri Valley, and the middle and upper portions of the Mississippi Valley. In 1895, the regions of greatest deficiency apparently were shifted to the East, the Middle and South Atlantic States, thus giving an apparent drift of the droughty conditions from west to east. Notwithstanding the great and widespread shortage in precipitation during the years 1894–95 the staple crops of those years did not fall much below the yield of a normal year.

The drought of 1901: This drought was most severe in the central valleys and the western part of the Corn Belt; it was associated with exceptionally high temperature.

The drought of 1911: This drought was largely a carry-over from the very dry year of 1910. In South Carolina it lasted from November, 1910, to May, 1911, and in Kansas from November, 1910, through to September, 1911. June, 1917, was very dry in the Savannah River Basin above Augusta, Ga. The droughts of 1916 and 1924 covered comparatively small areas.

Geographic Extent of the 1930 Drought

Information now at hand shows that the drought of 1930 extended to the West Indies and the Panama Canal Zone on the south. Gatun

Lake watershed, which supplies water for the efficient operation of the canal, yielded less than the average amount of water in 7 out of the 10 months, January to September, 1930, with a maximum shortage of 48 per cent in February and a secondary maximum of 39 per cent in August.

Canada received, on the whole, somewhat more rain, and the distribution was a little more favorable than in the United States. Flood-producing rains fell in July, the month in which the peak of the drought was experienced in this country, in the northern portions of Ontario and Quebec, and also in parts of the Atlantic Provinces.

European countries did not share in the drought that was experienced in North America.

ALFRED J. HENRY,
Principal Meteorologist, Weather Bureau.

DROUGHT in 1930 Showed Some Strains of Corn to be Drought Resistant The unusual drought of 1930 brought losses to the corn breeder as well as to the corn grower. The corn-breeding program of the Bureau of Plant Industry of the United States Department of Agriculture is carried on in cooperation with the State agricultural experiment stations in about 12 States. In several of these the losses due to drought were so severe as to delay progress by from one to three years. The corn breeder, however, is more fortunate than the corn grower. While losing the results of several years' carefully planned work, he obtained information on the ability of his different breeding stocks to withstand such conditions. This information is worth a great deal as a basis for developing strains that will be of value under the widely different weather conditions which occur from year to year.

The present-day corn-breeding programs, moreover, are particularly suited to taking advantage of such information. They are centered on the production of strains isolated by selection and self-fertilization. Such strains breed true, not only for various physical characters such as plant height, leafiness, color, ear characters, and the like, but also for function. Thus, some strains are better adapted to more productive soil conditions, others to less; some can withstand more cold than others, and some can stand more heat and drought. It is not too much to say that whenever many selfed strains have been exposed to an extreme condition, some have been more or less resistant. As strains resistant to any condition are found they become a valued part of the breeding stocks. They can be used to furnish this characteristic for immediate practical corn improvement. Equally important, they serve as material for finding out just why they are resistant, thereby giving a basis for further improvement.

How the 1930 Drought Affected Corn

The experience with the heat and drought in 1930 was no exception. One or more strains of corn at each station were able to stand the lack of moisture and the temperatures of 106° F. and upward better than other strains. In some cases resistance was insufficient to be of much value or was associated with the particular stage of development in which the plants happened to be at the critical time. Other strains, however, silked and tasseled with little or no apparent damage while the weather conditions were most severe.

Lake watershed, which supplies water for the efficient operation of the canal, yielded less than the average amount of water in 7 out of the 10 months, January to September, 1930, with a maximum shortage of 48 per cent in February and a secondary maximum of 39 per cent in August.

Canada received, on the whole, somewhat more rain, and the distribution was a little more favorable than in the United States. Flood-producing rains fell in July, the month in which the peak of the drought was experienced in this country, in the northern portions of Ontario and Quebec, and also in parts of the Atlantic Provinces.

European countries did not share in the drought that was experienced in North America.

ALFRED J. HENRY,
Principal Meteorologist, Weather Bureau.

DROUGHT in 1930 Showed Some Strains of Corn to be Drought Resistant

The unusual drought of 1930 brought losses to the corn breeder as well as to the corn grower. The corn-breeding program of the Bureau of Plant Industry of the United States Department of Agriculture is carried on in cooperation with the State agricultural experiment stations in about 12 States. In several of these the losses due to drought were so severe as to delay progress by from one to three years. The corn breeder, however, is more fortunate than the corn grower. While losing the results of several years' carefully planned work, he obtained information on the ability of his different breeding stocks to withstand such conditions. This information is worth a great deal as a basis for developing strains that will be of value under the widely different weather conditions which occur from year to year.

The present-day corn-breeding programs, moreover, are particularly suited to taking advantage of such information. They are centered on the production of strains isolated by selection and self-fertilization. Such strains breed true, not only for various physical characters such as plant height, leafiness, color, ear characters, and the like, but also for function. Thus, some strains are better adapted to more productive soil conditions, others to less; some can withstand more cold than others, and some can stand more heat and drought. It is not too much to say that whenever many selfed strains have been exposed to an extreme condition, some have been more or less resistant. As strains resistant to any condition are found they become a valued part of the breeding stocks. They can be used to furnish this characteristic for immediate practical corn improvement. Equally important, they serve as material for finding out just why they are resistant, thereby giving a basis for further improvement.

How the 1930 Drought Affected Corn

The experience with the heat and drought in 1930 was no exception. One or more strains of corn at each station were able to stand the lack of moisture and the temperatures of 106° F. and upward better than other strains. In some cases resistance was insufficient to be of much value or was associated with the particular stage of development in which the plants happened to be at the critical time. Other strains, however, silked and tasseled with little or no apparent damage while the weather conditions were most severe.

As a concrete example, there may be mentioned a strain of the Lancaster Surecrop variety developed at Ames, Iowa, in the corn-breeding program cooperative with the Iowa State Agricultural Experiment Station. This strain has been isolated through eight generations of selection within self-fertilized lines. It is familiarly known as the Dark Green Lancaster strain, because of the exceedingly dark green color of its leaves. The ears are borne somewhat high on relatively tall stalks. This strain was grown in 1930 in experiments at Ames, Iowa; at Bloomington, Ill.; and at the Arlington Experiment Farm, Rosslyn, Va.

The accumulated deficiency in rainfall at Ames on July 1, was 3.5 inches. The rainfall during July was 0.5 inch, and during August was 0.9 inch, with a total deficiency September 1 of 9.1 inches. The rainfall at Arlington Farm and that at Bloomington was somewhat more favorable. At all three places, however, the temperatures during July and August were well above 100 day after day.

It was these high temperatures, in fact, that did more damage to the corn than the lack of moisture in the soil. The moisture was taken out of the tassels and upper leaves of most plants by the hot, dry winds faster than it could be replaced. The whitened tassels and leaves seen across the field bore eloquent testimony of this condition. In marked contrast were the upper leaves and tassels of Dark Green Lancaster (and of a few other strains) where rows of this strain occurred in the experiments. The dark green leaves continued dark green and the tassels continued to shed viable pollen.

The selfed strains isolated in modern corn breeding are not themselves high yielding, but must be used in crosses or hybrids. It therefore is important to know whether desirable characteristics possessed by a strain are transmitted to its crosses. Crosses of Dark Green Lancaster with each of 10 other selfed strains were included in the experiments at Ames in 1930. Each cross was grown in 6 plots of about 50 plants each. There were thus about 3,000 plants of crosses having Dark Green Lancaster as one parent. None of these plants had any of the top leaves burned and only 12.6 per cent had burned tassels. In contrast, 37 per cent of the plants of the Krug variety had burned tassels and 13.4 per cent had burned top leaves. Inasmuch as some of the 10 other strains with which Dark Green Lancaster was crossed were heat susceptible, this is conclusive evidence of its ability to transmit much at least of its resistance to heat and drought to its crosses.

It is pleasant to see corn plants remain dark green in spite of the heat and drought. The corn grower, however, is more interested in the final yield. The 10 crosses of Dark Green Lancaster with other lines produced an average acre yield of 53.5 bushels in comparison with 37.5 bushels for Krug. The excess yield of 16 bushels, or 43 per cent, for the crosses above Krug, the best of the 12 commercial varieties in the experiment, shows clearly that heat and drought resistance as shown by lack of leaf and tassel burning was reflected also in ability to produce corn.

Most years in the Corn Belt are not drought years. To what extent may strains adapted to unfavorable conditions be expected to yield well in favorable seasons? Strains will, of course, differ in their breadth of adaptation. It is significant, however, that Dark Green Lancaster was isolated during seasons that were more or less favorable to corn production. Moreover, about 10 crosses having this strain as one parent have been in the experiments in 1927, in 1928, and in 1929, in addition to the 10 crosses in the 1930 experiments. In 1927 and 1928 the Dark Green Lancaster crosses were first and second in their groups, in 1929 they were fifth, and in 1930 they were first. In each year they were significantly more productive than the best commercial varieties.

The facts presented here are concerned with the possibilities of breeding corn for resistance to heat and drought, as emphasized by the extreme conditions in 1930. Similar methods are applicable and are being used by the corn breeders of to-day in meeting other conditions. Progress is slow at best and is retarded further by losses due to one condition or another. When this occurs all that the corn breeder can do is to forget the losses and see whether they can not be offset in part by advances in unexpected directions.

Merle T. Jenkins, *Associate Agronomist*,
Frederick D. Richey, *Principal Agronomist*,
Bureau of Plant Industry.

DROUGHT May Result in Lasting Damage to Stricken Forest Trees

Excessive droughts like that of 1930, which brought havoc to food crops and livestock in many eastern States, also cause serious loss to forest and shade trees. Some trees are killed outright while many others are robbed of their vigor so that within a few years they fall an easy prey to insects, disease, or some other indirect agent of death. Thus a continuing loss occurs which can not easily be forecast but which may in the aggregate equal the value of many years' growth of the forest.

Although the forest losses to be expected from the 1930 drought can not be directly foretold, a good deal can be learned indirectly from the effects of the 1925 drought in the southern Appalachian region, during which many trees turned brown and some were killed. The history of individual trees has been observed on sample areas established during the 1925 drought by the Appalachian Forest Experiment Station in the forest near Asheville, N. C. It is likely that much the same results will follow the drought of 1930.

The similarity of the two drought periods is shown by the following Asheville Weather Bureau records. These include the fall months preceding the year of drought, since the amount of rain prior to the drought affects the supply of ground water that will later be available to the trees. Apparently the water deficiency of 1925 in western North Carolina was a little more severe and protracted than that of 1930, and more closely resembles the 1930 drought in other more seriously affected States.

Table 6.—*Rainfall, normal and actual, and rainfall deficit, in inches, for drought months in 1924–25 and 1929–30*

[From records of the United States Weather Bureau office at Asheville, N. C.]

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Aggregate for the period
Rainfall:													
Normal year	2.75	2.23	3.20	3.10	3.15	3.97	3.02	3.43	3.93	4.30	4.16	3.04	40.28
1924–25	1.21	.41	4.03	2.74	1.85	2.45	2.45	2.15	1.97	.77	.22	1.92	22.17
1929–30	4.75	2.43	1.40	1.48	.67	1.66	1.72	2.56	2.96	1.12	1.78	4.23	26.76
Departure from normal:													
1924–25	−1.54	−1.82	+.83	−.36	−1.30	−1.52	−.57	−1.28	−1.96	−3.53	−3.94	−1.12	−18.11
1929–30	+2.00	+.20	−1.80	−1.62	−2.48	−2.31	−1.30	−.87	−.97	−3.18	−2.38	+1.19	−13.52

parent have been in the experiments in 1927, in 1928, and in 1929, in addition to the 10 crosses in the 1930 experiments. In 1927 and 1928 the Dark Green Lancaster crosses were first and second in their groups, in 1929 they were fifth, and in 1930 they were first. In each year they were significantly more productive than the best commercial varieties.

The facts presented here are concerned with the possibilities of breeding corn for resistance to heat and drought, as emphasized by the extreme conditions in 1930. Similar methods are applicable and are being used by the corn breeders of to-day in meeting other conditions. Progress is slow at best and is retarded further by losses due to one condition or another. When this occurs all that the corn breeder can do is to forget the losses and see whether they can not be offset in part by advances in unexpected directions.

Merle T. Jenkins, *Associate Agronomist,*
Frederick D. Richey, *Principal Agronomist,*
Bureau of Plant Industry.

DROUGHT May Result in Lasting Damage to Stricken Forest Trees

Excessive droughts like that of 1930, which brought havoc to food crops and livestock in many eastern States, also cause serious loss to forest and shade trees. Some trees are killed outright while many others are robbed of their vigor so that within a few years they fall an easy prey to insects, disease, or some other indirect agent of death. Thus a continuing loss occurs which can not easily be forecast but which may in the aggregate equal the value of many years' growth of the forest.

Although the forest losses to be expected from the 1930 drought can not be directly foretold, a good deal can be learned indirectly from the effects of the 1925 drought in the southern Appalachian region, during which many trees turned brown and some were killed. The history of individual trees has been observed on sample areas established during the 1925 drought by the Appalachian Forest Experiment Station in the forest near Asheville, N. C. It is likely that much the same results will follow the drought of 1930.

The similarity of the two drought periods is shown by the following Asheville Weather Bureau records. These include the fall months preceding the year of drought, since the amount of rain prior to the drought affects the supply of ground water that will later be available to the trees. Apparently the water deficiency of 1925 in western North Carolina was a little more severe and protracted than that of 1930, and more closely resembles the 1930 drought in other more seriously affected States.

Table 6.—*Rainfall, normal and actual, and rainfall deficit, in inches, for drought months in 1924–25 and 1929–30*

[From records of the United States Weather Bureau office at Asheville, N. C.]

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Aggregate for the period
Rainfall:													
Normal year	2.75	2.23	3.20	3.10	3.15	3.97	3.02	3.43	3.93	4.30	4.16	3.04	40.28
1924–25	1.21	.41	4.03	2.74	1.85	2.45	2.45	2.15	1.97	.77	.22	1.92	22.17
1929–30	4.75	2.43	1.40	1.48	.67	1.66	1.72	2.56	2.96	1.12	1.78	4.23	26.76
Departure from normal:													
1924–25	−1.54	−1.82	+.83	−.36	−1.30	−1.52	−.57	−1.28	−1.96	−3.53	−3.94	−1.12	−18.11
1929–30	+2.00	+.20	−1.80	−1.62	−2.48	−2.31	−1.30	−.87	−.97	−3.18	−2.38	+1.19	−13.52

The Asheville observations[2] showed that browning or fall of leaves during a drought does not necessarily mean that the trees are dead. Although a great many trees on ridges and upper slopes in western North Carolina turned brown in the summer of 1925, and some species shed their leaves in August, the majority of the trees put out new foliage the next spring. On many of the trees the browning was confined to the topmost branches, and there was a difference between the species as to the extent of browning. Dogwood, sourwood, and chestnut, for example, appeared to suffer more severe browning than white ash, black locust, and pignut hickory. Leaves of chestnut oak were only moderately or slightly injured by the drought, and by the following spring the chestnut oak trees appeared to be quite normal. Black oak, scarlet oak, and red oak, on the other hand, showed severe leaf injury during the drought period, and with few exceptions trees of these species that were heavily browned were dead by 1929. Hickory leaves were not seriously browned, the principal response to the drought being an early shedding of the leaves. In most cases the recovery of the hickories was complete. Regardless of species, trees with large scars caused by fire or logging showed more severe browning of the leaves than trees with sound boles.

After Effects of Drought

Of the individual trees that were observed, not one that maintained its normal green foliage during the drought showed any evidence of injury in the four succeeding years that could be attributed to the drought. About half the trees that showed injury during the drought completely recovered. The remainder showed permanent injury in the form of dead branches, or were killed by the drought or by some cause resulting indirectly from it.

During the years that followed the 1925 drought numerous reports were received of shade trees sick or dying from some unknown cause. A large number of apparently healthy scarlet oak trees were thrown by wind in the forest near Asheville. In other parts of the Appalachian region oak trees of various species were reported to have been killed. Upon examination, various causes were assigned for the death of these trees, chief among them being insects (particularly root-boring insects), root-destroying fungi, and the freezing of young leaves in the spring. While there is no evidence to prove that the underlying cause of death was the 1925 drought, the occurrence of this heavy mortality so closely after the drought furnishes a strong reason for the belief that the drought, by destroying roots and sapping the resistance of the trees, was the factor primarily responsible for their death.

The greatest direct injury observed during the 1925 drought occurred in the case of trees with restricted root systems growing on shallow soil. In some places where rock outcrops were abundant the shallow soil contained only 5 per cent moisture during the drought. During the succeeding summer the soil was found to have from 40 to 45 per cent of moisture. It is probable that when the moisture content is reduced as low as 5 per cent clay soils such as those of the sample areas have practically no water available for plant roots. Under such conditions serious injury to trees seems inevitable, and if any survive it is undoubtedly due to the density and extent of the

---

[2] HURSH, C. R., and HAASIS, F. W., EFFECTS OF 1925 SUMMER DROUGHT ON SOUTHERN APPALACHIAN HARDWOOD, 1930. Unpublished manuscript.

root network that penetrates crevices and soil pockets where a little more moisture can be obtained than is available in the dried upper layers of soil. When moisture is lacking much of the root system undoubtedly ceases to function, some of it permanently. The death of roots invites attack by root-boring insects and by fungi, and weakens the hold of the tree upon the soil, rendering it subject to wind throw.

Relation Between Leaves and Roots

There is an intimate relation between the leaves and the root ends of trees. The two are opposite ends of the same water-conducting system, and changed conditions, such as a pronounced decrease in the amount of soil moisture available to the roots, will have an immediate and perhaps also a deferred effect upon the foliage. Thus a severe drought is marked by the browning of the leaves of some species of trees and the premature fall of the leaves of others. If many of the roots are killed, not only leaves but entire branches and even entire trees will die. Complete killing is most common when trees have already been weakened by some damaging agency like fire, insects, disease, or ice breakage, or when their root systems are confined by rock or hard-pan to shallow layers or pockets of soil.

Forest trees that are crippled by drought so that they show large dead branches or tops (stag-headed trees) are no longer desirable members of the stand. Their growth is slowed down, they occupy space that might better be filled by healthy young trees, and it is wise to remove them at the first good opportunity. The health and productive vigor of a forest, as well as its sightliness, can thus be improved by weeding out the poorer individuals and permitting their replacement with strong, sound trees.

E. H. FROTHINGHAM,
Appalachian Forest Experiment Station, Forest Service.

DROUGHTS' Causes Partly Known; Comings and Goings Unpredictable

To understand what causes prolonged spells of dry weather over wide areas it is necessary first to know how nature induces precipitation. Her first step is to get an adequate quantity of water vapor into the atmosphere, and her second to get it out again in the form of drops. It is got into the air by evaporation from ocean and other water surfaces, from damp soil, and from growing vegetation; but there is a limit to the amount that can be got into, or can exist in, a given space, and this limit or maximum amount decreases rapidly with decrease in the temperature of the vapor. Furthermore, this amount is the same whether other gases, such as those of the dry air, are present or not. Whenever the temperature of the air as a whole is changed, so also is that of any water vapor that may be present. Water vapor also goes into the air, or evaporation occurs, at all temperatures—the more rapidly the higher the temperature—so long as the adjacent space is not saturated; that is, does not contain all the water vapor it can contain at the current temperature. It does not condense out of the air in any form—cloud, rain or snow—until its temperature falls below the saturation point. On the average, water vapor is taken into the air by evaporation at higher temperatures and ejected by condensation at lower temperatures.

root network that penetrates crevices and soil pockets where a little more moisture can be obtained than is available in the dried upper layers of soil. When moisture is lacking much of the root system undoubtedly ceases to function, some of it permanently. The death of roots invites attack by root-boring insects and by fungi, and weakens the hold of the tree upon the soil, rendering it subject to wind throw.

Relation Between Leaves and Roots

There is an intimate relation between the leaves and the root ends of trees. The two are opposite ends of the same water-conducting system, and changed conditions, such as a pronounced decrease in the amount of soil moisture available to the roots, will have an immediate and perhaps also a deferred effect upon the foliage. Thus a severe drought is marked by the browning of the leaves of some species of trees and the premature fall of the leaves of others. If many of the roots are killed, not only leaves but entire branches and even entire trees will die. Complete killing is most common when trees have already been weakened by some damaging agency like fire, insects, disease, or ice breakage, or when their root systems are confined by rock or hard-pan to shallow layers or pockets of soil.

Forest trees that are crippled by drought so that they show large dead branches or tops (stag-headed trees) are no longer desirable members of the stand. Their growth is slowed down, they occupy space that might better be filled by healthy young trees, and it is wise to remove them at the first good opportunity. The health and productive vigor of a forest, as well as its sightliness, can thus be improved by weeding out the poorer individuals and permitting their replacement with strong, sound trees.

E. H. Frothingham,
Appalachian Forest Experiment Station, Forest Service.

DROUGHTS' Causes Partly Known; Comings and Goings Unpredictable

To understand what causes prolonged spells of dry weather over wide areas it is necessary first to know how nature induces precipitation. Her first step is to get an adequate quantity of water vapor into the atmosphere, and her second to get it out again in the form of drops. It is got into the air by evaporation from ocean and other water surfaces, from damp soil, and from growing vegetation; but there is a limit to the amount that can be got into, or can exist in, a given space, and this limit or maximum amount decreases rapidly with decrease in the temperature of the vapor. Furthermore, this amount is the same whether other gases, such as those of the dry air, are present or not. Whenever the temperature of the air as a whole is changed, so also is that of any water vapor that may be present. Water vapor also goes into the air, or evaporation occurs, at all temperatures—the more rapidly the higher the temperature—so long as the adjacent space is not saturated; that is, does not contain all the water vapor it can contain at the current temperature. It does not condense out of the air in any form—cloud, rain or snow—until its temperature falls below the saturation point. On the average, water vapor is taken into the air by evaporation at higher temperatures and ejected by condensation at lower temperatures.

Cooling of Humid Air Makes Rain

Evidently, therefore, rain is produced only by the considerable cooling of a great volume of humid air—humid, for otherwise there would not be enough moisture present to produce rain; and cooled, for that is the one effective way of so reducing the vapor capacity of the space occupied as to force condensation of the humidity from the gaseous to the liquid form. We have just seen how the air is rendered humid, namely, by evaporation, but how is it so greatly cooled as to get any considerable portion of that vapor out again in the form of water?

The surface air over land is cooled during still, clear nights by contact with the vegetation and other objects that themselves had lost much heat through radiation, but this never involves enough air to induce rain; only at most, dew or fog. Air is cooled also when it blows or drifts over objects colder than itself, or into a relatively cool region, but this, too, only causes fog and a dew-like condensation onto the cold objects.

Still another way by which air often is cooled is the admixture with it of relatively cold air. But even under the most favorable conditions, even when both the warm air and the cold air are saturated before being mixed, this method of cooling can not induce much condensation—only some cloud and perhaps a little drizzle. There remains just one other method by which the atmosphere, and thereby the water vapor in it, is here and there, and from time to time, sharply cooled. This is by increase in its height, not necessarily above the surface of the land but above sea level. As the air rises, no matter how it is made to do so, it obviously comes under less and less pressure by the weight of the air left below. It therefore continuously expands, under decrease of load, as long as it gains in height. This expansion, however, always is against a pressure—the weight of the air still above the rising mass, and expansion against pressure means work, in this case work by the rising air, and that entails a loss of temperature, for gases can work only at the expense of their heat. Rising air, therefore, is cooling air, and as the air cools so also, and to the same extent, does the water vapor in it or of it. This in turn reduces the amount of water that can exist per cubic foot in the form of vapor. Hence, when the lower air contains a large amount of water vapor its considerable ascent, say half a mile to 3 miles, is certain to produce cloud and likely to produce rain also.

Rain, then, is induced by the ascent to decidedly higher levels of air in which there is a relatively large amount of water vapor. Conversely, dry weather obtains whenever and wherever there is but little to no ascent of the atmosphere; and also when the humidity present is insufficient to produce saturation, or much more than saturation, at the temperature reached through such ascent, great or small, as may occur. Hence the direct cause of a drought is the excessive dryness of the air, or absence of its considerable ascent, or both, during many consecutive days or several weeks over the region in question.

Forces That Cause Air to Ascend

But what makes that air ascend? There are several things that cause the air to ascend. One of them is the same thing that makes air go up a chimney when there is a fire in the fireplace; namely, difference between its densities (owing to difference in temperature) over adjacent regions. This is the cause of the so-called heat thunderstorm, the storm that brings most of the rain of tropical regions, and a large portion of the summer rains nearly everywhere. The air is made to ascend also by a mountain across the course of the wind, and where this wind is directly from a warm ocean, as in the case of the Hawaiian Islands, the rainfall thus induced is certain to be very abundant.

Another important cause of atmospheric ascent is a mass of relatively cool air in the path of a warmer current. Here the warmer, and often humid, air rises up over the colder air just as it would over a mountain, and with the same result in respect to precipitation. This is the chief source of the rainfall in the general or cyclonic storms of the middle latitudes, in which comparatively warm humid air from tropical and semitropical regions always encounters in its course the relatively cool air of the higher latitudes. In another portion of this storm area, equatorward from its center, the warm air often is actively underrun by the colder, thus lifted up and frequently made to yield brief but vigorous showers, the kind popularly known as clearing-up showers. The convergence of air currents also and obviously causes ascent of the atmosphere. This is a phenomenon of the front or rainy section of the general cyclonic storm, and likewise of the tornado, and even the dust whirl—in a small way.

How from the above can we account for the great drought of 1930 of the central and most of the eastern United States? It was owing partly to the fact that the cyclonic or rain-bearing storms that passed over this region were fewer and feebler than they normally are during the months in question, and partly to the fact that the local or heat thunderstorms also were fewer and feebler than usual. The cyclonic storms, being swirls between great interchanging currents of tropical and polar air, were few and feeble because this interchange was much less vigorous last year over the central and eastern United States than usually is the case. And this interchange was feeble here because a larger amount than normal of such interchange was occurring elsewhere—over western and northern Europe, especially, where the summer was exceptionally rainy.

Balance of Interchanges

The increased interchange at one or more places caused a decrease at others because, owing to the limited amount of heating in the lower latitudes and cooling in the higher, there also is only a correspondingly limited amount of total interzonal circulation. It can not be unusually strong everywhere at the same time, for the supply of air is limited; nor everywhere feeble, for there are large quantities of warm and cold air that somehow, somewhere, must be exchanged. It only can be excessive at some places if at the same it is unusually feeble elsewhere. Again this interchange, which is by fits and starts rather than by steady streams, tends to follow any paths that just previously had been followed. The cold air, for instance, flows best and farthest along routes already cooled by a previous flow, and similarly for the warm air. That is, the routes of interchange tend to remain fixed, and an abandoned region to remain abandoned longer than usual. That is one of the reasons why weather so often comes in spells. Again this stagnation of the air over the central and eastern United States led to its being all but equally warm from the Gulf to the Lakes, and even into Canada, and, therefore, to the removal of such interchange as was occurring in North America between cold and warm air, and the rains that accompany such interchange, to unusually high latitudes.

Also, and presumably owing to this same alteration of the general routes of warm and cold air, moderately high atmospheric pressure often extended from the Atlantic Ocean far out onto the continent in the latitude of the Carolinas, thus effectually shutting off from the areas covered, and also those to their immediate north, all access of humidity from the Gulf of Mexico, its chief source for the regions in question.

Finally, after the soil had become dry over this great territory, and vegetation withered, local showers, which depend for their moisture mainly upon inland evaporation, necessarily were relatively infrequent and feeble. Thus any drought when well established, as the one of 1930 certainly was, tends to perpetuate itself partly by maintenance of the same paths of warm and cold air interchange and partly by deficiency of surface evaporation.

Of course all this quasi-stable condition of drought, or of excessive rain, may be completely upset at any time by some unusual storm, such as a suitably timed and located hurricane, by the onset of cold weather or otherwise.

We know something of what causes droughts and how they tend to perpetuate themselves, but we can not yet predict their coming nor their going nor how severe they will be.

W. J. HUMPHREYS,
Principal Meteorologist, Weather Bureau.

EGG Hatchability Is Influenced by the Nutrition of Embryo Only about two-thirds of the fertile eggs incubated in the United States each year hatch. The developing chicks in the remaining third die at various stages before they are ready to leave the shell. Inherited weaknesses, improper conditions of incubation, and faulty diet of the breeding flocks are the principal causes of death.

Much of this loss could be prevented if poultry breeders would use only eggs from vigorous stock and incubate these eggs at a proper temperature with the correct degree of ventilation and moisture. Many fertile eggs would still fail to hatch, however, unless the breeding flocks received rations containing enough of the right quality of nutrients for the chick embryo from the time it begins to develop until it leaves the shell.

Except for the oxygen, which is obtained through the shell from the air, the food supply of the chick embryo is contained in the egg. The proteins, water, and minerals, assisted by the pigments and vitamins, form most of the structure; the carbohydrates, some protein, and fat supply energy.

Some proteins lack or contain too little of certain components needed by the developing embryo. Many hens, when fed only vegetable proteins, for instance, produce eggs which, although fertile, fail to hatch as well as when an animal protein is added to the ration.

40442°—31——14

this stagnation of the air over the central and eastern United States led to its being all but equally warm from the Gulf to the Lakes, and even into Canada, and, therefore, to the removal of such interchange as was occurring in North America between cold and warm air, and the rains that accompany such interchange, to unusually high latitudes.

Also, and presumably owing to this same alteration of the general routes of warm and cold air, moderately high atmospheric pressure often extended from the Atlantic Ocean far out onto the continent in the latitude of the Carolinas, thus effectually shutting off from the areas covered, and also those to their immediate north, all access of humidity from the Gulf of Mexico, its chief source for the regions in question.

Finally, after the soil had become dry over this great territory, and vegetation withered, local showers, which depend for their moisture mainly upon inland evaporation, necessarily were relatively infrequent and feeble. Thus any drought when well established, as the one of 1930 certainly was, tends to perpetuate itself partly by maintenance of the same paths of warm and cold air interchange and partly by deficiency of surface evaporation.

Of course all this quasi-stable condition of drought, or of excessive rain, may be completely upset at any time by some unusual storm, such as a suitably timed and located hurricane, by the onset of cold weather or otherwise.

We know something of what causes droughts and how they tend to perpetuate themselves, but we can not yet predict their coming nor their going nor how severe they will be.

W. J. HUMPHREYS,
Principal Meteorologist, Weather Bureau.

EGG Hatchability Is Influenced by the Nutrition of Embryo

Only about two-thirds of the fertile eggs incubated in the United States each year hatch. The developing chicks in the remaining third die at various stages before they are ready to leave the shell. Inherited weaknesses, improper conditions of incubation, and faulty diet of the breeding flocks are the principal causes of death.

Much of this loss could be prevented if poultry breeders would use only eggs from vigorous stock and incubate these eggs at a proper temperature with the correct degree of ventilation and moisture. Many fertile eggs would still fail to hatch, however, unless the breeding flocks received rations containing enough of the right quality of nutrients for the chick embryo from the time it begins to develop until it leaves the shell.

Except for the oxygen, which is obtained through the shell from the air, the food supply of the chick embryo is contained in the egg. The proteins, water, and minerals, assisted by the pigments and vitamins, form most of the structure; the carbohydrates, some protein, and fat supply energy.

Some proteins lack or contain too little of certain components needed by the developing embryo. Many hens, when fed only vegetable proteins, for instance, produce eggs which, although fertile, fail to hatch as well as when an animal protein is added to the ration.

40442°—31——14

Animal Protein in Feed Results in Best Hatches

At the United States Animal Husbandry Experiment Farm, Beltsville, Md., 120 Rhode Island Red pullets, equally divided in three pens, received an all-vegetable basal ration, a mineral mixture, cod-liver oil, and some form of protein. As sources of protein, cottonseed meal was fed to the pullets in one pen, soybean-oil meal to those in another, and mixed animal protein to those in the third pen. The eggs from the three pens were incubated and 58, 64.5, and 77 per cent, respectively, hatched. The results showed the superiority of the animal-protein supplement in producing eggs of high hatchability.

During the second week of incubation, when the embryo absorbs most of the egg white, a much higher percentage of the embryo deaths occurred in the eggs of the pullets receiving cottonseed and soybean-oil meals than from those receiving animal protein. Many of the dead embryos in the eggs from the pullets receiving vegetable protein were swollen because of liquid accumulating beneath the skin. This condition is known as edema, and may result from affected kidneys. The dead embryos in which edema was very noticeable also had extremely short and backwardly curved legs and parrotlike beaks, as shown in Figure 48. This condition is known as chondrodystrophy, signifying lack of normal formation of cartilage because of poor nourishment. Most embryos so affected die before the fifteenth day of incubation, though a few live until hatching time but rarely, if ever, hatch.

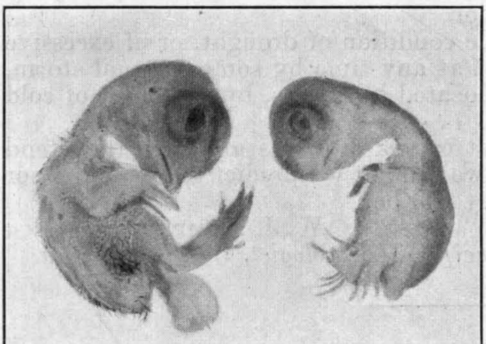


FIGURE 48.—On the left is a normal embryo after 11 days' incubation; on the right is one showing parrot beak and backwardly curved legs, caused in part by improper nutrition

Any ration lacking animal protein may result in this trouble. Less than 0.1 per cent of the fertile eggs (12 out of 15,000) from the department's breeding flock, which received a mixed ration and was allowed on range, showed this trouble. Many of these hens were of the same breeding as the hens used in the experiment mentioned.

Further poultry-nutrition studies showed that a supplement of yeast, though not so good as animal protein, gave fairly satisfactory hatchability results, when fed to pullets receiving an all-vegetable basal ration. A 20 per cent supplement of a dry-yeast preparation when fed to 40 pullets on such a ration resulted in the hatching of 74.5 per cent of the fertile eggs. When an all-vegetable basal ration and a supplement of mixed animal proteins were fed to another lot of 40 pullets, 77 per cent of the eggs hatched; and when an all-vegetable basal ration alone was fed to 40 pullets, 69.2 per cent hatched. These differences in hatchability are no greater than may be expected from the inherent variability of the hens used. The yeast supplement, however, is far too expensive to be practical.

Nutrition Effects Vary

Although in general hatchability of the eggs is lowered by the feeding of cottonseed and soybean-oil meals, all hens are not affected to the same extent and many apparently not at all; and since these feeds are cheaper than animal proteins, high in food value, and easy to obtain, there is a tendency for poultrymen to feed more of them. When they are to be used as protein supplements, it is advisable to carry on pedigree hatching, examine dead embryos in the eggs for the condition shown in the illustration, and cull the hens that have produced such eggs. However, until a vegetable-protein ration is found which results in as high a per cent of hatchability as does the use of animal proteins, it is best to include some of the latter in the ration of breeding hens.

Lime and vitamin D in the ration are also necessary for satisfactory hatchability as well as for bone formation. Cod-liver oil is the best-known source of this vitamin. However, if the hens receive an abundance of direct sunshine, no other source of vitamin D is necessary. Still another requirement for large hatches is a reasonable quantity of pigment in the ration. This term signifies the natural coloring matter in various feeds.

Although successive generations of chickens have been reared on rations containing little or no pigment, eggs from hens receiving these rations hatch poorly. Only 25 per cent of the eggs from experimental hens fed on such rations hatched, as compared with 77 per cent from hens on normal rations. The yellow pigment which colors the normal egg yolk is obtained by the hen directly from the feeds, especially green feed and yellow corn.

Briefly, it is recommended that poultry breeders feed a ration containing adequate quantities of protein, both vegetable and animal; lime; cod-liver oil unless an abundance of direct sunlight is received; and a source of pigment, such as yellow corn or green feed.

T. C. BYERLY,
Physiologist, Bureau of Animal Industry.

ELECTRICAL Machines Aid Department's Scientists in Compiling Statistics From Maine to California there is probably no State that does not utilize electricity in some way to lighten the burden of the farmer or the farmer's wife. Help is rendered in the form of power to work a pump jack, to run a corn sheller, to milk, or to turn a cream separator, or perhaps to operate a cordwood saw. Few farmers, however, realize the extent to which electricity is utilized in the daily tasks of agricultural workers in Washington. They might even regard tasks such as compiling statistics as easy enough without electrical help, but in this modern age, a task does not necessarily require muscular effort to become laborious.

A great deal of the clerical work incidental to the research studies undertaken by scientific workers of the Department of Agriculture is done with the aid of electrical machines. Some of this work is simple enough in itself but the large volume makes the use of machines a necessity. Other phases of the work are so complex that it is hardly conceivable that they could be undertaken at all without the aid of machinery. In this latter class of work comes the minute analytical studies which involve the use of elaborate questionnaires to get the many facts concerning a given subject. A very remarkable method has been developed for work of this kind, its great advantage being in the successive reclassifying of the same material.

the same extent and many apparently not at all; and since these feeds are cheaper than animal proteins, high in food value, and easy to obtain, there is a tendency for poultrymen to feed more of them. When they are to be used as protein supplements, it is advisable to carry on pedigree hatching, examine dead embryos in the eggs for the condition shown in the illustration, and cull the hens that have produced such eggs. However, until a vegetable-protein ration is found which results in as high a per cent of hatchability as does the use of animal proteins, it is best to include some of the latter in the ration of breeding hens.

Lime and vitamin D in the ration are also necessary for satisfactory hatchability as well as for bone formation. Cod-liver oil is the best-known source of this vitamin. However, if the hens receive an abundance of direct sunshine, no other source of vitamin D is necessary. Still another requirement for large hatches is a reasonable quantity of pigment in the ration. This term signifies the natural coloring matter in various feeds.

Although successive generations of chickens have been reared on rations containing little or no pigment, eggs from hens receiving these rations hatch poorly. Only 25 per cent of the eggs from experimental hens fed on such rations hatched, as compared with 77 per cent from hens on normal rations. The yellow pigment which colors the normal egg yolk is obtained by the hen directly from the feeds, especially green feed and yellow corn.

Briefly, it is recommended that poultry breeders feed a ration containing adequate quantities of protein, both vegetable and animal; lime; cod-liver oil unless an abundance of direct sunlight is received; and a source of pigment, such as yellow corn or green feed.

T. C. Byerly,
Physiologist, Bureau of Animal Industry.

ELECTRICAL Machines Aid Department's Scientists in Compiling Statistics From Maine to California there is probably no State that does not utilize electricity in some way to lighten the burden of the farmer or the farmer's wife. Help is rendered in the form of power to work a pump jack, to run a corn sheller, to milk, or to turn a cream separator, or perhaps to operate a cordwood saw. Few farmers, however, realize the extent to which electricity is utilized in the daily tasks of agricultural workers in Washington. They might even regard tasks such as compiling statistics as easy enough without electrical help, but in this modern age, a task does not necessarily require muscular effort to become laborious.

A great deal of the clerical work incidental to the research studies undertaken by scientific workers of the Department of Agriculture is done with the aid of electrical machines. Some of this work is simple enough in itself but the large volume makes the use of machines a necessity. Other phases of the work are so complex that it is hardly conceivable that they could be undertaken at all without the aid of machinery. In this latter class of work comes the minute analytical studies which involve the use of elaborate questionnaires to get the many facts concerning a given subject. A very remarkable method has been developed for work of this kind, its great advantage being in the successive reclassifying of the same material.

The principles of this method were first evolved in the eighties by an employee of the Bureau of the Census, who not only developed the method but invented a group of machines which greatly simplified the preparation of the census report. Since that time the machines have been improved to a remarkable extent and are now used not only for Government work in the Bureau of the Census but in many other Federal offices and in State offices, as well as by railroads, insurance companies, and almost every kind of big business throughout the United States. The chief feature of the method is the use of a record card 3¼ by 7⅜ inches in size made of lightweight cardboard similar to the standard Government post card, in which holes are punched to record the data. These cards are used in conjunction with machines of various types.

The punching is done by electricity; that is, an electrical contact passes the current through an electromagnet to actuate a simple punch mechanism. The contact is made by the operator, who depresses in proper sequence the typewriterlike keys of a small machine to record the desired information on the cards inserted in the machine. Thus, the operator is relieved of the necessity of supplying the power to perforate the holes. A skilled operator can punch from 1,000 to 2,000 cards a day, depending upon the nature of the work. After the cards are punched they are assembled in the groups desired for tabulation by means of an electrical sorting machine. In this machine the cards are passed rapidly over a brass roller against which a small steel wire is constantly pressed. The card passes between the roller and the wire and as contact is made through a punched hole the cards are caused to drop in one of 10 receptacles depending on the position of the hole in the card. This is accomplished by a system of timing very similar to the timing of the spark in an automobile engine, except that instead of an explosion the result is merely the opening of a gate through which opening the card must pass. This machine will accurately sort about 20,000 cards per hour. As the operation is continuous, the cards can be placed in and removed from the machine without stopping it.

The Listing Tabulator

After the cards have been completely sorted (it sometimes requires several sortings to arrange them in the groups desired, since the machine sorts only one column at a time) the next step is to count the number in each of the groups and add the various quantities, from which averages may be determined. This is done by sending the cards through another machine, called a listing tabulator, which counts the cards in each of the groups, accumulates the total of several items if desired, prints the group designation, the count of cards, and the totals on a sheet of paper held in a carriage similar to that of a typewriter. One of the most remarkable features of the tabulator is called the control. This mechanism, which is governed entirely by electricity, causes the machine to function in such a way that it will automatically stop the accumulation of totals upon completion of a designated group, print the totals on the paper, set the adding mechanism back to zero, ready for the next group, and then start the accumulation of totals of the next group. All this is done without the attention of the operator. The tabulator will handle from 4,000 to 8,000 cards an hour, depending upon the frequency of the totaling and resetting operation.

The great utility of this method of tabulation lies in the facility with which material may be reclassified or subdivided. An example of this kind is a study recently made of the consumption of dairy products by farm families. The basic information was secured by obtaining about 10,000 questionnaires from as many farm families. Each questionnaire showed the number of adults, number of children, milk consumed per week, number of cows, and other related questions. From the answers to these questions the investigators sought to determine: (1) Average consumption of milk per farm family; (2) average consumption of milk by farm families having no cows to compare with average consumption of milk by farm families having cows; and (3) average consumption per capita among adults to compare with average consumption per capita for families with children.

The answers to the questionnaires were recorded on punch cards, each card representing a farm family. It was then possible by successive sorting and tabulating operations to obtain the total milk consumption for all farm families in a certain State, for families having no cows, for families having cows, for families without children, and for families with children. With each of these tabulations the number of families or cards were counted, and the number of persons classified as adults or children, and total milk consumed, were all automatically printed on a strip of paper. The whole tabulating process, involving 10,000 reports, required but a few days' work on the two machines.

The use of machines is not confined to any one bureau of the Department of Agriculture or to any particular type of work. The folling bureaus make use of the machines in connection with their research work, and in some cases prepare reports of appropriations and expenditures: Agricultural Economics, Animal Industry, Biological Survey, Dairy Industry, Forest Service, and Public Roads.

The Bureau of Dairy Industry utilizes the punched cards and machines in connection with the work of the cow-testing associations while the Bureau of Biological Survey has a very interesting application in its study of bird migration through the banding method.

In spite of the labor-saving features of the machines the work handled on them is now so extensive that from 50 to 75 persons are employed in the various machine units, and the total card requirements are approximately 6,000,000 a year.

E. J. WAY,
Senior Administrative Assistant,
Bureau of Agricultural Economics.

ELK in Jackson Hole Studied to Facilitate Wild-Life Management

The growing complexity of human interests and of economic developments adds to the difficulty of the task of adequately caring for the valuable forms of wild life of the country. This has been brought to attention most strikingly in the past few years through studies made by the Bureau of Biological Survey of the southern Yellowstone Park elk at the elk refuge maintained in Jackson Hole, Wyo.

The public has become familiar with the plight of the elk herds, the crowding of the animals into restricted areas by the encroachment of civilization, and the starvation of the animals in hard winters, with the splendid response of public-spirited individuals and organizations, and

The great utility of this method of tabulation lies in the facility with which material may be reclassified or subdivided. An example of this kind is a study recently made of the consumption of dairy products by farm families. The basic information was secured by obtaining about 10,000 questionnaires from as many farm families. Each questionnaire showed the number of adults, number of children, milk consumed per week, number of cows, and other related questions. From the answers to these questions the investigators sought to determine: (1) Average consumption of milk per farm family; (2) average consumption of milk by farm families having no cows to compare with average consumption of milk by farm families having cows; and (3) average consumption per capita among adults to compare with average consumption per capita for families with children.

The answers to the questionnaires were recorded on punch cards, each card representing a farm family. It was then possible by successive sorting and tabulating operations to obtain the total milk consumption for all farm families in a certain State, for families having no cows, for families having cows, for families without children, and for families with children. With each of these tabulations the number of families or cards were counted, and the number of persons classified as adults or children, and total milk consumed, were all automatically printed on a strip of paper. The whole tabulating process, involving 10,000 reports, required but a few days' work on the two machines.

The use of machines is not confined to any one bureau of the Department of Agriculture or to any particular type of work. The folling bureaus make use of the machines in connection with their research work, and in some cases prepare reports of appropriations and expenditures: Agricultural Economics, Animal Industry, Biological Survey, Dairy Industry, Forest Service, and Public Roads.

The Bureau of Dairy Industry utilizes the punched cards and machines in connection with the work of the cow-testing associations while the Bureau of Biological Survey has a very interesting application in its study of bird migration through the banding method.

In spite of the labor-saving features of the machines the work handled on them is now so extensive that from 50 to 75 persons are employed in the various machine units, and the total card requirements are approximately 6,000,000 a year.

E. J. Way,
Senior Administrative Assistant,
Bureau of Agricultural Economics.

Elk in Jackson Hole Studied to Facilitate Wild-Life Management

The growing complexity of human interests and of economic developments adds to the difficulty of the task of adequately caring for the valuable forms of wild life of the country. This has been brought to attention most strikingly in the past few years through studies made by the Bureau of Biological Survey of the southern Yellowstone Park elk at the elk refuge maintained in Jackson Hole, Wyo.

The public has become familiar with the plight of the elk herds, the crowding of the animals into restricted areas by the encroachment of civilization, and the starvation of the animals in hard winters, with the splendid response of public-spirited individuals and organizations, and with the action of the Federal Government and State agencies to meet the situation. What is not so well known perhaps is that serious difficulties are encountered in adopting permanent plans for the care of the elk, and that some of the very necessary relief measures designed to remedy the situation have often been harmful in certain respects to the elk.

In the course of investigations by the Biological Survey, it has been discovered that each winter a certain percentage of the elk that come to the refuge die of disease. During the season of 1927–28 necrotic stomatitis, known to cattlemen as "calf diphtheria," or "sore mouth," was responsible for the loss of approximately 18 per cent of the calves, and it was not a particularly bad winter for game. The cause of this disease among these elk is chiefly the same as among some herds of domestic stock, namely, eating hay containing squirreltail grass (*Hordeum jubatum*). Thus, in efforts to assist the elk, man may be responsible for other dangers to the herds.

Steps are now being taken to avoid the purchase of hay containing harmful grasses and to eliminate these dangerous plants from the hay fields of the elk refuge. Even if this can be accomplished, however, the problem will not be solved. The task is larger. It does not greatly differ from some of our own social problems. How shall we aid our paupers, our unemployed, to their lasting benefit? How shall we assist the elk, in their winter forage problem, without pauperizing them? For these canny creatures, recognizing the helping hand, quickly become dependent, and eventually might lose much of their ability to rustle for themselves.

Investigations in Progress

The investigations now in progress are designed to solve some of the difficulties of management of these big-game animals. As a basis, it is necessary to have complete information on the life history of the elk, their food preferences, their breeding habits, their migrations, and other habits, in fact, a knowledge of all the factors that bear upon their welfare. Much information has already been obtained on the food habits of the animals. Elk are known to be chiefly grazing animals; it is known that under natural conditions cured grasses, which they obtain by scraping away the snow, constitute their chief winter forage, but that browse is also utilized to a great extent in winter. Inclosures now constructed in Jackson Hole will be used for various feeding experiments and in studying the effects of parasites, particularly ticks.

There is much to be learned before all the details can be worked out. The problems of diseases and parasites must be studied carefully. The food question requires further work. But enough has already been learned to outline some of the first requisites of a satisfactory management plan.

Heretofore the elk have been cared for chiefly by emergency feeding measures. These have been very necessary, but plans must be modified for permanent use. The present elk refuge administered by the Biological Survey is 4,560 acres in extent. Hay is harvested here each year and is fed to the elk in winter whenever conditions make it necessary. In theory, such artificial feeding is required only when snows on the neighboring foothills make the natural forage unavailable. But this is not the case in actual practice. The elk have learned to rely on the hay provided at the elk refuge, and each winter promptly repair to the feeding grounds. If feeding is delayed for some time the animals soon begin to worry the neighboring ranchers by breaking into their haystacks and interfering with the feeding of domestic stock. Thus feeding must very often begin early enough on the elk refuge to relieve the ranchers.

Sometimes as many as 8,000 elk congregate on feeding grounds maintained by the Federal Government and the State of Wyoming, and as many as 4,000 may assemble in a single area. There they remain throughout the winter, awaiting their daily hay ration. Such congestion of game animals is most undesirable and dangerous from a sanitary viewpoint. Under present conditions disease takes toll every winter, and there is always the dreaded possibility of an epizootic of a more deadly nature and of disastrous proportions.

Larger Winter Range Needed

The remedy for such conditions is to be found in a larger winter range, where the animals can not molest nor be molested by adjacent ranchers. It has been proposed that these neighboring ranches be purchased and added to the present refuge, thus furnishing natural pasturage on their former wintering areas for the elk of the Yellowstone Park and adjacent national forests, and obviating the necessity of feeding except in emergencies. It is certain that with enlarged grazing areas available, the elk would pass many winters in comfort without being fed artificially. Hay would be kept in reserve for a real emergency, however, as when alternate thawing and freezing produce a heavy snow crust through which the elk are unable to reach the natural forage.

The studies now being made by the Biological Survey should help not only to solve the elk problem of Jackson Hole but also to furnish facts bearing on big-game administration in other districts, whenever similar problems arise. The present programs of scientific study of wild life, undertaken by those having to do with its administration, are encouraging to conservationists. Only with more accurate knowledge of the food habits, diseases, and various biological factors, affecting our wild life, shall we be able to care for the various species efficiently.

OLAUS J. MURIE,
Biologist, Bureau of Biological Survey.

ENTOMOGENOUS Fungi Attack and Destroy Many Harmful Insects

While the injurious effects of fungi are recognized as the cause of many serious plant diseases, the fact that these organisms may be an asset as well as a liability to the farmer should not be overlooked. This is especially true of the so-called entomogenous fungi, which attack insects and thus assist man in his fight against these pests. These fungi, however, should not be depended upon as an unfailing means of insect control. Their usefulness is limited by the fact that they require a high degree of heat and humidity for their best development. Under such conditions they have been very useful in Florida, Cuba, and Porto Rico, and in other semitropical regions in the natural control of scales, white flies, aphids, and other serious insect pests.

the feeding grounds. If feeding is delayed for some time the animals soon begin to worry the neighboring ranchers by breaking into their haystacks and interfering with the feeding of domestic stock. Thus feeding must very often begin early enough on the elk refuge to relieve the ranchers.

Sometimes as many as 8,000 elk congregate on feeding grounds maintained by the Federal Government and the State of Wyoming, and as many as 4,000 may assemble in a single area. There they remain throughout the winter, awaiting their daily hay ration. Such congestion of game animals is most undesirable and dangerous from a sanitary viewpoint. Under present conditions disease takes toll every winter, and there is always the dreaded possibility of an epizootic of a more deadly nature and of disastrous proportions.

Larger Winter Range Needed

The remedy for such conditions is to be found in a larger winter range, where the animals can not molest nor be molested by adjacent ranchers. It has been proposed that these neighboring ranches be purchased and added to the present refuge, thus furnishing natural pasturage on their former wintering areas for the elk of the Yellowstone Park and adjacent national forests, and obviating the necessity of feeding except in emergencies. It is certain that with enlarged grazing areas available, the elk would pass many winters in comfort without being fed artificially. Hay would be kept in reserve for a real emergency, however, as when alternate thawing and freezing produce a heavy snow crust through which the elk are unable to reach the natural forage.

The studies now being made by the Biological Survey should help not only to solve the elk problem of Jackson Hole but also to furnish facts bearing on big-game administration in other districts, whenever similar problems arise. The present programs of scientific study of wild life, undertaken by those having to do with its administration, are encouraging to conservationists. Only with more accurate knowledge of the food habits, diseases, and various biological factors, affecting our wild life, shall we be able to care for the various species efficiently.

OLAUS J. MURIE,
Biologist, Bureau of Biological Survey.

ENTOMOGENOUS Fungi Attack and Destroy Many Harmful Insects While the injurious effects of fungi are recognized as the cause of many serious plant diseases, the fact that these organisms may be an asset as well as a liability to the farmer should not be overlooked. This is especially true of the so-called entomogenous fungi, which attack insects and thus assist man in his fight against these pests. These fungi, however, should not be depended upon as an unfailing means of insect control. Their usefulness is limited by the fact that they require a high degree of heat and humidity for their best development. Under such conditions they have been very useful in Florida, Cuba, and Porto Rico, and in other semitropical regions in the natural control of scales, white flies, aphids, and other serious insect pests.

Fungi that flourish in these regions would be of little value in countries having less favorable climatic conditions. It should be noted that many of these fungi are now widely distributed in the regions where their host insects occur, so that when the proper climatic conditions obtain they multiply practically as rapidly without as they do with artificial distribution.

Efforts to spread infection among insects have been carried on in several ways. In some instances diseased insects are placed where they will come in contact with healthy individuals or the fungous spores mixed with flour and blown on insect-infested plants. A simple method practiced against scale insects is to select a leaf covered with scales that are heavily infected with the fungi and pin it in the center of a tree, where healthy insects will come in contact with it. When naturally infected insects are not available an infection may be produced from specially prepared cultures of the proper fungus.

In order to produce an entomogenous fungus in large quantities it may be grown on a suitable culture medium such as cornmeal, potato cylinders, or extract of beef or of some vegetable, or even on a decoction prepared from the bodies of the insect hosts. Certain fungi that have been difficult to grow artificially will thrive on bits of sterilized fish or egg and potato.

Kinds of Fungi that Attack Insects

Several hundred fungi parasitic on many different kinds of insects have been reported, but in the present article only brief descriptions of a few conspicuous examples will be given.

Among the most familiar and conspicuous entomogenous fungi are species of the genus Cordyceps. (Fig. 49, A, B, D, E.) They are of wide geographic distribution but exceedingly abundant in the Tropics and attack a large variety of insects. They appear as erect, mostly club-shaped growths, varying from one-fourth of an inch to 3 inches in height, and range in color from dark slate or subdued gray to brilliant orange or red. Fungi of this group have two distinct stages in their development. Often in a tramp through the woods one will notice on or about rotting logs a white or delicately tinged feathery growth which on closer examination will be found to issue from the body of a partially concealed or buried insect. If this growth is shaken a fine white powder will be noticed. This powder consists of numerous minute spores that are capable of starting a new infection. Later a club-shaped, generally orange body develops, which produces another kind of spores.

Species of Entomophthoreae (fig. 49, H) are among the most common of the entomogenous fungi and attack many different insects including flies, grasshoppers, aphids, scales, South African locusts, thrips, cutworms, clover-leaf weevils, and others. These fungi may appear as fine white cobwebs covering the insects and in the case of the common house fly attaching them to windowpanes like a white halo, or in other instances fastening them to wood, leaves, sticks, or whatever plant host the insects may have attacked. Sometimes species of Entomophthoreae produce a definite growth as a band or mat or spongy layer on or around the body of the insect, or they may develop entirely within the body of the victim and show no external growth. These fungi not only act as a check in the multiplication of insects but also cause a high mortality among the adults. One species is very common on aphids,

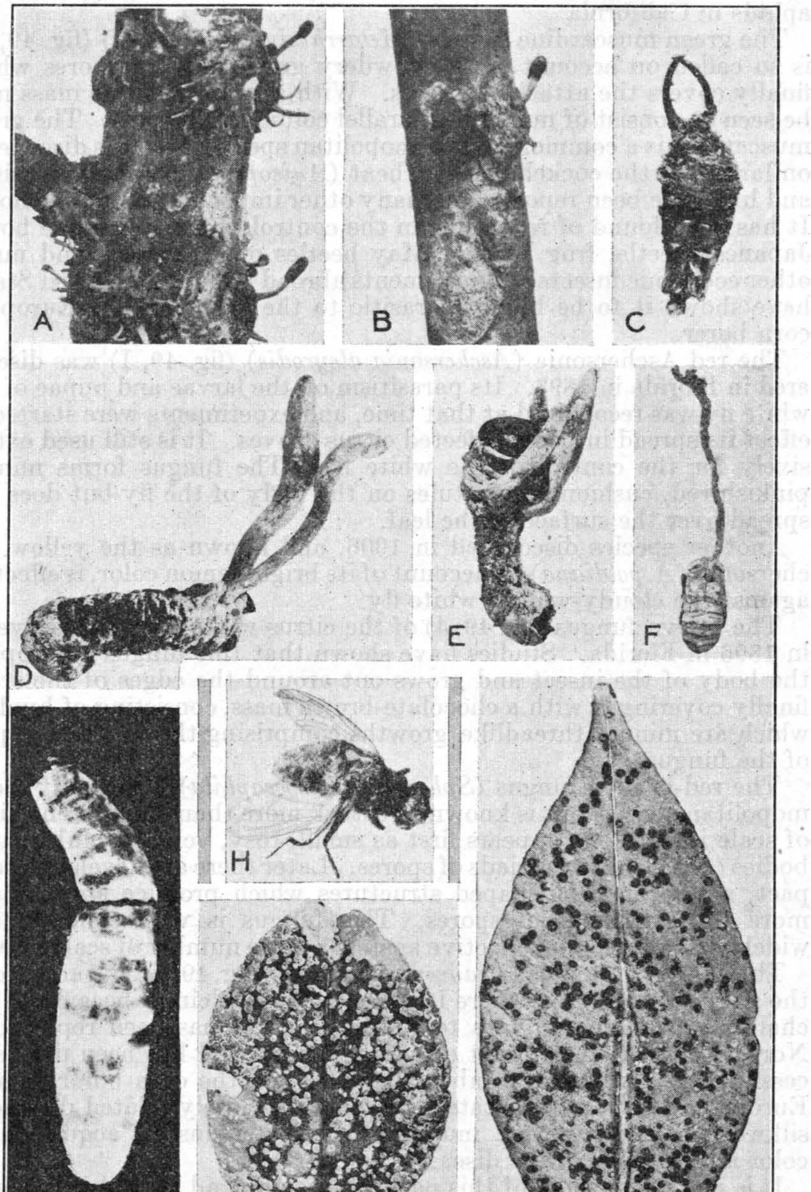


FIGURE 49.—Fungi that attack insects: A and B, *Cordyceps clavulata* on *Lecanium* sp.; C, *Metarrhizium anisopliae* on *Forficula auricularia;* D and E, *Cordyceps ricksii;* F, *Cordyceps sobolifera;* G, *Beauveria bassiana* on Japanese corn borer; H, *Entomophthora muscae* on dead house flies; I, *Aschersonia aleyrodes* on Aleyrodes; J, *Aegerita webberi* on *Aleyrodes citri*

and a recent report cites a case of 100 per cent mortality on alfalfa aphids in California.

The green muscardine fungus (*Metarrhizium anisopliae*) (fig. 49, C) is so called on account of the powdery green mass of spores which finally covers the attacked insects. With a hand lens this mass may be seen to consist of numerous parallel columns of spores. The green muscardine is a common and cosmopolitan species, but was discovered on larvae of the cockchafer of wheat (*Anisoplia austriaca*) in Russia and has since been reported on many other important economic hosts. It has been found of real value in the control of the sugarcane borer, Japanese beetle, frog hopper, May beetles of sugarcane, and many other economic insects. Experiments abroad and in the United States have shown it to be highly parasitic to the larvae of the European corn borer.

The red Aschersonia (*Aschersonia aleyrodis*) (fig. 49, I) was discovered in Florida in 1893. Its parasitism on the larvae and pupae of the white fly was recognized at that time, and experiments were started to effect its spread in badly infected citrus groves. It is still used extensively for the control of the white fly. The fungus forms minute pinkish red, cushionlike pustules on the body of the fly but does not spread over the surface of the leaf.

Another species discovered in 1906, and known as the yellow Aschersonia (*A. goldiana*) on account of its bright lemon color, is effective against the cloudy-winged white fly.

The brown fungus (fig. 49, J) of the citrus white fly was discovered in 1896 in Florida. Studies have shown that this fungus develops in the body of the insect and grows out around the edges of the scale, finally covering it with a chocolate-brown mass, consisting of hyphae, which are minute threadlike growths comprising the vegetative part of the fungus.

The red-headed fungus (*Sphaerostilbe coccophila*) is not only a cosmopolitan species but is known to attack more than 15 different kinds of scale insects. It appears first as small, rosy, velvety, club-shaped bodies consisting of myriads of spores. Later there are developed compact, spherical, flask-shaped structures which produce another and more resistant type of spores. This fungus is very common and widely distributed and effective against a large number of scale insects.

The silkworm fungus (*Beauveria bassiana*) (fig. 49, G) is parasitic on the silkworm in Italy, where it is known as "calcino" because of the chalky appearance it gives to the insects. It has been reported in North America on different economic insects and has been used successfully in experimental laboratory work on the corn borer in both Europe and the United States. In another closely related disease of silkworms, known as red muscardine, affected insects acquire a red color at one stage of the disease.

It is not the purpose of this paper to recommend the substitution of entomogenous fungi for effective insecticides, but rather to call attention to a comparatively little-known subject and explain how these fungi may and do aid the farmer in his struggle against insects. Although the results of studies have appeared from time to time, the subject as a whole has not been thoroughly investigated. That it offers much of purely scientific interest is unquestioned; what it still holds of potential economic value is yet to be discovered.

VERA K. CHARLES,
Associate Pathologist, Bureau of Plant Industry.

ETHYLENE-RIPENED Tomatoes Not Equal in Vitamins to Naturally Ripened Fruit The use of ethylene gas in the treatment of unripe fruits and vegetables resulted from a practice that had developed before our present knowledge of the fundamentals of human nutrition had been attained. Citrus fruits, such as oranges and lemons, when picked green will acquire the appearance of ripe fruit rapidly if they are placed in a closed chamber which is heated by an oil burner. This rapid change in the appearance of the fruit was generally attributed to the high temperature and humidity to which the fruit was subjected, but an investigation about 20 years ago demonstrated that the gas produced by the burner was the active agent, and that the exhaust gases of a gasoline engine were equally effective. Ten years later it was shown that ethylene was the product of combustion which had a specific effect on the fruit.

Ethylene gas is now produced in large quantities and compressed in steel cylinders so that it can be readily transported. It is, therefore, a rather simple matter to liberate the desired quantity of gas in an airtight compartment to treat fruit either in storage or in transit. The fruit can be picked at such a stage of maturity that it can be shipped with little danger of injury and loss, and then prepared for market at a rate approximating more nearly the rate of consumption. However, if forced coloration of fruit does not produce a product that is equal in nutritive value to naturally ripened fruit, the fact should be known so that the artificial product may be put in its proper category.

Experiments With Tomatoes

Investigations conducted in the Protein and Nutrition Division of the Bureau of Chemistry and Soils have shown that naturally ripened tomatoes are better sources of vitamins A, B, and C than tomatoes from the same vines that were picked green and then treated with ethylene gas. The tomatoes for these studies were grown and prepared by the food research division of the bureau. Tomatoes were selected at three stages of maturity—fully ripened, full size green, and about the size of an English walnut. Each of the two samples of immature fruit was divided into two equal portions, and one portion was treated with ethylene gas according to common commercial practice. The tomatoes were then canned with a heat treatment just sufficient to prevent spoilage. The vitamin content of the juice of these five lots of tomatoes was determined by feeding experiments. Ethylene treatment did not change the vitamin content of the tomatoes. With respect to each of the vitamins the naturally ripened tomatoes were superior to the ethylene-treated. The most marked difference was apparent in the vitamin C experiments. The full-sized green tomatoes, untreated or ethylene-treated, were markedly inferior to the naturally ripened, and the small green tomatoes contained but very small amounts of this vitamin. The vitamin A or B content of the juice of the ethylene-treated tomatoes did not differ from that of the green tomatoes, irrespective of size when picked or whether or not they were treated with ethylene. The naturally ripened tomatoes contained more of these vitamins than the green tomatoes.

Whether these observations are applicable to all ethylene-treated fruits and vegetables is not known. The fact that fully grown tomatoes treated with ethylene to produce the color of fully ripened fruit are decidedly inferior as a source of vitamin C to the vine-ripened tomatoes from the same plant indicates that vitamin C is formed largely during the final stage of ripening and that forced coloration with ethylene is not ripening in every sense of that word. The softening of tissues that occurs with ripening was apparent in the ethylene-treated tomatoes, and the juice could be expressed more readily when the treatment had been applied than in comparable untreated tomatoes. It seems very desirable to have a great deal of additional information in regard to the changes induced in fruits by ethylene treatment so that, if advisable, the process and resulting products can be used with discretion.

These studies offer additional evidence to the effect that in the handling of perishable food products new methods or processes which solve spoilage problems satisfactorily should not be accepted without first investigating the effect the process may have on the nutritive value of the product.

E. M. NELSON,
Senior Chemist, Bureau of Chemistry and Soils.

EXHIBITS Prepared by the Department Are in Growing Demand Exhibits have long been instrumental in disseminating information. They have had much to do with the advancement of industry and agriculture the world over. People in general grasp readily the significance of what they see.

In practically all the State, interstate, regional, county, and community fairs, agriculture and the industries dependent upon it have occupied the prominent place. Exhibits have afforded the observer opportunity to comprehend quickly progress in agricultural science and practice, and have enabled him to apply new knowledge to the solution of his own problems.

For a long time the United States Department of Agriculture has recognized the value of exhibits as a teaching method and has participated in fairs regularly. Some years ago it was necessary to seek opportunities for the display of department exhibits. That time has passed. Now, although the Office of Exhibits operates under an appropriation making provision for exhibitions at State, interstate, and international fairs, the demand for exhibits is much greater than the supply. During the exhibition season about 20 carload groups of exhibits are displayed at 50 or more State or interstate fairs. Approximately 2,000,000 persons view them.

Formerly the department's exhibits consisted largely of specimens of products, models, or panels presenting photographs and statements. The purpose of some was to show what the Department of Agriculture was doing, of others to stimulate emulation by portraying individual achievement. A marked evolution of purpose and type of exhibit has occurred. To-day the department exhibit must answer affirmatively the question: Will it give the visitor information likely to make his farming more profitable or his home more comfortable? The department, for instance, does not emphasize the largest ear of corn as the goal to be achieved, but the growing of corn that will bring to the grower the greatest return. What is true of corn applies to all phases of agriculture.

The exhibit must tell its story quickly, strikingly, and convincingly, so as to arrest, hold, and impress the attention of the observer. The decidedly inferior as a source of vitamin C to the vine-ripened tomatoes from the same plant indicates that vitamin C is formed largely during the final stage of ripening and that forced coloration with ethylene is not ripening in every sense of that word. The softening of tissues that occurs with ripening was apparent in the ethylene-treated tomatoes, and the juice could be expressed more readily when the treatment had been applied than in comparable untreated tomatoes. It seems very desirable to have a great deal of additional information in regard to the changes induced in fruits by ethylene treatment so that, if advisable, the process and resulting products can be used with discretion.

These studies offer additional evidence to the effect that in the handling of perishable food products new methods or processes which solve spoilage problems satisfactorily should not be accepted without first investigating the effect the process may have on the nutritive value of the product.

E. M. Nelson,
Senior Chemist, Bureau of Chemistry and Soils.

EXHIBITS Prepared by the Department Are in Growing Demand Exhibits have long been instrumental in disseminating information. They have had much to do with the advancement of industry and agriculture the world over. People in general grasp readily the significance of what they see.

In practically all the State, interstate, regional, county, and community fairs, agriculture and the industries dependent upon it have occupied the prominent place. Exhibits have afforded the observer opportunity to comprehend quickly progress in agricultural science and practice, and have enabled him to apply new knowledge to the solution of his own problems.

For a long time the United States Department of Agriculture has recognized the value of exhibits as a teaching method and has participated in fairs regularly. Some years ago it was necessary to seek opportunities for the display of department exhibits. That time has passed. Now, although the Office of Exhibits operates under an appropriation making provision for exhibitions at State, interstate, and international fairs, the demand for exhibits is much greater than the supply. During the exhibition season about 20 carload groups of exhibits are displayed at 50 or more State or interstate fairs. Approximately 2,000,000 persons view them.

Formerly the department's exhibits consisted largely of specimens of products, models, or panels presenting photographs and statements. The purpose of some was to show what the Department of Agriculture was doing, of others to stimulate emulation by portraying individual achievement. A marked evolution of purpose and type of exhibit has occurred. To-day the department exhibit must answer affirmatively the question: Will it give the visitor information likely to make his farming more profitable or his home more comfortable? The department, for instance, does not emphasize the largest ear of corn as the goal to be achieved, but the growing of corn that will bring to the grower the greatest return. What is true of corn applies to all phases of agriculture.

The exhibit must tell its story quickly, strikingly, and convincingly, so as to arrest, hold, and impress the attention of the observer. The department's Office of Exhibits is ever on the alert to find newer and better methods of presenting agricultural information. All principles of exhibit design and construction are utilized. The requirements make it necessary for the staff that prepares exhibits to become skilled in many different branches of work. Color artists have developed other specialties, such as the making of models in wax, plastic wood, plaster, sheet metal, and rubber, and the fabrication of things by tools and machinery.

Sound and Action Synchronized

During the past two or three years sound synchronized with action and light has been used effectively. One of the most popular types of exhibits the department now has is a talking-animal series consisting of dairy cows, a sow with pigs, a hen, and a ewe and lamb. Exhibits of this type appeal to both eye and ear and tell a story vividly and impressively. (Fig. 50.)

FIGURE 50.—An exhibit in which sound is synchronized with action

Department exhibits usually are not designed to give complete details of a principle, but rather to arouse interest, so that the observer will seek the further information required to put the illustrated principle into practice. The exhibits are supplemented by department publications, of which from 5,000 to 25,000 copies are distributed at each fair at which department exhibits are shown, or nearly half a million during the exhibition season. At one eastern exposition 2,168 visitors, representing 66 occupations and coming from 21 States, requested department publications.

In Arizona some years ago a wool exhibit, designed to demonstrate how to tie fleeces, was shown. A woolgrower, after studying the display, remarked that although wool buyers had told him for years he could get more for wool prepared in this way, he had never before been able to visualize the process. His enthusiasm led, while he was still at the exhibition, to an informal arrangement among neighboring woolgrowers, by which fleeces thereafter were prepared, assembled in quantities, graded, and sold in lots that gave the advantage of carload freight rates and grade prices.

Dairy Exhibits Bring Results

A visitor to the National Dairy Exposition at St. Paul a few years ago, seeing the department's exhibit, was impressed with the facts it presented with respect to the need for better cows. He persuaded his partner to substitute 9 good cows for the 15 low-producing cows they owned. The 9 good cows proved to be twice as profitable as the 15 had been, and required less work and care.

The secretary of a mid-western State fair featured dairy exhibits. Later he wrote:

> The effort that we started, with the assistance of the United States Department of Agriculture in 1923 to give special attention to dairying, is undoubtedly showing results. Increased interest in dairying is evident in almost every section of the State adapted to the industry. We can not claim, of course, all the credit for this, but we know that the sessions of the dairy congress at the fair, supplemented by the valuable dairy exhibits and demonstrations, have been important factors in increasing the interest in dairying.

JOSEPH W. HISCOX,
Chief, Office of Exhibits.

EXPERIMENT Station Record Keeps Track of Research Results

How to keep track of the new facts and findings in agriculture which the various bureaus of the department, the State experiment stations, and other research institutions are daily bringing to light is a problem that constantly confronts investigators, teachers, students, editors, writers, and many other people. So voluminous and scattered is this vast literature that its mere collection is too complicated, too expensive, and too time consuming to be attempted in any comprehensive way by individuals or even by most institutions. It is a specialized task, which becomes more difficult but also more indispensable each year.

Fortunately the need of such a service was recognized by the department at a relatively early stage in the history of agricultural investigation in this country. Soon after the passage of the Hatch Act in 1887, extending Federal aid to the States for the maintenance of agricultural experiment stations, provision was made for the establishment by the Office of Experiment Stations of an abstract journal which would summarize the results reported from time to time by these stations and the department. This record of the station work was named Experiment Station Record and was first issued in 1889. It has been keeping on with this task ever since, and consequently there are now assembled within its pages a complete epitome of the station and department publications for over 40 years.

Soon after the Record was started, however, its scope was broadened to include abstracts of all new findings of interest to agricultural science, regardless of their origin or channel of publication. This change was desirable because science knows no national boundaries, and the discovery of a new principle in animal nutrition or of a means of controlling a plant disease may be as vital whether made in Arkansas or in Bulgaria, or whether revealed in a station bulletin or an obscure foreign periodical. Accordingly the Record has been for many years, to the extent that its space limits have permitted, a digest of the world's agricultural research. Each year there are compressed into its available space of 1,800 printed pages the essential findings from perhaps 7,000 articles, representing in the original half-million pages more than a dozen languages and most of the civilized nations of the globe. During its entire history approximately 200,000 articles have thus been made available through its columns.

Library Receipts Examined Daily

What may be thought of as the raw material for this extensive grist comes chiefly through the department library. The heavy daily library receipts are examined carefully by a trained library assistant, The secretary of a mid-western State fair featured dairy exhibits. Later he wrote:

The effort that we started, with the assistance of the United States Department of Agriculture in 1923 to give special attention to dairying, is undoubtedly showing results. Increased interest in dairying is evident in almost every section of the State adapted to the industry. We can not claim, of course, all the credit for this, but we know that the sessions of the dairy congress at the fair, supplemented by the valuable dairy exhibits and demonstrations, have been important factors in increasing the interest in dairying.

JOSEPH W. HISCOX,
Chief, Office of Exhibits.

EXPERIMENT Station Record Keeps Track of Research Results How to keep track of the new facts and findings in agriculture which the various bureaus of the department, the State experiment stations, and other research institutions are daily bringing to light is a problem that constantly confronts investigators, teachers, students, editors, writers, and many other people. So voluminous and scattered is this vast literature that its mere collection is too complicated, too expensive, and too time consuming to be attempted in any comprehensive way by individuals or even by most institutions. It is a specialized task, which becomes more difficult but also more indispensable each year.

Fortunately the need of such a service was recognized by the department at a relatively early stage in the history of agricultural investigation in this country. Soon after the passage of the Hatch Act in 1887, extending Federal aid to the States for the maintenance of agricultural experiment stations, provision was made for the establishment by the Office of Experiment Stations of an abstract journal which would summarize the results reported from time to time by these stations and the department. This record of the station work was named Experiment Station Record and was first issued in 1889. It has been keeping on with this task ever since, and consequently there are now assembled within its pages a complete epitome of the station and department publications for over 40 years.

Soon after the Record was started, however, its scope was broadened to include abstracts of all new findings of interest to agricultural science, regardless of their origin or channel of publication. This change was desirable because science knows no national boundaries, and the discovery of a new principle in animal nutrition or of a means of controlling a plant disease may be as vital whether made in Arkansas or in Bulgaria, or whether revealed in a station bulletin or an obscure foreign periodical. Accordingly the Record has been for many years, to the extent that its space limits have permitted, a digest of the world's agricultural research. Each year there are compressed into its available space of 1,800 printed pages the essential findings from perhaps 7,000 articles, representing in the original half-million pages more than a dozen languages and most of the civilized nations of the globe. During its entire history approximately 200,000 articles have thus been made available through its columns.

Library Receipts Examined Daily

What may be thought of as the raw material for this extensive grist comes chiefly through the department library. The heavy daily library receipts are examined carefully by a trained library assistant, reservations are made of those publications reporting the results of experimental work, and soon the articles are in the hands of the Record's corps of 12 specialists by whom the abstracts are prepared. In the case of the station and department publications, a special and somewhat more elaborate procedure is followed, to insure that they are received and abstracted as systematically and completely as possible and that the abstracts are printed promptly and in chronological order. This service, not attempted by any other abstracting agency, assembles the results of the work of these institutions into compact and convenient form and disseminates the information all over the world. Advance carbon copies of the station and department abstracts are also made available under a cooperative agreement to Biological Abstracts and Social Science Abstracts, so that those abstracts which are of interest to their readers reach in this way an even wider circle without duplication of work.

Each issue of the Record contains about 400 abstracts, and for the greater convenience of users these are classified under 20 subject headings. The headings at present in use include the following: Agricultural and Biological Chemistry; Meteorology; Soils—Fertilizers; Agricultural Botany; Genetics; Field Crops; Horticulture; Forestry; Diseases of Plants; Economic Zoology—Entomology; Animal Production; Dairy Farming—Dairying; Veterinary Medicine; Agricultural Engineering; Rural Economics and Sociology; Agricultural and Home Economics Education; Foods—Human Nutrition; Textiles and Clothing; Home Management and Equipment; and Miscellaneous.

The various sections necessarily overlap to some extent, so that several may need to be followed to obviate the danger of an oversight. For example, the dairyman often finds articles of interest in the sections on Agricultural and Biological Chemistry, Veterinary Medicine, and Rural Economics and Sociology, while the horticulturist may also be concerned with material appearing under the headings of Agricultural Botany, Diseases of Plants, and Economic Zoology—Entomology. Ultimately, however, there are available for each volume author and subject indexes in which sectional lines are disregarded.

The indexes are unusually detailed and comprehensive. In addition to the volume indexes three general subject indexes have been issued covering, respectively, volumes 1 to 12, 13 to 25, and 26 to 40. It is expected that a similar index for volumes 41 to 50 will shortly be available, and corresponding issues on a 10-volume basis are projected for the subsequent volumes.

Guide to Past Accomplishments

The Record is used not only as a means of keeping track of what is current in agricultural science but as a guide to the accomplishments of the past. The second of these functions is of exceptional value in experimentation. Research represents an advance in knowledge over what has already been discovered, and one of the first tasks of the investigator, whether of an insect pest, plant disease, or a problem of genetics or nutrition, is to ascertain what has already been done by others. Without the services of an abstract journal or some similar aid, the proverbial "looking for a needle in a haystack" would be a comparatively easy occupation.

The data are also of much value to the many people, such as teachers, extension specialists, and students, who may need either a current or a permanent record. Writers of textbooks, treatises, and magazine and newspaper articles find in its pages a veritable mine of information. Within recent years an important group of subscribers has consisted of manufacturers of foods and fertilizers and other commercial interests who look to the Record as a means of keeping them in touch with some of the significant developments in their respective fields.

The Record was for many years issued monthly, but as the amount of literature to be abstracted increased additional numbers were added. The last enlargement of space took place in 1911. Since that time two volumes a year have appeared, each comprising six monthly and three supplementary, or "abstract," numbers of 100 pages each and an index number. The "abstract numbers" are so called because they consist almost wholly of abstracts, whereas from 10 to 15 per cent of the space in the issues bearing the names of the months is given over to editorials and notes.

Like most other technical publications of the department the free distribution of the Record is closely restricted. It is generally available to libraries, particularly those of scientific and educational institutions. The research and teaching staffs of such institutions in this country and Canada are also eligible, within the limits of the edition, as are representatives of the press in the agricultural field.

The Record is available by purchase through the Superintendent of Documents, Government Printing Office, at the rate of 75 cents per volume, or $1.50 per year, and the list of paid subscribers is constantly increasing. Many of these are the commercial interests previously referred to. The demand from all classes of readers is steadily growing.

HOWARD LAWTON KNIGHT,
Editor, Experiment Station Record.

EXTENSION Service Review Keeps Extension Workers Advised of Developments

In May, 1930, the Extension Service of the Department of Agriculture began a monthly publication entitled "Extension Service Review." The purpose of this periodical is to keep extension workers in every part of the United States acquainted with the latest results and methods in the extension field.

The need for a printed publication to help in the dissemination of extension information had been felt for many years, but owing to a lack of funds nothing had been accomplished. Recently the need for such a publication had become both frequent and insistent, and the Office of Information secured the approval of the Bureau of the Budget to the publication of a monthly periodical. The Review supersedes such informal mimeographed periodicals as the Extension Horticulturist, Boys' and Girls' 4-H Club Leader, Timely Extension Information, and Home Demonstration Review, and is the only official periodical that covers the entire field of extension activity.

The Extension Service Review contains 16 pages of printed matter and illustrations, together with a colored cover. It is set in 3-column census form, 8-point type, with attractive column headings. The issue is limited to 10,000 copies, and the publication is sent free to all extension employees, teachers in agricultural colleges, experiment station workers, college libraries, and to a few foreign correspondents.

or a permanent record. Writers of textbooks, treatises, and magazine and newspaper articles find in its pages a veritable mine of information. Within recent years an important group of subscribers has consisted of manufacturers of foods and fertilizers and other commercial interests who look to the Record as a means of keeping them in touch with some of the significant developments in their respective fields.

The Record was for many years issued monthly, but as the amount of literature to be abstracted increased additional numbers were added. The last enlargement of space took place in 1911. Since that time two volumes a year have appeared, each comprising six monthly and three supplementary, or "abstract," numbers of 100 pages each and an index number. The "abstract numbers" are so called because they consist almost wholly of abstracts, whereas from 10 to 15 per cent of the space in the issues bearing the names of the months is given over to editorials and notes.

Like most other technical publications of the department the free distribution of the Record is closely restricted. It is generally available to libraries, particularly those of scientific and educational institutions. The research and teaching staffs of such institutions in this country and Canada are also eligible, within the limits of the edition, as are representatives of the press in the agricultural field.

The Record is available by purchase through the Superintendent of Documents, Government Printing Office, at the rate of 75 cents per volume, or $1.50 per year, and the list of paid subscribers is constantly increasing. Many of these are the commercial interests previously referred to. The demand from all classes of readers is steadily growing.

HOWARD LAWTON KNIGHT,
Editor, Experiment Station Record.

EXTENSION Service Review Keeps Extension Workers Advised of Developments

In May, 1930, the Extension Service of the Department of Agriculture began a monthly publication entitled "Extension Service Review." The purpose of this periodical is to keep extension workers in every part of the United States acquainted with the latest results and methods in the extension field.

The need for a printed publication to help in the dissemination of extension information had been felt for many years, but owing to a lack of funds nothing had been accomplished. Recently the need for such a publication had become both frequent and insistent, and the Office of Information secured the approval of the Bureau of the Budget to the publication of a monthly periodical. The Review supersedes such informal mimeographed periodicals as the Extension Horticulturist, Boys' and Girls' 4-H Club Leader, Timely Extension Information, and Home Demonstration Review, and is the only official periodical that covers the entire field of extension activity.

The Extension Service Review contains 16 pages of printed matter and illustrations, together with a colored cover. It is set in 3-column census form, 8-point type, with attractive column headings. The issue is limited to 10,000 copies, and the publication is sent free to all extension employees, teachers in agricultural colleges, experiment station workers, college libraries, and to a few foreign correspondents.

The Review is on sale by the Superintendent of Public Documents in Washington, D. C., at a price of 50 cents a year to all others who may wish to obtain it.

The Review features from month to month statements or stories of outstanding extension accomplishments and methods. The field work is represented as far as space permits by news items contributed by the several State extension services. Many of these items and stories are illustrated by photographs sent in by correspondents in the field. Every attempt is made to select and use attractive and artistic illustrations.

Promoting Farm Board's Policies

In view of the fact that the extension forces have been cooperating closely with the work of the Federal Farm Board in its educational program, the Review has devoted much space to this type of extension work. Articles by members of the board, statements issued by the board, and facts and data obtainable from it have been printed from time to time.

The Review contains an editorial page in which are reflected the policies and opinions of the Extension Service. The editorials are planned to help extension workers and to strengthen extension field activities. Administrative announcements of importance are made from time to time, and changes in organization and personnel appear as occasion warrants. The Review frequently mentions new publications of interest to extension agents that they may be familiar with what is being written concerning their activities.

The Review is frequently used to bring to the attention of the field what the department and its bureaus have to offer for the extension of agricultural information. One page of the cover is devoted monthly to the presentation in advertising form of charts, photographs, movie films, bulletins, and other material that has recently been issued. In its columns there appear from time to time reviews and notices of recent publications that are of value to field agents.

All phases of extension are covered as fully as possible; 4-H club work, home demonstration work, and county agricultural agent work receive attention month by month. In each issue there are several signed articles written by members of the extension force. It is the intention of the editors to make the Extension Service Review in the fullest sense serve the entire field force of the cooperative extension service.

F. A. Merrill,
Senior Agriculturist, Office of Cooperative Extension Work.

FABRICS for Children's Play Suits Tested for Resistance to Weather

The lightweight durable clothing materials now on the market make it easy for children to enjoy the outdoors in rainy or cold weather. With just a little attention to appropriate clothing for open-air exercise, the average child can keep warm and dry without the burden of heavy wraps. The Bureau of Home Economics has recently made a study of both cotton and woolen materials to determine their suitability for playtime use. The woolens varied from closely woven coverts to the more open blanket materials. The cottons were for the most part closely woven

The Review is on sale by the Superintendent of Public Documents in Washington, D. C., at a price of 50 cents a year to all others who may wish to obtain it.

The Review features from month to month statements or stories of outstanding extension accomplishments and methods. The field work is represented as far as space permits by news items contributed by the several State extension services. Many of these items and stories are illustrated by photographs sent in by correspondents in the field. Every attempt is made to select and use attractive and artistic illustrations.

Promoting Farm Board's Policies

In view of the fact that the extension forces have been cooperating closely with the work of the Federal Farm Board in its educational program, the Review has devoted much space to this type of extension work. Articles by members of the board, statements issued by the board, and facts and data obtainable from it have been printed from time to time.

The Review contains an editorial page in which are reflected the policies and opinions of the Extension Service. The editorials are planned to help extension workers and to strengthen extension field activities. Administrative announcements of importance are made from time to time, and changes in organization and personnel appear as occasion warrants. The Review frequently mentions new publications of interest to extension agents that they may be familiar with what is being written concerning their activities.

The Review is frequently used to bring to the attention of the field what the department and its bureaus have to offer for the extension of agricultural information. One page of the cover is devoted monthly to the presentation in advertising form of charts, photographs, movie films, bulletins, and other material that has recently been issued. In its columns there appear from time to time reviews and notices of recent publications that are of value to field agents.

All phases of extension are covered as fully as possible; 4-H club work, home demonstration work, and county agricultural agent work receive attention month by month. In each issue there are several signed articles written by members of the extension force. It is the intention of the editors to make the Extension Service Review in the fullest sense serve the entire field force of the cooperative extension service.

F. A. Merrill,
Senior Agriculturist, Office of Cooperative Extension Work.

FABRICS for Children's Play Suits Tested for Resistance to Weather

The lightweight durable clothing materials now on the market make it easy for children to enjoy the outdoors in rainy or cold weather. With just a little attention to appropriate clothing for open-air exercise, the average child can keep warm and dry without the burden of heavy wraps. The Bureau of Home Economics has recently made a study of both cotton and woolen materials to determine their suitability for playtime use. The woolens varied from closely woven coverts to the more open blanket materials. The cottons were for the most part closely woven and included, beside a new experimental cloth, such materials as sailcloth, drill, jean, duck, mechanical cloth, cotton suède, and a special British twill cloth manufactured in England for the Grenfell mission in Labrador. Among the fabrics submitted by the manufacturers was discovered a new American cloth particularly well adapted for use in play suits.

The shower-proofed fabrics shown in Figure 51 were found to be of special interest. The British twill cotton material (fig. 51, B) is being successfully used for outer garments to resist wind and moisture in the far North. Both the British twill and the new American cloth (fig. 51, A) were made from long-fibered, 2-ply cotton yarns, but the yarns of the twill are finer and of lower twist. Since experiments with these two fabrics show that the new American cotton wears better and tears less easily, it is naturally the better adapted to play-suit requirements. The duck (fig. 51, C) is another fabric made from 2-ply cotton yarns especially noteworthy for its strength. The covert (fig. 51, D) seems to be outstanding among the woolen materials for its wearing qualities.

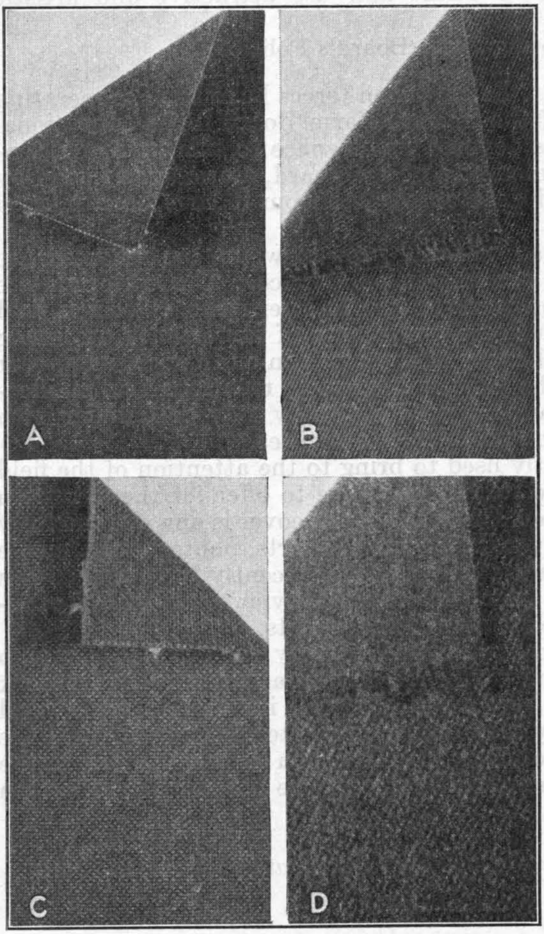


FIGURE 51.—A, New American cloth; B, British twill cloth; C, duck; D, covert

Examined Under Standard Conditions

A representative list and description of the various fabrics studied is given in Table 7. All the fabrics were examined under the required standard conditions for the following: Thread count (threads per inch in both the warp and the filling direction), yarn size, weight per square yard, thickness, tensile strength, stretch, bursting strength, resistance to tear and to wear, washability, air permeability (ease with which air passes through the fabric), and heat-retaining value. Inasmuch as different materials are not affected in the same way by varying amounts of moisture in the air, it was necessary, previous to any observations, to expose the test samples in a laboratory having known constant humidity conditions.

TABLE 7.—*A comparison of the construction, weight, and tensile strength of a representative group of the fabrics considered for children's play suits*

Fabric	Weave	Thread count per inch		Weight per square yard	Tensile strength per inch [1]	
		Warp	Filling		Warp	Filling
Cotton:		*Number*	*Number*	*Ounces*	*Pounds*	*Pounds*
Duck	Plain	63	56	9.3	118	107
British twill cloth	Twill	192	92	5.0	113	43
New American cloth	Plain	100	87	6.1	81	100
Sailcloth (in gray)	do	100	104	5.1	77	86
Sailcloth dyed	do	106	99	5.0	72	75
Drill	Drill	105	61	5.3	82	32
Suède	Sateen	77	100	10.9	77	59
Woolen:						
Covert	Twill	62	65	12.3	65	29
Blanket material (napped)	Broken twill	28	28	12.4	27	13
Kasha	Twill	82	67	3.8	21	9.5
Flat knit (napped)	Plain	[2] 19	[3] 23	13.2		

[1] Strip samples 1 inch in width were used for the tensile-strength tests. [2] Wales. [3] Courses.

Power-Operated Tester Used

The strength and the tear tests were made with a power-operated tester. For a tensile-strength determination, strip samples cut both warp and filling wise were used. While the machine jaws separated at a uniform rate, an automatic recorder gave the stretch of the sample with increasing load, as well as the pull in pounds required to break the strip. The tear-test samples, which were cut longer on one side than the other, were always clamped with the shorter side stretched taut so that additional separation of the jaws would tear the cloth. For the bursting-strength tests the fabric jaws were replaced by a special ball-burst attachment. With this device a cloth sample fixed in position between two flat rings was ruptured by being drawn down over a steel ball.

In order to compare the effect of hard wear upon the fabrics, they were rubbed under tension by an abrasive sea-sand surface in an oscillating-type abrasion machine. Under these conditions the duck was more than twice as resistant to wear as any other fabric. The new American cotton cloth was next in order, and the woolen covert compared favorably with this. All the other fabrics were much lower.

When the results of the strength and durability tests are considered as a whole, the duck and the new American cotton cloth rank the highest of the cotton goods, and the covert the highest of the woolens. While the duck stands the highest of all the fabrics in these mechanical tests, it seems somewhat bulky and stiff for young children, but it would be especially useful for the boys of school age who wear overalls over their regular clothing on cool days. Although the cotton suèdes gave high tests for tear and for bursting strength, they did not resist abrasion well and were also found to require special care in laundering. The sailcloth in the gray was comparatively high in tear resistance and bursting strength, but the dyed sails and the British twill cloth gave relatively low values.

The woolen covert and the first six cotton fabrics listed in Table 7 had received shower-proof treatment. According to the several types of waterproof tests applied to these fabrics, the British twill, the duck, and the new American cotton cloth were the most impervious to water even after several washings. The covert was satisfactorily shower-proof provided it was not stretched appreciably. Results obtained in the washing tests suggest that all fabrics still need to be tested for shrinkage before they are made into service garments. The highest warp shrinkage for any cotton material was 2 inches per yard. The British twill, which did not shrink at all warpwise, gave a filling shrinkage from 2½ to 3½ inches per yard. (Fig. 52.)

To give an estimate of their relative resistance to wind, the air permeability of the various fabrics was measured. Obviously the fabric having the greatest air permeability will give the least wind resistance. The air flow per minute through the blanket material, which was the most permeable fabric, was about eighty times the value for the new American cotton cloth under the same pressure-difference. When the permeability of the latter is expressed as 1, some of the other fabrics have the following order: Duck, 1.4; British

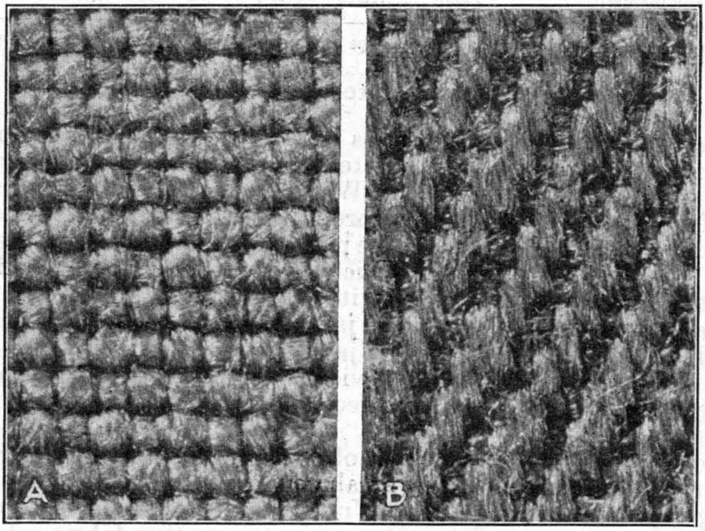


FIGURE 52.—Samples magnified 20 times. The plain weave of the new American cloth (A) and the twill weave of the British cloth (B) are shown clearly

twill cloth and sailcloths, about 2.5; covert, 6.8; drill and cotton suède, approximately 9.0; flat knit woolen, 57.0; kasha, 67.0; blanket material, 80.0.

Heat-Retaining Values

In a comparison of these materials for their heat-retaining value, the blanket material has the highest rating. The flat knit woolen is nearly four-fifths as high. The drill, the British twill, the sailcloth, and the new American cloth are all of the same order, which is a little less than half that of the blanket material when measured under the experimental conditions. Results from 11 to 15 per cent higher than those of this group were obtained for the duck, cotton suède, and covert. These values were computed from observations made on the Sale-Hedrick apparatus, in which the test sample is placed over an electrically heated plate and the current required to keep this plate at a certain definite temperature is determined. An unusually high heat retention was obtained when blanket material was placed under the sailcloth. Even the thin, open, lightweight woolen kasha, which gave a very low heat-retaining value when measured alone, was practically as warm under the sailcloth as the heavier cotton suéde with the same covering. (Fig. 53.)

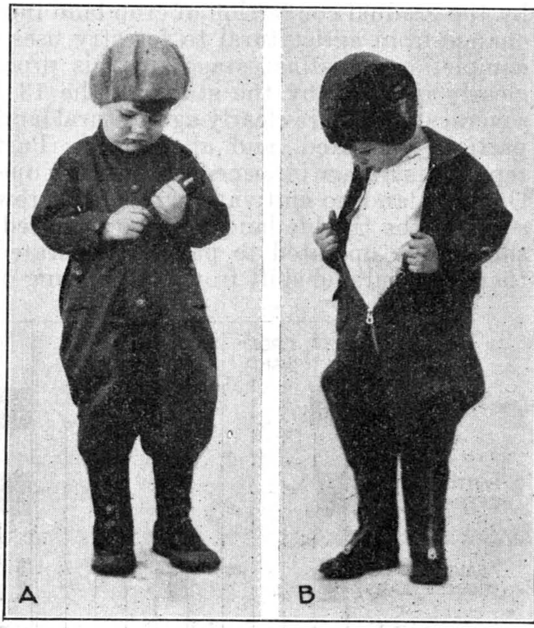


FIGURE 53.—Appropriate suits for play: A, New American cloth; B, woolen covert

The results obtained in these different tests seem to indicate that the needed protection from wind and moisture will be given by one of the tightly woven, low permeability materials such as the new American cotton or a proofed sailcloth. Worn loosely over the regular clothing, it ought to be warm enough for the healthy child engaged in active play under normal conditions. In extremely cold weather, however, it may be necessary to wear under this wind-resistant fabric a warm, lightweight, fluffy material containing many small air spaces. Protected in this way, the average child will have no difficulty in resisting snow, wind, and cold in the severe climates.

K. MELVINA DOWNEY,
Associate Physicist, Bureau of Home Economics.

FARM Abandonment Goes by Definite Stages in Vermont's Hill Towns[3] For decades the rural towns of Vermont, and particularly the rural "hill" towns, have lost in population. During the last 100 years the farmers in the hill towns have been confronted with the necessity of making a succession of major adjustments in their agriculture in response to changes in economic conditions. The lag of the adjustments undertaken and the relative rapidity of economic changes subjected the agriculture of the hill towns to recurring periods of maladjustment. Competition with western farming areas was made increasingly difficult, following the Civil War, by the fact that conditions in the hill towns made impracticable the extensive introduction and use of farm machinery which was revolutionizing the agriculture of the West. The younger generations migrated from the

[3] This article is based on data obtained during the summer of 1929 in the following towns: Granville Roxbury, Fayston, Warren, Ripton, Goshen, Stockbridge, Pittsfield, Sherburne, Plymouth, Mount Holly, Shrewsbury, and Wardsboro. The Division of Land Economics, U. S. Bureau of Agricultural Economics, the Vermont Agricultural Experiment Station, and the Vermont State Department of Forestry cooperated in the study.

under the sailcloth. Even the thin, open, lightweight woolen kasha, which gave a very low heat-retaining value when measured alone, was practically as warm under the sailcloth as the heavier cotton suéde with the same covering. (Fig. 53.)

The results obtained in these different tests seem to indicate that the needed protection from wind and moisture will be given by one of the tightly woven, low permeability materials such as the new American cotton or a proofed sailcloth. Worn loosely over the regular clothing, it ought to be warm enough for the healthy child engaged in active play under normal conditions. In extremely cold weather, however, it may be necessary to wear under this wind-resistant fabric a warm, lightweight, fluffy material containing many small air spaces. Protected in this way, the average child will have no difficulty in resisting snow, wind, and cold in the severe climates.

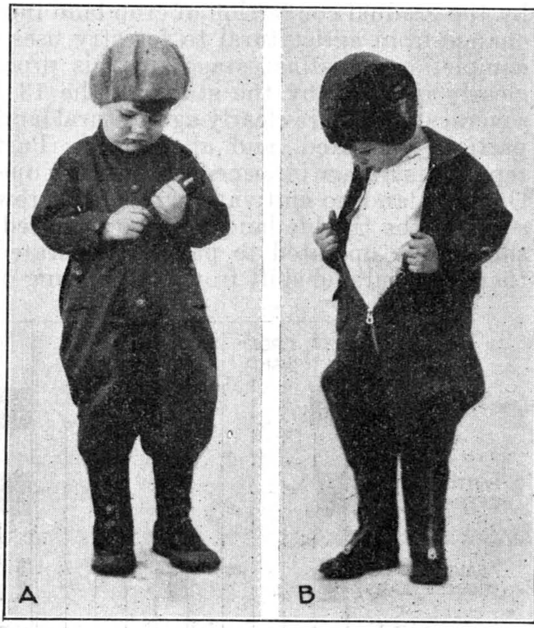


FIGURE 53.—Appropriate suits for play: A, New American cloth; B, woolen covert

K. MELVINA DOWNEY,
Associate Physicist, Bureau of Home Economics.

FARM Abandonment Goes by Definite Stages in Vermont's Hill Towns[3] For decades the rural towns of Vermont, and particularly the rural "hill" towns, have lost in population. During the last 100 years the farmers in the hill towns have been confronted with the necessity of making a succession of major adjustments in their agriculture in response to changes in economic conditions. The lag of the adjustments undertaken and the relative rapidity of economic changes subjected the agriculture of the hill towns to recurring periods of maladjustment. Competition with western farming areas was made increasingly difficult, following the Civil War, by the fact that conditions in the hill towns made impracticable the extensive introduction and use of farm machinery which was revolutionizing the agriculture of the West. The younger generations migrated from the

[3] This article is based on data obtained during the summer of 1929 in the following towns: Granville Roxbury, Fayston, Warren, Ripton, Goshen, Stockbridge, Pittsfield, Sherburne, Plymouth, Mount Holly, Shrewsbury, and Wardsboro. The Division of Land Economics, U. S. Bureau of Agricultural Economics, the Vermont Agricultural Experiment Station, and the Vermont State Department of Forestry cooperated in the study.

hill towns in large numbers to places of greater economic opportunities. One consequence of this exodus of population, in the following decades, was extensive farm abandonment in the hill towns.

Farm abandonment is not a single act, but a process characterized by the gradual conversion of crop land into woodland. The ultimate change from agricultural to forestry uses often requires decades for completion. Distinct stages in this process of abandonment were clearly revealed by the study of the 13 hill towns. To define the several stages more clearly agricultural land was classified as operated, partially operated, and abandoned. Partially operated farm land represents a stage intermediate between operated and abandoned land. On such land no cultivated crops are grown, but some hay is cut or some of the tillable land may be pastured. As the status of a farm shifts from operated to partially operated and then to abandoned, there is a parallel shift from the growing of cultivated crops and hay

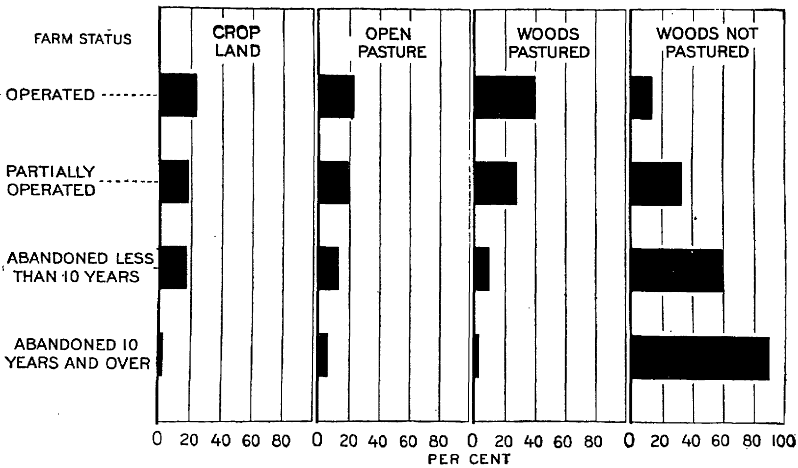


FIGURE 54.—As the status of a farm shifts from operated to partially operated to abandoned there is a parallel shift from the growing of cultivated crops and hay to hay only, from hay to open pasture, from open pasture to woodland pasture, and finally to woodland. The process is seldom reversed

to hay only, from hay to open pasture, from open pasture to woodland pasture, and finally to woodland.

This process is illustrated graphically in Figure 54. The crop land falls from 23.1 per cent of the farm acreage in operated farms to 2.3 per cent of the acreage of farms in the last stage of abandonment. On the other hand, the figures for woodland not pastured, which represents the use corresponding to the last stage of agricultural abandonment, increase with each succeeding stage of abandonment from 13.5 per cent of the total acreage of operated land to 89.9 per cent of the total acreage of land abandoned 10 years and over.

The question naturally arises as to the rate at which this reversion of agricultural land to woodland is proceeding in the 13 towns. On the assumption that woodland comprised the same percentage of the total acreage of land in each status in 1919 as in 1929, the area of woodland in farms in the 13 towns increased from 112,595 acres in 1919 to 118,413 acres in 1929. This estimate indicates that 5,818 acres of agricultural land reverted to woodland during the period 1919–1929. Less than 1,000 acres of this reforested area was planted.

In the past partially operated and abandoned lands ultimately have reverted to woodland. If this process continues, to reforest the 26,344 acres of open land now in partially operated and abandoned land in the 13 towns would require from 50 to 60 years at the rate of natural reforestation during the last decade. Of the 194,072 acres of agricultural land in the 13 towns in 1929, 118,413 acres, or over 60 per cent, was in woodland. More than one-third of the remaining open land is in process of reversion to woodland, as indicated by the fact that 26,344 acres of this open land are classed as partially operated or abandoned land.

Taking the 13 towns, crop land comprised 19.3 per cent of the land in farms, open pasture 18.8 per cent, woods pasture 30.3 per cent, woods not pastured 30.7 per cent, and farmstead and waste 0.9 per cent. Operated land comprised 54.6 per cent of the land in farms in the 13 towns; partially operated, 26.2 per cent; abandoned less than 10 years, 8.9 per cent; abandoned 10 years and over, 10.3 per cent.

For the decade 1919–1929 there were 697 farms classed as operated both at the beginning and at the end of the period. Of these farms, 676 had been operated continuously, 19 had been partially operated at some time during the period, and only 2 had been abandoned. Once abandoned a farm is seldom again operated. There were 154 farms classed as abandoned in 1919, and 152 of these were in the same status in 1929. One was classed as operated and one as partially operated at the end of the period.

Partially operated farms tend to continue as such until abandoned. Among 262 farms classed as partially operated in 1919 only 21 were in the operated status in 1929. But 78 had been abandoned. The sequence is from operated to partially operated to abandoned status. A reversal of this sequence rarely occurs. More than one-fourth of the farms operated in 1919 had passed out of that status in 1929, an average rate of 26.2 farms a year for the 13 towns.

Many of the partially operated farms probably will be abandoned. The buildings on these farms are fast falling into decay, natural reforestation is progressing rapidly, and two important sources of revenue, maple orchards and timber, are seriously reduced if not wholly eliminated. In some instances the farmhouses on these partially operated farms may be used for summer residences, but the probabilities are that the land will be used for growing timber.

During the next 10 or 20 years readjustments should be made in the 13 towns to meet the situation clearly indicated by the present trend in land use.

C. F. Clayton,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

FARM Income Changes Measured Roughly by Representative Reports

Nearly 12,000 farmers reporting to the Department of Agriculture each answered 36 questions related to their own farming operations in 1929. The questions asked the sums received and spent during the year for business purposes, the value of farm property, and other items descriptive of the farm and its business. The purpose of the inquiry was to ascertain direct from farmers the general results of farm operations during the year in different parts of the United States.

In the past partially operated and abandoned lands ultimately have reverted to woodland. If this process continues, to reforest the 26,344 acres of open land now in partially operated and abandoned land in the 13 towns would require from 50 to 60 years at the rate of natural reforestation during the last decade. Of the 194,072 acres of agricultural land in the 13 towns in 1929, 118,413 acres, or over 60 per cent, was in woodland. More than one-third of the remaining open land is in process of reversion to woodland, as indicated by the fact that 26,344 acres of this open land are classed as partially operated or abandoned land.

Taking the 13 towns, crop land comprised 19.3 per cent of the land in farms, open pasture 18.8 per cent, woods pasture 30.3 per cent, woods not pastured 30.7 per cent, and farmstead and waste 0.9 per cent. Operated land comprised 54.6 per cent of the land in farms in the 13 towns; partially operated, 26.2 per cent; abandoned less than 10 years, 8.9 per cent; abandoned 10 years and over, 10.3 per cent.

For the decade 1919–1929 there were 697 farms classed as operated both at the beginning and at the end of the period. Of these farms, 676 had been operated continuously, 19 had been partially operated at some time during the period, and only 2 had been abandoned. Once abandoned a farm is seldom again operated. There were 154 farms classed as abandoned in 1919, and 152 of these were in the same status in 1929. One was classed as operated and one as partially operated at the end of the period.

Partially operated farms tend to continue as such until abandoned. Among 262 farms classed as partially operated in 1919 only 21 were in the operated status in 1929. But 78 had been abandoned. The sequence is from operated to partially operated to abandoned status. A reversal of this sequence rarely occurs. More than one-fourth of the farms operated in 1919 had passed out of that status in 1929, an average rate of 26.2 farms a year for the 13 towns.

Many of the partially operated farms probably will be abandoned. The buildings on these farms are fast falling into decay, natural reforestation is progressing rapidly, and two important sources of revenue, maple orchards and timber, are seriously reduced if not wholly eliminated. In some instances the farmhouses on these partially operated farms may be used for summer residences, but the probabilities are that the land will be used for growing timber.

During the next 10 or 20 years readjustments should be made in the 13 towns to meet the situation clearly indicated by the present trend in land use.

C. F. Clayton,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

FARM Income Changes Measured Roughly by Representative Reports

Nearly 12,000 farmers reporting to the Department of Agriculture each answered 36 questions related to their own farming operations in 1929. The questions asked the sums received and spent during the year for business purposes, the value of farm property, and other items descriptive of the farm and its business. The purpose of the inquiry was to ascertain direct from farmers the general results of farm operations during the year in different parts of the United States.

In 1929 the 11,805 farmers reporting made an average of $1,298 from the farm business operations of the year, derived from cash sales amounting to $2,669, plus increase in value of property, $201, which might have been converted into cash or normally would soon be so converted, minus cash outlay for current farm expenses, $1,572. The farms which yielded these sums averaged 270 acres in size and were worth with buildings, stock, and equipment $15,242. The average ($1,298) is made up from individual reports, which ranged from $67,270 to a loss of $7,080; 65 per cent of the reports were below the average and 50 per cent below $861; 8 per cent showed net losses and only 3 per cent showed gains of more than $5,000. Averages for six major geographical divisions are stated in tables in the statistical section of this Yearbook.

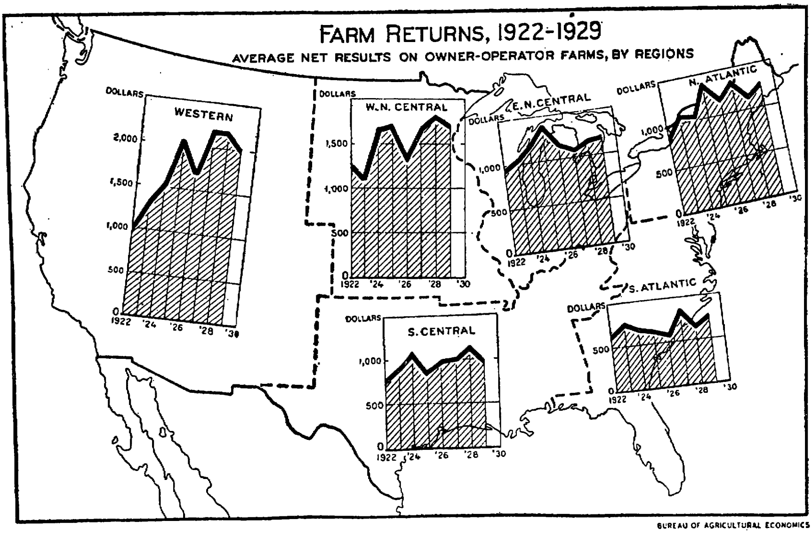


FIGURE 55.—Regional differences in farm returns result from differences in the size and value of farms and in prevailing types of farming. There is less annual variation in the averages of returns of all farmers reporting than in the averages of returns of farmers in the several regions

The return computed for 1929 ($1,298) is directly comparable with like figures for previous years in this series of reports. The list of correspondents to whom the inquiry is addressed has changed little in character and distribution during the period. The number reporting each year is large enough to render it probable that the average return obtainable from the 12,000 next neighbors of each reporter would be within $15 or $20 of the amount shown for those who did report in each of the years. The average returns in the several geographical divisions reflect real territorial differences in the results of farming. The average returns for the years 1922–1929 by regions are shown in Figure 55.

Reports Not "Average" But "Representative"

The farmers who report each year are "representative" rather than "average" in a sense that would permit using figures supplied by them as descriptive of the situation of all farmers. The report covers owner operators only, whereas owners constitute less than two-thirds of the number of farmers in the United States and smaller proportions in some of the States. Moreover, very few farms smaller than 50 acres are included, whereas small farms are numerous in some of the States. Presumably, however, economic forces affect groups of farmers in much the same way; tenants will have better crops and higher prices when owners have better crops and higher prices, and conditions hard for large farmers bear down also on small farmers. The adjustments necessary to convert farm-returns averages into average figures applying to all farmers or to tenants or to small farms have not been worked out. As an indication of the difference in levels between all farmers and the farm owners reporting their returns, the following comparisons of gross incomes from farming are made. Estimates by this department of the gross income of all farmers for the five years 1924–1928 give $1,840 per farm per year. Averages of cash receipts plus food produced on the farm and used by the farm family, as reported in the farm returns inquiry for the same period, amounted to $2,782, or 50 per cent more than the estimated average for all farmers. This proportion does not apply to subdivisions of the country nor to expenses or the net returns.

The computed net result ($1,298) is less than the income of the farmer under any of the usual definitions of income. Food used by the family out of farm production (averaging $262 at wholesale farm prices and perhaps less completely accounted for than the cash items), has not been included in the "net result," nor has any allowance been made for fuel available on most farms, or for house rent. Most farmers have some income from work done off the farm, and many have income from other property or contributions from the members of the family. These supplementary sources of income permit a higher standard of living among farmers than the meager cash returns from farming in some localities would support. On the other hand, the cash balance is not all available for family living, as part of it is paid out as interest on indebtedness, and part is spent for improvements or put into savings. Part of the earnings from the farm is shared by otherwise unpaid members of the farm family, so the farmer himself gets somewhat less than the indicated income of the family. These items, as yet unmeasured on a broad basis, must be considered in different combinations for comparisons of results of farming with results from other occupations. Surveys of farmers in selected areas have developed the relationships of part of the items at a time to the business results without yielding the key to their extension to all farmers or even to large groups of farmers differently situated.

Data Used in Other Studies

The items composing the farm-returns questionnaire are regularly used as supplementary information in several projects of the bureau where well-distributed replies to related questions are helpful. Thus, in the field of farm taxes the tax paid by the farmer for a farm of stated size and value yields rates which can be compared with rates obtained direct from local tax collectors and county officials, and something of the severity of the tax burden on income can also be indicated. In appraising the farm real estate situation, the acre values of real estate computed from groups of reports supplement those obtained from real estate dealers and other observers in working up the index numbers of values. In farm-management problems the results obtained in these inquiries are considered as significant supplementary information. Twelve thousand answers to the same questions year after year which reflect changes expected on logical grounds lead to confidence in changes observed in those items for which rigid proof is not currently available.

At a time when accurate information on the effect of economic problems is so important as it has been in recent years it is disappointing not to be able to get exact information on details of farm income in specified areas. The department must obtain such information from farmers, and farmers who do not have it can not give it to the department. Those who do not have the facts for their own farms well in mind can make little use of the summary information on incomes reported by the department. One of the accomplishments of the farm-returns inquiry has been that realization of inability to summarize the results of a year's effort has led a few hundred farmers each year to see for themselves what changing conditions mean to them.

S. W. MENDUM,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

FEDERAL Meat Inspection Protects Consumers and Locates Animal Diseases The Federal meat-inspection service of the Bureau of Animal Industry, while engaged in its principal task of protecting the health of consumers of meat, also renders helpful assistance to other enterprises. As notable examples, it has made available to farmers and livestock sanitarians reliable information regarding the prevalence of livestock diseases and has contributed materially to knowledge concerning the spoilage and care of meats.

As a routine activity, all animals which are about to be slaughtered under Federal meat inspection are subjected to a thorough and searching veterinary examination for evidence of disease or other condition which would render the meat unfit for food. This is called the ante-mortem inspection. Later on, at the time of slaughter, or post-mortem inspection, each carcass with its viscera, is sytematically examined by scientifically trained inspectors. Carcasses and parts that are diseased, unsound, or otherwise unfit are conspicuously marked "U. S. Inspected and Condemned" and are destroyed for food purposes under official supervision. The sound carcasses and parts, after being appropriately marked "U. S. Inspected and Passed," continue on to other departments of the establishment for chilling and processing.

Each step in these processing operations, including packing and labeling of the finished product for shipment from the establishment, is closely scrutinized, and the meats are carefully inspected at the various stages by specially trained employees. The results of all inspections are recorded on report forms which not only show in detail the results of the activities but also constitute a fund of valuable data.

The magnitude of meat-inspection activities will be obvious when it is known that during the year ended June 30, 1930, nearly 75,000,000 animals were slaughtered and the resulting meat and meat food products processed in 804 establishments, located in 254 cities and towns.

In the administration of the meat-inspection acts, especially as they apply to post-mortem inspections, much effort has been necessary to after year which reflect changes expected on logical grounds lead to confidence in changes observed in those items for which rigid proof is not currently available.

At a time when accurate information on the effect of economic problems is so important as it has been in recent years it is disappointing not to be able to get exact information on details of farm income in specified areas. The department must obtain such information from farmers, and farmers who do not have it can not give it to the department. Those who do not have the facts for their own farms well in mind can make little use of the summary information on incomes reported by the department. One of the accomplishments of the farm-returns inquiry has been that realization of inability to summarize the results of a year's effort has led a few hundred farmers each year to see for themselves what changing conditions mean to them.

S. W. Mendum,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

FEDERAL Meat Inspection Protects Consumers and Locates Animal Diseases The Federal meat-inspection service of the Bureau of Animal Industry, while engaged in its principal task of protecting the health of consumers of meat, also renders helpful assistance to other enterprises. As notable examples, it has made available to farmers and livestock sanitarians reliable information regarding the prevalence of livestock diseases and has contributed materially to knowledge concerning the spoilage and care of meats.

As a routine activity, all animals which are about to be slaughtered under Federal meat inspection are subjected to a thorough and searching veterinary examination for evidence of disease or other condition which would render the meat unfit for food. This is called the ante-mortem inspection. Later on, at the time of slaughter, or post-mortem inspection, each carcass with its viscera, is sytematically examined by scientifically trained inspectors. Carcasses and parts that are diseased, unsound, or otherwise unfit are conspicuously marked "U. S. Inspected and Condemned" and are destroyed for food purposes under official supervision. The sound carcasses and parts, after being appropriately marked "U. S. Inspected and Passed," continue on to other departments of the establishment for chilling and processing.

Each step in these processing operations, including packing and labeling of the finished product for shipment from the establishment, is closely scrutinized, and the meats are carefully inspected at the various stages by specially trained employees. The results of all inspections are recorded on report forms which not only show in detail the results of the activities but also constitute a fund of valuable data.

The magnitude of meat-inspection activities will be obvious when it is known that during the year ended June 30, 1930, nearly 75,000,000 animals were slaughtered and the resulting meat and meat food products processed in 804 establishments, located in 254 cities and towns.

In the administration of the meat-inspection acts, especially as they apply to post-mortem inspections, much effort has been necessary to coordinate the fundamental requirements of thorough inspection and sanitation with the speed of operation which the packer considers economically essential.

Mechanical Ingenuity Plays Important Part

Inventive genius, both within and without the service, has brought marked improvement in facilities for inspection and operations which are outstanding among the meat-inspection systems of the world.

In the modern meat-packing establishments the animals are hoisted to an overhead conveyer by means of which they pass in a suspended

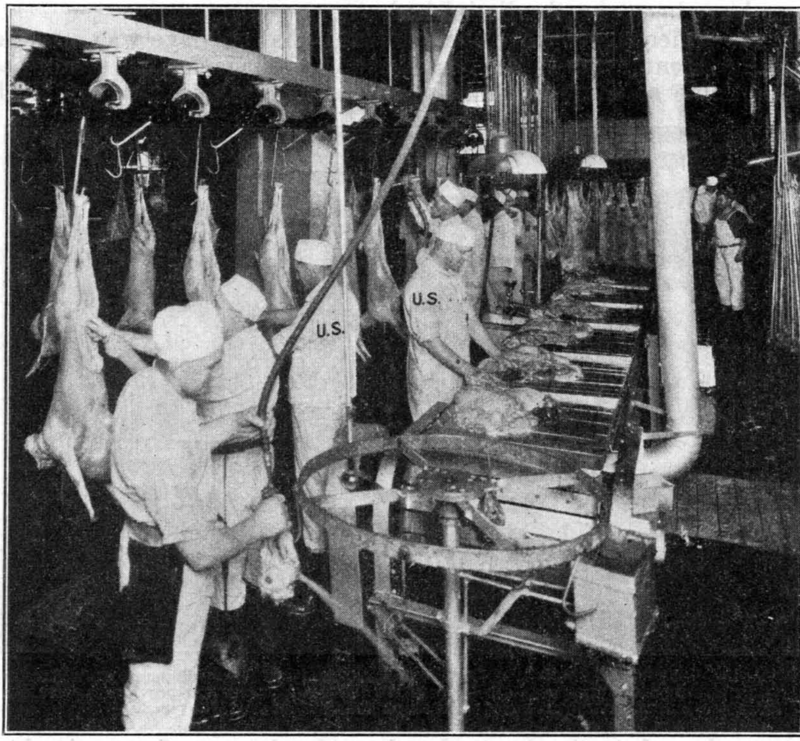


FIGURE 56.—Sheep-slaughtering department equipped with automatically cleansed, moving-top, all-metal inspection table with separate compartments for viscera and parts of each carcass. The movement of this equipment is synchronized with the rail mechanism which conveys the carcasses. Inspectors are indicated by the letters U. S.

position over a definite route with unvarying regularity through the various stages of the dressing operation and inspection. The viscera and parts are removed and placed for inspection on moving-top equipment which is synchronized in speed to that of the mechanical conveyer of the carcasses during the process of dressing. This is done in order to maintain accurate relationship and identification of the carcass and its viscera and detached parts until the post-mortem inspection is completed. (Fig. 56.)

The moving-top viscera-inspection table is constructed of corrosion-resisting metal, is automatically cleansed with pure water, and is also continuously subjected to sprays of scalding water. Good sanitation is thus assured as well as efficiency of inspection.

In both the slaughtering and processing departments where meats must be washed (fig. 57) the practice of spray washing under pressure up to 300 pounds is a recent and meritorious development in inspected establishments.

Improved Sanitation Reduces Spoilage

A study of assembled records shows that in the earlier years of meat inspection spoilage of meat was considerable and at times enormous, resulting in heavy losses. These conditions have from time to time been subjected to careful study and laboratory research in which the meat-inspection service contributed materially, with the result that the losses have been greatly diminished.

Much evidence was developed showing that spoilage was attended by and evidently due to the presence and propagation of certain bacteria. Some of these organisms, it was found, were present in the

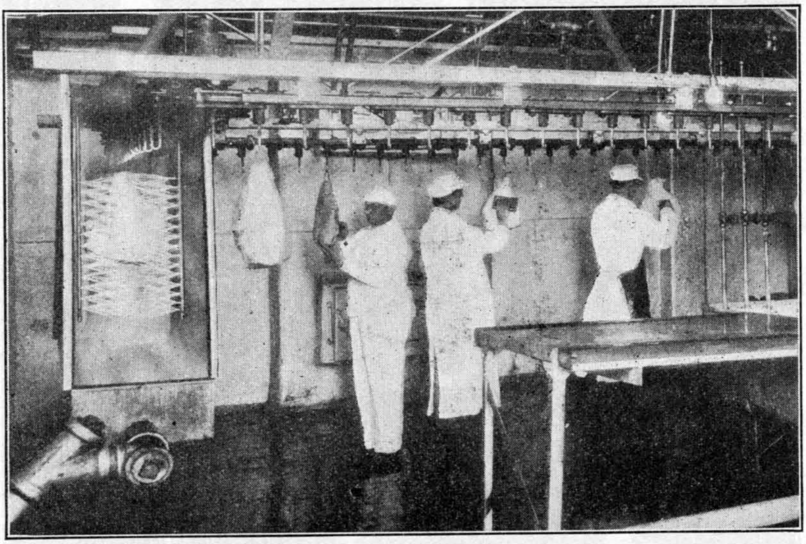


FIGURE 57.—Mechanical conveyer subjecting cured meats to spray washing in pure, tempered water under high pressure (approximately 300 pounds). This equipment also provides opportunity for inspection and branding of meats while suspended from the conveyer

tissues when the animal was slaughtered, whereas others gained entrance during the dressing of the carcasses and subsequent handling. Studies revealed the importance of good sanitation as a factor in preventing the spoilage of meat. They also proved that prompt and efficient refrigeration of meats would check the growth and propagation of those organisms which in some degree are present even when the best-known standards of sanitation are practiced. The soundness of these conclusions has been thoroughly demonstrated. When practiced with care the methods of prevention have greatly reduced spoilage losses, resulting in large savings and reaffirming the fact that a high standard of sanitation in packing houses is sound economically as well as hygienically.

Meat Inspection a Help to Livestock Producers

Diseases of animals, like weeds in growing crops, are a serious liability. Unlike weeds, however, the presence of which can readily be detected before much damage is done, communicable diseases are often insidious in nature, and may reduce or destroy the value of a herd or flock before their presence is apparent to the owner.

Probably no other agency is in a position to note and catalogue the livestock-disease situation so accurately as the meat-inspection service. The daily reports of diseased conditions found by inspectors assigned to ante-mortem and post-mortem duties, when assembled and tabulated, depict the general situation throughout the country.

These records furnish a reliable source of information for those interested in the control of animal diseases. An outstanding example may be found in reviewing the situation as it applies to bovine tuberculosis. Prior to the inauguration of the nation-wide campaign against this disease, the meat-inspection records showed a general increase in animals found on post-mortem inspection to be affected with tuberculosis. On the other hand the records of recent years indicate, with gratifying certainty, the retreat of the disease before the united efforts of livestock producers, assisted by the coordinated county, State, and national eradication forces.

As an added service to the livestock industry, when animals presented for slaughter are found to be affected with communicable disease, special reports are furnished to the State livestock sanitary authorities. These reports convey full information as to the character and extent of the disease found, thereby giving opportunity for measures of control and suppression to be applied as a protection to the owner against further loss, and to the community at large against the spread of infection.

W. C. Herrold,
Senior Veterinarian, Bureau of Animal Industry.

FERTILIZER Studies Show Manner of Distribution Is Extremely Important The expense incident to the use of any commodity is dependent not only on its purchase price, but also on its utility or length of service. Two distinct lines of endeavor are thus available for reducing the true cost of any commercial product. One of these, as applied specifically to fertilizers, is the economic improvement in manufacturing processes while the other involves increasing the returns from a given application of the fertilizer.

The new developments that have taken place since the war in the manufacture of fertilizers have greatly exceeded in importance those of any like period in the history of the industry. As an outcome of this work many new materials have been placed on the market at greatly reduced prices and the average cost of mixed fertilizers has therefore also been reduced. Comparatively little attention was given during the same period to the most effective use of fertilizers. Their efficiency remained about the same or actually decreased, owing to the poor mechanical properties of many of the new materials that were placed on the market. The question of the most effective use of fertilizers is, therefore, one of special importance at this time and one which seems to afford greater possibilities for reducing fertilizer expenses than is likely to result from further reduction in manufacturing costs.

The efficiency of fertilizers may be increased by (1) increasing the uniformity with which they are distributed in the field; (2) adjusting detected before much damage is done, communicable diseases are often insidious in nature, and may reduce or destroy the value of a herd or flock before their presence is apparent to the owner.

Probably no other agency is in a position to note and catalogue the livestock-disease situation so accurately as the meat-inspection service. The daily reports of diseased conditions found by inspectors assigned to ante-mortem and post-mortem duties, when assembled and tabulated, depict the general situation throughout the country.

These records furnish a reliable source of information for those interested in the control of animal diseases. An outstanding example may be found in reviewing the situation as it applies to bovine tuberculosis. Prior to the inauguration of the nation-wide campaign against this disease, the meat-inspection records showed a general increase in animals found on post-mortem inspection to be affected with tuberculosis. On the other hand the records of recent years indicate, with gratifying certainty, the retreat of the disease before the united efforts of livestock producers, assisted by the coordinated county, State, and national eradication forces.

As an added service to the livestock industry, when animals presented for slaughter are found to be affected with communicable disease, special reports are furnished to the State livestock sanitary authorities. These reports convey full information as to the character and extent of the disease found, thereby giving opportunity for measures of control and suppression to be applied as a protection to the owner against further loss, and to the community at large against the spread of infection.

W. C. Herrold,
Senior Veterinarian, Bureau of Animal Industry.

FERTILIZER Studies Show Manner of Distribution Is Extremely Important

The expense incident to the use of any commodity is dependent not only on its purchase price, but also on its utility or length of service. Two distinct lines of endeavor are thus available for reducing the true cost of any commercial product. One of these, as applied specifically to fertilizers, is the economic improvement in manufacturing processes while the other involves increasing the returns from a given application of the fertilizer.

The new developments that have taken place since the war in the manufacture of fertilizers have greatly exceeded in importance those of any like period in the history of the industry. As an outcome of this work many new materials have been placed on the market at greatly reduced prices and the average cost of mixed fertilizers has therefore also been reduced. Comparatively little attention was given during the same period to the most effective use of fertilizers. Their efficiency remained about the same or actually decreased, owing to the poor mechanical properties of many of the new materials that were placed on the market. The question of the most effective use of fertilizers is, therefore, one of special importance at this time and one which seems to afford greater possibilities for reducing fertilizer expenses than is likely to result from further reduction in manufacturing costs.

The efficiency of fertilizers may be increased by (1) increasing the uniformity with which they are distributed in the field; (2) adjusting the position of the fertilizer in the soil with respect to the seed so as to secure the optimum balance between its burning effects and its availability to the roots of the plant; and (3) improving the quality of the fertilizer.

Fertilizer Distribution

Fertilizer distributors have been in use for many years but the first study of the uniformity with which they apply fertilizers was made only a few years ago in a cooperative investigation by the Fertilizer and Fixed Nitrogen Unit of the Bureau of Chemistry and Soils and the Division of Agricultural Engineering, Bureau of Public Roads. It was found that all distributors apply fertilizers more or less irregularly, and that the variation in distribution may sometimes be so great as to indicate toxic applications to some plants, whereas others are insufficiently fertilized for best results. This irregularity in the distribution of fertilizers is caused by (1) segregation of the components of the mixture; (2) poor drillability of the fertilizer; and (3) imperfections in the design or working parts of the machines.

The extent to which fertilizers segregate increases with the difference in the size and specific gravity of the individual particles. Fertilizer mixtures therefore segregate differently according to the materials used in making up the mixture. A powdered or damp fertilizer is not as drillable as a dry granular one. Many fertilizer materials cake or become sticky by absorbing moisture from the air and the uniformity with which they can be distributed may vary from day to day.

That uniform distribution is essential for best crop yields was clearly demonstrated in later cooperative experiments between the two bureaus already mentioned, the South Carolina Experiment Station, and a joint committee on fertilizer application appointed by a number of fertilizer and agricultural agencies. These experiments were made on cotton during the summer of 1929 in several places in South Carolina. Several plantings were made in which 800 pounds per acre of a 4–8–4 fertilizer, or 267 pounds of a 12–24–12 fertilizer, were applied by 22 different types of commercial distributors, and also with great care in a uniform manner by hand. All the distributors applied the fertilizer more or less irregularly along the row. When other conditions were equal the uniformly hand-distributed fertilizer produced from 20 to 50 per cent more cotton than that produced on an average by the use of fertilizer machines in every one of six tests, and the more irregular the distribution the lower were the yields.

Fertilizer Placement

These experiments on the distribution of fertilizers as well as field tests by others have also shown that the effectiveness of a fertilizer also depends on its position with respect to the seed. The results indicate that it should be more or less localized rather than widely distributed through the soil, and that it should be placed within a certain maximum distance from the seed, but not in contact with it.

The field tests that emphasized the importance of uniformity of distribution were followed in turn by a study of the drillability of fertilizers as affected by their tendency to segregate. It was found that the segregation of fertilizers can be entirely prevented by a granulating treatment which is applicable alike to soluble or insoluble materials and mixtures. This treatment not only prevents the segregation of fertilizers but also greatly improves their drillability by decreasing their tendency to cake or become sticky. Other experiments are in progress which should further improve the efficiency of fertilizers by securing a greater degree of uniformity in their distribution and proper placement with respect to the seed.

Fertilizer Quality

The efficiency of certain synthetic mixtures that have recently been placed on the market has frequently been too low to be explained by irregular distribution or placement of the fertilizer. The poor results were always obtained on sandy soils and were limited to mixtures containing alkali salts only. A careful investigation of the subject by the Office of Tobacco and Plant Nutrition, Bureau of Plant Industry, has demonstrated that the poor results obtained with fertilizers of this kind are due to an inadequate supply of calcium to counteract the toxic action of the alkali salts and to a deficiency of both calcium and magnesium below the normal requirements of the plants. When these were supplied, normal crop yields were invariably obtained. The addition of certain other elements now known to be essential to crops, such as manganese and sulphur, has also been found to increase the effectiveness of synthetic fertilizer mixtures when used on soils deficient in these elements.

It may therefore be concluded that the economic value of a fertilizer to the farmer is dependent not only on its original cost but also on its composition and on the manner in which it is applied.

William H. Ross, *Senior Chemist,*
Arnon L. Mehring, *Associate Chemist,*
Bureau of Chemistry and Soils.

FERTILIZER'S Value Much Affected by Method of Applying It to Soil

Fertilizers are used to increase crop production and quality and on this account have become an essential feature of farming in all countries practicing modern agricultural methods. It is probably true that there has never been in the history of the fertilizer industry a greater need than exists now of aiding farmers to secure the best possible profit from fertilizers. They represent a considerable share of crop-production costs and should therefore be bought and used with care. The method of applying fertilizer and fertilizer materials is of great importance and has much to do with their efficiency. This is particularly true since the introduction of so many new fertilizer materials of high plant-food concentration and the growing use of high-analysis and concentrated fertilizers.

Fertilizer Usage in Pioneer Days

The development of the fertilizer industry and of the raw materials upon which it depends has been a distinctly evolutionary process. It is admittedly a far cry from the days when "a fish to a hill of corn" was considered to be a first-class job of feeding plants to present-day methods of doing so. In pioneer days no thought had to be given to segregation of fertilizers but also greatly improves their drillability by decreasing their tendency to cake or become sticky. Other experiments are in progress which should further improve the efficiency of fertilizers by securing a greater degree of uniformity in their distribution and proper placement with respect to the seed.

Fertilizer Quality

The efficiency of certain synthetic mixtures that have recently been placed on the market has frequently been too low to be explained by irregular distribution or placement of the fertilizer. The poor results were always obtained on sandy soils and were limited to mixtures containing alkali salts only. A careful investigation of the subject by the Office of Tobacco and Plant Nutrition, Bureau of Plant Industry, has demonstrated that the poor results obtained with fertilizers of this kind are due to an inadequate supply of calcium to counteract the toxic action of the alkali salts and to a deficiency of both calcium and magnesium below the normal requirements of the plants. When these were supplied, normal crop yields were invariably obtained. The addition of certain other elements now known to be essential to crops, such as manganese and sulphur, has also been found to increase the effectiveness of synthetic fertilizer mixtures when used on soils deficient in these elements.

It may therefore be concluded that the economic value of a fertilizer to the farmer is dependent not only on its original cost but also on its composition and on the manner in which it is applied.

William H. Ross, *Senior Chemist*,
Arnon L. Mehring, *Associate Chemist*,
Bureau of Chemistry and Soils.

FERTILIZER'S Value Much Affected by Method of Applying It to Soil

Fertilizers are used to increase crop production and quality and on this account have become an essential feature of farming in all countries practicing modern agricultural methods. It is probably true that there has never been in the history of the fertilizer industry a greater need than exists now of aiding farmers to secure the best possible profit from fertilizers. They represent a considerable share of crop-production costs and should therefore be bought and used with care. The method of applying fertilizer and fertilizer materials is of great importance and has much to do with their efficiency. This is particularly true since the introduction of so many new fertilizer materials of high plant-food concentration and the growing use of high-analysis and concentrated fertilizers.

Fertilizer Usage in Pioneer Days

The development of the fertilizer industry and of the raw materials upon which it depends has been a distinctly evolutionary process. It is admittedly a far cry from the days when "a fish to a hill of corn" was considered to be a first-class job of feeding plants to present-day methods of doing so. In pioneer days no thought had to be given to the application of materials of high plant-food content because they were unknown. In those days barnyard manure, wood ashes, lime or marl, gypsum, guano, bones, and tobacco stems constituted the chief supplies of fertilizer materials. Their application involved no special care and on account of large supplies fairly heavy applications were the rule. As these materials carried relatively low amounts of soluble plant food injurious effects were rarely observed.

Later on materials like sodium nitrate, ammonium sulphate, fish scrap, tankage, dried blood, cottonseed meal, castor pomace, and other nitrogen materials, superphosphate, and the various potash salts were employed for fertilizer usage. Complete fertilizers were manufactured out of these ingredients and for many years the fertilizer industry depended largely on them for raw materials. It was found that more care was required in applying such fertilizers, owing to their containing more active plant-food ingredients. Materials like tankage, fish scrap, and other organic-nitrogen carriers, while at one time used freely in fertilizers, are gradually being used less and less owing to their greater cost when compared to materials like sodium nitrate, ammonium sulphate, and other inorganic and organic salts. As the amount of inorganic nitrogen in fertilizer mixtures increases, it becomes necessary to exercise more care in the distribution and placement of the fertilizer.

World War Brought About Changes in Materials

Largely as a result of the World War, matters relating to fertilizer materials changed considerably. Extraction of nitrogen from the atmosphere for the manufacture of death-dealing explosives developed enormously. Huge plants were built in which to extract nitrogen and produce various salts therefrom. With the cessation of hostilities, it became necessary to find a peace-time outlet for these nitrogen products. The natural outlet was to dispose of them as plant-food materials to the fertilizer industry or to farmers direct. Not only nitrogen compounds, but also compounds high in phosphoric acid, such as double and treble superphosphate, ammonium phosphate, and a number of products of commercial origin containing two and three plant-food constituents are being produced synthetically for fertilizer usage.

The production of so many new materials of relatively great plant-food concentration led to another step, namely, the production of concentrated fertilizers. During the past decade, particularly the last five years, considerable progress has been made in the development and use of concentrated and high-analysis fertilizers. The necessity for greater precaution in applying modern fertilizers is therefore chiefly due to the diminished use of vegetable and animal organic-nitrogen materials, with a correspondingly greater use of inorganic and organic salts, and to a much greater plant-food content in fertilizer mixtures. Furthermore, there is a decided tendency to apply fertilizers at heavier rates which makes it more essential that care be exercised in their distribution.

Principal Factors Involved in Fertilizer Usage

The principal factors involved in the use of fertilizers are (1) what kind and how much to use, and (2) how to apply the fertilizer to insure uniform distribution and proper placement in relation to the seed or seed piece and to get it well mixed with the soil. In connection with the latter, the guiding principles are to apply the fertilizer uniformly so that every plant gets a proportionate share of plant food rather than suffer from an uneven distribution, and to avoid contact of fertilizer with seed or seed piece. In cases of uneven distribution some plants get too much fertilizer, frequently resulting in crop injury, while other plants get too little fertilizer and, as a result, fail to produce well.

Present-day methods of applying fertilizers include (1) broadcasting, (2) hill application, (3) drill or furrow application, (4) side dressing, and (5) combinations of the foregoing, such as applying part of the fertilizer broadcast and part in the hill or drill or partly in the drill and the rest as a side dressing after the crop is well established. Modern fertilizer practice utilizes distributing machines with which to apply fertilizers. Their design and construction varies in accordance with the method of application and the crop. Examples are as follows: Broadcasting, with fertilizer attachment on the grain drill or with lime distributor; hill application, made by means of fertilizer attachment on corn planter; drill or furrow application, with corn or potato planter; side dressing, by means of fertilizer attachment on cultivator. The main chance for injury to result from fertilizer application occurs when the fertilizer is applied in the hill or in the drill row, for the reason that these methods provide an opportunity for the fertilizer to come in contact with the seed which necessarily must be avoided if the method of application is to prove efficient.

Experimental Studies Being Made

Owing to the increasing use of high-analysis and concentrated fertilizers on crops and the fact that rates of application tend to increase, considerable interest is being taken by scientific investigators, fertilizer interests, and machinery manufacturers in the subject of efficient fertilizer distribution and placement. It is a mutual problem and one that is engaging the attention of varied interests. The fertilizer manufacturer who sells a good product in excellent physical condition is naturally desirous that whoever applies the fertilizer have a distributing machine that will do a first-class job. Otherwise, the blame for uneven distribution, poor stand, and lowered yield is apt to be charged to the fertilizer when the fault may have been due largely to the machine.

To furnish some idea of the situation in reference to fertilizer distributing machines it has been stated by specialists working on the problem that the faulty application of fertilizers to the soil causes serious losses to farmers and that the average fertilizer as applied to the land by present-day machinery is not always as effective as it should be. The various cooperative agencies attacking this important problem, including various State agricultural experiment stations, are not only making actual field trials with different crops to which the fertilizer is applied in different ways, but are working toward the improvement and standardization of fertilizer distributing machines and improvement of the drilling qualities of fertilizers.

Factors Affecting Fertilizer Distribution

The two main factors making for uneven distribution are, according to specialists, design and construction of implements and the variability of fertilizer properties, including tendency to absorb moisture, fineness or coarseness of particles, the degree of physical uniformity, and friction and cohesion between particles. In applying fertilizer a number of factors need to be considered. In the first place, it is undoubtedly true that all crops and all soils can not be given uniform fertilizer treatment, either as to amount or method of application. Crop plants vary in their growth characteristics, in-

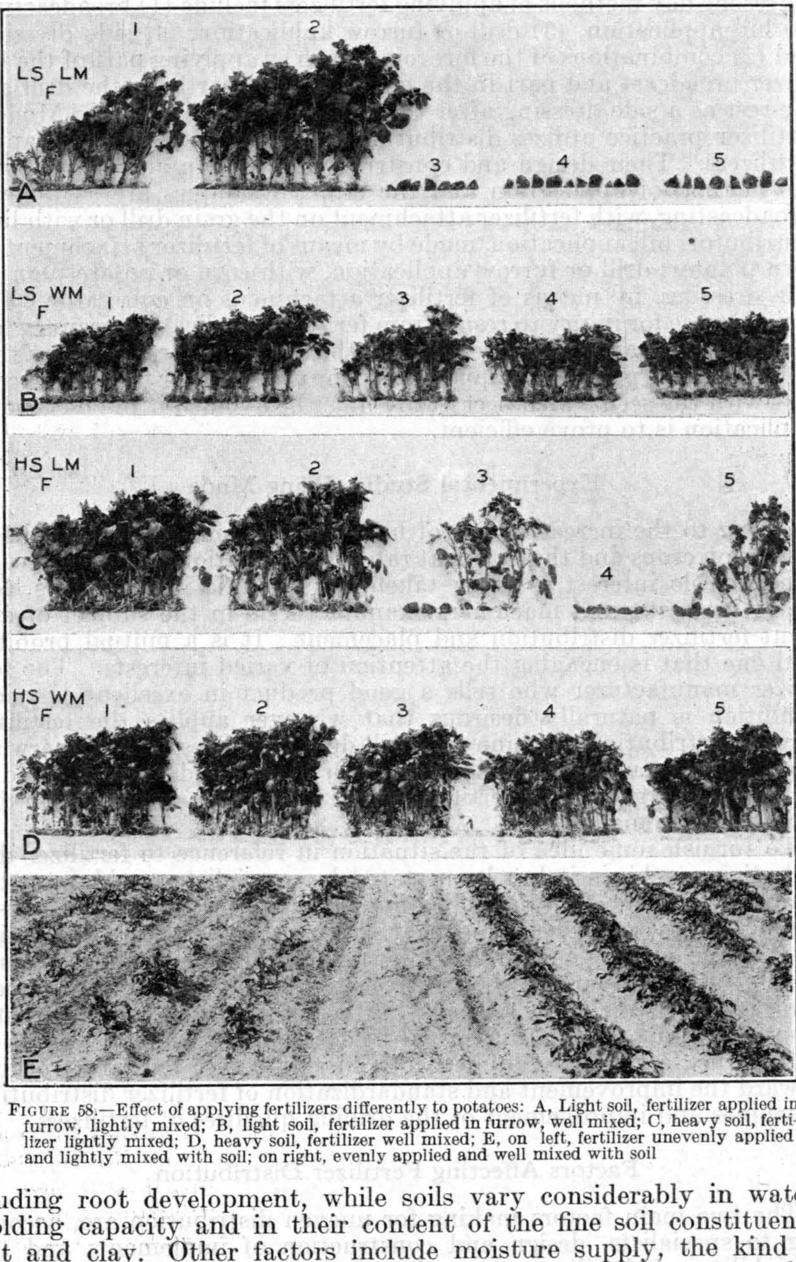


FIGURE 58.—Effect of applying fertilizers differently to potatoes: A, Light soil, fertilizer applied in furrow, lightly mixed; B, light soil, fertilizer applied in furrow, well mixed; C, heavy soil, fertilizer lightly mixed; D, heavy soil, fertilizer well mixed; E, on left, fertilizer unevenly applied and lightly mixed with soil; on right, evenly applied and well mixed with soil

cluding root development, while soils vary considerably in water-holding capacity and in their content of the fine soil constituents, silt and clay. Other factors include moisture supply, the kind of fertilizer and rate of application, the time of application, and weather conditions at and following planting time.

Effect of Applying Fertilizers Differently

Crops grown on light soils where drought may prevail will suffer most if the fertilizer is applied unevenly or is not well mixed with the soil. This effect is shown in Figure 58 in connection with the potato. Five fertilizer mixtures were used (1, 2, 3, 4, and 5) and applied in the drill. They were lightly mixed with the soil. (Fig. 58, A,) Fertilizer No. 1 was a 5–8–5 containing sodium nitrate, ammonium sulphate, superphosphate, and potassium sulphate. One-half of the nitrogen was derived from sodium nitrate, the rest from ammonium sulphate. In mixture No. 2, 50 per cent of the nitrogen was derived equally from fish scrap and tankage, the balance equally from sodium nitrate and ammonium sulphate. The effect of including organic materials is clearly evident. The other mixtures (3, 4, and 5) were concentrated fertilizers. Mixtures 1 and 2 were each applied at the rate of 2,000 pounds to the acre while Nos. 3, 4, and 5 mixtures were applied at the respective rates of 800, 700, and 900 pounds to the acre. In all cases the same amount of plant food was applied.

Figure 58, B shows what happened when the same fertilizers were well mixed with the soil. In Figure 58, C a much heavier soil, with greater water-holding capacity, was used. In the case of two of the concentrated fertilizers several seed pieces made an attempt to grow, although not effectually. Figure 58, D shows the advantage of having the fertilizer well mixed with the heavy soil. Figure 58, E affords an idea of the effect of poorly distributed fertilizer (left) on potato germination and stand. The plants on the right were uniformly fertilized. Such differences are reflected in the final yields.

No hard and fast rule can be established for applying fertilizer. The results of experimental work on different crops and soils will go far toward solving the problem. However, the following suggestions may prove helpful:

Never let fertilizer come in direct contact with the seed.

Get some of the fertilizer near the seed.

Mix fertilizer and soil together.

Use a distributing machine that provides an even distribution.

If fertilizer is applied by hand, as to the lawn, light applications frequently made are apt to prove better than heavy single applications.

Do not attempt to fertilize recently transplanted plants too soon or too heavily at first.

Do not expect fertilizer to do wonders when the soil is very dry.

B. E. Brown,
Senior Biochemist, Bureau of Chemistry and Soils.

FOOD and Drug Labels' Meaning and Value Are Shown in Radio Talks The most significant development of 1930 in the Federal Food and Drug Administration's campaign to educate the public regarding its regulatory activities were two series of "read-the-label" broadcasts, delivered through an eastern radio network by W. R. M. Wharton, chief of the administration's eastern district, and through a western network by W. W. Vincent, chief of the western district. Both series continued into 1931—Mr. Wharton's through a hook-up of 28 National Broad-

Effect of Applying Fertilizers Differently

Crops grown on light soils where drought may prevail will suffer most if the fertilizer is applied unevenly or is not well mixed with the soil. This effect is shown in Figure 58 in connection with the potato. Five fertilizer mixtures were used (1, 2, 3, 4, and 5) and applied in the drill. They were lightly mixed with the soil. (Fig. 58, A,) Fertilizer No. 1 was a 5–8–5 containing sodium nitrate, ammonium sulphate, superphosphate, and potassium sulphate. One-half of the nitrogen was derived from sodium nitrate, the rest from ammonium sulphate. In mixture No. 2, 50 per cent of the nitrogen was derived equally from fish scrap and tankage, the balance equally from sodium nitrate and ammonium sulphate. The effect of including organic materials is clearly evident. The other mixtures (3, 4, and 5) were concentrated fertilizers. Mixtures 1 and 2 were each applied at the rate of 2,000 pounds to the acre while Nos. 3, 4, and 5 mixtures were applied at the respective rates of 800, 700, and 900 pounds to the acre. In all cases the same amount of plant food was applied.

Figure 58, B shows what happened when the same fertilizers were well mixed with the soil. In Figure 58, C a much heavier soil, with greater water-holding capacity, was used. In the case of two of the concentrated fertilizers several seed pieces made an attempt to grow, although not effectually. Figure 58, D shows the advantage of having the fertilizer well mixed with the heavy soil. Figure 58, E affords an idea of the effect of poorly distributed fertilizer (left) on potato germination and stand. The plants on the right were uniformly fertilized. Such differences are reflected in the final yields.

No hard and fast rule can be established for applying fertilizer. The results of experimental work on different crops and soils will go far toward solving the problem. However, the following suggestions may prove helpful:

Never let fertilizer come in direct contact with the seed.

Get some of the fertilizer near the seed.

Mix fertilizer and soil together.

Use a distributing machine that provides an even distribution.

If fertilizer is applied by hand, as to the lawn, light applications frequently made are apt to prove better than heavy single applications.

Do not attempt to fertilize recently transplanted plants too soon or too heavily at first.

Do not expect fertilizer to do wonders when the soil is very dry.

B. E. Brown,
Senior Biochemist, Bureau of Chemistry and Soils.

FOOD and Drug Labels' Meaning and Value Are Shown in Radio Talks The most significant development of 1930 in the Federal Food and Drug Administration's campaign to educate the public regarding its regulatory activities were two series of "read-the-label" broadcasts, delivered through an eastern radio network by W. R. M. Wharton, chief of the administration's eastern district, and through a western network by W. W. Vincent, chief of the western district. Both series continued into 1931—Mr. Wharton's through a hook-up of 28 National Broadcasting Co. stations; Mr. Vincent's through a chain of eight western stations of the same company.

These talks are an important development in the public-information policy of the Food and Drug Administration. They represent the first sustained attempt by the administration to use broadcasting to interpret for consumers those food and drug standards designed to conserve their health and protect their funds from frauds. While these standards have been developed through a period of more than 23 years, the administration has never before so vigorously attempted to inform the public as to their practical value and use. The "read-the-label" talks are written in popular form, designed to appeal to the busy housewife and husband. Letters from more than 8,000 listeners and comments in food and drug trade journals testify that both consumers and the ethical majority in the food and drug trades appreciate this effort and are thoroughly awake to its value.

Results secured through these radio talks surpassed expectations. Mr. Wharton had on his regular mailing list more than 10,000 listeners, Mr. Vincent's list passed the 3,000 mark. While a fair share of this success is attributed to the style in which the talks have been written and to the radio personality of Mr. Wharton and Mr. Vincent, the administration believes that the general public is becoming increasingly convinced of the actual dollars-and-cents and health value of concrete instructions on how to read food and drug labels more intelligently.

Mr. Wharton, the administration's pioneer in this public-instruction campaign, outlines his purpose in broadcasting his talks, as follows:

> The object is to teach consumers how to read labels in order that they may make their own selections from competing commodities with care. I want to help them to discriminate between relative qualities and relative values. Buyers should be in a position to exercise their indisputable right to know the product they pay for, and to use their collective influence to get more informative labeling on foods and drugs.

Trade Practices Much Improved

Many leading food and drug manufacturers have written the administration declaring their appreciation of the value of the talks. These letters indicate a vast change in business methods since the days when caveat emptor was a commercial rule. That principle was based upon an unsound economic supposition that the buyer was without the right to stand upon an equal footing with the seller. Under such a practice, the buyer had to protect himself with all the means at his command, while the seller's right to cheat was tacitly recognized. To-day, business is largely aware that protection of the buyer is commercially profitable. There is a noticeable tendency, particularly among food manufacturers, to tell even more than the pure food laws require on the labels of their products.

While the large majority of food and drugs manufacturers are trustworthy, there are differences among labels. Labels are often designed so as to be of great pictorial attractiveness but of questionable truth. The manufacturer who uses such a label, even when he makes an attempt to comply with the letter of the pure food laws, may fail to comply with their spirit. The label designer may try to hide an important fact from the buyer. He may attempt to camouflage the real facts in such a way that even the experienced buyer will be deceived. Administration officials have been aware of this practice for two decades and have done much to educate label designers and manufacturers in the strict legal requirements of the law and have constantly attempted to teach the buyer how to discriminate between honest labels and misleading labels. The "read-the-label" talks of the past year have been designed to inform the public as to the true meanings, the limitations, and the guidance value of labels in purchasing foods and drugs.

Many Commodities Covered

The "read-the-label" talks broadcast during the past year have outlined the requirements of the food and drugs act as regards scores of food and drug products. A few of the subjects covered are: Canned peas, tea, sirups, canned corn, vinegar, oysters, lard, flour and meal, drugs, vitamins, artificial colors, baking powders, flavoring extracts, pudding powders, canned fish, beverages, botulism, obesity cures, eggs, butter, jams and jellies, milk and milk products, cream, potatoes, and apples. In all cases, the general plan of procedure was the same. The administration officials each week told a story of a personal experience in the enforcement of the Federal food and drugs act to illustrate how this law safeguards the nation's food and drug supply. They followed this with a discussion of the meanings of labels on the different products under consideration that week. This was followed with a statement of just how the law protects the buyer of the products under discussion. The administration proposes to follow the same general plan during coming campaigns. A vast quantity of free printed matter has been distributed to listeners. The administration is now considering getting out a Farmers' Bulletin to cover the entire range of the subjects taken up.

SOLON R. BARBER,
Information Specialist, Food and Drug Administration.

FOOD and Drug Law Covers Preparations for Treating Livestock The Federal food and drugs act forbids false and fraudulent therapeutic claims on the labels of drug and medicinal preparations. For 23 years the department has directed its regulatory attentions to the drug industry, and so far as medical preparations designed for human use are concerned, the public is more or less aware of the extent of this work. But the administration is also charged, in the enforcement of this law, with removing from the channels of trade misbranded or adulterated medical preparations designed for treating domestic animals. Even the farmer, most directly concerned, is inadequately informed on just what the administration has done along this line. An efficient farmer naturally wants his livestock to be healthy. This desire, combined with ignorance of what constitutes a reliable treatment or cure for certain livestock diseases, has led him to spend much hard-earned money for quack remedies of no value whatever in the treatment of livestock diseases. So serious is this situation that the Food and Drug Administration has, during the past few years, directed as much of its attention to these drug products as its funds and personnel would permit.

It is imperative, the department believes, that misplaced public confidence in worthless remedies for livestock be destroyed. The department wishes at the same time to build sound public confidence in the drug products of those manufacturers who are really turning out reliable preparations for certain animal diseases.

turers in the strict legal requirements of the law and have constantly attempted to teach the buyer how to discriminate between honest labels and misleading labels. The "read-the-label" talks of the past year have been designed to inform the public as to the true meanings, the limitations, and the guidance value of labels in purchasing foods and drugs.

Many Commodities Covered

The "read-the-label" talks broadcast during the past year have outlined the requirements of the food and drugs act as regards scores of food and drug products. A few of the subjects covered are: Canned peas, tea, sirups, canned corn, vinegar, oysters, lard, flour and meal, drugs, vitamins, artificial colors, baking powders, flavoring extracts, pudding powders, canned fish, beverages, botulism, obesity cures, eggs, butter, jams and jellies, milk and milk products, cream, potatoes, and apples. In all cases, the general plan of procedure was the same. The administration officials each week told a story of a personal experience in the enforcement of the Federal food and drugs act to illustrate how this law safeguards the nation's food and drug supply. They followed this with a discussion of the meanings of labels on the different products under consideration that week. This was followed with a statement of just how the law protects the buyer of the products under discussion. The administration proposes to follow the same general plan during coming campaigns. A vast quantity of free printed matter has been distributed to listeners. The administration is now considering getting out a Farmers' Bulletin to cover the entire range of the subjects taken up.

SOLON R. BARBER,
Information Specialist, Food and Drug Administration.

FOOD and Drug Law Covers Preparations for Treating Livestock The Federal food and drugs act forbids false and fraudulent therapeutic claims on the labels of drug and medicinal preparations. For 23 years the department has directed its regulatory attentions to the drug industry, and so far as medical preparations designed for human use are concerned, the public is more or less aware of the extent of this work. But the administration is also charged, in the enforcement of this law, with removing from the channels of trade misbranded or adulterated medical preparations designed for treating domestic animals. Even the farmer, most directly concerned, is inadequately informed on just what the administration has done along this line. An efficient farmer naturally wants his livestock to be healthy. This desire, combined with ignorance of what constitutes a reliable treatment or cure for certain livestock diseases, has led him to spend much hard-earned money for quack remedies of no value whatever in the treatment of livestock diseases. So serious is this situation that the Food and Drug Administration has, during the past few years, directed as much of its attention to these drug products as its funds and personnel would permit.

It is imperative, the department believes, that misplaced public confidence in worthless remedies for livestock be destroyed. The department wishes at the same time to build sound public confidence in the drug products of those manufacturers who are really turning out reliable preparations for certain animal diseases.

No Remedies Yet for Certain Diseases

Veterinary science recognizes that up to the present time there is no drug or mixture of drugs which can be considered effective in the treatment of the following diseases of poultry: Typhoid, cholera, coccidiosis, fowl pest, roup, pullorum disease or diarrhea of chicks, chicken pox, diphtheria, gapes, and blackhead of turkeys. But in spite of this recognition on the part of veterinary science, farmers see many advertisements of drug preparations which claim to be reliable in the treatment of these poultry troubles. Some of the above disease can be prevented by proper precautionary measures; but, once contracted, they do not respond to drug treatment. Drug preparations labeled for them create a false sense of security in the mind of the poultry man, and if he relies upon them he is apt even to encourage the spread of one or more of these diseases through an entire flock or community and to delay or prevent the application of suitable scientific methods of control. The Food and Drug Administration has removed from the market hundreds of preparations of this nature and has brought about the revision of labels of many others so that the purchaser will not be defrauded. But many such preparations are made locally and not entered in interstate trade and do not come under the jurisdiction of the food and drugs act. In many cases the administration has required the removal from the label of all untruthful and fraudulent claims, only to discover similar unwarranted statements in advertising over which the law has no control. The department believes it is a good practice not to place confidence in claims made in circulars or advertising matter which exceed those claims made on the printed matter which actually accompany the product shipped in interstate commerce.

Use of the Word "Health"

In recent years the country has been more or less flooded with scores of preparations which use the word "health" in their titles or on their labels. The Food and Drug Administration has investigated many of these and in the enforcement of the law has removed many of them from the market. The use of the word "health" on the label of a drug preparation to convey the impression that the use of the product will maintain or restore health is classed as misbranding under the law, since no drug or combination of drugs is capable of fulfilling such a promise.

In December, 1929, the courts rendered a judgment in favor of the department in a case against a preparation called "Liquid Hog Health." The manufacturer of this preparation claimed that oats treated with it would cure sick hogs and stimulate the growth of backward pigs and shoats. The Government alleged that the article was misbranded and proved to the satisfaction of the court that the preparation contained no ingredients capable of producing the effects claimed. The administration also takes exception to such words as "vital," "life," "vigor," "vim," in any form of spelling, when these words are used in names to imply far-reaching curative powers.

Alleged Worm Remedies

Farmers who have read the papers in recent months have probably noted a great many advertisements of "mineral mixtures," "tonics," and "conditioners," in which the manufacturers claim that such preparations control worm infestation in farm livestock. Such claims made for products of this character constitute misbranding under the law. Veterinary investigators have found that preparations of this nature have not proved effective in the control of worm infestation. Moreover, there is no drug or mixture of drugs known to science at this time which would be effective as an expeller of all types of worms which may infest animals, including poultry. The department has warned manufacturers of worm remedies or worm expellers to confine their claims in the labeling to the particular type of worm for which their product has proved to be effective. The unqualified use of terms such as "worm expellers" or "worm remedies" in labeling these preparations is a violation of the food and drugs act.

H. E. Moskey,
Veterinarian, Food and Drug Administration.

FOOD and Drugs Act Benefits Farmer as Producer and Consumer Pure-food legislation was considered by Congress for many years before the food and drugs act was passed in 1906. During all those years, the press continually carried stories which aroused public interest in the need for such legislation. During the years immediately preceding and following the passage of the pure food law, popular interest in the measure continued, largely because, in those days, the abuses which it was designed to correct were so sensational that they achieved a great deal of newspaper publicity. Scandalous abuses, such as the sale of dead horses as beef, promptly detected and stamped out under the law, caught and held the public interest. But as these startling types of adulteration and fraud were corrected, and as enforcement work under the law became more routinelike and better organized, the activities of the officials received less publicity and the general public, as well as the farmer, began to accept the protection afforded by the law as a matter of course. There is ample evidence to believe that, in many cases, people forgot it entirely.

Such forgetfulness is not justified. The work of the Food and Drug Administration, in enforcing the food and drugs act, is vitally important to the general consuming public, and particularly to the agricultural industries. Every American citizen is a daily consumer of food, and there are few so fortunate as not to be consumers, at one time or another, of medicines. The past 25 years have witnessed remarkable changes in food economics, one of the most striking being the gradual transfer of the manufacture of foods from the domestic kitchen to the factory. That transfer could not have occurred without the protection guaranteed by the food laws against adulterated and misbranded products. To-day, the farmer consumes almost as large a quantity of manufactured foods as the city dweller. He thus has a vital interest in those governmental activities designed to assure him pure, unadulterated, and honestly labeled foods.

Farmer Interested as Producer

But the farmer has an interest in food-law enforcement not shared by the city consumer. He is preeminently a producer. With the exception of our marine supply, the soil is the source of all our foods. There is, of course, little opportunity for adulterating commodities consumed rations control worm infestation in farm livestock. Such claims made for products of this character constitute misbranding under the law. Veterinary investigators have found that preparations of this nature have not proved effective in the control of worm infestation. Moreover, there is no drug or mixture of drugs known to science at this time which would be effective as an expeller of all types of worms which may infest animals, including poultry. The department has warned manufacturers of worm remedies or worm expellers to confine their claims in the labeling to the particular type of worm for which their product has proved to be effective. The unqualified use of terms such as "worm expellers" or "worm remedies" in labeling these preparations is a violation of the food and drugs act.

H. E. Moskey,
Veterinarian, Food and Drug Administration.

Food and Drugs Act Benefits Farmer as Producer and Consumer

Pure-food legislation was considered by Congress for many years before the food and drugs act was passed in 1906. During all those years, the press continually carried stories which aroused public interest in the need for such legislation. During the years immediately preceding and following the passage of the pure food law, popular interest in the measure continued, largely because, in those days, the abuses which it was designed to correct were so sensational that they achieved a great deal of newspaper publicity. Scandalous abuses, such as the sale of dead horses as beef, promptly detected and stamped out under the law, caught and held the public interest. But as these startling types of adulteration and fraud were corrected, and as enforcement work under the law became more routinelike and better organized, the activities of the officials received less publicity and the general public, as well as the farmer, began to accept the protection afforded by the law as a matter of course. There is ample evidence to believe that, in many cases, people forgot it entirely.

Such forgetfulness is not justified. The work of the Food and Drug Administration, in enforcing the food and drugs act, is vitally important to the general consuming public, and particularly to the agricultural industries. Every American citizen is a daily consumer of food, and there are few so fortunate as not to be consumers, at one time or another, of medicines. The past 25 years have witnessed remarkable changes in food economics, one of the most striking being the gradual transfer of the manufacture of foods from the domestic kitchen to the factory. That transfer could not have occurred without the protection guaranteed by the food laws against adulterated and misbranded products. To-day, the farmer consumes almost as large a quantity of manufactured foods as the city dweller. He thus has a vital interest in those governmental activities designed to assure him pure, unadulterated, and honestly labeled foods.

Farmer Interested as Producer

But the farmer has an interest in food-law enforcement not shared by the city consumer. He is preeminently a producer. With the exception of our marine supply, the soil is the source of all our foods. There is, of course, little opportunity for adulterating commodities consumed just as they come from the farm—the raw vegetables, the fruits, and the grains. But manufacturers to-day are more extensively engaged than ever before in utilizing these raw materials in the preparation of manufactured products. Without legal control, there would be ample opportunity to debase these materials in the course of manufacture. A prompt and inevitable loss to the farmer would result, (1) as a defrauded consumer, and (2) through lowered consumption of the products of the farm with decreased financial returns accruing to the farmer as producer. There is a very clear and direct relationship between the effective enforcement of the food laws and the economic welfare of the farmer, both as a producer and a consumer.

The canning industry, for illustration, to-day is one of the most important contributors to the national food supply. It utilizes vast amounts of raw vegetables and fruits produced by American agriculture. A generation ago, before the enactment of the pure food law, canned foods were of an uncertain and variable quantity. Their quality was seldom such as to commend them. With reason, they were looked upon suspiciously and employed only as a last resort where fresh fruits and vegetables were unobtainable. Too often, the can contained but a minimum of the fruit or vegetable and a maximum of liquid, for water has always been the cheapest and most prevalent of all adulterants.

This condition changed almost instantly with the passage of the food law. It was promptly announced that, under the law, the can must be full of the food it purported to contain and that the liquid content should be reduced to that minimum necessary for proper packing. Coincidentally, there was an insistence upon purity and cleanliness in the canned-food material. The enormous growth of the canned-food industry in the last 23 years has been the direct outcome of this principle of food-law enforcement. And to-day, the American consumer justifiably expects that when he purchases a canned-food product, he will receive a legal article, that is, a full can, honestly labeled, and packed in a clean and sanitary fashion. As a producer, it must be evident to the farmer that the demand by the canning industry for raw fruits and vegetables has been directly proportional to the insistence under the food law that a maximum of the food product shall be packed in the can. Not only has the demand for his product been increased through this cause, but also because increased public confidence has led to an increased consumption of canned-food commodities. It is evident that the American farmer as a consumer of canned foods and as a producer of the raw products for the canner, should emphatically insist upon a continued effective law enforcement so far as canned foods are concerned.

Farmers Benefited Through Butter Regulations

Let us consider the dairy industry. There would be a small profit to the dairy farmer if the creamery were permitted without restriction to incorporate excessive quantities of water in the butter which it markets, for with every pound of water incorporated in butter, the demand for butterfat would be correspondingly decreased. To-day, by special enactment of Congress, butter must contain not less than 80 per cent of butterfat and this requirement is rigidly enforced under the pure food law.

Concentrated commercial stock feeds are extensively used by dairy farmers and by livestock feeders. The value of these products depends upon their composition. Intelligent farmers buy according to the label guaranty of chemical constituents and net weight. Food officials, both Federal and State, annually analyze thousands of samples of such products for the protection of the farmers against the sale of feeding material of inferior value and of incorrectly labeled feeds.

The farmer is particularly victimized by the patent-medicine enterprise. In common with the rest of mankind, he is expected to fall a prey to the sale of fraudulently labeled medicines for human beings. He also offers the exclusive market for the sale of worthless livestock remedies. An amazing amount of superstition about the avoidance or treatment of serious livestock diseases prevails. Quackery capitalizes this fact. One of the big things the Food and Drug Administration has tried to do for the farmer has been to dispel dangerous illusions and protect him against the vendors of patent medicines with curative claims far in excess of their actual merit. Inspectors of the Food and Drug Administration are daily instituting action against fraudulent remedies purporting to cure cholera in hogs, heaves in horses, and many other serious livestock and poultry diseases for which no single drug or combination of drugs can properly be described as a competent treatment. Within the past few years, many hundreds of such preparations have been required either to go off the market or to revise their labeling so as truthfully to represent their real worth.

New Forms of Violation

Much work remains to be done by the administration under the food and drugs act, for new forms of violation are continually appearing. Nevertheless, the farmers of this country, as well as consumers in general, are being well repaid for the efforts that were made in 1906 to bring about the enactment of the food and drugs act. That law deserves the interest and support of all.

One point in conclusion. The law requires truthful labeling. It is the consumer's money that is being spent to enforce this requirement. But if the buyer does not take the trouble to read the labels which the law prescribes, he will not get the full protection he is entitled to. He will be well repaid for the small effort required to read the label of every food and drug he buys.

W. G. Campbell,
Director of Regulatory Work.

FOOD and Drugs Act Is Made Stricter by Request of Canners On July 8, 1930, Congress approved a new amendment to the Federal food and drugs act. This amendment, commonly known as the McNary-Mapes bill, or the canners' bill, is the fourth amendment since the enactment of that statute on June 30, 1906.

What is the purpose of this amendment? How did it originate? What is its significance?

The purpose of the canners' bill, briefly stated, is to authorize the Secretary of Agriculture to determine, establish, and promulgate, from time to time, a reasonable standard of quality, condition and/or fill of

Concentrated commercial stock feeds are extensively used by dairy farmers and by livestock feeders. The value of these products depends upon their composition. Intelligent farmers buy according to the label guaranty of chemical constituents and net weight. Food officials, both Federal and State, annually analyze thousands of samples of such products for the protection of the farmers against the sale of feeding material of inferior value and of incorrectly labeled feeds.

The farmer is particularly victimized by the patent-medicine enterprise. In common with the rest of mankind, he is expected to fall a prey to the sale of fraudulently labeled medicines for human beings. He also offers the exclusive market for the sale of worthless livestock remedies. An amazing amount of superstition about the avoidance or treatment of serious livestock diseases prevails. Quackery capitalizes this fact. One of the big things the Food and Drug Administration has tried to do for the farmer has been to dispel dangerous illusions and protect him against the vendors of patent medicines with curative claims far in excess of their actual merit. Inspectors of the Food and Drug Administration are daily instituting action against fraudulent remedies purporting to cure cholera in hogs, heaves in horses, and many other serious livestock and poultry diseases for which no single drug or combination of drugs can properly be described as a competent treatment. Within the past few years, many hundreds of such preparations have been required either to go off the market or to revise their labeling so as truthfully to represent their real worth.

New Forms of Violation

Much work remains to be done by the administration under the food and drugs act, for new forms of violation are continually appearing. Nevertheless, the farmers of this country, as well as consumers in general, are being well repaid for the efforts that were made in 1906 to bring about the enactment of the food and drugs act. That law deserves the interest and support of all.

One point in conclusion. The law requires truthful labeling. It is the consumer's money that is being spent to enforce this requirement. But if the buyer does not take the trouble to read the labels which the law prescribes, he will not get the full protection he is entitled to. He will be well repaid for the small effort required to read the label of every food and drug he buys.

W. G. Campbell,
Director of Regulatory Work.

FOOD and Drugs Act Is Made Stricter by Request of Canners On July 8, 1930, Congress approved a new amendment to the Federal food and drugs act. This amendment, commonly known as the McNary-Mapes bill, or the canners' bill, is the fourth amendment since the enactment of that statute on June 30, 1906.

What is the purpose of this amendment? How did it originate? What is its significance?

The purpose of the canners' bill, briefly stated, is to authorize the Secretary of Agriculture to determine, establish, and promulgate, from time to time, a reasonable standard of quality, condition and/or fill of container for each generic class of canned food, except meat and meat-food products and canned milk. It also authorizes the Secretary to prescribe a form of statement which must appear in a plain and conspicuous manner on each package or label of canned food which falls below the standard promulgated by him and which will indicate that such canned food falls below such standard.

It is a striking fact that this amendment to the law did not originate through the demand of consumers. Nor was it enacted through the initial recommendation of the Federal Government, but was framed and pushed to final congressional approval by the canning industry itself. In this fact lies the greatest significance of the amendment.

Before the enactment of the food and drugs act, there was a great deal of opposition to the legislation on the part of the food industries. It is needless now to enter into the many reasons for this opposition, but it is a fact that opposition to the law and to its rigid enforcement is almost unknown among the present generation of food manufacturers. There is plenty of evidence, in industrial support of the law, in the growth of better-business-bureau movements, in the advocacy of truth in advertising, and in other ways, that the food industry as a whole is to-day imbued with the conviction that profitable business depends on satisfied customers. Efforts to amend the food and drugs act by legislation tending to weaken it have met with strong opposition from the food manufacturers, and unquestionably there would be an overwhelming opposition to any move to repeal the measure. The peculiar significance of the enactment of the canners' bill lies in the fact that here we have an instance where an industry not only favors the law, but on its own volition secures an amendment proposing further legal restrictions upon its own operation. All of these restrictions are in the interest of the ultimate consumer of canned-food products.

Canning Industry's Position

The canning industry was not unselfish in seeking the passage of this new measure. After 23 years of experience, the industry has recognized that the food and drugs act has revolutionized its operations and that the enforcement of the act has eliminated much of the competition due to the marketing of unfit material, and has created public confidence by removing from the market a class of products so low in quality as to bring the entire output of the industry into disrepute.

The industry knows that glaring abuses in the manufacture of its products are rare to to-day. The industry knows that while the law is effective in protecting the public health and in curtailing offenses against decency and in materially influencing the economic welfare of the purchaser, border-line cases among canned foods still exist, which, though not definitely illegal, represent a degree of inferiority entitling the buyer to full and complete knowledge of their quality before he invests his money in products coming within this border-line group. The purpose of the canners' bill, then, is to authorize the formulation of such legal standards as will insure a product sold to be of at least a standard degree of excellence, while an article which has reached such a degree of inferiority as to offend the purchaser—even though that article be perfectly wholesome and nutritious—will be definitely labeled to show that it is substandard and therefore will not be bought at the ordinary price.

If a consumer has the money to buy a standard-grade article, he should be in a position to do so with full knowledge of the character of the product purchased. But if his means will not afford a product of that excellence, it should be possible, under the operation of the canners' bill, to secure a product within the range of his pocketbook which, while not so palatable, will nevertheless be pure and wholesome and carry a definite label declaration of its substandard quality. It is obviously the intent of Congress that this statement shall clearly inform the purchaser that the product does not conform to the standard, but it is also apparent that the designation is not to be of such a stigmatizing character as to convey the impression that the product is unfit for food.

Consumers naturally could be expected to favor any legislation which would guarantee them more wholesome food and food of a higher quality. And it is easy to see that the consumer would approve of any legislation which would cause food manufacturers to label their products in a way which the buyer could understand and profit by. But in the passage of the canners' bill, we have the paradoxical situation of an industry which 23 years ago was by no means united in its support of the enactment of the law, now seeking through appeal to Congress and obtaining the passage of legislation imposing more stringent regulation upon itself.

Necessity of Legislation

Leaders in the food industries recognize that the absence of legislatively authorized standards is a distinct handicap to uniform enforcement of the law and that the existence of such standards would facilitate good manufacturing practice. One of the most noticeable trends in recent trade views regarding food legislation is the tendency to favor legislation requiring even more extensive and stringent food standards. The reason for this is clear. In the absence of definitely established legal standards, the problem of enforcing the food and drugs act is materially increased. The industry realizes that food products coming under the border-line classification are potentially most demoralizing to honest competition. Leaders in the industry recognize, further, the high potential advertising value accruing through legislative standards which will standardize their products.

One of the most serious problems encountered in the enforcement of the food and drugs act is the determination of what actually constitutes a violation. The act is general in its language. With one exception, butter, there is no legislative standard for food products. After analysis, the general terms of the law must be applied to the commodity under consideration and a decision must be reached by the department, and later confirmed by the courts, as to whether a particular condition constitutes a violation within the general terms of the act. There is a legislative standard for butter. This was enacted by Congress in 1923 and requires butter to contain not less than 80 per cent butterfat. But before the butterfat standard was definitely established, there was considerable trade in a product which looked and tasted like butter, which to the layman was not distinguishable from butter, but which showed a deficiency of butterfat and a corresponding excess of water. If traffic in such a product were allowed to proceed unchecked, the consumer would pay the price of butter for this excess water; or, if a corresponding price reduction were made, honest competitors would be placed at an unfair trade disadvantage. It was not difficult, even without a legislative standard, to bring successful legal action against a so-called butter containing materially less butterfat than was recognized as proper in good commercial usage. But it was much more difficult to establish a violation where the deviation from accepted trade usage was comparatively small. Yet, in the aggregate, even small shortages in butterfat represent an enormous imposition upon consumers and honest manufacturers. Until a definite legal standard for butter was enacted, there was occasionally a question whether the enforcement officials, alleging butter with, let us say, 79 per cent butterfat to be adulterated, could establish to the satisfaction of the court that this product was actually in violation of the law. So far as butter is concerned, that problem no longer exists.

Probable Legislative Trend Indicated

The action of the canners to secure the enactment of the canners' bill is indicative of the probable trend of future legislation regulating the manufacture and sale of all manufactured food products. The preservers of the United States made an earnest attempt to secure the legislative enactment of standards for fruit preserves by Congress in the summer of 1930. Before the passage of the food and drugs act, there was no assurance that a commercial product sold as preserves would consist exclusively of fruit and sugar in the proper proportions, regardless of the fact that common understanding would lead the purchaser to expect such a product under that name. So-called preserves were found in which but an insignificant amount of the fruit ingredient was present, while excessive sugar or glucose, fruit substitutes like apple base, and artificial colors concealed the real character of the product. These articles might be wholesome and even nutritious if the purchaser was looking only for food value. The individual who can not afford a more palatable product undoubtedly received in many cases a valuable food. But he was entitled to receive it with full knowledge of the character of the product. On the other hand, the man who had the means to buy a pure preserve was likewise entitled to get the article he expected to get. While the passage of the food and drugs act has checked gross forms of violation in the preserve industry, there is still need for certain definite legislative standards which will make it possible to eliminate conditions unfair alike to consumers and competitive manufacturers. The attempt of the preservers to secure legislative standards for their products reflects their appreciation of this fact. As time goes on, it is to be expected that this trend in the direction of more definite legislative standardization of food products will become more pronounced. Congress, in fact, considered in its Seventy-first session a proposed amendment to give authority to the Secretary of Agriculture to establish legal standards for all food products. While the amendment was not acted upon by that session, it at least indicates the trend in thought on the part of the food industries and of Congress. The passage of the canners' bill in the summer of 1930 was an important step in that direction.

P. B. Dunbar,
Assistant Chief, Food and Drug Administration.

FOOD Composition Tables Revised to Meet Demand for More Adequate Data In recent years the public mind has become aware of the significance of diet in maintaining health and well being and in the control of certain diseases. This awareness is due not alone to the awakening of the public mind but to the making of new discoveries with regard to nutritional needs. Older theories emphasized only protein and energy requirements, but later investigations have brought to light requirements hitherto unappreciated, and have shown particularly the need for vitamins and for minerals.

In the light of the newer knowledge of nutrition, vegetables have acquired an important place among foodstuffs and they have been introduced into the diet in greater quantity and in much greater variety than formerly. Vegetables, particularly the green leafy ones, have been chiefly heralded because of their vitamin content, but their value has been further enhanced by their worth in bolstering up the mineral intake which all too often tends to fall short of sufficiency.

To many people it is enough to know that they have had three good meals a day with an ample supply of standard foods. There are many, however, who must make a quantitative estimate of the various components of their diet. The diabetic, for example, knows that he has but a limited tolerance for carbohydrate and that he can burn fat only in proportion to the carbohydrate he can utilize as fuel. For such an individual it is essential that he calculate the quantities of fat and carbohydrate in his diet, and it is important for him to obtain the carbohydrate from milk and fruits and vegetables because of the alkalinity of their ash, because of their vitamin content, and in the case of the leafy vegetables because of their indigestible fiber which constitutes the needed roughage for the diet.

Many Uses for Diet Studies

While tables on the composition of foodstuffs are indispensable to the diabetic, such tables are equally valuable to many others interested either in normal or in special diets. Figures used by the dietitian and the layman relative to the composition of foodstuffs have been taken for the last three decades from the compilations of the department. These tables, The Chemical Composition of American Food Materials, first published in 1896 and last revised in 1899, have served their purpose admirably, but are now inadequate, covering as they do but a part of the foodstuffs common to-day. Recently, certain sections of this bulletin have been revised so that up-to-date figures are now available on the composition of fresh fruits and on wholesale cuts of meat. Now new figures on fresh vegetables are available.

In the original compilation only 38 fresh vegetables are included. The reason for this is twofold. In the first place, the market or garden vegetables were far more limited in number in the nineties than they are at the present time. In the second place, vegetables did not hold such an important place in the early dietary studies as they do at the present time. In the revised tables data are given concerning the proximate composition of 110 different kinds of vegetables. Many of these, such as New Zealand spinach, Chinese cabbage, and sprouting broccoli, although in common use to-day were practically unheard of by many American gardeners a decade or so ago. Other vegetables not widely used but worthy of wider attention are included.

The new compilation presents additional information to suit the needs of various groups. Particular attention is given to nomenclature; each vegetable is described by the scientific name and the accepted common name. Data on different species are reported separately, and in a few cases the figures show the effect on composition of maturity differences. Data on the chemical constituents refer to the part analyzed as edible portion, but the averages are also calculated on the as-purchased basis. Since the data on composition refer to the edible portion a description of the edible part is given wherever there might be doubt, and refuse figures are likewise accompanied by a description of the refuse portion. The samples included are representative and varied, typical of vegetables as they would be bought on the open market or obtained direct from the garden, and the data are so presented as to give not only averages but also a picture of the variation to be expected.

While the revised compilation on the proximate composition of fresh vegetables will fill a long-felt want on the part of dietitians and all those making dietary studies it will also be of value to the layman who nowadays is gaining an appreciation of the value of diet both in health and disease.

GEORGIAN ADAMS,
Associate Specialist in Foods and Nutrition,
Bureau of Home Economics.

FORAGE-CROP Seed's Regional Origin Often Revealed by Analysis The region of production of some kinds of forage-crop seed is important to the American consumer because of the inadaptability to American conditions of seed produced in some regions.

The culture of some forage crops is conducive to the undisturbed development of volunteer plants, such as weeds and occasional plants of other crops. The seed of such forage crops contains the seed of these volunteer plants under usual conditions. The extent to which the volunteer seed appears in harvested crop seed depends, first of all, upon the simultaneous development of the crop seed and volunteer seed and is influenced by the duration of the volunteer plants' seeding period. Finally, the occurrence and prevalence of volunteer seed in marketed crop seed is dependent upon the extent to which the crop seed is cleaned before marketing. The comparatively large or small size of certain kinds of volunteer seeds permits their practically complete removal from the crop seed by suitable screening. Other kinds of volunteer seeds having approximately the same size, form, and weight as the crop seed are not wholly removed from the latter by the methods of seed cleaning now in general use. These seeds and those remaining from incomplete preliminary cleaning are the seed analyst's guide in determining where the crop seed was produced.

Certain kinds of forage-crop seed, as that of red clover, alfalfa, also that of the bent grasses, are produced in widely separated regions possessing more or less different local volunteer floras. The resulting difference in kinds of volunteer seeds found in the crop seed from these regions provides what are sometimes designated as "characteristic" seeds, since they characterize the regions where they grew. Such seeds usually are accompanied by seeds of other plants so cosmopolitan that their seeds commonly appear in crop seed from many regions.

The new compilation presents additional information to suit the needs of various groups. Particular attention is given to nomenclature; each vegetable is described by the scientific name and the accepted common name. Data on different species are reported separately, and in a few cases the figures show the effect on composition of maturity differences. Data on the chemical constituents refer to the part analyzed as edible portion, but the averages are also calculated on the as-purchased basis. Since the data on composition refer to the edible portion a description of the edible part is given wherever there might be doubt, and refuse figures are likewise accompanied by a description of the refuse portion. The samples included are representative and varied, typical of vegetables as they would be bought on the open market or obtained direct from the garden, and the data are so presented as to give not only averages but also a picture of the variation to be expected.

While the revised compilation on the proximate composition of fresh vegetables will fill a long-felt want on the part of dietitians and all those making dietary studies it will also be of value to the layman who nowadays is gaining an appreciation of the value of diet both in health and disease.

GEORGIAN ADAMS,
Associate Specialist in Foods and Nutrition,
Bureau of Home Economics.

FORAGE-CROP Seed's Regional Origin Often Revealed by Analysis

The region of production of some kinds of forage-crop seed is important to the American consumer because of the inadaptability to American conditions of seed produced in some regions.

The culture of some forage crops is conducive to the undisturbed development of volunteer plants, such as weeds and occasional plants of other crops. The seed of such forage crops contains the seed of these volunteer plants under usual conditions. The extent to which the volunteer seed appears in harvested crop seed depends, first of all, upon the simultaneous development of the crop seed and volunteer seed and is influenced by the duration of the volunteer plants' seeding period. Finally, the occurrence and prevalence of volunteer seed in marketed crop seed is dependent upon the extent to which the crop seed is cleaned before marketing. The comparatively large or small size of certain kinds of volunteer seeds permits their practically complete removal from the crop seed by suitable screening. Other kinds of volunteer seeds having approximately the same size, form, and weight as the crop seed are not wholly removed from the latter by the methods of seed cleaning now in general use. These seeds and those remaining from incomplete preliminary cleaning are the seed analyst's guide in determining where the crop seed was produced.

Certain kinds of forage-crop seed, as that of red clover, alfalfa, also that of the bent grasses, are produced in widely separated regions possessing more or less different local volunteer floras. The resulting difference in kinds of volunteer seeds found in the crop seed from these regions provides what are sometimes designated as "characteristic" seeds, since they characterize the regions where they grew. Such seeds usually are accompanied by seeds of other plants so cosmopolitan that their seeds commonly appear in crop seed from many regions.

The volunteer seed content of commercial crop seed becomes complicated when seed of the same crop but from different regions becomes mixed in the trade. A representative sample of a pound or more of such mixed seed usually contains conclusive evidence of the mixture. In such cases other evidence sometimes is helpful. Individual seeds of most forage crops do not differ materially in form within the same kind, but a difference in size and in color sometimes is noticeable in seed of the same crop from different regions. Again, the quality of the crop seed, which affects its appearance, may happen to differ on occasions in different regions. When these conditions coincide with trade mixing, the latter sometimes is evident irrespective of the volunteer seed content.

Significance of the Volunteer Seed

As a rule, the volunteer-seed content of a pound of crop seed suffices to identify its source; often it is evident in a much smaller quantity. Occasionally a pound of seed affords insufficient evidence of origin. It might be thought that intentional addition or extraction of telltale seeds would be attempted to mislead the analyst. Removal of the volunteer seeds in a sample of crop seed submitted from test would result in a negative report upon its origin. Deliberate addition of characteristic seeds would necessitate knowledge of what kinds to use, the approximate proportions, and the possession of the seeds—a combination of conditions not at all likely to be provided. Such procedure is improbable, since true information usually is desired by those who submit seed for test.

Seed analysis is a branch of agricultural science so much in its infancy that existing books, except those relating to local floras, are but indirectly helpful to the analyst in determining the origin of crop seed. His main reliance is upon experience in the analysis of a great number of samples of crop seed of many kinds representative of the regions where they are produced, aided by fragmentary descriptive and illustrative matter helpful a little here and a little there, but mostly proving sound when well investigated. Many characteristic seeds are recognized by their appearance long before their botanical identity is determined; but their usefulness for the immediate purpose is not materially lessened by this fact. Their botanical identification eventually becomes an important factor in the thorough study of the subject and especially in making published statements. The origin-determining value of characteristic seeds present in a quantity of crop seed is materially strengthened by the absence of the characteristic seeds of other regions.

Identification of Unknown Seeds

The identification of unknown seeds is best attained by growing plants to maturity from them, that is, from seed to seed again, procuring enough plants for preservation to show the important stages of development and to display the plant habit, including root, leaves, flowers, fruits, and seeds. Named herbarium specimens and plant descriptions will be depended upon thereafter. This is not always easily accomplished with plants peculiar to some distant part of the world. Collections of named seed samples and certain published matter afford some preliminary help. The usual descriptive works on botany afford little help in making identifications of seeds, because most plant descriptions end where the seed analyst's need for information begins.

In deciding the origin of a sample of crop seed, all possible evidence is utilized. Rarely is a decision made upon the presence of a single kind of seed. As an instance of the latter, the origin of a small sample of alfalfa seed was designated upon the presence of seeds of an unknown kind of pigweed (Amaranth) not known to occur in seed from any region other than that designated. Further study of a larger portion of the same lot of seed afforded ample additional evidence of the accuracy of the decision made upon a single kind of characteristic seed. Determinations of origin based on this botanical evidence, contrary to persistent denial, have brought forth admission of the truth of the determination when court action threatened.

F. H. HILLMAN,
Associate Botanist, Bureau of Plant Industry.

FOREST Destruction and Soil Erosion Destroying Land Fertility Rapidly The comparatively recent advent of man upon the earth, dating back perhaps a few millions of years, has produced changes of a destructive nature, probably the greatest of which is the removal of forest cover by burning, purposely as well as accidentally, and by lumbering, followed usually by fires in the slashings and consequent destruction of young trees and other vegetation. This causes a rapid run-off of rainfall and soil erosion and filling of streams, with consequent flooding and destruction of wild life and wild-life refuge, including fish, and destroying navigation.

These conditions, with their dire results to human welfare, are most evident at the present time in China and parts of India and northern Africa, where floods and famine are more or less regular occurrences. Here man has upset those great natural balances that made it possible for him to live in comparative comfort and safety.

Japan and most European countries have long since learned the folly of such wastefulness and disturbance of natural conditions and have established policies of protection and reforestation that have made them able to support increasing populations.

Slow to Realize the Danger

On the American Continent and in our own country in particular we have been slow to realize the potential dangers of forest destruction and the destruction of the natural vegetation cover of the plains and nonforested lands.

Certain types of soils are particularly liable to erosion or washing, even though they are not on appreciable slopes and the run-off of waters is comparatively slow.

So-called sheet erosion over immense areas of overgrazed land is rapidly washing away the valuable humus layer that has required hundreds of years to form and is opening the way for more rapid erosion.

It is estimated that the loss in soluble fertility alone is double that removed by crops.

matter afford some preliminary help. The usual descriptive works on botany afford little help in making identifications of seeds, because most plant descriptions end where the seed analyst's need for information begins.

In deciding the origin of a sample of crop seed, all possible evidence is utilized. Rarely is a decision made upon the presence of a single kind of seed. As an instance of the latter, the origin of a small sample of alfalfa seed was designated upon the presence of seeds of an unknown kind of pigweed (Amaranth) not known to occur in seed from any region other than that designated. Further study of a larger portion of the same lot of seed afforded ample additional evidence of the accuracy of the decision made upon a single kind of characteristic seed. Determinations of origin based on this botanical evidence, contrary to persistent denial, have brought forth admission of the truth of the determination when court action threatened.

F. H. HILLMAN,
Associate Botanist, Bureau of Plant Industry.

FOREST Destruction and Soil Erosion Destroying Land Fertility Rapidly

The comparatively recent advent of man upon the earth, dating back perhaps a few millions of years, has produced changes of a destructive nature, probably the greatest of which is the removal of forest cover by burning, purposely as well as accidentally, and by lumbering, followed usually by fires in the slashings and consequent destruction of young trees and other vegetation. This causes a rapid run-off of rainfall and soil erosion and filling of streams, with consequent flooding and destruction of wild life and wild-life refuge, including fish, and destroying navigation.

These conditions, with their dire results to human welfare, are most evident at the present time in China and parts of India and northern Africa, where floods and famine are more or less regular occurrences. Here man has upset those great natural balances that made it possible for him to live in comparative comfort and safety.

Japan and most European countries have long since learned the folly of such wastefulness and disturbance of natural conditions and have established policies of protection and reforestation that have made them able to support increasing populations.

Slow to Realize the Danger

On the American Continent and in our own country in particular we have been slow to realize the potential dangers of forest destruction and the destruction of the natural vegetation cover of the plains and nonforested lands.

Certain types of soils are particularly liable to erosion or washing, even though they are not on appreciable slopes and the run-off of waters is comparatively slow.

So-called sheet erosion over immense areas of overgrazed land is rapidly washing away the valuable humus layer that has required hundreds of years to form and is opening the way for more rapid erosion.

It is estimated that the loss in soluble fertility alone is double that removed by crops.

The Government, with the cooperation of the States, has begun a program of study of the situation, with the hope of suggesting practical means of stopping the losses.

Another aspect of the matter is the depletion of the readily available "organic content" of the soil. This is made up of decaying roots and vegetable remains accumulated through centuries. The vegetable material acts favorably on the physical structure of the soil, increasing its ability to admit air and to hold and give up water to growing plants. It is also the feeding ground of a host of organisms—protozoa, algae, fungi, bacteria, worms, insects, and other small animals. Most of these are beneficial and altogether they constitute what is popularly called the life of the soil. If the organic matter is unduly depleted these organisms die and the soil becomes dead and infertile.

This is taking place in millions of acres of what is now known as good agricultural land. Millions of acres more have been ruined for agricultural purposes by this process of organic-content destruction.

Eroded Soils a Menace

These soils wash and erode badly and soon become valueless for any purpose. In fact they become a menace as they fill up streams and watercourses, with the results described in earlier paragraphs.

The students of soils and agronomy are just waking up to the menace and are strongly advocating a strong cooperative program to articulate with the erosion program to halt these devastations.

A third category of destructive procedure consists in constantly taking from the soil the soluble compounds necessary for plant growth—lime, magnesium, potash, nitrogen compounds, phosphorus iron, manganese, copper, and the other essentials in plant nutrition.

Fertilizers Replace Loss Only in Part

To some extent these can be replaced by the use of fertilizers containing the necessary elements in available form.

The use of chemical fertilizers is increasing slowly but not as fast as the depletion of soils in these materials. Profitable crops depend upon maximum yield of high quality with the smallest expenditure of labor and investment. Numberless experiments and demonstrations by the Department of Agriculture and the State experiment stations have shown that this result can be obtained only where the highest fertility is maintained.

Finally, as economists and students of history and social science have repeatedly pointed out, the well-being of people and nations in the last analysis depends on the soil as a source of food and raw materials. In new countries we may for a time be oversupplied, but when population pressures reach a point where land must be divided into smaller and smaller portions and it becomes decreasingly difficult or costly to maintain an adequate food supply, standards of living decline until at last it is a life-and-death struggle, as it is in several Asiatic counties to-day. By foresight in planning, this day may be long delayed for America.

A. F. Woods,
Director of Scientific Work.

40442°—31——17

FOREST-FIRE Protection on Privately Owned Land Is a Cooperative Task

Who is responsible for the protection of privately owned forests from fire? It is obvious that many of the benefits of forest protection come to the public at large and not to the private owner as such. This is true of the great beneficial effect that fire prevention and control have upon the run-off and storage of water and upon the fixation of soil to prevent erosion. It is also true of the strikingly improved conditions for the production of fish and game and in recreational advantages. The public benefits directly through the stabilization of wood-using industries and through increased land values. The general economic development of the community and of the Nation depends in no small measure, in forest regions, upon the continual production of forest crops which is possible only when the forests are adequately protected from fire.

The public has a very real interest in the adequate production of wood materials of desirable quality and quantity wherever these wood materials are produced. Each fire loss effects a definite reduction in the prosperity of the Nation, and is a positive disadvantage to millions of people. Each single destructive fire attacks the economic and social well-being of the whole country.

The public generally benefits by forest-fire prevention and control and therefore has a large measure of responsibility for proper measures of forest protection. Furthermore the public is frequently to blame for the occurrence of fire. Of the 44,000 fires reported on protected areas in the United States in 1929, over 50 per cent were attributed to agencies over which the individual landowner had little or no control.

As the Nation and State benefit from forest-fire protection, so also, does the individual landowner. To him come the most direct results from the prevention of fire on his forest lands. In addition to sharing the general benefits, to him comes the gain from stimulated and sustained yield of forest products which he himself can sell. Like the public, also, he is not blameless in the matter of fire occurrence; nearly half the fires are caused by him. Is it not clear then that the Nation, the State, and the private owner have a community of responsibility?

Organized Effort Required

Prevention and control of forest fires can not be accomplished economically and effectively except by the joint efforts of public and private agencies. Group action is essential to success. Each effective protective working unit will, generally speaking, embrace not single but several ownerships. The planning and direction of the work very clearly can be best handled by the public, the State.

Fires must be prevented by education—State-wide and Nation-wide; they must be promptly located when they occur by adequate detection and communication machinery; and those who wilfully cause them must be apprehended. This work can be economically done only when handled on a State-wide basis. Fire must be fought promptly and without reference to property lines, under efficient leadership, by men who know how and who are organized in advance, with suitable equipment. Only through organized and united effort can forest fires be economically prevented and controlled. The public must take the leadership and responsibility.

Forest-fire protection has been recognized as a great cooperative undertaking by the Clarke-McNary law, act of June 7, 1924, under the terms of which the Federal Government, States, and private owners are to-day working together. The job, however, is scarcely more than half done. Of the 417,000,000 acres of forest or potential forest land in State and private ownership, 194,000,000 acres are at present receiving no systematic protection from forest fires although greatly in need of such protection. The completion of the task constitutes a challenge to the Federal Government, the States, and private owners.

A. B. Hastings,
In Charge of State Cooperation, Forest Service.

FOREST-FIRE Protection Presents Some Unusual Problems in Minnesota Among the unusual problems in fire protection faced by the United States Forest Service is that presented by physical conditions within the Superior National Forest in Minnesota. Visualize an area of 1,600,000 acres within which 1,000 square miles has been set aside as a primitive area, where there are no roads, and practically no trails—a wild country with little of human habitation, but abounding in game, such as moose, deer, bear, wolves, and other fur bearers.

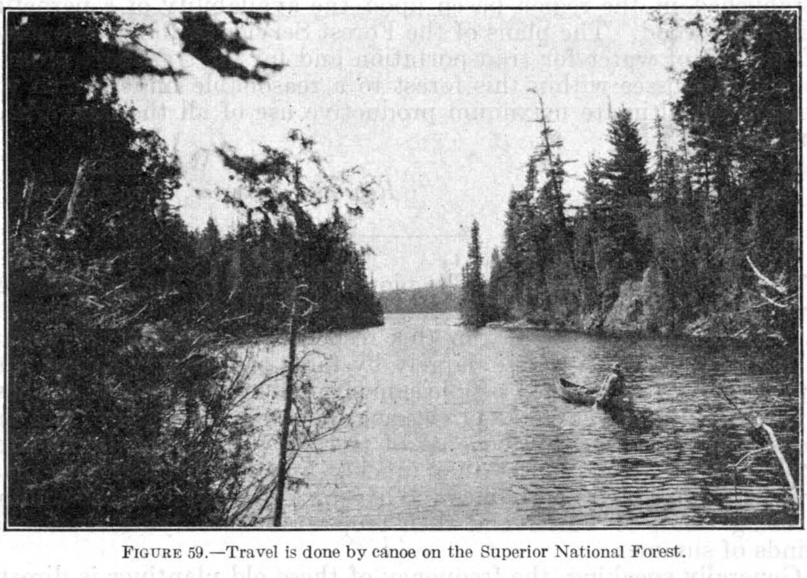


Figure 59.—Travel is done by canoe on the Superior National Forest.

Interlaced with a labyrinth of waterways, lakes, and great areas of spruce and muskeg swamp, this forest is almost impassable to foot travel in the summer. The cruising of timber and other similar activities of the Forest Service are carried on in winter, when the lakes, swamps, and streams are frozen, and dog teams can be used for transport. The usual method of travel during the summer season is by canoe and portage, a slow and laborious method, rendering forest-fire protection, where rapid movement of men and supplies is vital, extremely difficult.

Forest-fire protection has been recognized as a great cooperative undertaking by the Clarke-McNary law, act of June 7, 1924, under the terms of which the Federal Government, States, and private owners are to-day working together. The job, however, is scarcely more than half done. Of the 417,000,000 acres of forest or potential forest land in State and private ownership, 194,000,000 acres are at present receiving no systematic protection from forest fires although greatly in need of such protection. The completion of the task constitutes a challenge to the Federal Government, the States, and private owners.

A. B. Hastings,
In Charge of State Cooperation, Forest Service.

FOREST-FIRE Protection Presents Some Unusual Problems in Minnesota Among the unusual problems in fire protection faced by the United States Forest Service is that presented by physical conditions within the Superior National Forest in Minnesota. Visualize an area of 1,600,000 acres within which 1,000 square miles has been set aside as a primitive area, where there are no roads, and practically no trails—a wild country with little of human habitation, but abounding in game, such as moose, deer, bear, wolves, and other fur bearers.

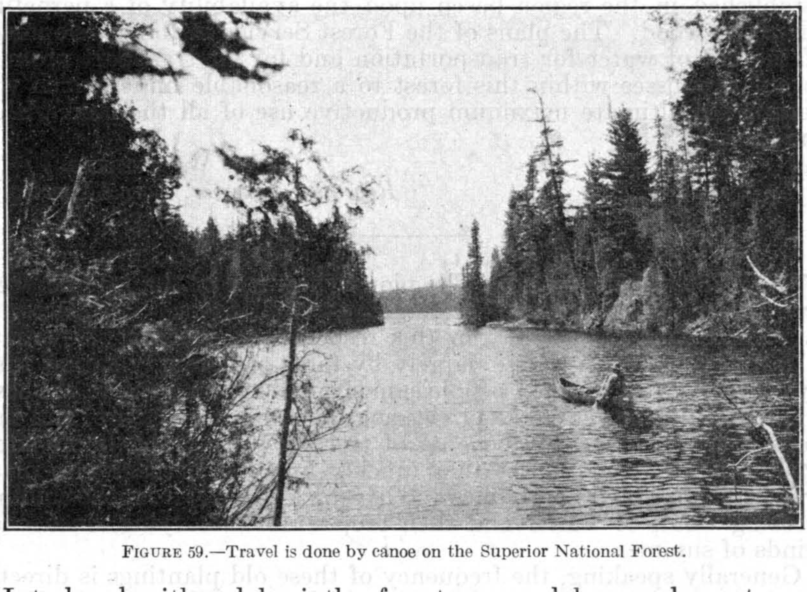


Figure 59.—Travel is done by canoe on the Superior National Forest.

Interlaced with a labyrinth of waterways, lakes, and great areas of spruce and muskeg swamp, this forest is almost impassable to foot travel in the summer. The cruising of timber and other similar activities of the Forest Service are carried on in winter, when the lakes, swamps, and streams are frozen, and dog teams can be used for transport. The usual method of travel during the summer season is by canoe and portage, a slow and laborious method, rendering forest-fire protection, where rapid movement of men and supplies is vital, extremely difficult.

Much work has been done to improve the portages to permit faster travel, and yet 1½ miles an hour is considered a high speed within the region. The transportation of men and equipment to fires at best is slow, hazardous, and difficult. Of a crew of 50 men, often not more than 4 or 5 are experienced in the use of canoes. Camp equipment, tools, and pumps must be transported by back pack over portages, and time after time reloaded into canoes along with men who are unappreciative of the hazard of travel in these fragile craft.

Plans Being Developed

To meet the situation, three plans are being developed:

(1) The improvement of portages, and on the primary travel routes the installation of light tracks over which fire equipment can be moved with greater speed.

(2) The use of hydroplanes for rapid transportation of small crews with essential equipment. This method has proved a great success, sometimes enabling the movement of a small crew to a fire in 30 minutes where previously it would have required a day and a half.

(3) The improvement of water routes by the installation of retaining dams, thus eliminating slow portage work.

The forest products produced within the Superior National Forest are of great value, because a permanent wood-using industry is being established in the region based upon the availability of a perpetual supply of wood. The plans of the Forest Service in the development of the use of water for transportation and for air transport promise to cut fire losses within this forest to a reasonable limit, which will permit the ultimate maximum productive use of all the land within the forest

EARL W. TINKER,
Regional Forester, Forest Service.

FOREST Plantings in Central States Repay Their Cost Manyfold

The pioneer farmers of the Middle West were great tree planters. Their activity in this respect was encouraged perhaps largely by force of necessity rather than by choice. Most of these people came from districts lying to the east, where they had been actively clearing lands for agriculture, and had been accustomed to the benefits of tree growth around home sites. On the high, open prairies they quickly found it necessary to plant trees to shelter their new homes and livestock (fig. 60) from the chilling, freezing winds of winter and their crops from the drying, unchecked winds of summer.

Generally speaking, the frequency of these old plantings is directly in proportion to the area of prairie which originally existed. There are no accurate figures on the total planted area in the Middle West. Estimates show about 240,000 acres in Iowa where most of the area was treeless, about 40,000 acres in Illinois where there were also large areas of prairie, about 14,000 acres in Ohio, 10,000 acres in Missouri, and smaller areas in Indiana, Kentucky, and other States which were mostly wooded. A similar example on a small scale can frequently be seen in a country which is partly wooded and partly prairie. In

Much work has been done to improve the portages to permit faster travel, and yet 1½ miles an hour is considered a high speed within the region. The transportation of men and equipment to fires at best is slow, hazardous, and difficult. Of a crew of 50 men, often not more than 4 or 5 are experienced in the use of canoes. Camp equipment, tools, and pumps must be transported by back pack over portages, and time after time reloaded into canoes along with men who are unappreciative of the hazard of travel in these fragile craft.

Plans Being Developed

To meet the situation, three plans are being developed:

(1) The improvement of portages, and on the primary travel routes the installation of light tracks over which fire equipment can be moved with greater speed.

(2) The use of hydroplanes for rapid transportation of small crews with essential equipment. This method has proved a great success, sometimes enabling the movement of a small crew to a fire in 30 minutes where previously it would have required a day and a half.

(3) The improvement of water routes by the installation of retaining dams, thus eliminating slow portage work.

The forest products produced within the Superior National Forest are of great value, because a permanent wood-using industry is being established in the region based upon the availability of a perpetual supply of wood. The plans of the Forest Service in the development of the use of water for transportation and for air transport promise to cut fire losses within this forest to a reasonable limit, which will permit the ultimate maximum productive use of all the land within the forest

EARL W. TINKER,
Regional Forester, Forest Service.

FOREST Plantings in Central States Repay Their Cost Manyfold

The pioneer farmers of the Middle West were great tree planters. Their activity in this respect was encouraged perhaps largely by force of necessity rather than by choice. Most of these people came from districts lying to the east, where they had been actively clearing lands for agriculture, and had been accustomed to the benefits of tree growth around home sites. On the high, open prairies they quickly found it necessary to plant trees to shelter their new homes and livestock (fig. 60) from the chilling, freezing winds of winter and their crops from the drying, unchecked winds of summer.

Generally speaking, the frequency of these old plantings is directly in proportion to the area of prairie which originally existed. There are no accurate figures on the total planted area in the Middle West. Estimates show about 240,000 acres in Iowa where most of the area was treeless, about 40,000 acres in Illinois where there were also large areas of prairie, about 14,000 acres in Ohio, 10,000 acres in Missouri, and smaller areas in Indiana, Kentucky, and other States which were mostly wooded. A similar example on a small scale can frequently be seen in a country which is partly wooded and partly prairie. In

Vermilion County, Ill., no plantings were found within the limits of natural woods, but they were immediately found in all portions which were originally prairie.

Shelter and Shade Most Pressing Needs

The need for shelter and protection has been the most impelling force toward tree planting. In a study of forest plantations which the Forest Service's Central States Forest Experiment Station is pursuing, data have been collected as far as possible on the purposes for which plantations have been established. Out of a total of 96 plantings, 39 were for windbreaks, 16 were for shade, 14 for timber, and the remaining planted groves were established for experiment, ornamentation, climatic control, and other purposes.

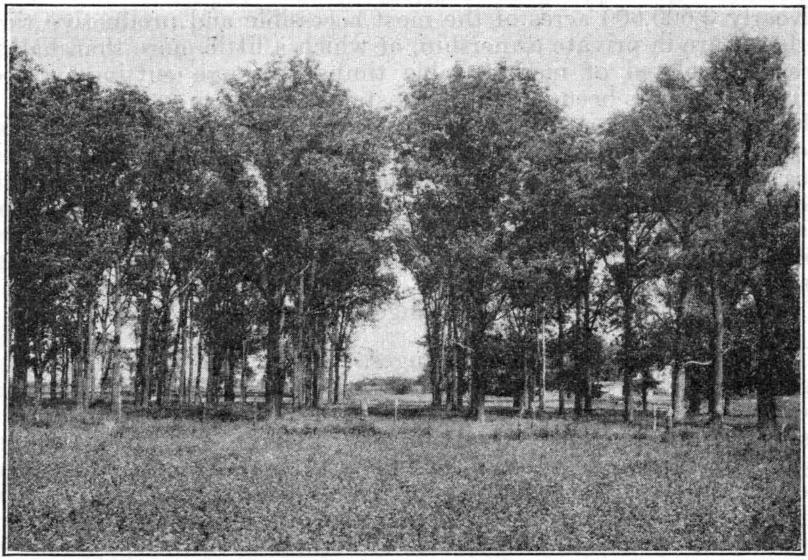


FIGURE. 60.—Black walnut, originally alternated with rows of cottonwood planted to protect a farm home from western and northern winds. The cottonwood has been removed. Many of these trees are now merchantable. (Champaign County, Ill.)

Additional advantages have been gained from the presence of planted trees on farms. Much fuel wood has been secured from trees which die or are removed. Poles, posts, and rough timbers have been cut, where the species originally planted was suitable for these uses. In the case of a valuable wood, like black walnut, the trees which remain have grown to merchantable size where the species has been suited to the soil, and growth has been continuous and rapid. To some farm owners, the ornamental and esthetic value of the windbreak is so great as to dwarf all cost of establishment and rental for the land area occupied. The statement is frequently made that the owner would not take several thousand dollars for his trees, solely because of their beauty and scenic value.

L. F. Kellogg,
Associate Silviculturist, Forest Service.

FOREST Problems Are Unusually Difficult in Idaho Panhandle In its efforts to help solve the forestry problems of the various regions, the Forest Service encounters many difficult and perplexing situations. One of the most baffling of these is found in the Idaho Panhandle, comprising that narrow strip of land in Idaho extending from the Salmon River Gorge northward to the Canadian boundary and containing the heart of the great white-pine forests of the West.

Of its entire extent of nearly 13,000,000 acres, approximately 10,000,000 acres is forest land, and more than 8,000,000 acres is suited to the growing of commercial timber crops; an area of slightly less than 4,000,000 acres still supports timber of commercial size. As against this large forest-producing area, less than 1,000,000 acres in the Panhandle is now producing farm crops, and the possibilities of further agricultural development are limited.

Nearly 3,000,000 acres of the most accessible and productive timberlands are in private ownership, of which a little more than half is already depleted of merchantable timber through cutting or fire. Much of this has been left in a devastated condition.

Ever since the great conflagrations of 1910 it has been realized that the prevention or prompt suppression of fires is fundamental to the success of any attempt to keep the forest lands of the Panhandle productive. There is, of course, much more to forestry in the region than mere fire control, but so long as fire still remains an unsolved problem it jeopardizes the results of any silvicultural measures that may be employed.

High Fire Danger in Region

The region is one of high fire danger. Long summer droughts, with high temperatures and low humidity are common. Over large areas the forest floor is crisscrossed with down timber, strewn with inflammable litter, and cluttered with dense undergrowth. Moss drapes itself from the trees, inviting the flames to climb into the tops where they form rapidly spreading "crown fires." Lightning sets fires in wholesale fashion, forming the chief cause of fires and one that is not preventable by any known means. All these conditions combine to aid the start and spread of fires and hinder control work. (Fig. 61.)

In the 18-year period from 1908 to 1925, inclusive, fire swept over nearly 5,000,000 acres of forest lands in the Panhandle and destroyed almost 10,000,000,000 board feet of timber. The estimated damage was more than $22,000,000, to which should be added the large sums expended in fire fighting by both public and private agencies.

It was early realized that slash from logging operations adds much to the natural fire hazards. Accumulated slash not only increases the chances of fires starting, but may be the cause of fires gaining such size and headway that control becomes well nigh impossible. From the start the Forest Service adopted piling and burning of slash on national forest sales of timber. The State later took up the same method on State lands, and a State law was enacted in 1925 requiring slash disposal on private lands except where the State Forester might direct otherwise.

Cut-Over Land Problem

The fate of cut-over and burned-over lands in private ownership is another important angle to the problem, the answer to which is not yet in sight. The burden of protection costs and taxes looms as a serious obstacle to continued private ownership. In spite of the fact that encouragement has been given through State laws favoring the formation of protective associations, in which the State assumes its share of costs, and in spite of the allotment of Federal funds under the Clarke-McNary law by which material contributions toward meeting pro-

FIGURE 61.—A typical mature stand of Idaho white pine

tection costs have been made, it became evident that further relief was necessary. The Idaho Legislature in 1929, therefore, passed the so-called reforestation law, providing for a flat valuation on cut-over and reforested lands of $1 per acre, with a 12½ per cent yield tax when the timber is cut. (Fig. 62.)

Coupled with these measures to alleviate fire losses and carrying charges has gone much educational effort, aimed at the prevention of man-caused fires and the cooperation of the public in rendering forest-land ownership less burdensome and hazardous. But large areas are still being burned over each year, and cut-over lands are becoming tax delinquent in some sections at a rather alarming rate. Difficulties are still being encountered in enforcing the slash disposal requirements, while the extent to which the tax relief contemplated in the 1929 reforestation law may be realized has not had time to prove itself. As if to complete the chain of obstacles to private ownership, there has recently been added the white-pine blister rust menace. This destructive disease has spread so rapidly in Idaho that it threatens to wipe out the most valuable commercial timber tree of the region unless control measures are extensively undertaken at once and completed within the next 10 years.

As a result of the study of this whole problem to date, there stands out clearly the fact that the next crop of timber in the Idaho Panhandle will not grow of its own accord as did the crop which is now being

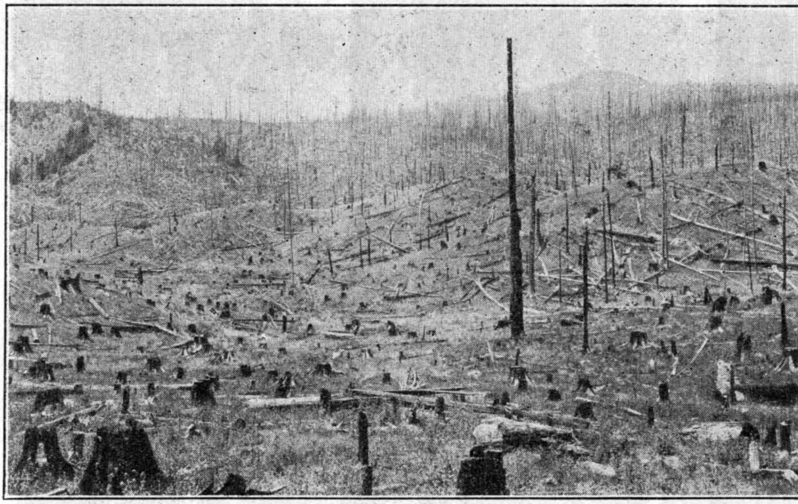


FIGURE 62.—Condition in which much of the cut-over lands of the Idaho Panhandle are being left

rapidly harvested. Fires, insects, blister rust, and unregulated cutting stand in the way. Man will have to grow the next timber crop, and he will have to do it by exercising control over these agencies, instead of allowing them to work on the side of forest destruction and denudation as in the past. Man has upset nature's scheme of forest rehabilitation in the Panhandle, and unless steps can be taken promptly to restore the balance between forest destruction and forest restoration the forests must perish.

Such are the forest problems of one of the Nation's timber storehouses; and into their solution must enter such ingredients as improved methods of cutting, better fire control, war against insect and parasitic enemies, increased public ownership of timberlands, and tax reform. Last, but underlying the rest, must go a vast amount of forest research. To meet these problems calls for courage, vision, patience, and a large amount of applied detail extending through the years to come.

THEODORE SHOEMAKER,
Assistant Regional Forester, Forest Service.

FOREST Roads and Trails Expenditure in Fiscal Year 1930 Was $8,500,000 Approximately $8,500,000 of forest-road funds was expended during the fiscal year 1930 for the construction and maintenance of roads and trails in the national forests of the United States. This sum covered the construction of 1,726 miles of roads, including 593 miles of motor ways; 6,176 miles of trails, including 4,601 miles of trail ways; and the maintenance of 65,785 miles of trail and 19,898 miles of roads.

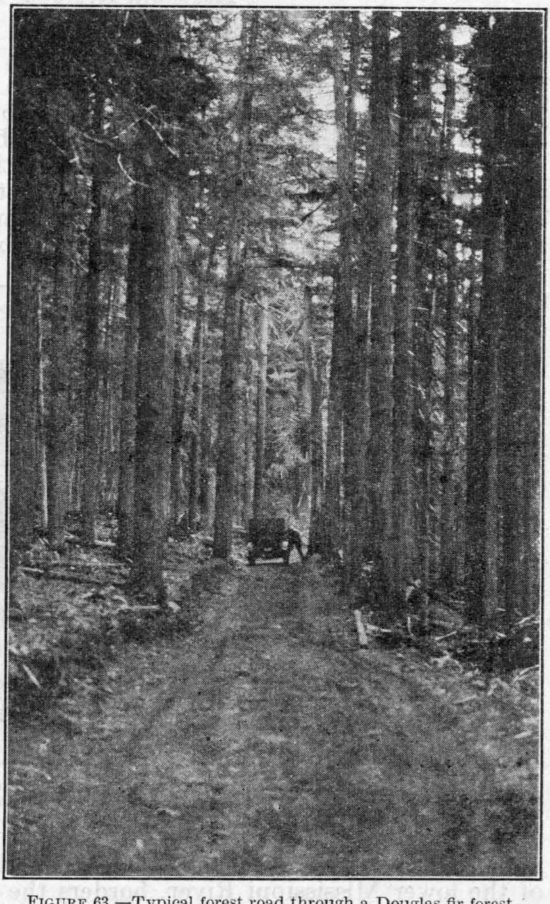


FIGURE 63.—Typical forest road through a Douglas fir forest, western Oregon

An adequate transportation system is required to facilitate the protection of the national forest resources from fire. Cheap construction is resorted to for secondary roads, but the roads are made safe. The requirements are so great that to construct only first-class roads would retard unduly the opening up of large inaccessible regions. To extend the mileage of roads and trails as rapidly as funds permit is the first consideration.

Many of the roads constructed are called "motor ways;" if they will permit a 2-ton loaded fire truck to pass over them safely, they meet the specifications. A "trail way" is the roughest kind of a trail through the woods. It must, however, be made reasonably safe for loaded pack animals. Trail ways are designed for use in case of fire only, and neither motor ways nor trail ways are constructed for public use.

When roads to be used extensively by the public or local settlers are constructed, the specifications provide for a 9-foot road with adequate turnouts, and a 7 per cent ruling grade. Forest roads are rarely surfaced as they are for the most part for summer use only. (Fig. 63.)

The crews engaged in road and trail construction are organized for fire suppression and constitute what is called the second line of defense. Trained men in the forest, subject to immediate call in the event of fires, mean reduced acreage burned and decreased fire suppression costs and damages.

Many years will be required for the completion of a transportation system that will afford adequate protection of the vast timber resources of the national forests of the United States, but a good start has been made on the system.

A. O. Waha,
Assistant Regional Forester, Forest Service.

FORESTRY Invoked to Aid Flood Control in Mississippi Uplands The influence of floods on the agriculture of the lower Mississippi Valley is well known, but the part which agricultural practices may have played in producing floods is less obvious. During the fall of 1929, erosion studies were initiated in the loess and silt loam uplands of Mississippi, by the Forest Service's Southern Forest Experiment Station. This

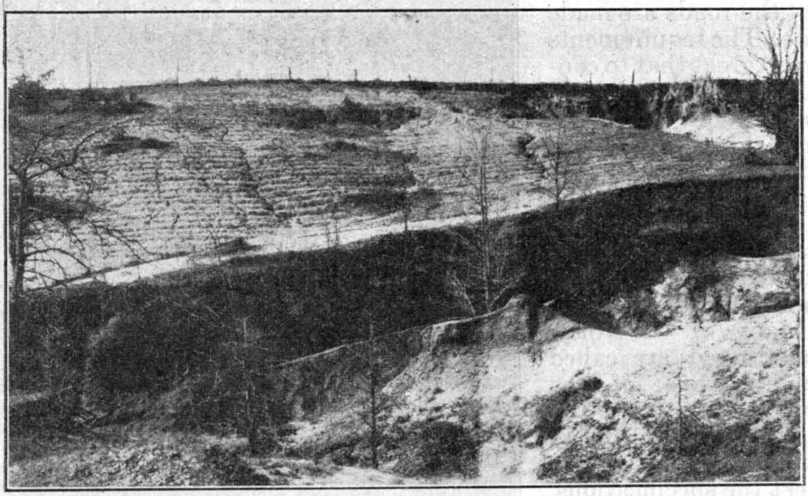


Figure 64.—The presence of small gullies on this cultivated slope means probable abandonment of the field in another year. The cultivatable life of such land is 5 to 10 years. The future appearance of this hillside is foretold by that of adjoining eroded areas

area, reported to be one of the heaviest contributors to the silt problem of the lower Mississippi River, borders the Mississippi Delta on the east and traverses the length of the State in a strip 35 to 50 miles in width.

Preliminary surveys show that the northern half of this area, comprising some 3,400,000 acres, is undergoing erosion in its most devastating and active forms. Near Oxford, Miss., a pasture which was a profitable cotton field in 1885 is now a maze of gullies, some of which are 50 feet in depth. In three months' time, during the winter of 1929-30, one of the deepest chasms had become filled to a depth of 10 feet with tons of loose soil which had sloughed from the gully banks. This soil was later flushed from the gully and carried into an adjacent stream by the heavy spring rains. Another gully 100 feet in depth, near Holly Springs, Miss., has resulted in a loss of approximately 2,000,000 tons of soil. It is, however, in the smaller gullies covering, fires, mean reduced acreage burned and decreased fire suppression costs and damages.

Many years will be required for the completion of a transportation system that will afford adequate protection of the vast timber resources of the national forests of the United States, but a good start has been made on the system.

A. O. WAHA,
Assistant Regional Forester, Forest Service.

FORESTRY Invoked to Aid Flood Control in Mississippi Uplands The influence of floods on the agriculture of the lower Mississippi Valley is well known, but the part which agricultural practices may have played in producing floods is less obvious. During the fall of 1929, erosion studies were initiated in the loess and silt loam uplands of Mississippi, by the Forest Service's Southern Forest Experiment Station. This

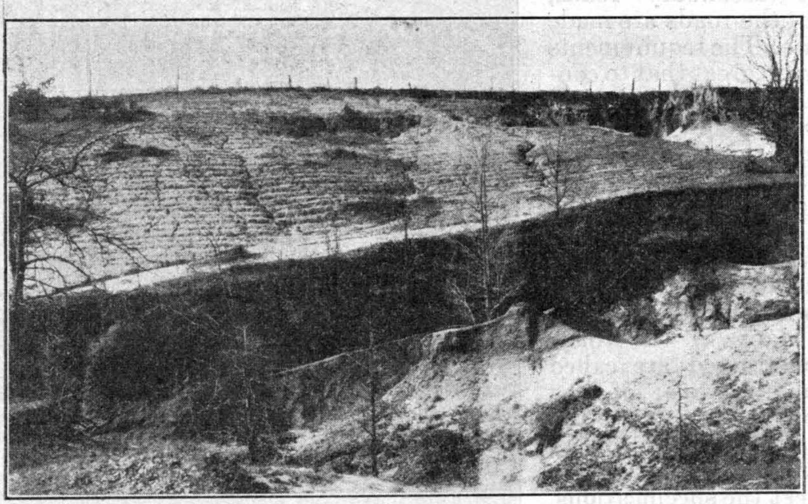


FIGURE 64.—The presence of small gullies on this cultivated slope means probable abandonment of the field in another year. The cultivatable life of such land is 5 to 10 years. The future appearance of this hillside is foretold by that of adjoining eroded areas

area, reported to be one of the heaviest contributors to the silt problem of the lower Mississippi River, borders the Mississippi Delta on the east and traverses the length of the State in a strip 35 to 50 miles in width.

Preliminary surveys show that the northern half of this area, comprising some 3,400,000 acres, is undergoing erosion in its most devastating and active forms. Near Oxford, Miss., a pasture which was a profitable cotton field in 1885 is now a maze of gullies, some of which are 50 feet in depth. In three months' time, during the winter of 1929-30, one of the deepest chasms had become filled to a depth of 10 feet with tons of loose soil which had sloughed from the gully banks. This soil was later flushed from the gully and carried into an adjacent stream by the heavy spring rains. Another gully 100 feet in depth, near Holly Springs, Miss., has resulted in a loss of approximately 2,000,000 tons of soil. It is, however, in the smaller gullies covering, in the aggregate, thousands of acres in this region, that the most serious erosion is occurring.

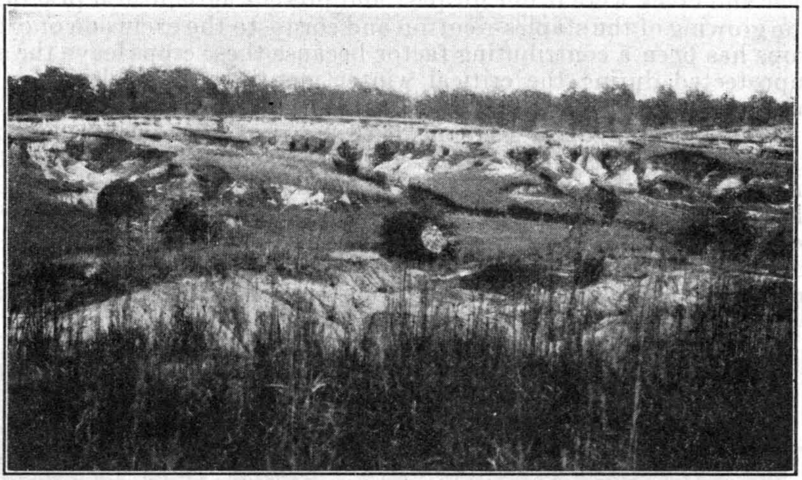


FIGURE 65.—Formerly a fertile cotton field, this intricate maze of rapidly enlarging gullies is typical of thousands of acres of abandoned land in north-central Mississippi

The decreasing value of eroded lands with a consequent shifting of the burden of taxation to other property and the high costs of maintaining public roads, represent losses perhaps as important as the loss of the valuable topsoil. Other losses result from the deposition of sterile sands and other débris on bottom-land farms. In some cases, driftwood dikes have been built along streams to protect adjacent fields from the sandy outwash carried by flood waters, but usually no adequate protection is possible.

FIGURE 66.—Portion of large gully showing extensive area of sandy outwash poured upon the timbered flood plain of an adjacent creek. About 2,000,000 tons of soil have washed from this chasm

Influence of Heavy Rainfall

The serious erosion problem in north-central Mississippi is due, among other things, to the heavy annual rainfall that averages about 50 inches, especially when these torrential rains follow the loosening effects of frost. The brown loam surface soils erode readily, but by far the most serious erosion is produced when the loose clay, gravel, or sands underneath are exposed.

But in spite of all the other conditions favoring erosion, the uplands of north-central Mississippi would not be pouring their sediments into river and creek were it not for past and present agricultural practices. The growing of the staples—cotton and corn—to the exclusion of other crops has been a contributing factor because these crops leave the soil unprotected during the critical winter months. The cultivation of unterraced steep hillsides has also favored the forces of erosion. Cultivated slopes having a gradient of 58 per cent were observed in one county. Erosion is not pronounced even on such slopes as long as the brown loam surface soil is kept in good physical condition. Shallow plowing, however, and careless cultivation, over a period of several years, allows run-off water to break through the furrows and form small gullies. These gullies are soon transformed into a network of larger washes which render cultivation difficult and the field is abandoned. Many gullies in abandoned fields might soon be controlled by the establishment of native vegetation were it not for the damage produced by annual or periodic fires.

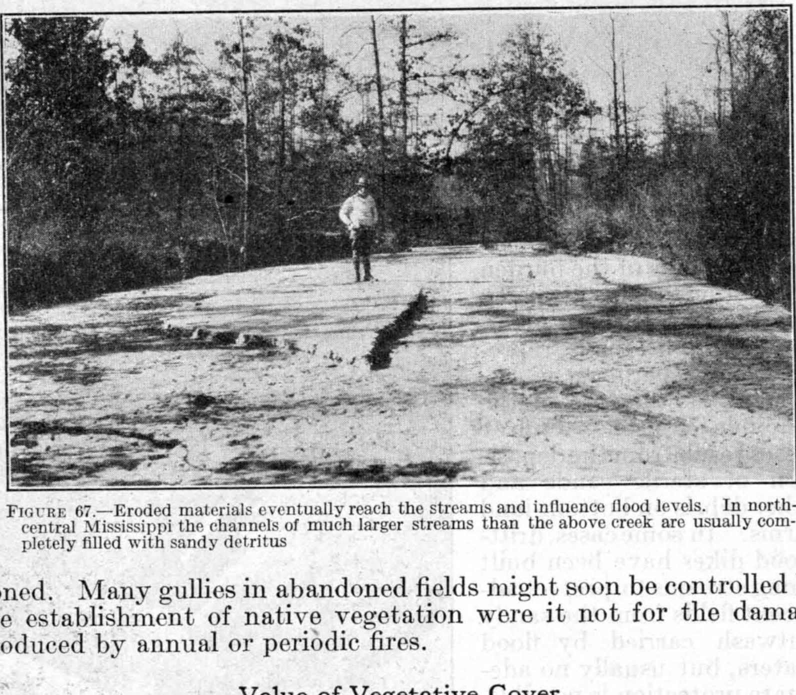


FIGURE 67.—Eroded materials eventually reach the streams and influence flood levels. In north-central Mississippi the channels of much larger streams than the above creek are usually completely filled with sandy detritus

Value of Vegetative Cover

The protective value of vegetative cover is well illustrated in north-central Mississippi. Only remnants of the once extensive upland hardwood stands occur in this region. Original virgin forest, through unregulated cutting and through the damaging effects of fires, has been replaced by an inferior second growth of scrub oaks and shortleaf pine, the protective value of which is far below that of well-managed woodlands. But even these timberlands, although they are usually burned over annually, are undergoing little or no erosion.

Studies have been started by the Southern Forest Experiment Station to work out the best methods of reclaiming, by tree planting, the waste lands of the Mississippi silt loam upland. Thousands of acres of gullied and waste lands are in such condition that their use, even for timber growing, will be made possible only through the solution of many perplexing problems.

H. G. MEGINNIS,
Southern Forest Experiment Station, Forest Service.

FRUIT Juices Preserved by Various Methods Find Steadily Growing Market

Naturally the health movement slogan "Eat More Fruit and Vegetables" has carried with it the corollary "Drink More Fruit Juice," until within the past few years the consumption of fruit juices has increased enormously. Manufacturers of so-called fruit-juice beverages are required by Federal and many State food officials to use a substantial amount of actual fruit juice when the unqualified names of fruits are used on the labels.

The popularity of fruit juices comes largely from advertising campaigns extolling their healthfulness. These claims are in the main based on the results of sound research showing the high vitamin content of the popular juices. Thus orange juice contains the three vitamins, A, B, and C, so necessary to proper nutrition; lemon and grapefruit juices are rich in vitamins B and C. Apple juice also has vitamins A, B, and C, but in smaller quantities. Pineapple and tomato juices are equivalent to orange juice. Grape juice contains vitamins B and C.

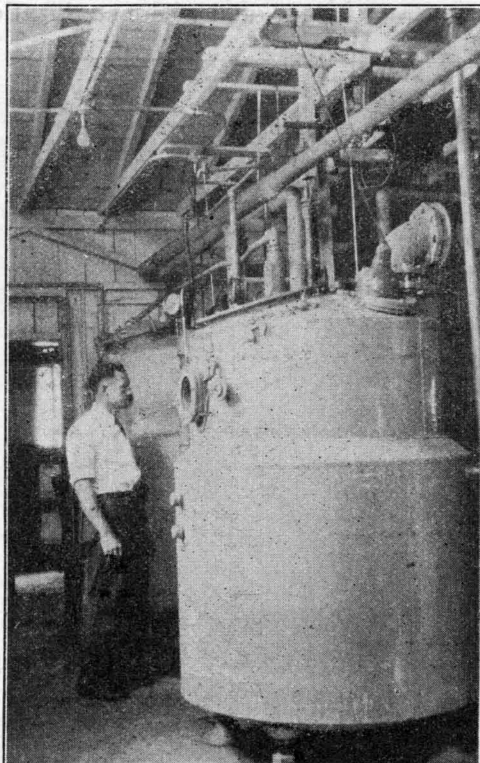


FIGURE 68.—Juice mixers

The preparation of fruit juice for consumption without loss of flavor is a matter of considerable difficulty. The first methods tried were those most familiar to the preservers, and depended upon heat. Some juices can be prepared in this way; others lose their fruity flavor and become objectionable. It is difficult to prepare orange, lemon, apple, and some other juices by the usual methods of heating.

Methods depending upon flash pasteurization are more satisfactory with most juices. This type of pasteurization consists in passing a relatively thin film of juice rapidly over the surface of the heating unit. A commonly used apparatus is a tube or coil of small diameter surrounded by hot water or steam. When the juice enters the coil, it timber growing, will be made possible only through the solution of many perplexing problems.

H. G. Meginnis,
Southern Forest Experiment Station, Forest Service.

FRUIT Juices Preserved by Various Methods Find Steadily Growing Market Naturally the health movement slogan "Eat More Fruit and Vegetables" has carried with it the corollary "Drink More Fruit Juice," until within the past few years the consumption of fruit juices has increased enormously. Manufacturers of so-called fruit-juice beverages are required by Federal and many State food officials to use a substantial amount of actual fruit juice when the unqualified names of fruits are used on the labels.

The popularity of fruit juices comes largely from advertising campaigns extolling their healthfulness. These claims are in the main based on the results of sound research showing the high vitamin content of the popular juices. Thus orange juice contains the three vitamins, A, B, and C, so necessary to proper nutrition; lemon and grapefruit juices are rich in vitamins B and C. Apple juice also has vitamins A, B, and C, but in smaller quantities. Pineapple and tomato juices are equivalent to orange juice. Grape juice contains vitamins B and C.

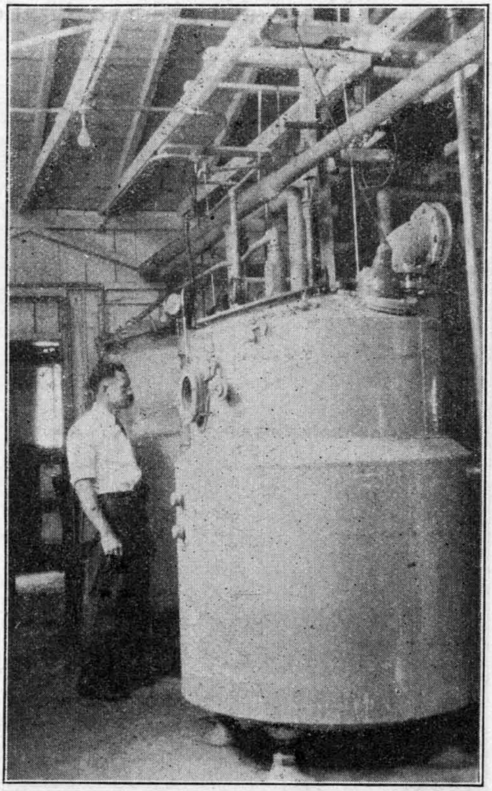


FIGURE 68.—Juice mixers

The preparation of fruit juice for consumption without loss of flavor is a matter of considerable difficulty. The first methods tried were those most familiar to the preservers, and depended upon heat. Some juices can be prepared in this way; others lose their fruity flavor and become objectionable. It is difficult to prepare orange, lemon, apple, and some other juices by the usual methods of heating.

Methods depending upon flash pasteurization are more satisfactory with most juices. This type of pasteurization consists in passing a relatively thin film of juice rapidly over the surface of the heating unit. A commonly used apparatus is a tube or coil of small diameter surrounded by hot water or steam. When the juice enters the coil, it reaches the temperature of the heating medium almost instantaneously and need be maintained at the proper temperature for a few seconds only. It can be bottled while still hot. The temperature of the water or steam, the length of the coil, and the rapidity of the flow of juice can all be used for controlling the pasteurization. When it is advisable to cool the juice immediately after pasteurization, it can be passed directly from the hot coil to one surrounded by cold water or brine. However, the problem of getting cold juice into the final containers without reinfection by yeasts or other organisms is one well-nigh impossible of solution under the usual commercial conditions. (Fig. 68).

Advantages of Coil Apparatus

The coil type of apparatus has the advantage of keeping the juice away from the air, and where sterilization can be carried on at sufficiently high temperatures, a part of the air dissolved in the juice is removed. As the juice is in motion while being heated, the danger of overheating the part in contact with the heating surface is reduced to a minimum.

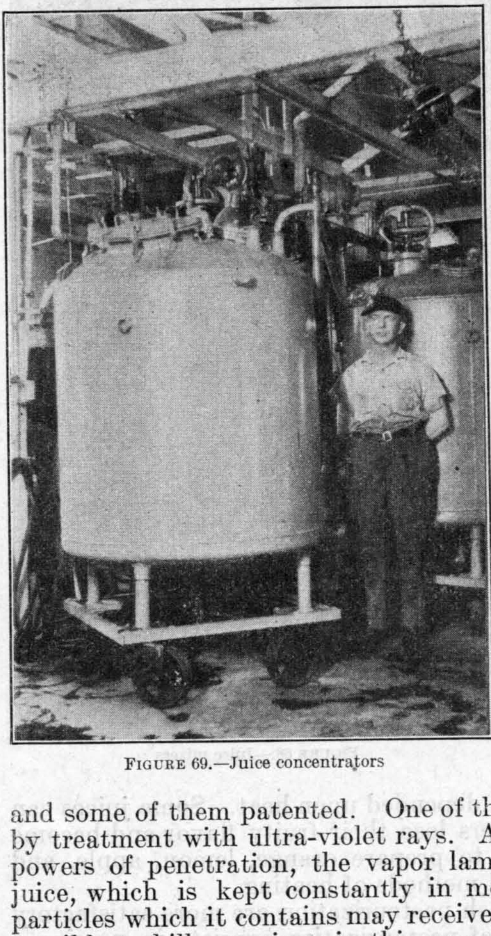


FIGURE 69.—Juice concentrators

Another method of preparation which has found favor is the concentration of the juices under high vacuum. This method not only sterilizes the juice but removes the air and evaporates the liquid at temperatures considerably below its boiling point. Where the acidity of the juices is normal, there is not much loss of vitamins during pasteurization or concentration under vacuum. When concentrated juice is diluted for consumption, however, it lacks the flavor and aroma of the original juice. (Fig. 69.)

Many methods of sterilization which avoid the use of heat and the resulting off-flavors have been devised and some of them patented. One of these is the preparation of juices by treatment with ultra-violet rays. As these rays have but slight powers of penetration, the vapor lamps are usually placed in the juice, which is kept constantly in motion, so that all sides of all particles which it contains may receive treatment. It is undoubtedly possible to kill organisms in this way, but the problem of getting the treated juice into sterile containers without contamination is a difficult one. The department has not yet demonstrated that the ultra-violet or electrical treatment of juices is successful.

There are a number of patents for treating fluids by passing electric currents through them. This is usually accomplished by running the liquid between a series of electrodes. The method is said to be satisfactory for use on milk, but not much is known about its use with fruit juice. There has also been some discussion as to whether the sterilizing is accomplished by the electric current or the heat generated.

Another set of methods employs gases under high pressure for sterilization. Carbon dioxide, oxygen, and sulphur dioxide (the gas given off by burning sulphur) have all been used. Where this is done, the excess of gas must be removed before the liquid is consumed, and in the juice treated with sulphur dioxide, only mere traces could remain without imparting an off flavor.

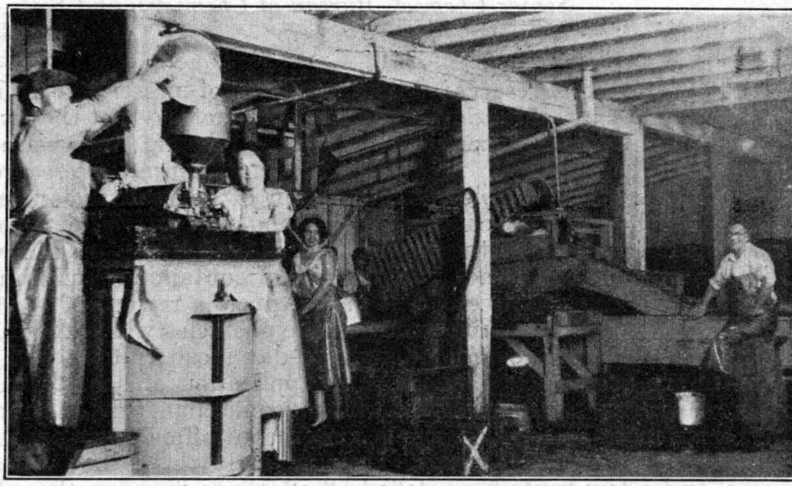


FIGURE 70.—Washing fruit and extracting juice

Preservation By Freezing

A very recent method of preserving juices does not depend on killing the organisms with which it is contaminated, but merely on checking their growth so that spoilage from this source is eliminated. Recently experimental work and shipments on a considerable scale have revealed that frozen juice may be held in cold storage and shipped under special refrigeration so that it can be delivered to large consumers in better shape than that put up by many methods of pasteurization. This development is still in its infancy, and much needs to be ascertained about its limitations, but with improvements in retail distribution and in home refrigeration, a new field for distribution of fruit juices may be opened. (Fig. 70.)

The problem of keeping juices is not altogether a biological one. Some chemical changes take place during the storage period. As yet no method of preventing these changes has been devised; we know, however, that cool storage retards them so that something can be done to lengthen the period during which they can be held.

Some juices keep best when they are kept from contact with air as much as possible, and the greatest possible amount of the air is removed from the container and from the juice itself. This is most often done by substituting an inert gaslike carbon dioxide for the air.

One phase of juice distribution has been neglected in this country, and that is the preparation of juice mixtures or blends. Small amounts of one juice added to another may greatly improve its flavor and appearance, and the mixture may be superior to either of the juices used. Thus, grapefruit juice is greatly improved by the addition of 15 to 20 per cent of Logan blackberry or pomegranate juice. Apple juice mixes well with many tart juices, and lemon juice is often used to take away the flat taste of other citrus juices. Pomegranate juice can be used with good effect, owing to its high color and rather neutral flavor. Even rhubarb juice has been sold as a beverage, and tomato juice is popular in many localities.

E. M. Chace,
Senior Chemist, Bureau of Chemistry and Soils.

FRUIT Products Preserved Successfully by Freezing With Solid Carbon Dioxide

The problem of preserving fruits and fruit products so that they will be available during the periods when the fruits can not be secured fresh is one that has occupied the attention of housewives for centuries. Since the advent of canning as a method of preservation, a vast industry has been built on the sterilization of fruit by means of heat and its storage out of contact with sources of contamination. Since 1810, when the French Government gave Appert a reward of 12,000 francs for his work on canning, many of the obstacles which the canner has faced have been overcome, until to-day most fruits as well as vegetables are acceptably canned. The application of heat to fruit products can rarely be accomplished without some change in the flavor. In numerous instances this change is such that it offers an acceptable substitute for the original flavor. Unfortunately this is not always the case, and a few fruits have defied all efforts to preserve them by heat and retain a satisfactory flavor. It is also true that not a few fruits, although they may be very satisfactory when canned, are better when they are preserved without the use of heat.

Some 20 years ago, the berry packers of the Northwest began experimenting with cold-pack berries. At first the fruit was placed in 50-gallon barrels, mixed with sugar, and placed in cooling rooms. Too often, however, the package fermented and exploded before the temperature could be sufficiently lowered. To obviate this trouble, ice was placed in the package to keep the temperature down until the package reached the freezers. This was not successful, as the fermentation was only delayed and the product diluted. With better facilities for handling the fruit, these difficulties have been overcome. The berries are now washed in the packing shed in cold water, cleaning and cooling them in one operation, and are placed in the freezing rooms as soon as possible. That there is a large demand for this unheated product is shown by the fact that well over 100,000 packages of the 50-gallon size are being sold annually. Besides this package, 30 and 15 pound slip-cover cans are becoming popular, and in 1929 over 1,200-000 paper cartons containing 1 pound were sold.

Rapidity of Freezing Important

Until recently, it was thought that if a fruit product were cooled sufficiently to prevent fermentation, all had been done that was

One phase of juice distribution has been neglected in this country, and that is the preparation of juice mixtures or blends. Small amounts of one juice added to another may greatly improve its flavor and appearance, and the mixture may be superior to either of the juices used. Thus, grapefruit juice is greatly improved by the addition of 15 to 20 per cent of Logan blackberry or pomegranate juice. Apple juice mixes well with many tart juices, and lemon juice is often used to take away the flat taste of other citrus juices. Pomegranate juice can be used with good effect, owing to its high color and rather neutral flavor. Even rhubarb juice has been sold as a beverage, and tomato juice is popular in many localities.

E. M. CHACE,
Senior Chemist, Bureau of Chemistry and Soils.

FRUIT Products Preserved Successfully by Freezing With Solid Carbon Dioxide

The problem of preserving fruits and fruit products so that they will be available during the periods when the fruits can not be secured fresh is one that has occupied the attention of housewives for centuries. Since the advent of canning as a method of preservation, a vast industry has been built on the sterilization of fruit by means of heat and its storage out of contact with sources of contamination. Since 1810, when the French Government gave Appert a reward of 12,000 francs for his work on canning, many of the obstacles which the canner has faced have been overcome, until to-day most fruits as well as vegetables are acceptably canned. The application of heat to fruit products can rarely be accomplished without some change in the flavor. In numerous instances this change is such that it offers an acceptable substitute for the original flavor. Unfortunately this is not always the case, and a few fruits have defied all efforts to preserve them by heat and retain a satisfactory flavor. It is also true that not a few fruits, although they may be very satisfactory when canned, are better when they are preserved without the use of heat.

Some 20 years ago, the berry packers of the Northwest began experimenting with cold-pack berries. At first the fruit was placed in 50-gallon barrels, mixed with sugar, and placed in cooling rooms. Too often, however, the package fermented and exploded before the temperature could be sufficiently lowered. To obviate this trouble, ice was placed in the package to keep the temperature down until the package reached the freezers. This was not successful, as the fermentation was only delayed and the product diluted. With better facilities for handling the fruit, these difficulties have been overcome. The berries are now washed in the packing shed in cold water, cleaning and cooling them in one operation, and are placed in the freezing rooms as soon as possible. That there is a large demand for this unheated product is shown by the fact that well over 100,000 packages of the 50-gallon size are being sold annually. Besides this package, 30 and 15 pound slip-cover cans are becoming popular, and in 1929 over 1,200-000 paper cartons containing 1 pound were sold.

Rapidity of Freezing Important

Until recently, it was thought that if a fruit product were cooled sufficiently to prevent fermentation, all had been done that was necessary. It has been found, however, that in preparing frozen fish for shipment and consumption in inland communities, the rapidity of freezing makes a difference in the physical condition or texture of the product after it is thawed and cooked. Very rapid freezing produces a firmer, finer texture than slow freezing. This is probably due to the fact that in rapid freezing, the ice crystals which are formed are very small and there is consequently less tendency to rupture the cells in the frozen food. Where the cells are ruptured, the product becomes mushy when thawed.

Some years ago an investigator of the Department of Agriculture showed that fruit juices could be concentrated by slowly freezing and separating the ice crystals formed in the juice. By refreezing the separated liquid and again removing the ice, a highly concentrated juice could be obtained. Unfortunately in not a few cases, it was found that during the process the concentrated juice lost its flavor and aroma. These juices, however, were frozen very slowly, usually 24 hours being required to produce a solid cake. Quite recently further studies have been carried out on both fruits and fruit juices, using the sharp-freezing methods applied to fish.

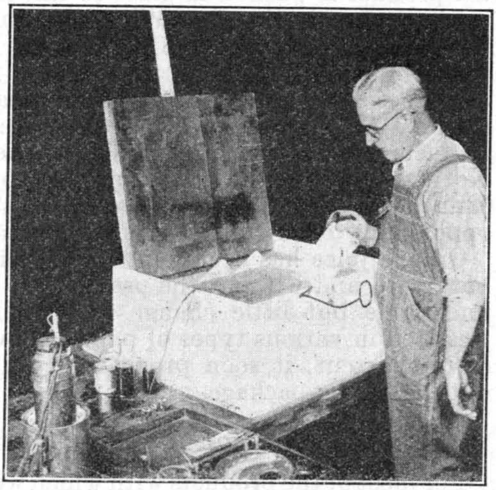


FIGURE 71.—Placing solid carbon dioxide in experimental freezer

By the use of what is known as "2-stage freezers" with a brine made of calcium chloride instead of salt, it is possible to obtain a temperature of −50° F. for commercial "sharp freezing." For experimental work, a comparatively new product is now available. Carbon dioxide can now be obtained in a solid condition. When this solid evaporates, becoming a gas, it produces a temperature of −110°. This solid carbon dioxide is known commercially as "dry ice" or "nu-ice." By constructing well-insulated coolers containing holders for this ice, around which the brine is circulated, the latter can readily be cooled to −50°. Such a cooler used in experimental work is shown in the illustration. (Fig. 71.)

The fruit or fruit juice to be frozen is placed in paper cups, tin cans, or glass jars or bottles. They are sealed before freezing and placed directly in the cold brine. With temperatures of −30° to −50° F., the juices become solid in about five minutes; the fruits require a longer time. Where pieces of fruit do not come into contact with the container over a considerable surface, the freezing is much slower. This difficulty can be overcome by filling the can with sugar sirup or fruit juice after the pieces have been packed in it, thus affording a satisfactory contact with the sides of the container. Grapefruit sections and orange slices become solid in about 30 minutes under these conditions.

Effecting Almost Instantaneous Freezing

Yet another possibility exists where temperatures as low as −80° F. can be obtained. The packages, cans, or bottles can be placed in direct contact with the solid carbon dioxide and an almost instantaneous freezing secured. This method has an advantage in the case of material which undergoes rapid change after its preparation for freezing. Some fruits, notably peaches, darken very rapidly after peeling, and it is desirable to get them frozen as quickly as possible. The danger zone for darkening seems to end at about 20° F., so that the sooner they reach that temperature the better.

Some advantage can be obtained in cases where air is responsible for the changes taking place after freezing, by filling the head space in the package with an inert gas such as carbon dioxide. The same gas which is used in its solid phase for the production of the low temperatures can also be used to take the place of air in the package. Where the product is packed in glass or tin, a vacuum closure can also be used to remove the air. With some products, this works with advantage; with others, little difference is found.

Among the products on which these new freezing methods can be used to considerable advantage are peaches, citrus fruits, and pineapples. All of these are changed to a greater or less extent by cooking. In fact, most citrus products are quite adversely affected by heat. Notwithstanding the fact that pineapple makes a very successful canned product, in the opinion of most of those who have had the opportunity of tasting it, the frozen material is much superior.

Orange juice has been kept frozen for months in cans and bottles, both with and without the use of inert gas in the container, and has undergone but little change in flavor. Where it has been stored wrapped in various types of paper, allowing contact with the air to a certain extent, it soon progressively deteriorates, beginning at the outside of the package.

Storage Temperatures Required

For most of the products with which we have experimented, a storage temperature up to 5° F. seems adequate. Much research is still before us on the problem and it is possible that higher storage temperatures can be used on some commodities, but they are not recommended as yet.

With further improvement in the retail distribution of frozen products, and in household refrigeration, it seems highly probable that the consumption of frozen fruit products will increase enormously in the next decade. Already frozen strawberries, raspberries, cherries, peaches, and orange juice are being placed on the market in considerable quantities.

E. M. Chace,
Senior Chemist, Bureau of Chemistry and Soils.

FUR-TRADE Exposition Includes Special Exhibit of the U. S. Government

With the United States standing as the leading fur-producing and fur-consuming country in the world, it was entirely fitting that the Congress of the United States by a special act should enable this Government to participate in the International Fur-Trade Exposition and Congress

Effecting Almost Instantaneous Freezing

Yet another possibility exists where temperatures as low as −80° F. can be obtained. The packages, cans, or bottles can be placed in direct contact with the solid carbon dioxide and an almost instantaneous freezing secured. This method has an advantage in the case of material which undergoes rapid change after its preparation for freezing. Some fruits, notably peaches, darken very rapidly after peeling, and it is desirable to get them frozen as quickly as possible. The danger zone for darkening seems to end at about 20° F., so that the sooner they reach that temperature the better.

Some advantage can be obtained in cases where air is responsible for the changes taking place after freezing, by filling the head space in the package with an inert gas such as carbon dioxide. The same gas which is used in its solid phase for the production of the low temperatures can also be used to take the place of air in the package. Where the product is packed in glass or tin, a vacuum closure can also be used to remove the air. With some products, this works with advantage; with others, little difference is found.

Among the products on which these new freezing methods can be used to considerable advantage are peaches, citrus fruits, and pineapples. All of these are changed to a greater or less extent by cooking. In fact, most citrus products are quite adversely affected by heat. Notwithstanding the fact that pineapple makes a very successful canned product, in the opinion of most of those who have had the opportunity of tasting it, the frozen material is much superior.

Orange juice has been kept frozen for months in cans and bottles, both with and without the use of inert gas in the container, and has undergone but little change in flavor. Where it has been stored wrapped in various types of paper, allowing contact with the air to a certain extent, it soon progressively deteriorates, beginning at the outside of the package.

Storage Temperatures Required

For most of the products with which we have experimented, a storage temperature up to 5° F. seems adequate. Much research is still before us on the problem and it is possible that higher storage temperatures can be used on some commodities, but they are not recommended as yet.

With further improvement in the retail distribution of frozen products, and in household refrigeration, it seems highly probable that the consumption of frozen fruit products will increase enormously in the next decade. Already frozen strawberries, raspberries, cherries, peaches, and orange juice are being placed on the market in considerable quantities.

E. M. Chace,
Senior Chemist, Bureau of Chemistry and Soils.

FUR-TRADE Exposition Includes Special Exhibit of the U. S. Government

With the United States standing as the leading fur-producing and fur-consuming country in the world, it was entirely fitting that the Congress of the United States by a special act should enable this Government to participate in the International Fur-Trade Exposition and Congress held in Leipzig, Germany, during the summer of 1930. It was the purpose of the exhibit so to present all aspects of the fur industry that representatives of all countries should be better informed with respect to the source of supply of furs as well as with the nature and extent of the commercial manufacture of raw furs into finished wearing apparel, both in this country and abroad. (Fig. 72.)

Frank G. Ashbrook, in charge of the Division of Fur Resources of the Bureau of Biological Survey, was made commissioner general to represent this country at the exposition and congress. The Office of Exhibits of the Department of Agriculture cooperated not only with the Bureau of Biological Survey but with the Department of Commerce in designing and constructing the material that formed the governmental parts of the general exhibit. These comprised readily grasped statistics on the commercial aspects of the fur industry in continental United States and on the Pribilof Islands. Mounted specimens of native wild fur bearers were shown in natural habitats as well as on fur farms. Motion pictures, lantern slides, transparencies, charts, and other forms of visual information were prepared in a manner that fully illustrated every phase of the fur industry.

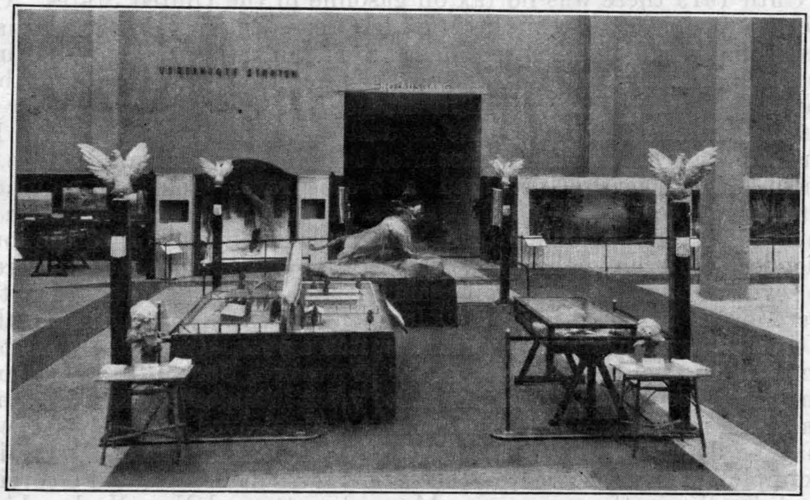


FIGURE 72.—Section of the United States Government's exhibit at the International Fur-Trade Exposition, held at Leipzig, Germany, June 1 to September 30, 1930

A large number of persons interested in the various angles of fur production and utilization viewed this country's exhibit. As a result of their studies and their reading of literature distributed by the department's representatives and others in attendance, they have been placed in a better position to arrange their transactions with fur-animal breeders in the United States, manufacturers of fur garments, and fur exporters. A special publication prepared by the Biological Survey and the Office of Exhibits of the Department of Agriculture and the Bureaus of Fisheries and Foreign and Domestic Commerce of the Department of Commerce, containing a foreword by the Secretaries of the two departments, was issued in both English and German editions to supplement the Government's exhibit.

While the exhibits of many countries demonstrated the commercial phases of the fur industry, that of the United States stressed methods of conservation of the fur bearers and of production and utilization of fur. Participation by the United States in this international exhibition should have a salutary effect on the fur industry in this country.

J. E. SHILLINGER,
Senior Biologist, Bureau of Biological Survey.

GASOLINE Taxes Nearly All Used for Building and Maintaining Roads Gasoline taxes paid by road users of the 48 States and the District of Columbia in 1929 reached the largest total in the 10-year history of this remarkable taxing measure. After deduction of refunds allowed by the State laws the tax netted in this tenth year of its existence $431,636,454 from levies on more than 13,400,000,000 gallons of motor fuel.

Until 1919 there was no tax on gasoline in the United States. On February 25 of that year the State of Oregon set in motion the small "snowball" which since has rolled through all the States and, swelling in size, has finally rolled up one of the largest of all revenues available for highway construction and maintenance.

Oregon's initial levy was the modest one of 1 cent per gallon. In the same year three other States tried the same experiment, and one of them—New Mexico—ventured a 2-cent rate. Colorado matched Oregon's 1 cent; but North Dakota decided to be content with a fourth of a cent per gallon. This was the beginning. By 1923 the four pioneers had been joined by 31 other States, and a 3-cent rate appeared in seven of them, with Oregon again in the van. In 1925 the 35 States were joined by the District of Columbia, and Arkansas celebrated the New Year by imposing a 4-cent rate; and a year later, with 44 States and the District of Columbia in the procession, South Carolina came out for a 5-cent tax. Then, for three years it appeared that the limit had been reached; but South Carolina again proved that appearances may be deceptive by laying down a 6-cent tax in March, 1929; its example quickly followed by the sister States of Florida and Georgia. And, finally, in the same year, Massachusetts and New York, which had previously held aloof, joined with the rest of the Nation, each levying a 2-cent tax.

Tax is Cheaply Collected

Regarded by tax experts as one of the most remarkable revenue producers ever devised, this tax is also one of the most cheaply collected of all imposts. In 34 States for which the costs of collection in 1929 are known, the net revenue produced, after deduction of all costs of administration was 99¾ cents for every dollar of tax collected.

It has also been one of the most willingly paid of all taxes. Devoted mainly to the work of road improvement, the road using public by which it is paid in proportion to the use of the highways, has in no case seriously opposed the imposition of the tax. Even at the 6-cent maximum rate now charged in three States there is still no definite indication of a diminishing return which would indicate approach to the limit of public tolerance.

How greatly the road improvement activity of recent years has depended upon this single source of revenue, and to what extent the rapid progress of the latter years has been made possible by the of conservation of the fur bearers and of production and utilization of fur. Participation by the United States in this international exhibition should have a salutary effect on the fur industry in this country.

J. E. SHILLINGER,
Senior Biologist, Bureau of Biological Survey.

GASOLINE Taxes Nearly All Used for Building and Maintaining Roads Gasoline taxes paid by road users of the 48 States and the District of Columbia in 1929 reached the largest total in the 10-year history of this remarkable taxing measure. After deduction of refunds allowed by the State laws the tax netted in this tenth year of its existence $431,636,454 from levies on more than 13,400,000,000 gallons of motor fuel.

Until 1919 there was no tax on gasoline in the United States. On February 25 of that year the State of Oregon set in motion the small "snowball" which since has rolled through all the States and, swelling in size, has finally rolled up one of the largest of all revenues available for highway construction and maintenance.

Oregon's initial levy was the modest one of 1 cent per gallon. In the same year three other States tried the same experiment, and one of them—New Mexico—ventured a 2-cent rate. Colorado matched Oregon's 1 cent; but North Dakota decided to be content with a fourth of a cent per gallon. This was the beginning. By 1923 the four pioneers had been joined by 31 other States, and a 3-cent rate appeared in seven of them, with Oregon again in the van. In 1925 the 35 States were joined by the District of Columbia, and Arkansas celebrated the New Year by imposing a 4-cent rate; and a year later, with 44 States and the District of Columbia in the procession, South Carolina came out for a 5-cent tax. Then, for three years it appeared that the limit had been reached; but South Carolina again proved that appearances may be deceptive by laying down a 6-cent tax in March, 1929; its example quickly followed by the sister States of Florida and Georgia. And, finally, in the same year, Massachusetts and New York, which had previously held aloof, joined with the rest of the Nation, each levying a 2-cent tax.

Tax is Cheaply Collected

Regarded by tax experts as one of the most remarkable revenue producers ever devised, this tax is also one of the most cheaply collected of all imposts. In 34 States for which the costs of collection in 1929 are known, the net revenue produced, after deduction of all costs of administration was 99¾ cents for every dollar of tax collected.

It has also been one of the most willingly paid of all taxes. Devoted mainly to the work of road improvement, the road using public by which it is paid in proportion to the use of the highways, has in no case seriously opposed the imposition of the tax. Even at the 6-cent maximum rate now charged in three States there is still no definite indication of a diminishing return which would indicate approach to the limit of public tolerance.

How greatly the road improvement activity of recent years has depended upon this single source of revenue, and to what extent the rapid progress of the latter years has been made possible by the direct contributions of the road user in this form and in motor vehicle license fees can be shown by a few figures.

In 1919—the year the gasoline tax was adopted by the first four States—the whole expenditure on rural highways in the United States, by all agencies of government—Federal, State, and local—was $389,455,932. The total of gasoline taxes collected in that year was only $1,022,514. Motor-vehicle license fees produced an additional $64,697,255; so that the total contribution of the road user was $65,719,769, which was about 17 per cent of the comparatively small expenditure.

By 1929—just 10 years later—the total rural road expenditure had grown to an annual outlay of $1,444,668,985; and in support of this enormously increased expenditure the operators of motor vehicles contributed $729,791,055, or more than 50 per cent. Of their total contribution the road users paid $406,453,249 in the form of gasoline taxes and the balance in motor-vehicle license fees, permits, etc. In both instances these amounts are exclusive of the portions of the total contributions which were used to defray collection costs or diverted to other than rural highway uses.

Between the two years mentioned the yearly rural road expenditure increased slightly more than a billion dollars, and of this increase just about two-thirds was met by the increased contributions of the road user, made up in larger part of gasoline taxes. The remainder was met by increased revenue from real property taxation and bond issues.

Distribution of Gasoline Taxes

Of the $431,636,454 of gasoline taxes collected in 1929, $297,967,756 or 69 per cent was allotted for expenditure in the construction and maintenance of the main roads comprising the State highway systems. For the construction and maintenance of local roads of the counties and townships the allotment was $85,113,708 or nearly 20 per cent of the total. To meet necessary payments on State and county road bonds there was an allotment of $23,371,785, approximately 5 per cent of the total and the remainder of $24,405,027, or approximately 6 per cent was devoted to purposes other than the improvement of rural roads.

Of the amount thus diverted to other than rural road purposes, the greatest fraction, amounting in eight States and the District of Columbia to $14,548,106, was allotted to the improvement of streets in cities and towns; a further sum was diverted to the construction of schools and public buildings in three States in the amount of $9,270,562; one State allotted $90,000 to its Department of Commerce and Navigation; five States held $282,346 as a reserve for payment of tax refunds; one State devoted $210,093 raised by a special gasoline tax to the construction of a seawall for road protection; and the small balance of $3,920 was paid by one State into its general funds.

It will thus be seen that of the total amount of these taxes collected in 1929, nearly 98 per cent was devoted directly or indirectly to the construction and maintenance of rural roads and city streets. The diversions to other purposes, such as schools and public buildings, are as yet unimportant from the point of view of the country as a whole, though they represent very substantial sums in the few States involved.

This does not mean, however, that there have not been many efforts to appropriate the returns of the tax to other than the purposes for which it was originally designed. On the contrary there is scarcely a legislative session in any State at which there is not some effort, more or less strongly supported, to reap the benefits of the tax for other purposes.

Such attempts are stoutly and quite properly resisted by motorists as inconsistent with the character of the impost. They contend that, as a special levy on road users, the tax should be exclusively devoted to the benefit of the special class upon which it falls; and as a matter of equity, and public policy as well, their contention is fully justified.

Division Between Rural and City Uses

Whether the apportionment of the return on the present basis to State and county roads and city streets is entirely reasonable is a more debatable question. As originally levied in practically all States the tax was intended for the support of the State road program. Since the expensive investment in the main roads is necessitated by the heavy accumulation of motor-vehicle traffic which they must accommodate, there is peculiar fitness in this use of the tax.

In recognition of this fact, property taxes for main-road purposes have been greatly reduced or abandoned in all States, and now constitute less than 9 per cent of the total State highway revenue. The user taxes, including motor-vehicle license fees and gasoline taxes, constituting the bulk of the 91 per cent remaining, have thus become the main support of the important work of State road improvement; and the amount allotted to this purpose from the two special taxes can not be reduced without jeopardizing the continuance of this work which has made so great a change in the condition of the most important rural roads.

If, therefore, additional sums for county roads and city streets are to be raised by taxation of vehicle owners it is practically imperative that they be provided by increasing the tax rate; and proposals to that end affecting gasoline taxes should be very carefully considered. It is well to remember that additions have thus far been made to a falling price of gasoline and have thus been so absorbed that they have not been felt by the consumer. If the price of the fuel turns upward, as it doubtless will eventually, the higher tax rates already levied may become actually burdensome.

H. S. Fairbank,
Principal Highway Engineer, Bureau of Public Roads.

GIFTS of Land Often Made to Government by Public-Spirited Citizens It is generally known that the Government is the owner of many lots of land utilized as sites for its various activities, and that in the past, due to its ownership of an empire of vacant public lands, the United States was one of the largest if not the largest and most active real-estate agency the world has ever known. While knowledge of its innumerable free grants is common, the fact that many tracts of land are given to the United States is probably known to comparatively few. Some of these gifts are by public-spirited citizens or organizations wishing to aid in the furtherance of projects conducted by the Government. Others are prompted in part by sentiment. Many for which it was originally designed. On the contrary there is scarcely a legislative session in any State at which there is not some effort, more or less strongly supported, to reap the benefits of the tax for other purposes.

Such attempts are stoutly and quite properly resisted by motorists as inconsistent with the character of the impost. They contend that, as a special levy on road users, the tax should be exclusively devoted to the benefit of the special class upon which it falls; and as a matter of equity, and public policy as well, their contention is fully justified.

Division Between Rural and City Uses

Whether the apportionment of the return on the present basis to State and county roads and city streets is entirely reasonable is a more debatable question. As originally levied in practically all States the tax was intended for the support of the State road program. Since the expensive investment in the main roads is necessitated by the heavy accumulation of motor-vehicle traffic which they must accommodate, there is peculiar fitness in this use of the tax.

In recognition of this fact, property taxes for main-road purposes have been greatly reduced or abandoned in all States, and now constitute less than 9 per cent of the total State highway revenue. The user taxes, including motor-vehicle license fees and gasoline taxes, constituting the bulk of the 91 per cent remaining, have thus become the main support of the important work of State road improvement; and the amount allotted to this purpose from the two special taxes can not be reduced without jeopardizing the continuance of this work which has made so great a change in the condition of the most important rural roads.

If, therefore, additional sums for county roads and city streets are to be raised by taxation of vehicle owners it is practically imperative that they be provided by increasing the tax rate; and proposals to that end affecting gasoline taxes should be very carefully considered. It is well to remember that additions have thus far been made to a falling price of gasoline and have thus been so absorbed that they have not been felt by the consumer. If the price of the fuel turns upward, as it doubtless will eventually, the higher tax rates already levied may become actually burdensome.

H. S. Fairbank,
Principal Highway Engineer, Bureau of Public Roads.

GIFTS of Land Often Made to Government by Public-Spirited Citizens

It is generally known that the Government is the owner of many lots of land utilized as sites for its various activities, and that in the past, due to its ownership of an empire of vacant public lands, the United States was one of the largest if not the largest and most active real-estate agency the world has ever known. While knowledge of its innumerable free grants is common, the fact that many tracts of land are given to the United States is probably known to comparatively few. Some of these gifts are by public-spirited citizens or organizations wishing to aid in the furtherance of projects conducted by the Government. Others are prompted in part by sentiment. Many such gifts have been made to the United States through the Department of Agriculture. It is the policy of the department not to favor the acceptance of free transfers of land unless they can be used to advantage in the performance of the activities assigned to the department. This policy often leads to the necessity of rejecting gifts of land although they may have been prompted by the best motives.

Many may have heard of a tract of land in Warren County, Pa., known as "Heart's Content" and wondered at the significance of the name. This piece of land of 20 acres carries a highly valuable virgin stand of white-pine and hemlock timber, a rare combination in the East. It was given to the United States by a lumber company, Wheeler & Dusenbury. The tract is very accessible and has long been used for recreational purposes. In accepting this gift on behalf of the department, Acting Secretary Marvin said that it was planned to maintain this land in a virgin condition, to serve as a forest laboratory for the investigation of forest-soil problems. It was anticipated that this use would contribute to the rebuilding of the white-pine forests of the Northeastern States. The donation was one of the first of this kind of any magnitude made by a lumber concern to be used for the benefit of research and with the object of promoting a better development of forest lands in the future. The land is said to be worth more than $1,000 an acre. It was named "Heart's Content" 75 years ago by an old lumberman.

Morgan Horse Farm

The United States Morgan Horse Farm, located 2 miles north of Middlebury, Vt., in the town of Weybridge, was established in 1907 on land given to the Government by Joseph Battel, then owner of the American Morgan Register. Colonel Battel was one of the foremost breeders of Morgan horses and had spent much time and money in securing the best representatives of the breed. The land, a tract of 435 acres, was donated to the United States with the understanding that it should be used for the preservation and distribution of the Morgan breed of horses. This breed was established by a single stallion known as Justin Morgan, a horse renowned for beauty, symmetry, style, and strength. This farm, which has been enlarged, is still used in investigational work relating to Morgan horses. It is the only farm in America founded for the purpose of prepetuating a breed of horses. From this farm stock has been distributed for over 20 years throughout the United States and its overseas possessions and to many foreign countries.

In 1924 Secretary Henry C. Wallace accepted on behalf of the department 302 acres of land near Sisson, Calif., as a gift from Mary Burt Brittan. This land is of great value for forestry and recreation. In it is Castle Lake, from which a fine view of Mount Shasta may be had. It had been the custom of William Giles Brittan, formerly a judge of the Superior Court of California and a brother of the donor of this land, to pass much of his leisure time on this beautiful spot. His sister desired that it should continue to be used largely for recreational purposes, under the regulations of the department pertaining to national forests. The land was valued at approximately $15,000.

It quite often happens that none of the lands owned by the Government in a region are suitable for a particular purpose of the United States Forest Service. Some public-spirited citizen may then come forward and give the department land to meet its need. Recently the

Government needed a site for a fire lookout tower within the Sitgreaves National Forest, Ariz. Mike Chaco and his wife gave 10 acres of land to the Government for this purpose. This gift resulted in the erection of the Chevalon Butte fire lookout tower.

A short time ago the Colorado chapter of the Daughters of the American Revolution gave the Government a quarter section of land for a memorial forest planting tract.

Barbour Lathrop Plant Introduction Garden

The origin of the Barbour Lathrop Plant Introduction Garden is of interest. In 1918 the existence of a bamboo grove near Savannah, Ga., was called to the attention of an official of the department, with the information that the owner planned to cut it down. This would have meant the loss to the United States of one of its largest groves of timber bamboo. The situation was called to the attention of Barbour Lathrop, of Chicago, Ill., who had shown his unusual interest in bamboo plants by presenting a collection of them to the Government. Mr. Lathrop purchased the tract, which comprised 46 acres, and presented it to the United States to be used as a plant-introduction garden. The bamboo grove of this garden was derived from plants introduced from Japan. It was started with three small plants in 1890. While the most important plant in the garden is the Japanese timber bamboo, the general object of the project is the trial of new foreign plants and their propagation for distribution. At his death Mr. Lathrop left $10,000 to be used in connection with the station.

An outstanding example of cooperative effort between a local community and the Federal Government exists in the recent establishment of the United States pecan field station near Shreveport, La. The people of Caddo Parish, La., desired pecan investigational work. Parish authorities purchased 100 acres of land selected by representatives of the department and erected buildings thereon. The project involved an expenditure of approximately $41,000. This tract, together with the improvements and 42 acres of additional uplands donated by a public-spirited citizen, C. E. Ellerbe, was conveyed to the United States as a gift. The action required an amendment to the Constitution of the State of Louisiana. These lands have been taken over by the United States and work is progressing toward the organization of experimental activities which will include varietal testing, cultural and disease work, and consideration of soil problems.

A joint resolution approved in 1928 by President Coolidge authorized the Secretary of Agriculture to accept from James B. Munn, of New York City, on behalf of the United States, a gift of certain lands in Clayton County, Iowa, to become a part of the Upper Mississippi River Wild Life and Fish Refuge, which is administered jointly by the Bureau of Biological Survey, Department of Agriculture, and the Bureau of Fisheries, Department of Commerce. These lands, embracing a total area of 488 acres, estimated to be worth $30,000 or $40,000, were generously donated to the Government by Mr. Munn through his interest in the objects of the refuge.

Situated near McGregor, Iowa, the lands are more or less overgrown with original timber and are especially attractive for upland migratory birds. One parcel includes an excellent lookout point, known as Pikes Peak, that will be of great value in connection with fire protection, administrative uses, and other purposes on the refuge. Although adjacent to the lowlands embraced in the refuge much of the area is not subject to overflow, as it extends up into the hills bordering the river bottoms, and the inclusion of this high land will have the desirable result of lending variety to the refuge and attracting and protecting additional species of wild life.

H. N. Foss,
Attorney, Office of the Solicitor.

GOAT Grass, a New Wheat-Field Weed, Is Growing Troublesome In recent years goat grass, *Aegilops cylindrica* Host., has become a troublesome weed in wheat fields of south-central Kansas and north-central Oklahoma. It was first reported from the vicinity of Trousdale, Kans., in 1917. The grass was not identified at that time and received no particular attention. Nothing was heard of it again until 1920, when it was identified. Its continued spread has forced a recognition of its importance as a weed in wheat fields.

Goat grass is a wild relative of cultivated wheat. It will even cross to a certain extent with wheat, although most plants arising from the hybrid seeds are sterile. Goat grass, like winter wheat, is a winter annual. The seedlings emerge in the fall, and the plants mature the following spring, about the time wheat is ready for harvest. Seedlings and young plants of goat grass are difficult to distinguish from wheat plants. The leaves of goat grass are narrower than those of wheat, however, and have hairs along the edges near the base, a character lacking in wheat. The grass tillers profusely, and when abundant it often crowds out the wheat. Plants with as many as 50 tillers are not of unusual occurrence, although in thick stands fewer tillers are developed. The grass is a vigorous grower, very winter-hardy, and has a distinct advantage over wheat where the latter is at all checked by unfavorable conditions.

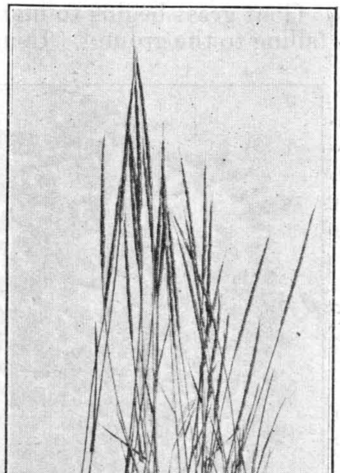


FIGURE 73.—A plant of goat grass showing its resemblance to wheat and its tillering habit

Goat grass produces a head or spike something like that of wheat, but more slender and cylindrical, as shown in Figure 73. Two varieties are found in the southern Great Plains, one with velvety chaff and the other smooth. Both varieties have beards only at the tip of the heads. At maturity the heads become very brittle and break up.

fire protection, administrative uses, and other purposes on the refuge. Although adjacent to the lowlands embraced in the refuge much of the area is not subject to overflow, as it extends up into the hills bordering the river bottoms, and the inclusion of this high land will have the desirable result of lending variety to the refuge and attracting and protecting additional species of wild life.

H. N. Foss,
Attorney, Office of the Solicitor.

Goat Grass, a New Wheat-Field Weed, Is Growing Troublesome In recent years goat grass, *Aegilops cylindrica* Host., has become a troublesome weed in wheat fields of south-central Kansas and north-central Oklahoma. It was first reported from the vicinity of Trousdale, Kans., in 1917. The grass was not identified at that time and received no particular attention. Nothing was heard of it again until 1920, when it was identified. Its continued spread has forced a recognition of its importance as a weed in wheat fields.

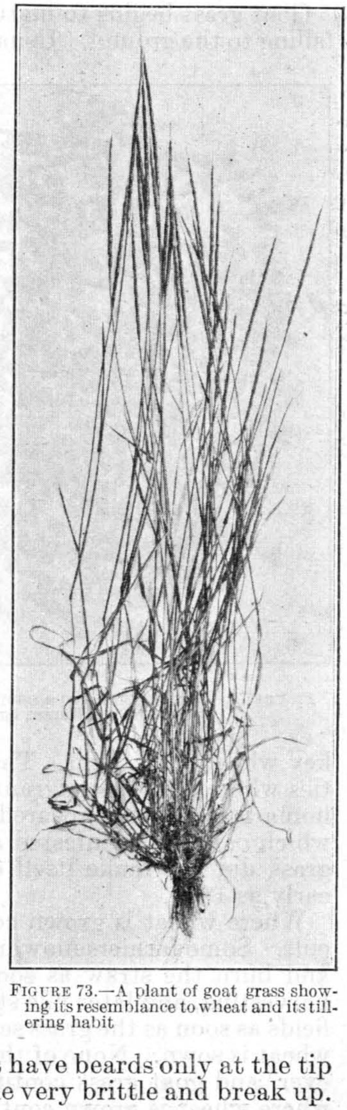


FIGURE 73.—A plant of goat grass showing its resemblance to wheat and its tillering habit

Goat grass is a wild relative of cultivated wheat. It will even cross to a certain extent with wheat, although most plants arising from the hybrid seeds are sterile. Goat grass, like winter wheat, is a winter annual. The seedlings emerge in the fall, and the plants mature the following spring, about the time wheat is ready for harvest. Seedlings and young plants of goat grass are difficult to distinguish from wheat plants. The leaves of goat grass are narrower than those of wheat, however, and have hairs along the edges near the base, a character lacking in wheat. The grass tillers profusely, and when abundant it often crowds out the wheat. Plants with as many as 50 tillers are not of unusual occurrence, although in thick stands fewer tillers are developed. The grass is a vigorous grower, very winter-hardy, and has a distinct advantage over wheat where the latter is at all checked by unfavorable conditions.

Goat grass produces a head or spike something like that of wheat, but more slender and cylindrical, as shown in Figure 73. Two varieties are found in the southern Great Plains, one with velvety chaff and the other smooth. Both varieties have beards only at the tip of the heads. At maturity the heads become very brittle and break up.

The seed remains inclosed in the chaff with the latter attached to a portion of the head. The head ripens from the top downward, each portion falling to the ground as soon as mature. Mature heads are so brittle that a slight disturbance scatters the seed-bearing portions in all directions. The grass therefore reseeds itself very profusely. Each section of the head contains two seeds which resemble those of wheat in general appearance, but are much smaller. The sections of the goat-grass head are only slightly larger than well-formed kernels of wheat and about the same weight, making them difficult to remove from threshed grain. In appearance they resemble small pieces of straw or trash. (Fig. 74.)

Matures Before Wheat is Cut

Goat grass begins to mature slightly before the wheat, the ripe seed falling to the ground. Usually about one-half to two-thirds of the seed has been dropped before the wheat is cut. The remainder goes into the threshed grain.

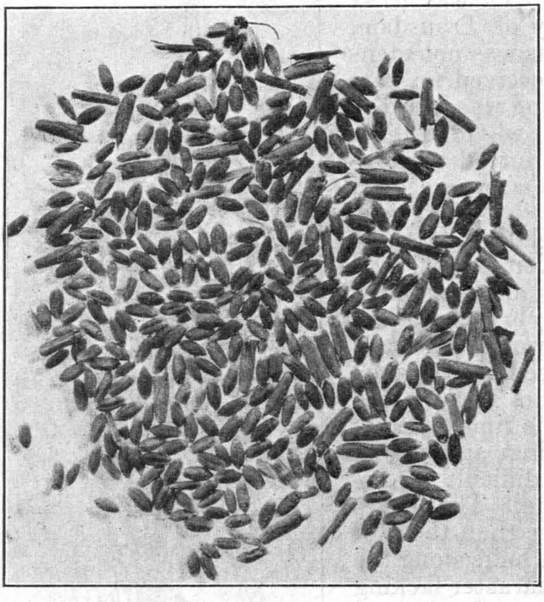


FIGURE 74.—Goat-grass seed in a sample of threshed wheat as it came from a Kansas farmer's field

Goat grass has been reported from 21 counties in central and southern Kansas and 2 counties in north-central Oklahoma. In individual fields the extent of infestation varies from a few scattered plants to solid stands of the grass several acres in extent.

Goat grass is not native to the United States, and it probably was brought into the area in seed wheat imported from southern Russia. Many Russian immigrants settled in central Kansas about 1873 and brought Turkey wheat with them. The most severely infested areas are in counties where these immigrants settled, or near by. The original Oklahoma infestation appeared in fields of Turkey wheat, the seed of which came from infested areas in Kansas. It is not clear why the grass did not make itself evident before 1918 if it was imported as early as 1873.

Where wheat is grown continuously, eradication is extremeiy difficult. Some farmers mow infested spots while the plants are still green and burn the straw as soon as dry. Others avoid infested spots in harvesting, and later pile straw on them and burn it. Still others disk fields as soon as the grass seedlings are well up in the fall and before the wheat is sown. None of these methods really controls the weed, however, and goat grass continues to spread slowly in the infested area where wheat is grown continuously.

Control of goat grass is not difficult where rotation with row crops is possible. It is easily killed by cultivation. The only complicating factor is the difficulty of killing plants growing in fence rows, roadways, and other waste places. The grass does not compete with native grasses in undisturbed sod.

C. O. Johnston,
Associate Pathologist, Bureau of Plant Industry.

GULLIED Land Reclaimed by the Use of Brush Followed by Terracing Preliminary to terracing land cut up with deep gullies that can not be crossed with farm machinery, it is sometimes advisable first to partly fill the gully by intercepting eroded soil in the run-off water. Where an abundant supply of brush is available, an ideal method for

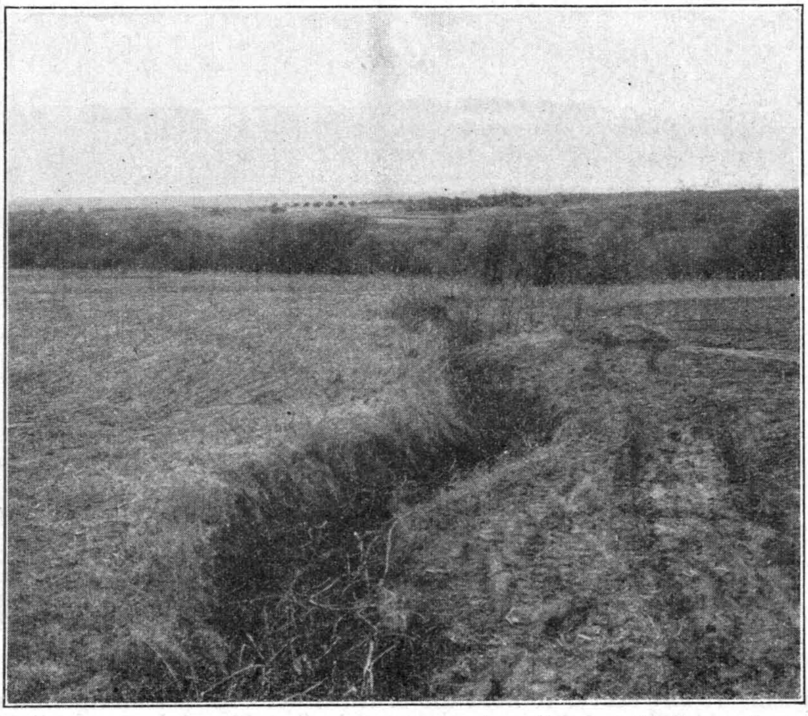


FIGURE 75.—Gully about half filled with brush to check erosion and intercept silt in the run-off water

collecting a deposit of soil is to partly fill the gully along its entire length with brush. This method has some advantages over the use of brush dams in that a greater proportion of the silt in the run-off water is caught and deposited in the gully, resulting in only small loss of soil from the field. The gully should be filled to about one-half its depth at the middle, and the brush should extend up the sides as near to the top of the banks as possible. This provides a passageway for the run-off water without permitting erosion on the sides of the gully. Two very common mistakes are to fill the gully so full of brush as to cause an overflowing of the banks and the eroding of a new parallel

Control of goat grass is not difficult where rotation with row crops is possible. It is easily killed by cultivation. The only complicating factor is the difficulty of killing plants growing in fence rows, roadways, and other waste places. The grass does not compete with native grasses in undisturbed sod.

C. O. JOHNSTON,
Associate Pathologist, Bureau of Plant Industry.

GULLIED Land Reclaimed by the Use of Brush Followed by Terracing Preliminary to terracing land cut up with deep gullies that can not be crossed with farm machinery, it is sometimes advisable first to partly fill the gully by intercepting eroded soil in the run-off water. Where an abundant supply of brush is available, an ideal method for

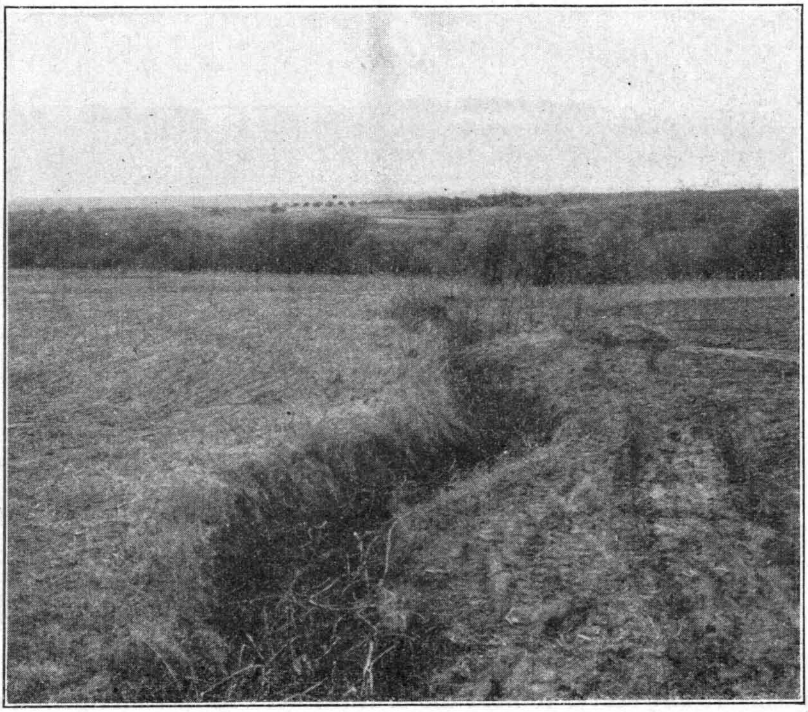


FIGURE 75.—Gully about half filled with brush to check erosion and intercept silt in the run-off water

collecting a deposit of soil is to partly fill the gully along its entire length with brush. This method has some advantages over the use of brush dams in that a greater proportion of the silt in the run-off water is caught and deposited in the gully, resulting in only small loss of soil from the field. The gully should be filled to about one-half its depth at the middle, and the brush should extend up the sides as near to the top of the banks as possible. This provides a passageway for the run-off water without permitting erosion on the sides of the gully. Two very common mistakes are to fill the gully so full of brush as to cause an overflowing of the banks and the eroding of a new parallel gully down the slope, and to neglect to protect the sides of the gully against the erosive action of the water.

Before laying the brush it is a good plan to cover the bottom and sides of the gully with straw, grass, or some other similar material to protect the soil from the eroding effect of water percolating through the brush. Starting at the lower end of the gully the brush should be laid with the butts downstream, overlapping it in a manner similar to that employed in shingling a house. This ties the brush effectively together throughout the length of the gully and reduces to a minimum any possible movement from the force of the run-off water. If rock is available it should be placed on top of the brush along the center line of the gully as an anchor and to prevent the movement of the top

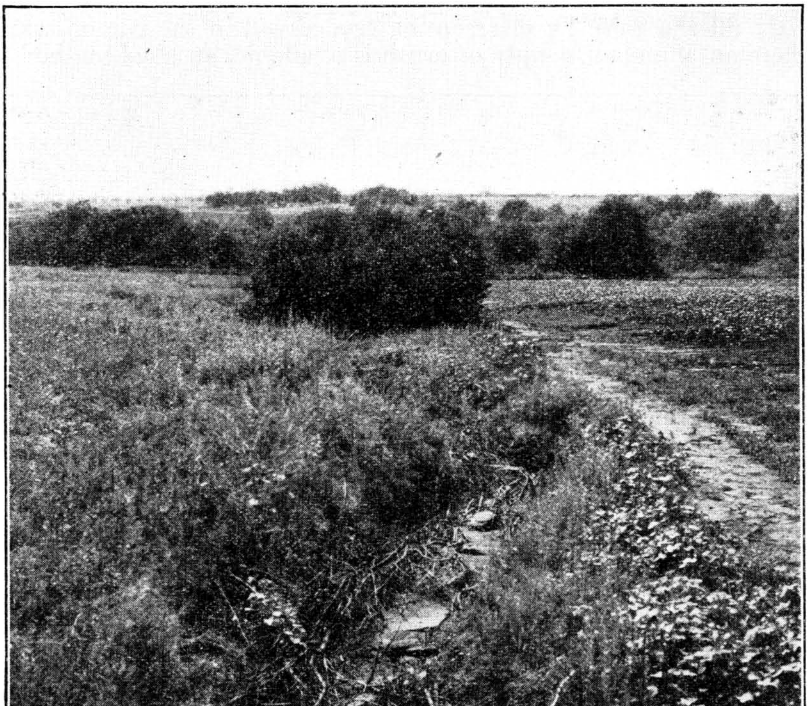


FIGURE 76.—Showing silt deposited to top of brush in gully shown in Figure 75

brush. It also serves to hold the brush closer together and permits a more rapid filling of the open spaces with silt. If rock is not available, stakes driven with tops tilting uphill and connected with cross poles will answer the same purpose.

Test at Erosion Experiment Farm

In the spring of 1929, on the department's soil-erosion experiment farm near Guthrie, Okla., a gully with a bottom width of from 2 to 7 feet, a top width of from 5 to 15 feet, and a depth of from 2 to 8 feet, was about half filled with brush as shown in Figure 75. During a period of about one month during which time four ordinary rains occurred, 1 to 2 feet of soil was intercepted by the brush and deposited in the bottom of the gully. Before the fall of the same year the gully had been filled with eroded soil practically to the top of the brush. (Fig. 76.)

In the fall the edges of the gully were plowed in and sufficient soil was scraped into the gully to permit crossing with tractors and terracing implements. The land was then terraced and, with some additional work between terraces consisting of plowing in the sharp edges of the banks, it was possible to cross the gully at any place with farm

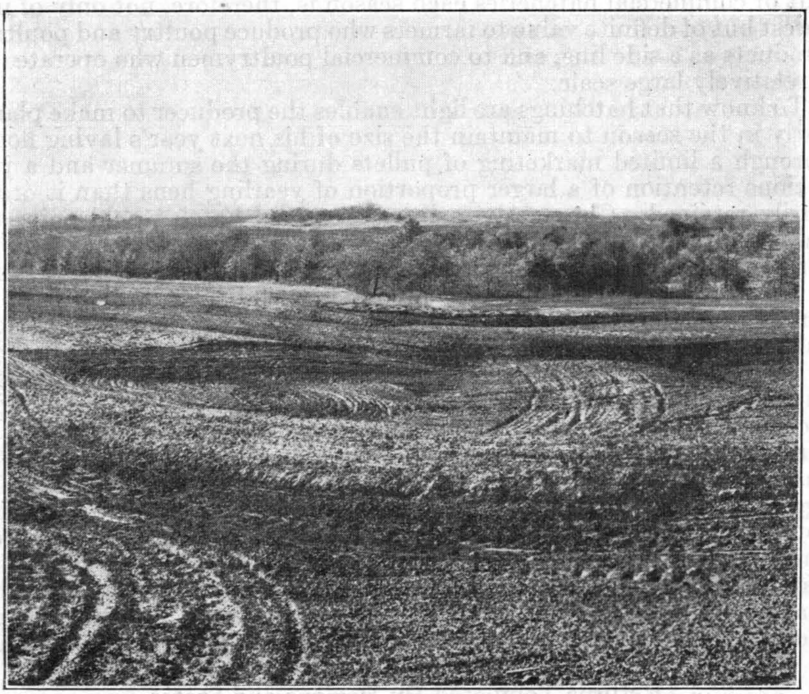


FIGURE 77.—View taken at same location as views in Figures 75 and 76 after land was terraced. Note disappearance of gully, all land being available for farming purposes

machinery. Figure 77 is a view taken in the same location as those in Figures 75 and 76 from which it is apparent that the gully has entirely disappeared and the former sharp edges have given way to smooth curves which can be readily crossed with farm machinery. All of the waste land formerly occupied by the gully is reclaimed for cultivable purposes.

C. E. RAMSER,
Senior Drainage Engineer, Bureau of Public Roads.

HATCHERY Reports, Issued Monthly, Aid Poultrymen to Regulate Production

Chicks hatched in the spring become either a part of the summer's supply of broilers or fryers or of the laying flocks that furnish the egg supply of the following season. A crop of baby chicks smaller than usual, therefore, is indicative of a smaller supply of young poultry for the summer markets, a reduction in the number of pullets in the bottom of the gully. Before the fall of the same year the gully had been filled with eroded soil practically to the top of the brush. (Fig. 76.)

In the fall the edges of the gully were plowed in and sufficient soil was scraped into the gully to permit crossing with tractors and terracing implements. The land was then terraced and, with some additional work between terraces consisting of plowing in the sharp edges of the banks, it was possible to cross the gully at any place with farm

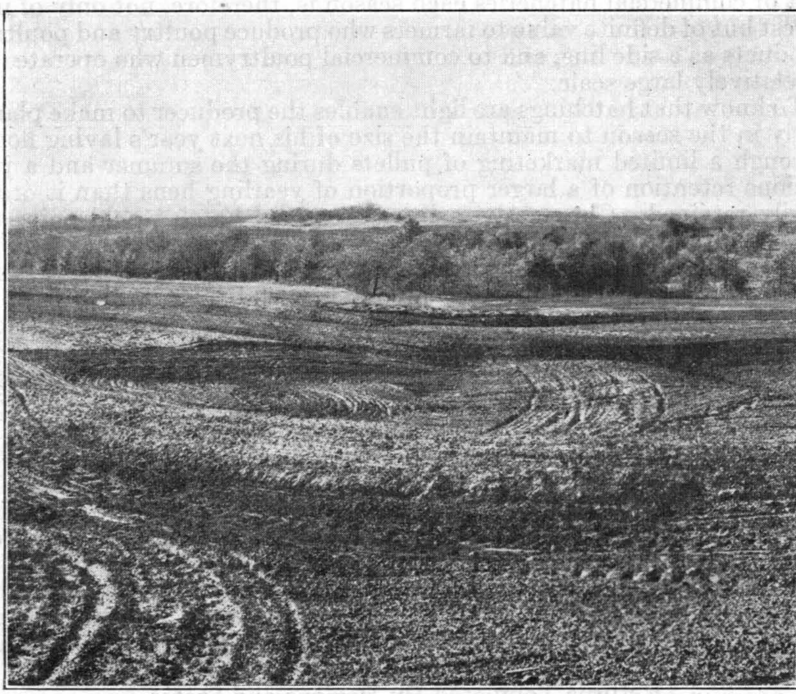


FIGURE 77.—View taken at same location as views in Figures 75 and 76 after land was terraced. Note disappearance of gully, all land being available for farming purposes

machinery. Figure 77 is a view taken in the same location as those in Figures 75 and 76 from which it is apparent that the gully has entirely disappeared and the former sharp edges have given way to smooth curves which can be readily crossed with farm machinery. All of the waste land formerly occupied by the gully is reclaimed for cultivable purposes.

C. E. RAMSER,
Senior Drainage Engineer, Bureau of Public Roads.

HATCHERY Reports, Issued Monthly, Aid Poultrymen to Regulate Production

Chicks hatched in the spring become either a part of the summer's supply of broilers or fryers or of the laying flocks that furnish the egg supply of the following season. A crop of baby chicks smaller than usual, therefore, is indicative of a smaller supply of young poultry for the summer markets, a reduction in the number of pullets available for laying purposes the following fall, and a correspondingly lighter egg production for the next winter, spring, and summer than is usual in those seasons. Such a situation normally results in a higher level of prices for both eggs and poultry. On the other hand, a comparatively heavy hatch points to a substantial increase in the summer supplies of marketable young stock and a marked expansion of laying flocks the next fall. Such a situation may lead to a sharp decline in the prices for eggs and poultry. Information as to the size of the output of commercial hatcheries each season is, therefore, not only of interest but of definite value to farmers who produce poultry and poultry products as a side line, and to commercial poultrymen who operate on a relatively large scale.

To know that hatchings are light enables the producer to make plans early in the season to maintain the size of his next year's laying flock through a limited marketing of pullets during the summer and a judicious retention of a larger proportion of yearling hens than is ordinarily retained. Conversely, a heavy seasonal hatch would point to the desirability of a more liberal marketing of young stock and a stricter culling of old stock at the beginning of the next laying season. Such a program, if intelligently followed, would tend to modify to a large extent the extremes of the periodic cycles of production to which the poultry industry in the past has been subjected.

For the purpose of furnishing poultry producers with an index on the probable size of the season's chick crop, the Bureau of Agricultural Economics has for the past two years issued a hatchery report monthly during the main hatching season. This report contains information submitted by commercial hatcheries with incubating capacity of 10,000 eggs and over. Schedules sent to such firms each month request the total egg capacity of the hatchery on first of month, total number of chicken eggs set during month, and total number of salable chicks hatched during month. In order that proper comparisons may be made it is essential that reports be made not only for the current month under survey but also for the same month of the previous year.

Returns Tabulated By Regions and States

The returns are tabulated for the monthly hatchery report, (1) according to the principal geographic regions, and (2) according to States. While the poultry industry is conducted on a commercial scale to a greater or less degree in all States, the areas that furnish the principal proportion of the market supplies of eggs and poultry are rather definitely defined. General information on the changes occurring by areas is of interest and value to those concerned with the marketing of poultry and poultry products. Information on the changes by States is of particular benefit to hatcherymen and to the various State officials working with the poultry industry within the respective States. With facts on current changes before them they are in a much better position to measure the results of their efforts and to modify their programs if such a modification seems necessary.

In a short comment, written in popular style, the statistical data presented in the report are analyzed, and the most significant of the indicated changes pointed out and discussed.

The first year's results of the hatchery report indicate that it has excellent possibilities for roughly measuring early in the season the prospective supply of eggs and poultry. A summary of the 1929 reports at the close of the season showed a seasonal increase of 13.5 per cent in total incubating capacity, 29 per cent in the number of eggs set, and 31 per cent in the number of salable chicks hatched, over the same period in 1928. Such changes pointed to an increase in the supply of both eggs and poultry for the 1929–30 season. That this is what happened is borne out by the fact that receipts of fresh-killed dressed poultry at the four principal egg and poultry markets—New York, Boston, Philadelphia, and Chicago—for the last three months of 1929 and the first three months of 1930 were approximately 28,000,000 pounds, or 12 per cent, heavier than the receipts for the preceding comparable period. The receipts of eggs at the same markets for the period from January 1 to May 15, 1930, were larger by around 540,000 cases, or 8 per cent, than the receipts for the same period of 1929. The heavy supplies of both poultry and eggs for the 1929–30 season caused prices for both commodities to drop substantially under the prices for the corresponding period of the preceding year. These developments were fully indicated by the reports of commercial hatchery output during the midsummer of 1929.

B. H. Bennett,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

HAYSTACKS' Content Is Measurable More Closely by New Rules

Requests for rules for computing the quantity of hay in stacks are frequently received by the Department of Agriculture from producers, stock feeders, and others, particularly in the Pacific and Intermountain States, who are interested in the marketing of hay for which actual weights can not be obtained because of distance from suitable scales, or for other reasons. In such cases it is necessary to have some means of estimating the weight of the hay. This usually is done by measuring certain dimensions of the stack and then computing the volume by one of several rules in common use. This volume is then divided by the accepted number of cubic feet required for a ton for the particular kind of hay in question. The result is the accepted number of tons in the stack, and settlement is made on this basis.

Rectangular Stacks

Recent studies show that the rules for determining volume of rectangular stacks in common use at present are not very accurate. In all the rules or formulas for computing the volume of rectangular stacks O equals the distance from the ground at one side of the stack over the stack to the ground at the other side, W equals the width of the stack at the ground, and L equals the average length of the stack. These measurements are taken in feet. The Frye-Bruhn rule or rule of two, $\frac{(O-W)W}{2}L$, which is commonly used, gave in some cases studied only 70 per cent of the actual volume of the stack and in other cases as high as 105 per cent of the actual volume. On an average this rule gave 86 per cent of the actual volume. The quartermaster or so-called Government rule, $\left(\frac{O-W}{4}\right)^2 L$, another rule in at the close of the season showed a seasonal increase of 13.5 per cent in total incubating capacity, 29 per cent in the number of eggs set, and 31 per cent in the number of salable chicks hatched, over the same period in 1928. Such changes pointed to an increase in the supply of both eggs and poultry for the 1929–30 season. That this is what happened is borne out by the fact that receipts of fresh-killed dressed poultry at the four principal egg and poultry markets—New York, Boston, Philadelphia, and Chicago—for the last three months of 1929 and the first three months of 1930 were approximately 28,000,000 pounds, or 12 per cent, heavier than the receipts for the preceding comparable period. The receipts of eggs at the same markets for the period from January 1 to May 15, 1930, were larger by around 540,000 cases, or 8 per cent, than the receipts for the same period of 1929. The heavy supplies of both poultry and eggs for the 1929–30 season caused prices for both commodities to drop substantially under the prices for the corresponding period of the preceding year. These developments were fully indicated by the reports of commercial hatchery output during the midsummer of 1929.

B. H. Bennett,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

HAYSTACKS' Content Is Measurable More Closely by New Rules

Requests for rules for computing the quantity of hay in stacks are frequently received by the Department of Agriculture from producers, stock feeders, and others, particularly in the Pacific and Intermountain States, who are interested in the marketing of hay for which actual weights can not be obtained because of distance from suitable scales, or for other reasons. In such cases it is necessary to have some means of estimating the weight of the hay. This usually is done by measuring certain dimensions of the stack and then computing the volume by one of several rules in common use. This volume is then divided by the accepted number of cubic feet required for a ton for the particular kind of hay in question. The result is the accepted number of tons in the stack, and settlement is made on this basis.

Rectangular Stacks

Recent studies show that the rules for determining volume of rectangular stacks in common use at present are not very accurate. In all the rules or formulas for computing the volume of rectangular stacks O equals the distance from the ground at one side of the stack over the stack to the ground at the other side, W equals the width of the stack at the ground, and L equals the average length of the stack. These measurements are taken in feet. The Frye-Bruhn rule or rule of two, $\frac{(O-W)W}{2}L$, which is commonly used, gave in some cases studied only 70 per cent of the actual volume of the stack and in other cases as high as 105 per cent of the actual volume. On an average this rule gave 86 per cent of the actual volume. The quartermaster or so-called Government rule, $\left(\frac{O-W}{4}\right)^2 L$, another rule in common use, gave in some cases only 80 per cent and in other cases as high as 130 per cent of the actual volume. On an average, this rule gave 96 per cent of the actual volume. Several other rules in use to a limited extent were studied and results were even more unsatisfactory. (Fig. 78.)

Studies were then carried on for the purpose of developing rules or formulas for determining the volume of rectangular stacks that would be more accurate than those in use at present. The stacks were divided into three groups or types, based on the shape of the stacks. These types are (1) square flat-topped stacks similar to those built in certain parts of California; (2) high round-topped stacks similar to those built in the Intermountain States of Utah, Nevada, Idaho, and eastern Oregon; and (3) low round-topped stacks similar to those built in Montana South Dakota, Colorado, and Minnesota.

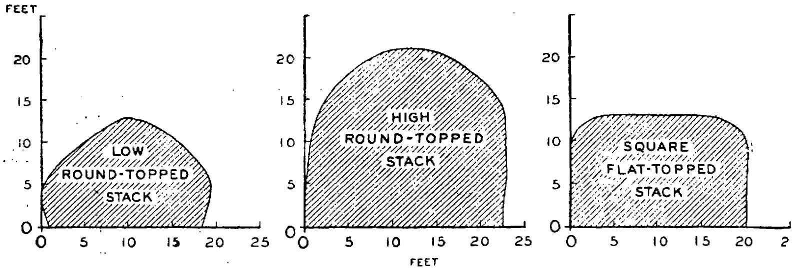


FIGURE 78.—Outline of three types of hay stacks

A formula was developed for each of these types of stacks that will give a volume within 5 per cent of the actual volume in practically all cases. All three of these formulas gave on the average 100 per cent of the actual volume. The formulas are as follows:

For square flat-topped stacks .... $(0.56\times O-0.55\times W)WL$.
For high round-topped stacks .... $(0.52\times O-0.46\times W)WL$.
For low round-topped stacks .... $(0.52\times O-0.44\times W)WL$.

Round Stacks

The rules in use at present for the purpose of determining the volume of round stacks were studied and found to be rather inaccurate. In the rules for round stacks O equals the average distance from the ground on one side of the stack over the peak to the ground on the other side; C equals the circumference of the stack at the ground. The quartermaster or Government rule for round stacks $\left(\frac{C}{4}\right)\times\left(\frac{O-\frac{C}{4}}{2}\right)$ was found on the average to give 95 per cent of the actual volume.

The following rule developed from the data obtained will give fairly accurate results for all round stacks:

$$\text{Volume} = (0.04\times O-0.012\times C)C^2$$

On the average this rule will give a result that is equal to the actual volume.

Cubic Feet per Ton

Many factors affect the number of cubic feet required for a ton, or the density of the hay in the stack. At present there are no methods for measuring this variation in density, but the following figures, which are the averages obtained from a large number of stacks, can be used with fairly satisfactory results:

Length of time in stacks	Number of cubic feet per ton of hay		
	Alfalfa	Timothy and timothy mixed	Wild
30 to 90 days	485	640	600
Over 90 days	470	625	450

These figures, when used with the new rules for determining volume stated above, will give more accurate results than can be obtained from the figures for cubic feet per ton now used in connection with present volume rules.

W. H. Hosterman,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

HEMP Fiber Losing Ground, Despite Its Valuable Qualities Hemp is one of the oldest of known textile fibers. There is a definite record that the hemp plant (*Cannabis sativa*) (fig. 79) was cultivated in China for fiber production 27 centuries before the Christian Era. For nearly 5,000 years it has been important and has won an honorable position because of its strength and durability and the well-established fact that it is dependable. Until less than a century ago hemp and flax were the principal fibers of vegetable origin. While flax was the aristocratic fiber for fine linens, laces, and embroideries, hemp was the strong and dependable fiber for ropes, cables, and sails. The name canvas is derived from the Arabic name for hemp. The Pilgrim Fathers at Plymouth and the Cavaliers at Jamestown planted hemp and flax among their earliest crops. The clothing of the men was hempen homespun, and it did not quickly wear out. The famous clipper ships that carried the merchandise on the seven seas until the middle of the last century were outfitted with sails, ropes, cables, halyards, and shrouds all made of hemp fiber. Many of the covered wagons that crossed the plains before 1860 had covers of real canvas.

For many of these uses of former days, hemp has been replaced by other fibers. In some instances fibers have been found that are better adapted for the particular purposes; for some temporary uses cheaper fibers have been found to serve the purpose quite as well; but in many cases hemp has been crowded out for uses where its strength and durability are desirable qualities.

Hemp for marine cordage has been superseded by abacá (Manila hemp) because the abacá ropes, cables, and hawsers are lighter and will float in water and this hard fiber is resistant to injury from salt water without being tarred. Hemp fiber is used in the marlines or twines with which the ends of the larger ropes are bound. The term for measuring this variation in density, but the following figures, which are the averages obtained from a large number of stacks, can be used with fairly satisfactory results:

Length of time in stacks	Number of cubic feet per ton of hay		
	Alfalfa	Timothy and timothy mixed	Wild
30 to 90 days	485	640	600
Over 90 days	470	625	450

These figures, when used with the new rules for determining volume stated above, will give more accurate results than can be obtained from the figures for cubic feet per ton now used in connection with present volume rules.

W. H. HOSTERMAN,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

HEMP Fiber Losing Ground, Despite Its Valuable Qualities Hemp is one of the oldest of known textile fibers. There is a definite record that the hemp plant (*Cannabis sativa*) (fig. 79) was cultivated in China for fiber production 27 centuries before the Christian Era. For nearly 5,000 years it has been important and has won an honorable position because of its strength and durability and the well-established fact that it is dependable. Until less than a century ago hemp and flax were the principal fibers of vegetable origin. While flax was the aristocratic fiber for fine linens, laces, and embroideries, hemp was the strong and dependable fiber for ropes, cables, and sails. The name canvas is derived from the Arabic name for hemp. The Pilgrim Fathers at Plymouth and the Cavaliers at Jamestown planted hemp and flax among their earliest crops. The clothing of the men was hempen homespun, and it did not quickly wear out. The famous clipper ships that carried the merchandise on the seven seas until the middle of the last century were outfitted with sails, ropes, cables, halyards, and shrouds all made of hemp fiber. Many of the covered wagons that crossed the plains before 1860 had covers of real canvas.

For many of these uses of former days, hemp has been replaced by other fibers. In some instances fibers have been found that are better adapted for the particular purposes; for some temporary uses cheaper fibers have been found to serve the purpose quite as well; but in many cases hemp has been crowded out for uses where its strength and durability are desirable qualities.

Hemp for marine cordage has been superseded by abacá (Manila hemp) because the abacá ropes, cables, and hawsers are lighter and will float in water and this hard fiber is resistant to injury from salt water without being tarred. Hemp fiber is used in the marlines or twines with which the ends of the larger ropes are bound. The term "hemp rope" has lost its significance for in America ropes are no longer made of hemp.

Cotton, which is adapted to a wider range of uses than other vegetable fibers, has replaced hemp for many purposes, and in most cases advantageously, for it can be spun more easily and with less waste, making smoother and more uniform yarns. Cotton twines, of course. are not as strong or as durable as hemp twines of the same size or weight.

Jute, which was first brought from India to Europe and North America about a century ago, is now used more than all other vegetable fibers combined except cotton. It is the cheapest and most easily spun of any of the soft fibers, and it is well adapted for purposes where strength and durability are of secondary importance but it is the weakest and least durable of the important textile fibers. Jute has replaced hemp for many temporary uses such as covering for cotton bales and

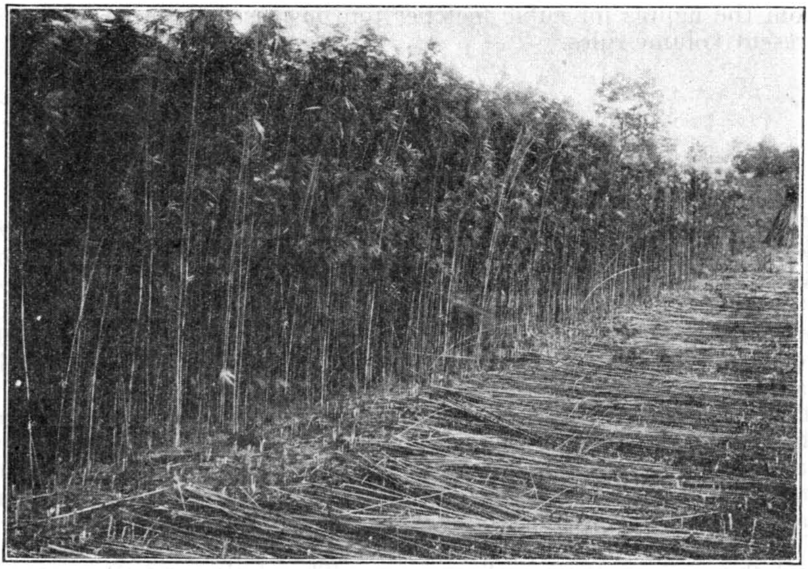


FIGURE 79.—Hemp (*Cannabis sativa*) grown in Kentucky from seed brought from China

packages of merchandise in transit and sacks for coffee, sugar, and grain where the cheaper fiber may give satisfactory service; but the weak and short-lived jute does not give as satisfactory service as the stronger and more durable hemp for twines for tying heavy packages, hop vines that must be exposed to the weather all summer, carpet warp that ought to last many years, or furniture webbing that should last a lifetime.

Owing partly to the resistant character of the fiber itself and partly to the lack of development of special machinery for spinning hemp, this fiber is not spun as efficiently and cheaply as cotton and jute. The average price per pound of scutched hemp fiber is nearly twice the average price of jute and less than the price of cotton, but hemp yarns are more expensive than those of cotton as well as jute.

The uses of hemp have thus been reduced by the competition of cheaper yarns made of other fibers. At the present time water-retted hemp imported from Italy and dew-retted hemp produced in Wisconsin, Illinois, and Kentucky are used for the following purposes:

Wrapping twines for heavy packages.
Mattress twine for sewing mattresses.
Spring twine for tying springs in overstuffed furniture and in box springs.
Sacking twine for sewing sacks containing sugar, wool, peanuts, stock feed, or fertilizer.
Baling twine, similar to sacking twine, for sewing burlap covering on bales and packages.
Broom twines for sewing brooms.
Sewing twine for sewing cheesecloth for shade-grown tobacco.
Hop twine for holding up hop vines in hop yards.
Ham strings for hanging up hams.
Tag twines for shipping tags.
Meter cord for tying diaphrams in gas meters.
Blocking cord used in blocking men's hats.
Webbing yarns which are woven into strong webbing.
Belting yarns to be woven into belts.
Marlines for binding the ends of ropes, cables, and hawsers to keep them from fraying.
Hemp packing or coarse yarn used in packing valve pumps.
Plumber's oakum, usually tarred, for packing the joints of pipes.
Marine oakum, also tarred, for calking the seams of ships and other water craft.

Other fibers are competing with hemp for even this limited list of uses, and for some of these uses increasing proportions of jute are mixed with hemp.

The annual importations of hemp into the United States in the last five years have ranged from only about 1,200 to 2,000 tons, compared with 5,000 to 8,000 tons previous to 1914, and the domestic production amounting to 800 to 1,100 tons per annum is only about one-half that of the years between 1908 and 1913.

LYSTER H. DEWEY,
Senior Botanist, Bureau of Plant Industry.

HEREDITARY Mutations Induced in Plants by the Action of X Rays

The experimental modification of heredity is one of the oldest problems of science, but until very recent years there was no convincing evidence of the artificial production of hereditary changes in plants or animals. In 1927 Muller, of the University of Texas, in a remarkable series of experiments with the fruit fly, succeeded in demonstrating that mutations (fundamental changes in heredity) are produced in large numbers in that insect by treatment of the germ cells with X rays. It was soon found that mutations may be produced similarly in other animals and in plants, that body cells as well as germ cells may be caused to mutate, and that the radiations of radium produce genetic effects similar to those produced by X rays.

The phenomenon of mutation is fundamental to plant and animal breeding as well as to evolution, since it is the only process, so far as we now know, by which new hereditary determiners arise. Intensive experiments on heredity in plants and animals during the last 30 years have shown that the occurrence of hereditary qualities is dependent on the presence within the cell of minute determiners, or genes, one for each separately inherited modification of the type. Ordinarily the genes are very constant and are distributed with perfect regularity, so hemp imported from Italy and dew-retted hemp produced in Wisconsin, Illinois, and Kentucky are used for the following purposes:

Wrapping twines for heavy packages.
Mattress twine for sewing mattresses.
Spring twine for tying springs in overstuffed furniture and in box springs.
Sacking twine for sewing sacks containing sugar, wool, peanuts, stock feed, or fertilizer.
Baling twine, similar to sacking twine, for sewing burlap covering on bales and packages.
Broom twines for sewing brooms.
Sewing twine for sewing cheesecloth for shade-grown tobacco.
Hop twine for holding up hop vines in hop yards.
Ham strings for hanging up hams.
Tag twines for shipping tags.
Meter cord for tying diaphrams in gas meters.
Blocking cord used in blocking men's hats.
Webbing yarns which are woven into strong webbing.
Belting yarns to be woven into belts.
Marlines for binding the ends of ropes, cables, and hawsers to keep them from fraying.
Hemp packing or coarse yarn used in packing valve pumps.
Plumber's oakum, usually tarred, for packing the joints of pipes.
Marine oakum, also tarred, for calking the seams of ships and other water craft.

Other fibers are competing with hemp for even this limited list of uses, and for some of these uses increasing proportions of jute are mixed with hemp.

The annual importations of hemp into the United States in the last five years have ranged from only about 1,200 to 2,000 tons, compared with 5,000 to 8,000 tons previous to 1914, and the domestic production amounting to 800 to 1,100 tons per annum is only about one-half that of the years between 1908 and 1913.

LYSTER H. DEWEY,
Senior Botanist, Bureau of Plant Industry.

HEREDITARY Mutations Induced in Plants by the Action of X Rays The experimental modification of heredity is one of the oldest problems of science, but until very recent years there was no convincing evidence of the artificial production of hereditary changes in plants or animals. In 1927 Muller, of the University of Texas, in a remarkable series of experiments with the fruit fly, succeeded in demonstrating that mutations (fundamental changes in heredity) are produced in large numbers in that insect by treatment of the germ cells with X rays. It was soon found that mutations may be produced similarly in other animals and in plants, that body cells as well as germ cells may be caused to mutate, and that the radiations of radium produce genetic effects similar to those produced by X rays.

The phenomenon of mutation is fundamental to plant and animal breeding as well as to evolution, since it is the only process, so far as we now know, by which new hereditary determiners arise. Intensive experiments on heredity in plants and animals during the last 30 years have shown that the occurrence of hereditary qualities is dependent on the presence within the cell of minute determiners, or genes, one for each separately inherited modification of the type. Ordinarily the genes are very constant and are distributed with perfect regularity, so that the distribution of hereditary characteristics in a progeny of known parentage may be predicted with statistical accuracy. In very rare cases, however, a gene changes, or mutates, and this is the mode of origin of new hereditary types.

Irregularities in the distribution of the genes also occur occasionally. The normal germ cell contains one complete set of genes and the normal body cell two sets (one from the father and one from the mother). The genes themselves are invisible, but each occupies a definite position in a microscopically visible body within each cell (the chromosome). In many species the appearance of the characteristic set of chromosomes has been closely studied. Various irregularities in the distribution of the chromosomes have been found, resulting in such abnormal conditions as the loss of a chromosome or section of a chromosome, the reduplication of a chromosome or section of it, or the development of an individual with only one set or with three or four sets of chromosomes instead of the normal two sets. These irregularities in distribution produce corresponding irregularities in inheritance.

Experiments at Missouri Station

Experiments on mutation in crop plants have been in progress for several years at the Missouri Agricultural Experiment Station at Columbia, Mo., in cooperation with the United States Department of Agriculture. These experiments involve a study of the frequency of gene mutation and of chromosomal irregularities under normal conditions, and of the effects of various genetic and environmental factors upon the mutation process. The ultimate objective is a definite knowledge of the physical nature of mutation and the physical constitution of the gene.

The normal frequency of mutation in eight genes or determiners for endosperm characters in corn has been measured in an extensive experiment begun in 1924. The frequency of mutation of a specific gene has not hitherto been determined in any plant or animal species, except in the case of genes selected for study because of their previously known high rate of mutation. The eight genes used in this experiment are genes of well-known and wholly normal genetic behavior, and are entirely unselected as regards mutation frequency, since none of them had previously been known to mutate.

The mutation rates were determined by the genetic testing of millions of germ cells. Mutation rate differs widely in different genes, the most mutable gene tested (*R*) yielding about 400 mutations per million, while the least mutable gene (*Wx*) has thus far yielded no mutations among about 2,000,000 germ cells or gametes tested. Mutations have been found in all the genes tested except *Wx*. There is also distinct and consistent variation in the frequency of mutation of the same gene in different families, and the rate of mutation may be increased or decreased by selection.

Mutations Induced in Various Plants

Mutations induced by X-ray treatment of barley were obtained in 1927, and in later experiments about 700 mutations in barley, oats, wheat, and corn have been obtained. The induced mutations appear to be identical with the mutations found in much smaller numbers in untreated material. The rate is proportional to the quantity of radiant energy absorbed and is independent of wave length within the limits of the X-ray spectrum available with present-day equipment. Mutations are induced similarly by beta rays of radium and radiothorium, and by cathode rays. Mutations are induced in dormant cells, but only about one-fifth as frequently as in similarly treated cells at a high level of activity. Mutations are induced readily by treatment of young embryos (seed germs), mature seed (whether dormant or germinating), young plants, or immature or mature germ cells.

The rate of induced mutation is very low in common oats and wheat, apparently because of a reduplication of genes involved in the increased chromosome number of these species. A number of other crop-plant species, including cotton and tobacco, have chromosome numbers similarly increased above those of more primitive related species. It is probable that this factor will limit the application of induced mutation in practical plant breeding.

The frequency of irregular chromosome distribution is also increased greatly by irradiation. A frequent result is the elimination of a chromosome or part of a chromosome. This occurs in early endosperm development in untreated material with a low but measurable frequency. X-ray treatment during early endosperm development greatly increases the frequency of its occurrence. Similar chromosomal deficiencies in the early development of the embryo have not been found in untreated material, but may be induced in large numbers by X-ray treatment. This results in the production of dwarfed and defective plants with at least 50 per cent of their germ cells aborted. The chromosomal deficiency is eliminated in the aborted germ cells, and the self-fertilized progeny of the defective plants are normally vigorous.

Transmission of Partial Sterility

Another type of chromosomal disturbance, occurring sometimes in as high a proportion as 40 per cent of the progeny of an irradiated plant, produces plants apparently normal except for the abortion of half of the germ cells. This semisterility is transmitted to half of the progeny. The same phenomenon had previously been found by other investigators in untreated plants of various species. The cause is apparently a transfer of a section of one chromosome to another, or an interchange of parts between two chromosomes, without any actual loss of genes.

An interesting type of chromosomal variant is the "haploid," a plant with only one set of chromosomes and genes instead of the usual two sets. Several haploid corn plants have been found in the progeny of X-rayed parents. Microscopic examinations have shown the absence of chromosomes or sections in the defective plants, the detachment of nonhomologous chromosomes in the transmissible semisteriles, and the presence of only one set of chromosomes in the haploids.

Practical application of induced mutation is now being attempted in the breeding of corn and certain fruit crops. It is probable, however, that the increased knowledge of heredity which will be secured in genetic experiments with this new technic will ultimately be of much greater value in practical breeding than the immediate applications now possible.

L. J. Stadler,
Senior Geneticist, Bureau of Plant Industry.

HIDES and Skins Require Prompt, Thorough Curing to Bring Best Prices

Promptness, thoroughness, and cleanliness are the reading, writing, and arithmetic of producers of properly salted and cured hides and skins. Fresh hides and skins must be cured because they are perishable. Curing is not a process of tanning. It is a treatment to keep hides and skins in a sound condition from the time they come off the animal until they reach the tanner.

Hide is the foundation of all leather. First-quality leather can not be made from a half-rotted hide. Sound hides and skins mean a sound foundation upon which the tanner builds the leather that makes up many of our daily necessities. The careless indifferent producer of poor, partly rotted hides and skins may be sure that they will result in shoes, belting, harness, and luggage that are less serviceable than they might have been had he done his part well.

There is no secret about curing. Except in the far southwestern section of this country, practically all hides and skins are cured with salt, the chemist's sodium chloride, and our common table salt. This does not apply to the skins used for fur. Salt is not required on these, as fur dressers and dyers prefer to have them cured by scraping off the excess fat, placing them on proper stretchers, and allowing them to be air-dried.

Promptness is essential in proper curing because fresh hide will spoil like fresh meat. The instant an animal is killed post-mortem changes and deterioration set in. The hide or skin should be removed quickly and salted promptly, as soon as the animal heat has escaped, which for cattle hides and calfskins usually requires about an hour in a cool place. Sheepskins require more time to cool off. Salting should not be put off or forgotten, as often is the case, until serious decay has occurred, and damage has been done. In hot weather especially salting should be done promptly.

Thoroughness Necessary in Curing

Thoroughness is a requisite of proper curing, because only those hides and skins that are thoroughly salted, or are saturated with salt, keep well. Cakes of salt have been used for money, and indeed to-day salt means money to producers and dealers in hides and skins. An excess of salt in the form of a continuous layer must be used. Folds, wrinkles, and spots that get little or no salt will rot. Two pounds of salt for every 3 pounds of hide or skin is a good proportion. To cure, the salt must get into the hide quickly and not simply on it, which means that the salt should be put on the flesh side.

Cleanliness plays a large part in the curing of hides and skins. Only clean hides and skins thoroughly cured with clean salt can come out with that bright, clean flesh side that the tanner always looks for and pays a premium to get. The exact origin and formation of many discolorations, grain defects, and other damages found in hides and skins is not known, but experience and scientific study of curing conditions have shown invariably that such damage is found to the least extent in those hides and skins that are handled with reasonable cleanliness. Many of these defects are the result in part, if not entirely, of the growth of bacteria and molds. Dirt, dung, blood, and other foreign matter, such as meat and fat, are excellent food for these microorganisms. Naturally the more of this foreign matter that is present the better the microorganisms thrive and the more damage they do.

The use over and over again of the same or recovered salt for curing is one of the worst evils in the production of "country" hides and skins. Used salt is contaminated with dirt, blood, hair, pieces of meat and fat, as well as bacteria and other microorganisms. It can not possibly do a good job of curing. Many small producers and those uninformed think it is economy to use old salt again and again. Such practice is indeed penny wisdom and pound foolishness. The money lost on a single hide damaged from the use of bloody, dirty salt might buy enough salt to cure about 10 hides. Yet some producers and dealers persist in using salt that contains so much dirt and filth that it is hardly recognizable.

If salt must be used again, it should at least be cleaned as much as possible. It should be screened to remove hair and other foreign matter, then piled and a stream of water played on the pile until the drainings run clear. Some salt will be lost in this way, but what remains will be fairly clean. If used, it should be mixed well with at least twice its bulk of new salt. Calfskins should never be cured with dirty used salt.

Kinds of Salt Used

Evaporated salt, rock or mined salt, and solar salt are all used for curing hides and skins. The first two, however, are more generally used because of their much greater production and wider distribution. Though evaporated and rock salt are widely used for both cattle hides and calfskins, many producers and dealers recommend for calfskins the use of evaporated salt only.

Salt is available in a range of sizes. A finer salt is required for curing calfskins than for cattle hides. Sizes G. A., F. C., and C. C. are extensively used for calfskins. (Fig. 80.) Salt of these sizes is slightly coarser than that used for curing meats. The individual particles range in size from grains about like granulated sugar to pieces as large as about one-third of a grain of ordinary polished rice. An even finer salt is better for curing sheepskins. The salt should be thoroughly rubbed into the flesh side of the skin with the hand until the salt "takes hold."

Size No. 1 and the next finer size are best for curing hides, and are widely used by experienced producers and dealers. The particles of size No. 1 will average slightly smaller than dried navy beans. No. 2 salt, which is about twice as large as No. 1, is too coarse to be used alone for curing.

Hides and skins should be cured in a place that is cool and watertight. Rain water dripping on salted hides will quickly wash out the salt and cause decay. A building partly under ground will maintain a more uniform temperature. An old root cellar with a plank floor makes a good hide cellar. A barn floor, if out of direct sunlight, can be used. A drain of some kind is a necessity. The best floor is one of concrete with sufficient slope to carry away all drainings. If a concrete floor is not available, one of heavy planking will do. Never put hides and skins on a dirt floor to cure.

Time Required for Curing

After they are salted, hides and skins should be left until cured, or at least until they become "salt hard" or "salt firm," which takes from 10 to 14 days. The usual time in cure for calfskins is from 2 to 4 weeks, and for cattle hides from 30 to 60 days. Hides and skins should not be rolled into a bundle immediately after salting as the falling away of the salt from parts of the hide or skin during the bundling will result in raw spots and rot.

Sheepskins, primarily because of their wool and grease, heat and spoil very quickly. Consequently they not only should be salted promptly and thoroughly but also should be marketed within five or

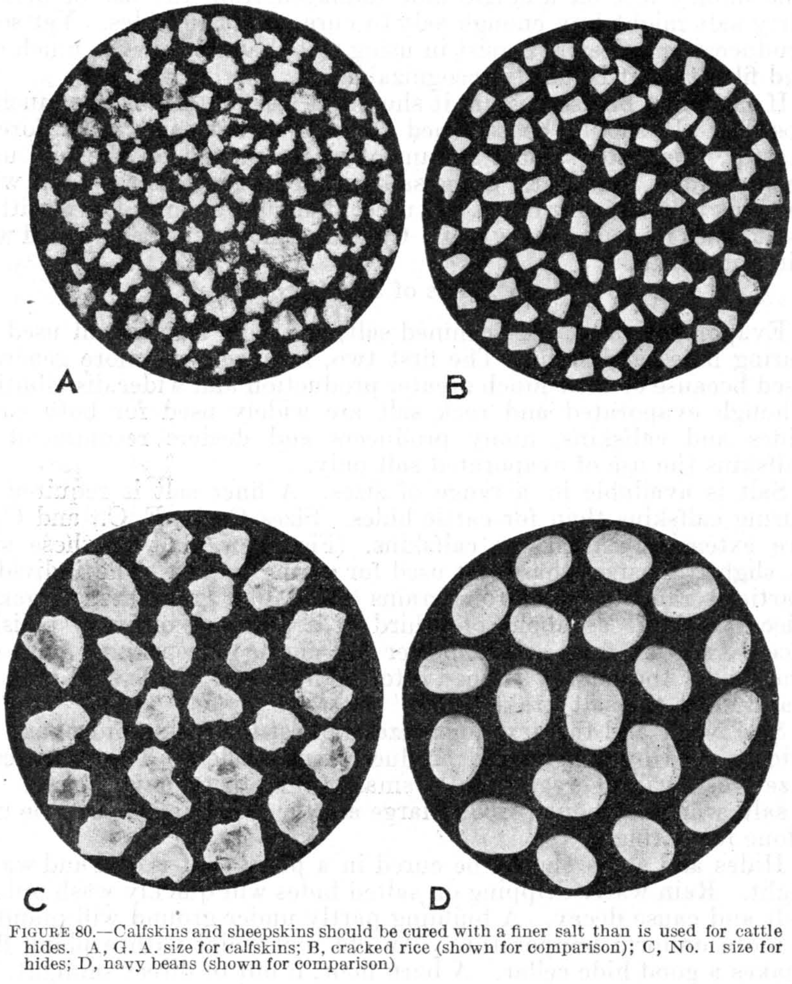


FIGURE 80.—Calfskins and sheepskins should be cured with a finer salt than is used for cattle hides. A, G. A. size for calfskins; B, cracked rice (shown for comparison); C, No. 1 size for hides; D, navy beans (shown for comparison)

six days. For the same reason not more than 10 sheepskins should be placed in one pile and if space is available, it is best not to pile them at all.

Producers and dealers in hides and skins should realize that they are handling a raw material essential for everyday necessities made from leather. The tanner buys hides and skins solely to make leather from them. He prefers those hides and skins that will make the best leather and the most leather, and he pays the best prices for them. Those who handle hides and skins should supply them in the best possible condition. They should learn to recognize condition and quality and thus know what they have for sale and should sell strictly according to the leather-making value of their products.

R. W. Frey, *Chemist*,
R. M. duBruyne, *Associate Hide Specialist*,
Bureau of Chemistry and Soils.

Hog-Cholera Serum Is Greatly Improved by Pasteurizing Process Because of the dependence of swine raisers on the preventive serum treatment for protecting their herds against cholera, any means of improving the serum is a subject of public interest. In recent years three types of serum, resulting from different methods of manufacture, have

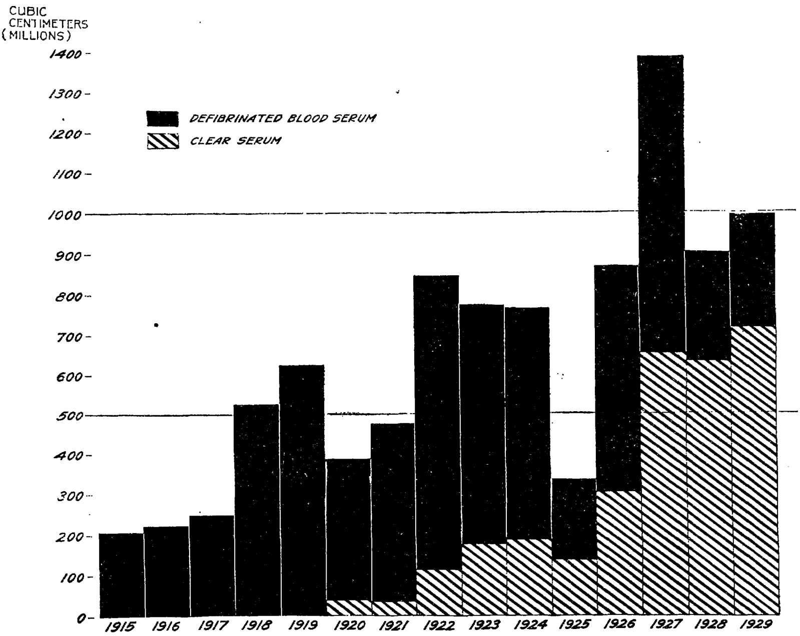


Figure 81.—Yearly production of defibrinated-blood and clear anti-hog-cholera serum by federally licensed establishments, 1915–1929, inclusive. Note increase in production of clear serum

been produced. Of these, a product known as clear concentrated serum has increased rapidly in popularity since it possesses several distinct advantages over types previously made, especially the original long-used type known as defibrinated-blood serum.

In 1928 the production of the clear product for the first time exceeded that of the defibrinated. And last year, the preference for clear serum caused it to be made in a quantity more than three times that of the other. Since the clear product is also more concentrated the actual dosage represented is approximately four to one. Figure 81, which shows the yearly production of these types of serum, portrays both total output and the relative quantity of each.

possible condition. They should learn to recognize condition and quality and thus know what they have for sale and should sell strictly according to the leather-making value of their products.

R. W. FREY, *Chemist*,
R. M. DUBRUYNE, *Associate Hide Specialist*,
Bureau of Chemistry and Soils.

HOG-CHOLERA Serum Is Greatly Improved by Pasteurizing Process

Because of the dependence of swine raisers on the preventive serum treatment for protecting their herds against cholera, any means of improving the serum is a subject of public interest. In recent years three types of serum, resulting from different methods of manufacture, have

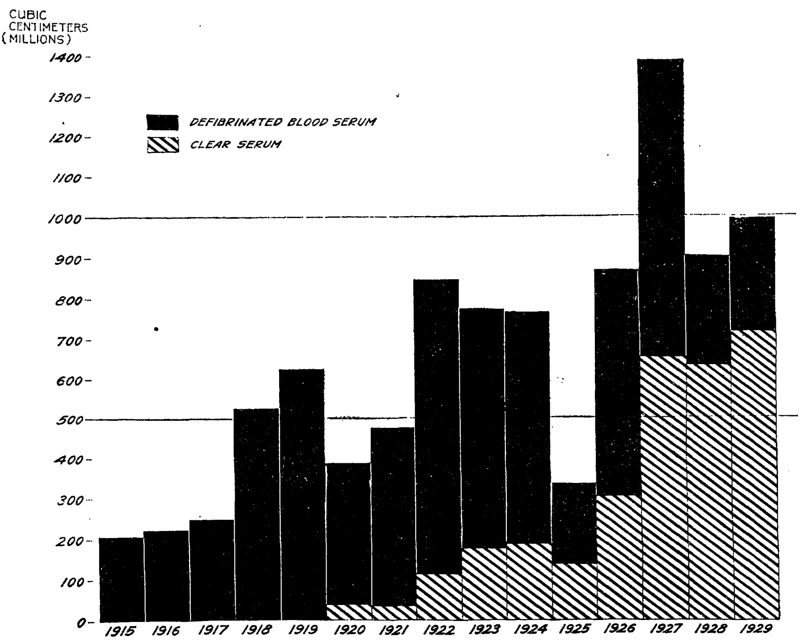


FIGURE 81.—Yearly production of defibrinated-blood and clear anti-hog-cholera serum by federally licensed establishments, 1915–1929, inclusive. Note increase in production of clear serum

been produced. Of these, a product known as clear concentrated serum has increased rapidly in popularity since it possesses several distinct advantages over types previously made, especially the original long-used type known as defibrinated-blood serum.

In 1928 the production of the clear product for the first time exceeded that of the defibrinated. And last year, the preference for clear serum caused it to be made in a quantity more than three times that of the other. Since the clear product is also more concentrated the actual dosage represented is approximately four to one. Figure 81, which shows the yearly production of these types of serum, portrays both total output and the relative quantity of each.

Wider Interest in Prevention

The condition mentioned has been brought about by a combination of causes, including more general interest among farmers in protecting hogs against cholera and the requirements of the Bureau of Animal Industry, which supervises the production of all anti-hog-cholera serum authorized for interstate shipment. The bureau's requirements, besides insuring the effectiveness of the serum in protecting hogs against cholera, also safeguard the product against contamination with bacteria that may cause undesirable changes in it or unsatisfactory conditions in animals treated.

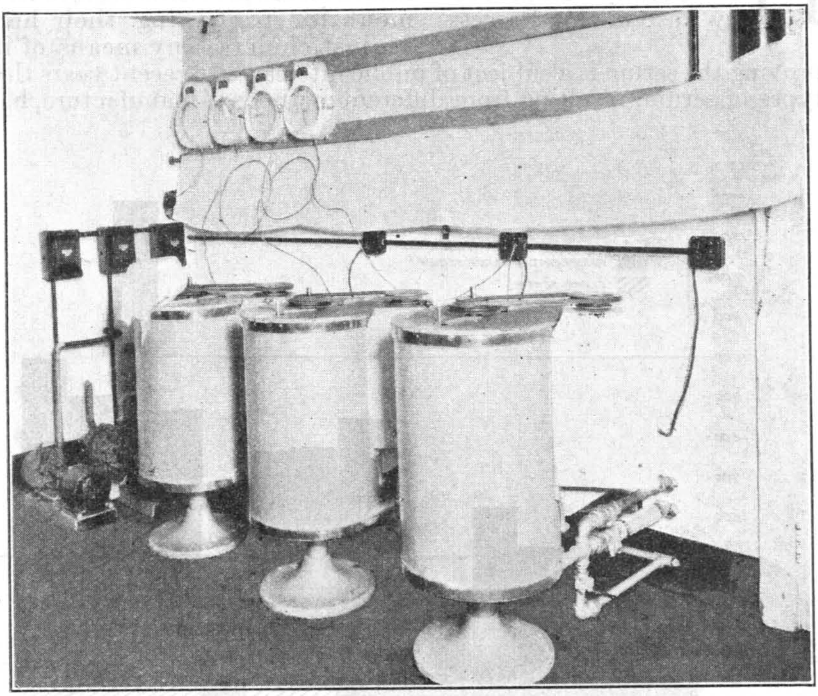


FIGURE 82.—Equipment for pasteurizing and cooling clarified anti-hog-cholera serum. Containers of serum are submerged within each unit shown. Temperatures are recorded by the clocklike devices on the wall

An important step now applied in the preparation of clear serum is efficient pasteurization, which involves heating the product to destroy any undesirable germ life that may be present. In this process the container of serum must be completely submerged in the heating fluid for a specified period. The required procedure is to heat the serum to 59°–60° C., maintain that temperature for at least 30 minutes and then reduce the temperature to 12° in the course of 20 minutes more.

In the development of the process it was necessary to provide new equipment which was devised at the bureau's request and under its direction. Besides providing for the entire submergence of the serum container during the entire heating process, the equipment includes power-driven agitators for thoroughly mixing the product, thus insuring uniform temperatures throughout the container. The equipment also makes use of automatic recording thermometers for registering temperatures continuously during the heating and cooling operations.

The entire procedure results in a product that is either sterile or of very low bacterial content when completed for marketing. Though designed primarily to safeguard the quality of serum and protect the swine industry, the system outlined also aids serum producers by enabling them to improve and standardize methods of production. The serum is handled in larger units than before, with less exposure to adverse influences, and with less cumbersome recording systems. The type of equipment now required for heating and cooling serum is illustrated in Figure 82.

Though all anti-hog-cholera serum produced under Federal supervision is dependable for the prevention of cholera, the clear product is considered superior in several important respects, as follows:

The concentrated product is reduced in bulk, thus enabling the purchaser to procure a given number of protective doses in smaller volume. This means that fewer containers are required for the same number of doses, compared with defibrinated-blood serum.

The clear product is absorbed somewhat more quickly after injection, making it especially suitable for use in herds exposed to the disease.

Its increased fluid character facilitates administration.

The smaller volume required for a dose and for treating a herd makes less filling of syringes necessary.

Advantage of Pasteurization

The most important advantage of clear serum is derived, however, from its pasteurization, which destroys possible sources of infection from infectious abortion, tuberculosis, and other communicable diseases. The pasteurization likewise improves the keeping qualities of the product, enabling serum producers to maintain larger reserve supplies for use in time of large demand.

It is noteworthy also that the strict Federal regulations surrounding the manufacture of the serum, together with hog-cholera virus and other veterinary biological products, have been favorably received and even welcomed by manufacturers of these products. The net result of these developments is the present high standard of purity and potency, thereby aiding materially in the suppression of hog cholera and other livestock diseases in the United States.

D. I. Skidmore,
Chief, Division of Virus-Serum Control,
Bureau of Animal Industry.

HOG Grades Shown Effectively by Use of Plaster Models

Carefully constructed plaster models are now being used as excellent substitutes for live animals in the demonstration of Government standards for grades of livestock, and, in many respects, they are superior to animals in effectiveness.

The greatest problem in livestock standardization work is to devise effective means of transferring the concept of a standard from one mind to another without impairment or modification of the standard. The standard for a Choice grade hog, for example, includes the relationships between the length, depth, and width of body; the proportion between length of legs and size of body; between the thickness of fat also makes use of automatic recording thermometers for registering temperatures continuously during the heating and cooling operations.

The entire procedure results in a product that is either sterile or of very low bacterial content when completed for marketing. Though designed primarily to safeguard the quality of serum and protect the swine industry, the system outlined also aids serum producers by enabling them to improve and standardize methods of production. The serum is handled in larger units than before, with less exposure to adverse influences, and with less cumbersome recording systems. The type of equipment now required for heating and cooling serum is illustrated in Figure 82.

Though all anti-hog-cholera serum produced under Federal supervision is dependable for the prevention of cholera, the clear product is considered superior in several important respects, as follows:

The concentrated product is reduced in bulk, thus enabling the purchaser to procure a given number of protective doses in smaller volume. This means that fewer containers are required for the same number of doses, compared with defibrinated-blood serum.

The clear product is absorbed somewhat more quickly after injection, making it especially suitable for use in herds exposed to the disease.

Its increased fluid character facilitates administration.

The smaller volume required for a dose and for treating a herd makes less filling of syringes necessary.

Advantage of Pasteurization

The most important advantage of clear serum is derived, however, from its pasteurization, which destroys possible sources of infection from infectious abortion, tuberculosis, and other communicable diseases. The pasteurization likewise improves the keeping qualities of the product, enabling serum producers to maintain larger reserve supplies for use in time of large demand.

It is noteworthy also that the strict Federal regulations surrounding the manufacture of the serum, together with hog-cholera virus and other veterinary biological products, have been favorably received and even welcomed by manufacturers of these products. The net result of these developments is the present high standard of purity and potency, thereby aiding materially in the suppression of hog cholera and other livestock diseases in the United States.

D. I. Skidmore,
Chief, Division of Virus-Serum Control,
Bureau of Animal Industry.

HOG Grades Shown Effectively by Use of Plaster Models Carefully constructed plaster models are now being used as excellent substitutes for live animals in the demonstration of Government standards for grades of livestock, and, in many respects, they are superior to animals in effectiveness.

The greatest problem in livestock standardization work is to devise effective means of transferring the concept of a standard from one mind to another without impairment or modification of the standard. The standard for a Choice grade hog, for example, includes the relationships between the length, depth, and width of body; the proportion between length of legs and size of body; between the thickness of fat and size of body, etc. A standard of this kind is rather easily grasped provided one has a concrete example of it, but any word description is always more or less incomplete and subject to different interpretations.

The models now in use are small, and can be taken anywhere for purposes of demonstration. They can be handled as much as one chooses and can be readily viewed from any angle. Finally, in making a model to illustrate a standard all conditions can be controlled. The advantages of this are many.

A grade standard represents uniform development in all respects or, in other words, uniform deviation from a certain point in all characteristics. In the case of hogs for example, there are six grades ranging from Prime to Cull. Good grade is the third from the top of the range and is the fourth from the bottom of the range. The standard for the

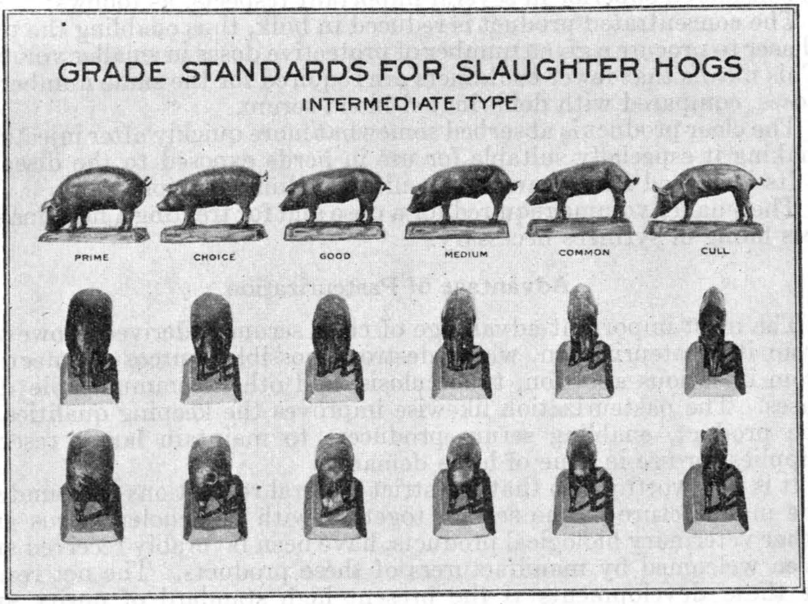


FIGURE 83.—Three views of six clay models illustrating standards for as many grades of intermediate-type slaughter hogs. Note how the bodies become narrower and shallower as they step down grade by grade from Prime to Cull. This means a decreasing proportion of edible flesh and an increasing proportion of bone. Note also a decrease in fat or finish from grade to grade which, within certain limits, means a decrease in tenderness, juiciness, and general palatability. (Models made by Justine A. Warner, Bureau of Agricultural Economics.)

Good grade therefore presupposes conformation that is three steps removed from the best and four steps above the poorest; it is likewise assumed that the finish in the standard for Good grade occupies a similar position in the scale of finish, and that the quality in the standard is similarly situated in the scale of quality.

In constructing a model this can easily be brought about, but in live animals it seldom, if ever, occurs. An animal usually is superior in certain respects and deficient in others. This fact offers little or no difficulty in grading, but it is a serious defect when the animal is used to represent a standard.

Artist's Collaboration Obtained

The value of models in presenting standards has long been appreciated, but it was thought that the services of a sculptor were required.

Collaboration between the livestock specialists and an artist worker in the Bureau of Agricultural Economics, however, recently resulted in an excellent set of clay models illustrating standards for six grades and three types of slaughter hogs. These were then used to make plaster casts which were painted to resemble live animals. (Fig. 83.)

Requests have been received from all parts of the country and from all branches of the swine industry for duplicate sets of the models. Shipping association managers and packer buyers expect to find them useful in maintaining uniformity in their grading and buying. Livestock market reporters find them an aid in reporting trade conditions and prices on a grade basis. Teachers and animal husbandry instructors plan to use the models in class work and in training judging teams. Presentation of standards by these models has attracted so much favorable comment that it is now planned to extend the scheme to cattle, sheep, and lambs.

C. E. Gibbons,
Senior Marketing Specialist,
Bureau of Agricultural Economics.

Hogs That Produce the Best Export Pork Also Make Good Domestic Cuts

The American consumer is gradually demanding pork products that contain a larger amount of lean in proportion to fat. This is a development in consumer preference that the producer should keep constantly in mind. In days gone by, the big lumber and railway-construction camps used large quantities of dry salt sides of pork, but those days are over. The laboring man of the past drew a small wage and was practically compelled to buy cheap cuts of meat, but now the laboring man draws a good wage and demands a much better quality of meat than formerly.

A different type of hog weighing much less at slaughter is now in favor. When dry salt sides of pork were wanted, the demand was for a hog with a slaughter weight of 300 pounds or more; but the present demand is for a hog with a slaughter weight of about 200 pounds, rather long, fairly deep, fairly well finished, and carrying a good proportion of lean meat.

Every outlet for his product is of value to the American pork producer; consequently, he should be keenly interested in the foreign demand for pork products. Several European countries are buyers of pork products from the United States, but the English market is probably the most discriminating and pays the best price when it gets its favorite cut, the Wiltshire, cured as it wants it. This cut is the whole side of the hog, except the head and feet, cured as one piece.

Experiment Station Results

For several years investigators of the department have been experimenting at the United States Range Livestock Experiment Station, Miles City, Mont., to determine the methods by which American hog raisers can produce satisfactory Wiltshire sides from their own breeds receiving the feeds commonly grown in this country.

As the Chester-White hog most nearly represents the Landrace hog of Denmark, which is used in that country in the production of Wilt-

Collaboration between the livestock specialists and an artist worker in the Bureau of Agricultural Economics, however, recently resulted in an excellent set of clay models illustrating standards for six grades and three types of slaughter hogs. These were then used to make plaster casts which were painted to resemble live animals. (Fig. 83.)

Requests have been received from all parts of the country and from all branches of the swine industry for duplicate sets of the models. Shipping association managers and packer buyers expect to find them useful in maintaining uniformity in their grading and buying. Livestock market reporters find them an aid in reporting trade conditions and prices on a grade basis. Teachers and animal husbandry instructors plan to use the models in class work and in training judging teams. Presentation of standards by these models has attracted so much favorable comment that it is now planned to extend the scheme to cattle, sheep, and lambs.

C. E. Gibbons,
Senior Marketing Specialist,
Bureau of Agricultural Economics.

HOGS That Produce the Best Export Pork Also Make Good Domestic Cuts The American consumer is gradually demanding pork products that contain a larger amount of lean in proportion to fat. This is a development in consumer preference that the producer should keep constantly in mind. In days gone by, the big lumber and railway-construction camps used large quantities of dry salt sides of pork, but those days are over. The laboring man of the past drew a small wage and was practically compelled to buy cheap cuts of meat, but now the laboring man draws a good wage and demands a much better quality of meat than formerly.

A different type of hog weighing much less at slaughter is now in favor. When dry salt sides of pork were wanted, the demand was for a hog with a slaughter weight of 300 pounds or more; but the present demand is for a hog with a slaughter weight of about 200 pounds, rather long, fairly deep, fairly well finished, and carrying a good proportion of lean meat.

Every outlet for his product is of value to the American pork producer; consequently, he should be keenly interested in the foreign demand for pork products. Several European countries are buyers of pork products from the United States, but the English market is probably the most discriminating and pays the best price when it gets its favorite cut, the Wiltshire, cured as it wants it. This cut is the whole side of the hog, except the head and feet, cured as one piece.

Experiment Station Results

For several years investigators of the department have been experimenting at the United States Range Livestock Experiment Station, Miles City, Mont., to determine the methods by which American hog raisers can produce satisfactory Wiltshire sides from their own breeds receiving the feeds commonly grown in this country.

As the Chester-White hog most nearly represents the Landrace hog of Denmark, which is used in that country in the production of Wiltshires, the Chester-White breed and the Yorkshire, which the Danes also use, were selected for this experiment. In the production of these hogs both the Chester-White and Yorkshire sows are bred to Chester-White boars and also to Yorkshire boars, resulting in four lots: Purebred Chester-White and Yorkshire pigs and crossbreds, both ways.

The hogs are fed and handled in very much the same manner as any good farmer would manage his hogs. They are full-fed barley and tankage and kept on alfalfa pasture from weaning until they reach about 200 pounds, live weight, when they are sent to market for slaughter.

The pigs raised from the spring litters of 1929 were slaughtered in Milwaukee, and a number of Wiltshires from each of the four lots were cured and sent to England for sale. There was some variation in the quality of the different sides in each lot and the prices showed this clearly. But the general results were highly satisfactory.

Representatives of the firm handling the shipment on the Liverpool market made the statement that the entire shipment was superior to any previous arrival of the same brand of Wiltshire received at that port, the type of hog being very much superior. They added:

> By this we mean long sides, leaner and quite equal to the best brands of Canadian bacon. We are delighted to see that the Government is taking such an interest in the future of the Wiltshire hog and we hope the production of this type will be considerably increased. We do feel there is a great future for American bacon provided you can get the farmers to produce the right type of bacon hog.

It is interesting to note that as good Wiltshires were produced from Chester Whites, a lard breed, as from Yorkshires, a bacon breed, and as from the crossbreds. Careful attention was given to the selection of breeding animals used in this experiment, but it is believed that equally as good results could be obtained from carefully selected individuals of any of the other lard breeds. Proper selection of the individual is of more importance than choice of breed.

In these experiments the investigators made domestic cuts from many of the carcasses, and it has been found that a hog making a good Wiltshire will also make a very satisfactory domestic cut. American hog men, therefore, with American hogs on American-grown feeds, can produce pork which will meet highest market favor both at home and abroad.

E. Z. Russell,
Senior Animal Husbandman, Bureau of Animal Industry.

HOME Demonstration Work is Democratic Education of Adults

Democracy in education is a fact in rural America. The United States Government and the rural woman have become partners in an endeavor of significance to all who are interested in physical, social, educational, and civic well-being. This principle of true democracy finds practical expression in home demonstration work, an endeavor whose objective is to make rural home and community life more satisfying and efficient.

Originally this service was conceived as a means of taking to rural home makers the vast accumulation of scientific facts which were in the possession of the United States Department of Agriculture and the experiment stations of the State colleges of agriculture, which would be of help to rural home makers.

shires, the Chester-White breed and the Yorkshire, which the Danes also use, were selected for this experiment. In the production of these hogs both the Chester-White and Yorkshire sows are bred to Chester-White boars and also to Yorkshire boars, resulting in four lots: Purebred Chester-White and Yorkshire pigs and crossbreds, both ways.

The hogs are fed and handled in very much the same manner as any good farmer would manage his hogs. They are full-fed barley and tankage and kept on alfalfa pasture from weaning until they reach about 200 pounds, live weight, when they are sent to market for slaughter.

The pigs raised from the spring litters of 1929 were slaughtered in Milwaukee, and a number of Wiltshires from each of the four lots were cured and sent to England for sale. There was some variation in the quality of the different sides in each lot and the prices showed this clearly. But the general results were highly satisfactory.

Representatives of the firm handling the shipment on the Liverpool market made the statement that the entire shipment was superior to any previous arrival of the same brand of Wiltshire received at that port, the type of hog being very much superior. They added:

> By this we mean long sides, leaner and quite equal to the best brands of Canadian bacon. We are delighted to see that the Government is taking such an interest in the future of the Wiltshire hog and we hope the production of this type will be considerably increased. We do feel there is a great future for American bacon provided you can get the farmers to produce the right type of bacon hog.

It is interesting to note that as good Wiltshires were produced from Chester Whites, a lard breed, as from Yorkshires, a bacon breed, and as from the crossbreds. Careful attention was given to the selection of breeding animals used in this experiment, but it is believed that equally as good results could be obtained from carefully selected individuals of any of the other lard breeds. Proper selection of the individual is of more importance than choice of breed.

In these experiments the investigators made domestic cuts from many of the carcasses, and it has been found that a hog making a good Wiltshire will also make a very satisfactory domestic cut. American hog men, therefore, with American hogs on American-grown feeds, can produce pork which will meet highest market favor both at home and abroad.

E. Z. Russell,
Senior Animal Husbandman, Bureau of Animal Industry.

Home Demonstration Work is Democratic Education of Adults

Democracy in education is a fact in rural America. The United States Government and the rural woman have become partners in an endeavor of significance to all who are interested in physical, social, educational, and civic well-being. This principle of true democracy finds practical expression in home demonstration work, an endeavor whose objective is to make rural home and community life more satisfying and efficient.

Originally this service was conceived as a means of taking to rural home makers the vast accumulation of scientific facts which were in the possession of the United States Department of Agriculture and the experiment stations of the State colleges of agriculture, which would be of help to rural home makers.

Gradually, however, enlarged objectives developed as the technically trained representatives of the colleges and the department realized the valuable contribution which these home makers could make in vitalizing the endeavors of these State and Federal institutions.

To-day, there is a mutual give-and-take relationship. The representatives of the colleges and the department meet with the rural home maker on a coordinate basis, the home economists contributing the latest information of the research laboratories, the home makers contributing the practical judgment born of sustained rural home-making experience, plus knowledge of rural conditions based upon actual participation as members of rural communities.

This present plan is a sound but belated recognition of the educational value of practical experience and judgment born of repeated endeavor.

As a result of this united effort, the programs and plans evolved are not only scientifically accurate but they are psychologically sound, being based upon the knowledge of local people as to the needs, desires, and abilities of their communities. Such procedure has assured interested local cooperation and participation.

The Procedure Followed

The procedure followed in counties in many States is as follows: Each year approximately 15 to 20 home makers who are members of local home demonstration groups are chosen as a county home committee. The women so chosen continue as members of local groups to learn from the home demonstration agent or specialist such improvements in home-making activities as are included in the year's program, but they have additional duties. They are evaluating local needs. They are objectively observing conditions in their own homes and in those of their neighbors; they are evaluating the quality of home equipment and supplies to be found in the local stores; they are questioning members of their home demonstration groups as to their interests; they are analyzing the social and civic satisfactions of the community as a whole. They are seeking the viewpoint of merchants, bankers, editors, and others as to home and community needs. If needed facts are missing they make surveys to obtain them.

From time to time, these women meet with the home demonstration agent to discuss their observations. Once a year they meet to decide formally upon the county-wide program for the ensuing year. The agent, too, has been making observations. The State leader of home demonstration work from the agricultural college, who is usually present at this program-planning meeting, has also been making observations of the county, less intensively but with more perspective.

The meeting is opened by the county chairman. Discussion is general and informal. Analysis of local conditions is first considered. This is followed by decision as to basic needs. There is further discussion in relation to the viewpoint of local home makers, merchants, and others. The practicability of each suggestion is weighed by the trained staff and the home makers, and finally there emerges a program which is vitally related to local conditions and interests and which is of immediate value to home makers throughout the county.

The selection of the program is but one part of the duties of this committee. They also help to determine practical ways and means of interesting large numbers of home makers to follow the suggestions to be recommended. As a means to this end, consideration is given to the possibility of local tours, window displays, circular letters, exhibits, contests, special meetings, and the like, and a complete plan of procedure is determined with delegated responsibilities assigned to all concerned.

Home Makers Participate in Organized Work

In addition to the plans for the content and procedure for the home demonstration program, this committee helps to plan means of interesting more women in regular participation in the organized endeavors of these rural home makers, and to strengthen the groups already formed. They visit local group meetings; they check the publicity given to the work by local newspapers; they endeavor to increase the activities of each local group to include one matter of interest to all members of the community; they urge groups to sponsor a 4-H girls' club. Thus the group serves as a general efficiency committee to aid the home demonstration agent so to plan that a maximum of service and opportunity is given to the rural home makers of the county.

The constructive results of this democratic plan are manifold. It has vitalized the interest of home makers, for the plan and the program are their own. It has challenged their judgment to know that their viewpoint is of vital concern in planning an educational program. It has aroused the interest of increasing numbers of women and caused them to participate in the work. It has stimulated them to keen, impersonal analysis of their homes and their communities. It has made local merchants and others recognize the practical nature of home demonstration work. It has humanized educational methods. It has challenged educators to know conditions and to offer practical solutions to meet recognized needs. It has helped the colleges of agriculture and the Department of Agriculture to know the basic problems toward which these agencies may direct their endeavors.

Theory and Practice United

It is an example of true democracy. There is give and take. There is adjustment of the logical theory of the trained staff to the practical conditions of everyday life; and there is the challenge to the home maker from the trained staff as to her interests, standards, and practices.

This plan is a stimulating challenge to all concerned. It is a step in vitalizing educational procedure which is making of education a thing to be desired by home makers and a profession second to none for the trained staff. For the State and Federal institutions it is an efficient means of determining upon wise procedure in bringing about a maximum of service in their expenditure of public funds.

Grace E. Frysinger,
Senior Home Economist,
Office of Cooperative Extension Work.

HONEY Has Many Possibilities of Use as Yet Undeveloped Honey production in the United States is estimated at 200,000,000 to 250,-000,000 pounds annually, valued at between $20,000,000 and $25,000,000. In some States, such as California, production of honey is a considerable industry.

Exports of honey to foreign countries during 1929[4] amounted to almost 12,000,000 pounds, valued at over $1,000,000. This figure compares favorably with exports of honey for the past 12 years, being higher than for any year except 1918, when approximately 16,000,000 pounds of honey valued at about $2,500,000 was exported. From 1921, when only 1,112,015 pounds of honey was exported, until 1930, the general trend of exports has been upward. However, exports of honey in 1930 decreased to approximately 6,500,000 pounds. This decrease is very probably due in large measure to the action taken by certain foreign countries in protecting their own honey industries against outside competition. Germany, for example, increased the duty on honey from 4⅓ cents a pound net to 7 cents a pound gross, effective December 31, 1929. Exports of honey to Germany in 1930 were considerably less than in 1929. In the past Germany has been the largest consumer of American honey.

During the past two or three years a number of shipments of American honey to Germany were penalized as a result of claims by German importers that the honey was deficient in diastase. Until recently very little attention has been given in this country to the presence of diastase and other enzymes in honey, although in Germany some importance appears to be attached to their presence. German investigators have assigned a definite physiological value to diastase and other enzymes of honey, and honey that is deficient in these enzymes (either naturally or as a result of heating) is considered as being no longer "genuine" and is regarded as a "denatured" product.

Honeys Tested for Diastase Content

A large number of samples of unheated American honeys have been examined for diastase content by the Carbohydrate Division of the Bureau of Chemistry and Soils. These samples represented a great variety of floral types, and were obtained from practically every honey-producing region of importance in the United States. The results of this investigation showed that the diastatic activity of honey of most of the types examined was quite high, comparing favorably with German honeys in this respect. Orange and alfalfa honeys showed low diastase values, even when unheated, although the honeys themselves were excellent in quality. With this information available it should be possible for exporters to make a more suitable selection of honey for foreign requirements.

Stimulation of domestic consumption of honey is needed, however, to counteract the effect of a decline in exportation. Honey has some valuable properties not possessed by other saccharine materials used as a substitute for it. The flavor of honey is a valuable asset that is not duplicated by other products of somewhat similar sugar content. With such a great variety of floral types from which to choose, interest-

[4] The years for which exports are given are in each instance fiscal years, i. e., the annual period beginning July 1 and ending June 30.

ing possibilities suggest themselves for utilizing the individuality of each flavor. Featuring honeys of approximately individual floral source offers an opportunity of extending consumption of honey. Many persons to whom blended honey does not appeal might find honey of some particular flavor to their liking. The fact that honey exhibits such a great diversity of attractive flavors is an asset that is only imperfectly utilized in blended honeys.

Uses of Dark Honey

While there is produced, especially in the South, a large quantity of dark honey of fine quality and flavor, there are also produced in this country at the present time considerable quantities of honey the color and flavor of which restrict marketability for table purposes. This dark honey of inferior quality must be sold either in localities where people are accustomed to it, or to the baking trade. Large quantities of dark honey are used by baking concerns for increasing the retention of moisture by cakes and bread, thereby keeping these products soft and moist for longer periods of time. This effect is due to a great extent to the levulose present in honey, which, being extremely hygroscopic, has a pronounced effect in retarding the drying of baked goods. Furthermore, the hygroscopicity of the levulose is increased by certain nonsugar substances present in honey. The fact that honey usually contains a preponderance of the sugar levulose as compared with dextrose gives it a distinct advantage for use in baking and is a good illustration of the beneficial effect of certain specific constituents.

Difficulties arise in using honey for candy making, since many honeys possess poor cooking qualities. High temperature causes decomposition with resulting discoloration and off-flavor. Results of an investigation of various nonsugar constituents of honey being conducted by the Carbohydrate Division of the Bureau of Chemistry and Soils indicate that these substances have considerable influence on the behavior of honey when heated. Honey treated by a new and simple process whereby a large proportion of the colloidal substances in it are flocculated and removed showed considerable improvement in its ability to withstand elevated temperatures as shown by candy tests. These results promise to lead to a method of treatment of honey that will make it more suitable for use in candy making and for similar purposes, where heating to moderately high temperatures is required. It is to be understood, of course, that such treatment is applicable only to honey which is to be used for purposes for which heating to a fairly high temperature is required and that it is not needed for honey intended for table use.

Additional Research Necessary

There is also need for additional information on the suitability of honeys of various floral types for use in candy and for similar purposes. More honey could probably be used in this way if the manufacturer were certain that he could always obtain honey of suitable quality. Owing to the great variability of honey from different floral sources, considerable study will be required to reveal the underlying causes for the difference in behavior. Recent investigations of the nonsugar compounds present in honey and the effect of their removal on color and flavor promise to result in a method of treatment whereby some low-grade honeys can be converted into honeys suitable for table consumption.

In conclusion, it is believed that increased knowledge regarding the constituents of honeys of various types and the way in which they influence the suitability of honey for different specific purposes will lead to a greater appreciation of the merits of honey as a constituent of other foods and will point the way to its more extensive use in a number of food industries.

R. E. LOTHROP,
Assistant Chemist, Bureau of Chemistry and Soils.

HONEY Production in Mountain States Favored by Local Conditions The intermountain region is one of the important honey-producing regions of the United States. Many carloads of honey are shipped each year to both the eastern and Pacific coast markets as well as to foreign countries, only a very small part of the crop, up till 1930 at least, having been consumed locally. There is considerable demand for this honey, particularly for the honey-bottling trade, because of its uniformly fine qualities, such as light color, heavy body, and flavor due to type and purity of nectar source.

This region comprises primarily the States of Colorado, Wyoming, Montana, Idaho, and Utah, and parts of Nevada, although western Nebraska and the Dakotas, eastern Washington, and eastern Oregon should also be considered in this connection because in them a similar type of honey is produced. The main part of the region is traversed from north to south by the Rocky Mountains. There are many fertile valleys throughout the mountainous sections, while to the east is the Great Plains area crossed by numerous rivers having their sources in the mountains. The altitude of the various honey-producing centers varies from about 2,300 feet in parts of Idaho to 7,700 feet in the San Luis Valley of Colorado, with a large part of the region averaging around 1 mile above sea level.

Notwithstanding the differences in altitude, the rainfall is nowhere great, but is more or less variable owing to the effect of the mountain formations. It ranges from 6 or 7 inches annually in parts of Colorado and Wyoming to 18 or 20 inches in parts of Montana, but with a large part of the region averaging only from 10 to 15 inches. For this reason the agriculture of the region is almost entirely dependent upon irrigation for moisture, the water being obtained from streams arising in the mountains and fed by melting snow. Therefore the honey-producing areas of the various States are practically delineated by the irrigation projects. However, although the amount of rainfall is low and the air of the region is quite uniformly dry, the conditions are most favorable for nectar secretion where water is available because of the fertile soil, the high percentage of sunshine, and the fact that in these high altitudes there is sufficient variation between day and night temperatures to insure abundant nectar secretion.

Beekeeping Industry on Commercial Basis

Honey production is one of the well-recognized agricultural industries in this region. (Figs. 84 and 85.) A great majority of the bee-low-grade honeys can be converted into honeys suitable for table consumption.

In conclusion, it is believed that increased knowledge regarding the constituents of honeys of various types and the way in which they influence the suitability of honey for different specific purposes will lead to a greater appreciation of the merits of honey as a constituent of other foods and will point the way to its more extensive use in a number of food industries.

R. E. Lothrop,
Assistant Chemist, Bureau of Chemistry and Soils.

Honey Production in Mountain States Favored by Local Conditions

The intermountain region is one of the important honey-producing regions of the United States. Many carloads of honey are shipped each year to both the eastern and Pacific coast markets as well as to foreign countries, only a very small part of the crop, up till 1930 at least, having been consumed locally. There is considerable demand for this honey, particularly for the honey-bottling trade, because of its uniformly fine qualities, such as light color, heavy body, and flavor due to type and purity of nectar source.

This region comprises primarily the States of Colorado, Wyoming, Montana, Idaho, and Utah, and parts of Nevada, although western Nebraska and the Dakotas, eastern Washington, and eastern Oregon should also be considered in this connection because in them a similar type of honey is produced. The main part of the region is traversed from north to south by the Rocky Mountains. There are many fertile valleys throughout the mountainous sections, while to the east is the Great Plains area crossed by numerous rivers having their sources in the mountains. The altitude of the various honey-producing centers varies from about 2,300 feet in parts of Idaho to 7,700 feet in the San Luis Valley of Colorado, with a large part of the region averaging around 1 mile above sea level.

Notwithstanding the differences in altitude, the rainfall is nowhere great, but is more or less variable owing to the effect of the mountain formations. It ranges from 6 or 7 inches annually in parts of Colorado and Wyoming to 18 or 20 inches in parts of Montana, but with a large part of the region averaging only from 10 to 15 inches. For this reason the agriculture of the region is almost entirely dependent upon irrigation for moisture, the water being obtained from streams arising in the mountains and fed by melting snow. Therefore the honey-producing areas of the various States are practically delineated by the irrigation projects. However, although the amount of rainfall is low and the air of the region is quite uniformly dry, the conditions are most favorable for nectar secretion where water is available because of the fertile soil, the high percentage of sunshine, and the fact that in these high altitudes there is sufficient variation between day and night temperatures to insure abundant nectar secretion.

Beekeeping Industry on Commercial Basis

Honey production is one of the well-recognized agricultural industries in this region. (Figs. 84 and 85.) A great majority of the beekeepers are commercial honey producers, deriving their chief income from this source. Most of the honey produced is in the form of extracted honey, although there still are some sections, notably parts of Idaho, where considerable comb honey is produced.

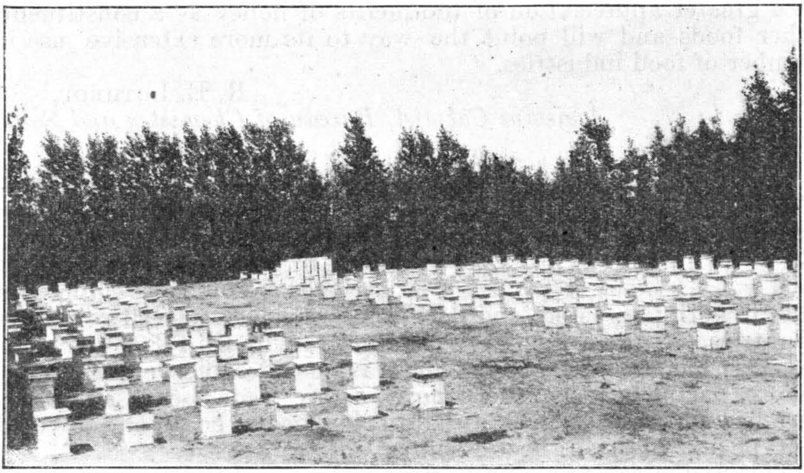


FIGURE 84.—A well-located Wyoming apiary surrounded by an excellent windbreak

The outstanding characteristics of the honey from the Intermountain States are its uniform delicate flavor, light color, fine texture, and heavy body. Practically all of the honey from these States and from parts of the surrounding States is derived from alfalfa and sweet clover. Alfalfa is one of the principal crops of the irrigated sections, while

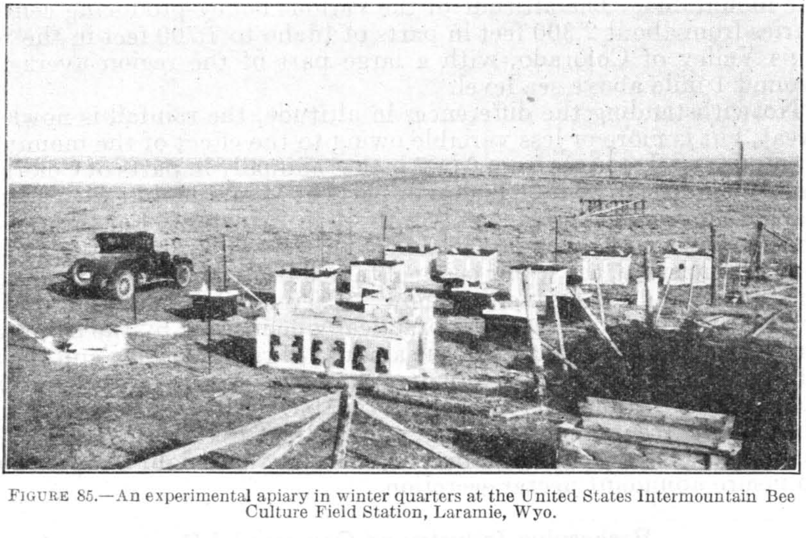


FIGURE 85.—An experimental apiary in winter quarters at the United States Intermountain Bee Culture Field Station, Laramie, Wyo.

sweetclover thrives in abundance along the ditch banks and near-by waste places where not actually grown as a seed or forage crop. Dandelion and fruit bloom serve as excellent stimulating sources for the bees in the spring, but the surplus from these does not produce good commercial honey. Other sources of nectar are negligible, and in most cases the bees will desert other plants to work on the alfalfa and sweetclover when they come into bloom. This accounts for the purity of flavor and color of the honey from this region.

Another characteristic of alfalfa and sweetclover honeys is the rapidity with which they granulate and the fine texture of the granulation when the honey has not been heated sufficiently to retard the process. This granulation presumably is due, at least in part, to the fact that there is a slightly higher percentage of dextrose than levulose in these honeys. Granulation is an advantage for extracted honey, particularly where the honey has to be shipped long distances.

ARNOLD P. STURTEVANT,
Associate Apiculturist, Bureau of Entomology.

HORTICULTURAL Practice Greatly Changed in Last Quarter Century A 25-year period is a short space of time, relatively, by which to measure fundamental changes in an art that is as old as the human race, yet within that period science and the application of sound business principles have effected some notable changes in horticulture.

In orcharding, pruning practices and the use of fertilizers have undergone great changes as a direct result of scientific investigation. Though these two operations are very diverse, they have close relationships in their effect on the nutritional condition of the tree, especially with respect to stored-up food supplies within the tree. The plant physiologist, by means of biochemical methods, has found out something about what the tree does under different conditions as affected by pruning and feeding; he has determined the plant-food content of fruit spurs and twigs and its relation to fruit-bud formation and the setting and development of fruit; also that these factors may be decidedly influenced both by pruning and by fertilizing.

In line with the earlier understanding of pruning principles, the regular pruning for young fruit trees consisted of severely heading them back each year, in the belief that it made them stocky and well-branched. But such pruning, as a rule, undoubtedly delayed by years the time when the trees came into bearing; and if summer pruning was done, the expected resultant formation of fruit buds was more likely than otherwise not to be realized.

It is now known that heavy cutting back of the annual growth of young trees removes large quantities of stored-up plant-food materials otherwise available in the future development of the tree and that in summer pruning the removal of a large amount of leaf surface commonly deprives the tree of needed food-elaborating apparatus just when it is required for the proper functioning of the tree. The practical effect of this newer knowledge of the physiology of tree growth has been to reduce the pruning of young trees to the minimum consistent with corrective training.

In close relationship with this is the matter of food requirements and supplies as affected by the application of commercial plant foods. The present understanding of such requirements involves the practice now widely followed in the regular use of quickly available forms of nitrogen at certain periods in the season. Earlier teachings cautioned against the use of nitrogen except very sparingly.

commercial honey. Other sources of nectar are negligible, and in most cases the bees will desert other plants to work on the alfalfa and sweetclover when they come into bloom. This accounts for the purity of flavor and color of the honey from this region.

Another characteristic of alfalfa and sweetclover honeys is the rapidity with which they granulate and the fine texture of the granulation when the honey has not been heated sufficiently to retard the process. This granulation presumably is due, at least in part, to the fact that there is a slightly higher percentage of dextrose than levulose in these honeys. Granulation is an advantage for extracted honey, particularly where the honey has to be shipped long distances.

ARNOLD P. STURTEVANT,
Associate Apiculturist, Bureau of Entomology.

HORTICULTURAL Practice Greatly Changed in Last Quarter Century A 25-year period is a short space of time, relatively, by which to measure fundamental changes in an art that is as old as the human race, yet within that period science and the application of sound business principles have effected some notable changes in horticulture.

In orcharding, pruning practices and the use of fertilizers have undergone great changes as a direct result of scientific investigation. Though these two operations are very diverse, they have close relationships in their effect on the nutritional condition of the tree, especially with respect to stored-up food supplies within the tree. The plant physiologist, by means of biochemical methods, has found out something about what the tree does under different conditions as affected by pruning and feeding; he has determined the plant-food content of fruit spurs and twigs and its relation to fruit-bud formation and the setting and development of fruit; also that these factors may be decidedly influenced both by pruning and by fertilizing.

In line with the earlier understanding of pruning principles, the regular pruning for young fruit trees consisted of severely heading them back each year, in the belief that it made them stocky and well-branched. But such pruning, as a rule, undoubtedly delayed by years the time when the trees came into bearing; and if summer pruning was done, the expected resultant formation of fruit buds was more likely than otherwise not to be realized.

It is now known that heavy cutting back of the annual growth of young trees removes large quantities of stored-up plant-food materials otherwise available in the future development of the tree and that in summer pruning the removal of a large amount of leaf surface commonly deprives the tree of needed food-elaborating apparatus just when it is required for the proper functioning of the tree. The practical effect of this newer knowledge of the physiology of tree growth has been to reduce the pruning of young trees to the minimum consistent with corrective training.

In close relationship with this is the matter of food requirements and supplies as affected by the application of commercial plant foods. The present understanding of such requirements involves the practice now widely followed in the regular use of quickly available forms of nitrogen at certain periods in the season. Earlier teachings cautioned against the use of nitrogen except very sparingly.

Changes in insect and disease control have occurred both in insecticides and fungicides and in spraying equipment, but they have been less revolutionary than changes in many other aspects of horticulture.

Breeding and Selection

In the improvement of horticultural varieties by breeding and selection the period covered by this article has witnessed material advancement. While most horticultural varieties of fruits originated as chance seedlings, the planting of selected seeds with a view to obtaining better varieties was both advocated and practiced many years ago, but the principles of plant breeding and heredity were not then understood. In fact, the whole science of plant breeding is new. During the period under consideration great advancement has been made through the application of the laws of genetics, though most of the results are still too new to be as yet fully appraised.

Some of the striking improvements of varieties by breeding are in the field of olericulture and in the direction of disease resistance—for example, the Washington strains of asparagus, which are resistant to rust; disease-resistant tomato varieties that have superseded older sorts susceptible to wilt and other diseases; cabbage varieties resistant to yellows; and new lettuce varieties that have contributed largely to the vast expansion of a regional industry.

Fruit improvement by bud selection has been carried far in recent years. Prior to 20 years ago little attention was given to the bud variations or mutations occasionally seen in fruit trees. Their significance for "weal or woe" was not recognized. The fact that bud variations occur on fruit trees (perhaps more often than is commonly realized) has been established; also the fact that such variations are perpetuated in progeny trees propagated from them. These mutations may represent either much of value or utter worthlessness.

Very much the same idea is involved in the seed potato improvement plan which in recent years has become generally adopted in the commercial potato-growing regions of the country. It recognizes superior yielding strains within the variety. In many cases the superiority is in the absence of virus diseases which deplete the vigor of the plants. Such strains may be "certified" by properly constituted authorities. The use of certified seed by the growers has undoubtedly been by far the most potent factor in increasing the average acre yield of potatoes for the country by nearly 20 bushels since about 1900.

Self-sterility or self-unfruitfulness in fruit varieties has become recognized within the last 20 or 25 years as a basic orchard problem of far-reaching purport. Though much research work remains to be done in this field, the fact is now widely recognized that cross-pollination for fruitfulness is the rule rather than the exception in the majority of tree fruit varieties.

Influence of Rootstocks

In the matter of rootstocks used in propagating fruit trees and other plants, the conception, long prevailing, to the effect that the stock as a rule had little or no influence on the characteristics of the top has largely given place to the view that the rootstock greatly influences the top and its behavior. Much effort is being put forth to find better stocks. The use by commercial propagators of domestically grown fruit stocks in place of imported stocks is in rather rapid transition.

Improved roads and motor-truck transportation have done much to eliminate the distance factor in the geography of production. Formerly a grower of perishable crops who was more than 4 or 5 miles from market or shipping station was seriously handicapped. Now transportation of horticultural products 50 or 100 miles or more by motor truck is not unusual. Adequate transportation facilities and other agencies have made possible the winter-garden industry whereby tomatoes, lettuce, peas, snap beans, and other vegetables are grown in extensive quantities in some of the warmer sections such as southern Florida, southern Texas, and the Imperial Valley in southern California, not to mention the development on the west coast in Mexico, and supplied fresh to the markets of the country throughout the winter months. The extensive growing of other crops in some of these sections is in reality a part of the same enterprise; for instance, the thousands of carloads of muskmelons produced annually in the Imperial Valley. Not only has the geography of production been changed, but meanwhile the greenhouse industry in which some of these winter-garden crops were grown under glass in the North has undergone considerable modification.

Roadside marketing as a real factor in the disposal of horticultural commodities has largely come during the past decade. It may be noted in passing that many thousands of dollars in the aggregate are invested in roadside marketing facilities, and hundreds of thousands of dollars worth of produce are sold annually from roadside stands.

Ornamental horticulture has experienced marked expansion in some directions in recent years, while other fundamental changes in horticulture have been made and are still taking place.

H. P. Gould,
Senior Pomologist, Bureau of Plant Industry.

ICE-WELL Refrigeration for Dairy Farms Works Well at Mandan, N. Dak. Ice wells for cooling and storing milk and cream on the farm may be a satisfactory solution of the refrigeration problem on many dairy farms where the usual methods are too expensive or impracticable.

The ice-well "refrigerator" consists primarily of a pit in the ground in which a large solid cake of ice is formed by running a small quantity of water into the hole daily during freezing weather. The method has been tried to some extent on dairy farms in Canada, but no information regarding its adaptation in the United States had heretofore been available.

Following closely the plans suggested by the Saskatchewan Department of Agriculture, the Bureau of Dairy Industry, in cooperation with the North Dakota Agricultural College, constructed an ice well in the fall of 1928 at the United States Dairy Experiment Station at Mandan, N. Dak., to test the possibilities of the method under conditions there.[5] (Fig. 86.)

On a well-drained spot near the milk house and convenient to a well a pit was dug 8 feet square and 9½ feet deep. The sides were boarded up with cheap lumber and the bottom covered to a depth of 1½ feet

[5] A. L. Watt, superintendent of the U. S. Dairy Experiment Station at Mandan, N. Dak., collected the data presented here.

Improved roads and motor-truck transportation have done much to eliminate the distance factor in the geography of production. Formerly a grower of perishable crops who was more than 4 or 5 miles from market or shipping station was seriously handicapped. Now transportation of horticultural products 50 or 100 miles or more by motor truck is not unusual. Adequate transportation facilities and other agencies have made possible the winter-garden industry whereby tomatoes, lettuce, peas, snap beans, and other vegetables are grown in extensive quantities in some of the warmer sections such as southern Florida, southern Texas, and the Imperial Valley in southern California, not to mention the development on the west coast in Mexico, and supplied fresh to the markets of the country throughout the winter months. The extensive growing of other crops in some of these sections is in reality a part of the same enterprise; for instance, the thousands of carloads of muskmelons produced annually in the Imperial Valley. Not only has the geography of production been changed, but meanwhile the greenhouse industry in which some of these winter-garden crops were grown under glass in the North has undergone considerable modification.

Roadside marketing as a real factor in the disposal of horticultural commodities has largely come during the past decade. It may be noted in passing that many thousands of dollars in the aggregate are invested in roadside marketing facilities, and hundreds of thousands of dollars worth of produce are sold annually from roadside stands.

Ornamental horticulture has experienced marked expansion in some directions in recent years, while other fundamental changes in horticulture have been made and are still taking place.

H. P. Gould,
Senior Pomologist, Bureau of Plant Industry.

ICE-WELL Refrigeration for Dairy Farms Works Well at Mandan, N. Dak. Ice wells for cooling and storing milk and cream on the farm may be a satisfactory solution of the refrigeration problem on many dairy farms where the usual methods are too expensive or impracticable.

The ice-well "refrigerator" consists primarily of a pit in the ground in which a large solid cake of ice is formed by running a small quantity of water into the hole daily during freezing weather. The method has been tried to some extent on dairy farms in Canada, but no information regarding its adaptation in the United States had heretofore been available.

Following closely the plans suggested by the Saskatchewan Department of Agriculture, the Bureau of Dairy Industry, in cooperation with the North Dakota Agricultural College, constructed an ice well in the fall of 1928 at the United States Dairy Experiment Station at Mandan, N. Dak., to test the possibilities of the method under conditions there.[5] (Fig. 86.)

On a well-drained spot near the milk house and convenient to a well a pit was dug 8 feet square and 9½ feet deep. The sides were boarded up with cheap lumber and the bottom covered to a depth of 1½ feet

---

[5] A. L. Watt, superintendent of the U. S. Dairy Experiment Station at Mandan, N. Dak., collected the data presented here.

with coarse gravel to insure good drainage. A small house was built over the pit. (Fig. 87.) The floor was of two thicknesses of planking with building paper between the layers, and it was built in sections to permit easy removal during freezing weather. Windows in the house provided air circulation in the winter, but were closed during the summer. A wooden rack or basket suspended from a pulley overhead served for raising and lowering the cans of cream and other food products held in storage. (Fig. 88.)

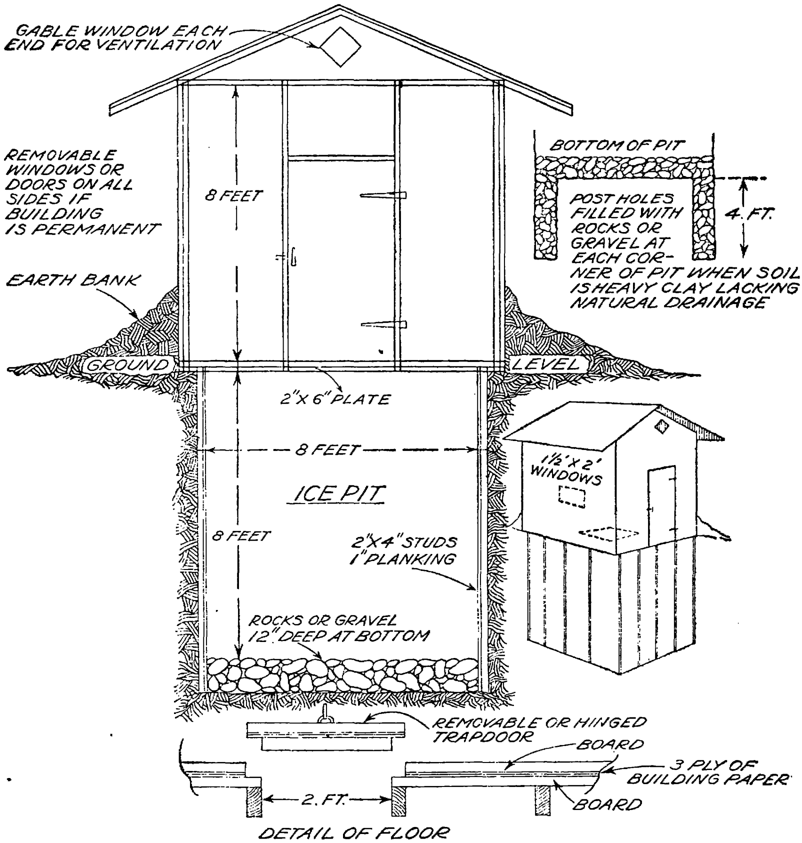


FIGURE 86.—Details of ice well and shelter building. There seems to be no reason why the well can not be of any size that is practical; the measurements above are only suggested

Freezing was started in January, 1929. Two to four gallons of water were run into the pit each day and allowed to freeze until a layer of ice was started. Some difficulty was experienced in getting the first layer of ice to form because the water drained out rapidly. After the formation of the first layer sufficient water was added each day to make a layer of ice from 1 to 3 inches thick, depending upon the outside temperature. By the end of February a solid cake of ice 8 feet square and 6½ feet deep had formed. When freezing weather was over, the house was closed tightly and the floor replaced.

Mean Winter Temperatures

The mean average temperature in this vicinity for January and February was $-2.9°$ and $4.6°$ F., respectively. The highest temperature for the two months was 38°, and the lowest was $-43°$.

Storage of cream was started May 25 and the ice lasted until September 28, a period of 126 days.

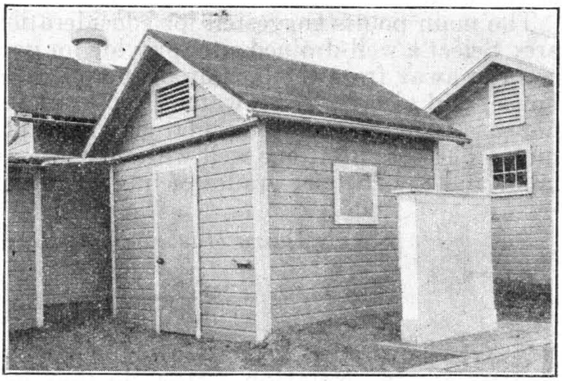


FIGURE 87.—Shelter house over ice well. Doors and windows are kept open in freezing weather and closed as much of the time as possible in summer. The scales at right had no part in the ice-well experiments

Careful records were kept throughout the summer. Cream cooled with well water to 56.5° F. and placed in the rack in the pit at 8.30 a. m. was cooled to 48° within three hours and to 42° by 4.30 p. m. Cream in cans placed directly on the ice was cooled to 34° in the same period. Cream was kept perfectly sweet for 14 days in July, the hottest part of the summer. The cream was in small lots, varying from 20 to 25 pounds. The temperature in the pit an inch above the ice varied from 32° to 42°. Six inches above the ice it varied from 44° to 50°; and a foot above the ice the temperature was never higher than 50°.

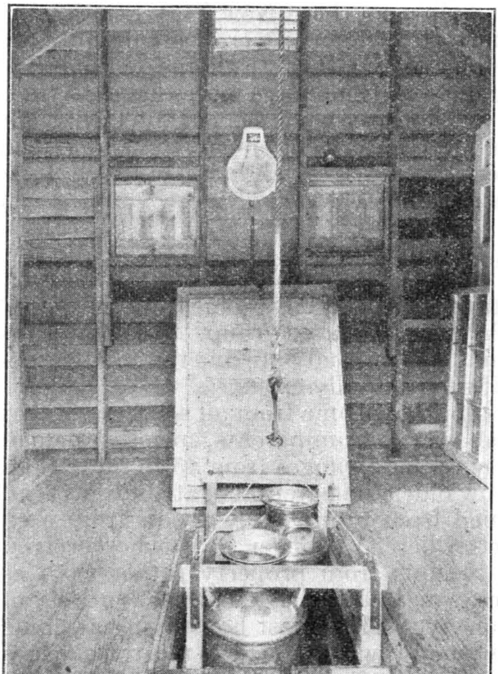


FIGURE 88.—Inside of the shelter house over the ice well. Note opening through floor leading to pit. Milk cans, on rack, are being lowered to the ice in the well. On the wall is the dial of the self-recording thermometer, which kept a record of the temperatures in the well

The mean average temperature for this locality for June, July, and August was 62.9°, 73.6°, and 70.6° F., respectively. The highest recorded temperature for the three months was 106°, in July. On 14 days in July and 10 days in August the maximum temperature was 90° or higher.

Meat, fruit, and vegetables, as well as milk and cream, were stored in the pit and kept perfectly. No offensive odors were detected at any time throughout the summer in the well or in any of the stored products.

The results seem to indicate that the ice well will prove to be a satisfactory means of refrigeration on many farms in the regions having sufficiently low temperatures for the freezing of ice in winter. The work is being continued, with some slight variations in the construction of the well.

The main points suggested for consideration in building an ice well are: Select a well-drained site; provide for good drainage, so the water can run away from the bottom of the pit; locate the pit near the milk house, and also near the water supply; and see that the floor of the house is tight, so the air circulation will be at a minimum in the summer. The cost of an ice well will vary, of course, but by using home labor and the cheaper grades of lumber it can be very low.

J. R. Dawson,
Senior Dairy Husbandman, Bureau of Dairy Industry.

INCOME of Farm Boys Studied in Relation to 4-H Club Activity How much money do farm boys have? How do they get it? What do they do with it? Do 4-H club members have a more favorable economic standing than nonclub members in a community? These and other questions are answered in a recent study made in a southern New York State dairy region.[6] Two hundred and thirty-two families were visited and data obtained for 304 boys 10 to 20 years of age, living at home on the farm. Boys living at home but working away from home more than half time were not included in the study. Thirty-six per cent of the boys were 4-H club members; 33 per cent were former club members; and 31 per cent had never belonged to the 4-H clubs. Two hundred and five were 15 to 20 years of age, and 99 were 10 to 14 years of age.

Amount and Source of Income

The fact that a large percentage of the 4-H boys come from the better families might indicate that they are a selected group. It is not probable that all the differences found by the study are due to the superiority of 4-H families, however, if such actually exists.

If all boys are taken as a group, the income from all sources—wages received for definite services, allowance from parents, spending money given by parents, and property owned—ranges from $5 to more than $500 per boy. As the boys grow older the parental contributions tend to decrease, and more is earned from property owned or from cash wages received at home or elsewhere. Younger boys who received higher incomes got them as receipts from property rather than as wages. The source of incomes over $400 consisted almost entirely of the boys' own produce or property. Thus most boys living at home and working away part of the time for wages, or boys receiving wages at home, did not receive as large incomes as most of the boys who got receipts from their own property.

---

[6] Beers, Howard W. The money income of farm boys in a southern New York dairy region. Thesis. Cornell Univ. 1929.

The results seem to indicate that the ice well will prove to be a satisfactory means of refrigeration on many farms in the regions having sufficiently low temperatures for the freezing of ice in winter. The work is being continued, with some slight variations in the construction of the well.

The main points suggested for consideration in building an ice well are: Select a well-drained site; provide for good drainage, so the water can run away from the bottom of the pit; locate the pit near the milk house, and also near the water supply; and see that the floor of the house is tight, so the air circulation will be at a minimum in the summer. The cost of an ice well will vary, of course, but by using home labor and the cheaper grades of lumber it can be very low.

J. R. Dawson,
Senior Dairy Husbandman, Bureau of Dairy Industry.

INCOME of Farm Boys Studied in Relation to 4-H Club Activity How much money do farm boys have? How do they get it? What do they do with it? Do 4-H club members have a more favorable economic standing than nonclub members in a community? These and other questions are answered in a recent study made in a southern New York State dairy region.[6] Two hundred and thirty-two families were visited and data obtained for 304 boys 10 to 20 years of age, living at home on the farm. Boys living at home but working away from home more than half time were not included in the study. Thirty-six per cent of the boys were 4-H club members; 33 per cent were former club members; and 31 per cent had never belonged to the 4-H clubs. Two hundred and five were 15 to 20 years of age, and 99 were 10 to 14 years of age.

Amount and Source of Income

The fact that a large percentage of the 4-H boys come from the better families might indicate that they are a selected group. It is not probable that all the differences found by the study are due to the superiority of 4-H families, however, if such actually exists.

If all boys are taken as a group, the income from all sources—wages received for definite services, allowance from parents, spending money given by parents, and property owned—ranges from $5 to more than $500 per boy. As the boys grow older the parental contributions tend to decrease, and more is earned from property owned or from cash wages received at home or elsewhere. Younger boys who received higher incomes got them as receipts from property rather than as wages. The source of incomes over $400 consisted almost entirely of the boys' own produce or property. Thus most boys living at home and working away part of the time for wages, or boys receiving wages at home, did not receive as large incomes as most of the boys who got receipts from their own property.

---

[6] Beers, Howard W. The money income of farm boys in a southern New York dairy region. Thesis. Cornell Univ. 1929.

TABLE 8.—*The money income of 99 farm boys, age 10 to 14, and 205 farm boys, age 15 to 20, Chenango and Otsego Counties, N. Y., 1929*

Money income for one year (dollars)	Boys 10 to 14 years of age	Boys 15 to 20 years of age	Percentage of boys 10 to 14 years of age	Percentage of boys 15 to 20 years of age
	Number	*Number*		
0–24	57	15	58	7
25–49	23	29	23	14
50–74	13	42	13	21
75–99	1	25	1	12
100–199	0	11	0	5
200–299	1	24	1	12
300–399	0	11	0	5
400 and over	1	21	1	10
Total	99	205	100	100

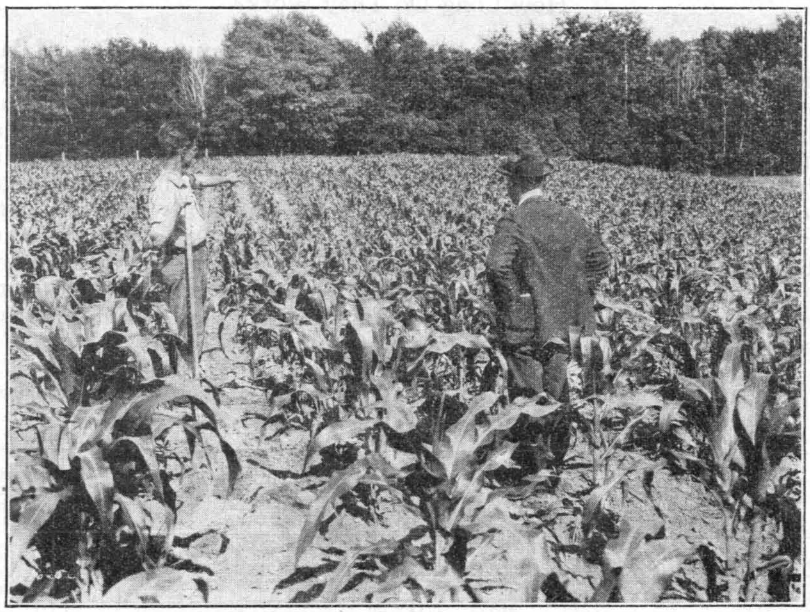


FIGURE 89.—Club boy showing his field of corn from which he made a profit

Spending money given at irregular intervals by parents is the source of income for 56 per cent of all the boys, and wages earned from home is the source of income for 21 per cent. A decreasing importance of spending money and an increasing importance of income from property exists among the 4-H membership, especially for boys under 15. Thus 4-H club members have to earn and handle and expend money at an earlier age than nonclub boys. Both present and former club members had more property than nonmembers. The average property value for all boys was $95. Boys connected with junior extension or 4-H club work have more savings than nonmembers, and these varied with income.

How is the Money Used?

Fifty-three per cent of the boys had no responsibility for their own clothing, school expense, and spending money. Seventeen per cent of all boys were responsible for all clothing and school expense and spending money, and 19 per cent were responsible for part of these expenses. As the farm boy's money income is increased he assumes responsibility for more and more expenditures that have to be made for his clothing, schooling, and other needs.

Only 3 per cent of the boys were responsible for spending money alone! This fact reverses the common notion that if a boy has money the first items of expense he is responsible for are items calling for spending money. These farm boys are responsible for spending money only when they are also responsible for other items of expense.

On the whole, the boys who had the highest independent incomes were most decidedly favorable to farming as a vocation. Where father-son partnerships were known, other fathers were initiating similar partnerships in these communities.

How Long Do They Work?

On the average the boys under 15 worked 2.27 hours per school day, and those over 15 worked 2.96 hours per school day. The figures for city boys, from a study [7] made in Lincoln, Nebr., in 1928, show that they spent 43 minutes per day in work at home and 47 minutes per day in work for pay. Those boys who worked more than an hour per day were near the average of school attainment, whereas those working an hour or less were in higher school grades. The study indicates that school advancement limits the amount of farm work done rather than that farm work retards school attainment. The boys on farms of better economic status tended to work more than boys on farms of poorer economic status; and those on dairy farms, particularly grade A farms, worked more than boys on nondairy farms.

TABLE 9.—*Relation of age to work done by 237 farm boys in school, Chenango and Otsego Counties, N. Y., 1929*

Age of boys (years)	Number	Average months of labor	Age of boys (years)	Number	Average months of labor
10–11	35	3.08	17	12	6.00
12	18	3.66	18	18	6.77
13	21	4.66	19	8	6.75
14	24	5.12	20	4	4.75
15	55	5.61			
16	42	5.69	Total and average	237	5.10

The Fathers' Incomes When Boys

None of the fathers reported having received allowances when boys, and only five received any kind of wages before they were 21. Seven reported having had a share in the farm business, and two had property of their own from which they derived an income. The remainder of the 272 fathers received any money they had, or spending money, at irregular intervals for special occasions.

The significant facts of this study indicate that 4-H club work tended to influence the way in which boys received their money income, increasing with the importance of the boys' own property and decreasing

[7] COOK, J. M., and GOODRICH, T. V. HOW HIGH-SCHOOL PUPILS SPEND THEIR TIME. School Review, v. 36, p. 771. Dec. 8, 1924.

the importance of wages and spending money received from parents. Club work tended to increase the size of the money income and the amount of property owned by boys and exerted a positive influence upon the size of the savings.

Thus this one bit of research tends to substantiate one of the fundamental objectives of 4-H club work—that of aiding farm youth to solve satisfactorily their most pressing economic problems to the end of better living. Each boy who, through property ownership, learns to earn, invest, and save money wisely has acquired a training that is the basis of good citizenship.

ROBERT G. FOSTER,
Senior Agriculturist, Office of Cooperative Extension Work.

INCOMES from Farms in the Appalachian Region Added to in Many Ways

When incomes from farming in the up lands of the Appalachian region are compared with those in more favored farming regions of the United States, farm families within the Applachian region apparently are at a considerable disadvantage.

Farm business studies for 1926 and 1927 on 959 farms located within the Appalachian upland region of Ohio, West Virginia, Kentucky, and North Carolina, were made in cooperation with the agricultural experiment stations of the respective States. Data obtained show sales of farm products, including inventory changes, averaging $630 per farm. Of this amount $236 were left for family living, savings, and other expenditures after deducting expenses of operating the farm, excluding any charge for unpaid family labor. Similar data for 1,102 farms in Illinois for 1927 show sales of $4,067 per farm, with $2,307 left for family living, savings, and other expenditures.

As figures such as these become available from studies in localities within the upland Appalachian region, the question is often asked, "How do these people live?"

Probably the families in the aggregate accept lower standards of living as measured in the number of dollars spent than do those in better agricultural regions, but their standards are not so low as is indicated by the amount of money available through the sales of farm products alone.

Data for 503 farm families within the Appalachian upland region of Ohio and Kentucky for 1926 and 1927 show that these families spent an average of $448 annually for their living, while comparative data for 1,557 families in more favored agricultural regions show an annual expenditure of $961 per family. The average amount from the sales of farm products available to the 503 families for family living and other expenditures was $272, or a deficit of $176 in meeting their cost of living.

Other Sources of Income

These families, like other families of the United States, endeavor to piece out their incomes to have more money to spend or to save. Many of the farmers and frequently other members of the family contribute to the income in ways other than from the sales of farm products. It can not be supposed, of course, that on the whole and year after year their expenditures exceed their incomes. As a matter of the importance of wages and spending money received from parents. Club work tended to increase the size of the money income and the amount of property owned by boys and exerted a positive influence upon the size of the savings.

Thus this one bit of research tends to substantiate one of the fundamental objectives of 4-H club work—that of aiding farm youth to solve satisfactorily their most pressing economic problems to the end of better living. Each boy who, through property ownership, learns to earn, invest, and save money wisely has acquired a training that is the basis of good citizenship.

ROBERT G. FOSTER,
Senior Agriculturist, Office of Cooperative Extension Work.

INCOMES from Farms in the Appalachian Region Added to in Many Ways

When incomes from farming in the uplands of the Appalachian region are compared with those in more favored farming regions of the United States, farm families within the Applachian region apparently are at a considerable disadvantage.

Farm business studies for 1926 and 1927 on 959 farms located within the Appalachian upland region of Ohio, West Virginia, Kentucky, and North Carolina, were made in cooperation with the agricultural experiment stations of the respective States. Data obtained show sales of farm products, including inventory changes, averaging $630 per farm. Of this amount $236 were left for family living, savings, and other expenditures after deducting expenses of operating the farm, excluding any charge for unpaid family labor. Similar data for 1,102 farms in Illinois for 1927 show sales of $4,067 per farm, with $2,307 left for family living, savings, and other expenditures.

As figures such as these become available from studies in localities within the upland Appalachian region, the question is often asked, "How do these people live?"

Probably the families in the aggregate accept lower standards of living as measured in the number of dollars spent than do those in better agricultural regions, but their standards are not so low as is indicated by the amount of money available through the sales of farm products alone.

Data for 503 farm families within the Appalachian upland region of Ohio and Kentucky for 1926 and 1927 show that these families spent an average of $448 annually for their living, while comparative data for 1,557 families in more favored agricultural regions show an annual expenditure of $961 per family. The average amount from the sales of farm products available to the 503 families for family living and other expenditures was $272, or a deficit of $176 in meeting their cost of living.

Other Sources of Income

These families, like other families of the United States, endeavor to piece out their incomes to have more money to spend or to save. Many of the farmers and frequently other members of the family contribute to the income in ways other than from the sales of farm products. It can not be supposed, of course, that on the whole and year after year their expenditures exceed their incomes. As a matter of fact the 503 families had average total family incomes of $578, and total family living expenditures of $448. Therefore, the former question might better be put in the form, "What else do these people do to make a living?"

In studies of 678 families in Ohio, West Virginia, and Kentucky, the sources of the total family income, or the amount available for family living, savings, and other expenditures after farm expenses were paid, were grouped in three classes—income from sales of farm products, from outside work of the farmer, and from other sources. (Fig. 90.)

Were all the facts known, it probably would be an endless task to enumerate all the ways in which the incomes from farming in the Appalachian upland region are supplemented. Facts and figures, however, from two studies—one in southeastern Ohio for the year 1926 and one in southeastern Kentucky for the year 1927—covering 503 farm

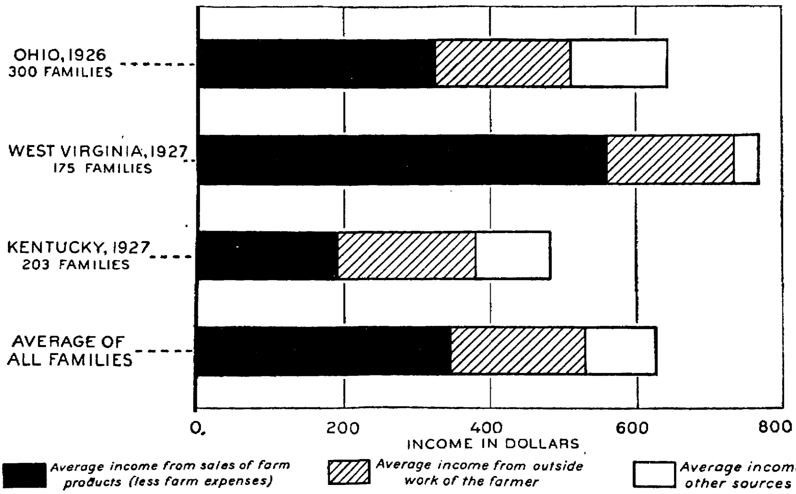


FIGURE 90.—Sources of family cash income

families, serve to illustrate what is more or less common, although subject to modifications, in many other farming communities within the region.

Of the 300 farm families in the Ohio study only 49 obtained all their income from the farm, and 33 of these received income from coal or oil leases. Many of the other 251 families (57 per cent) also received income from coal or oil leases. Of the 203 families in the Kentucky study only 20 obtained all income from the farm, and two of these received income from coal leases. Of the other 183 families, only one received income from a coal lease.

In addition to the income from coal or oil leases, the income of the 251 Ohio families and the 183 Kentucky families were supplemented in one or more of the following ways:

Outside work of farmer:	Number of families
Road work	65
Farm work	61
Work in woods	38
Mining coal	34
Carpentry	23

Outside work of farmer—Con.	Number of families
Official work	13
Hauling coal	8
Dealing in livestock	7
Selling	7
Teaching	7

Outside work of farmer—Con.	Number of families
Blacksmithing	6
Painting	5
Baling hay and straw	4
Work in railroad shops	4
Work in oil fields	4
Hauling school children	3
Auto trucking	2
Buying furs	2
Buying wool	2
Grinding feed	2
Work on railroad	2
Postmaster	2
Rural mail carrier	2
Work in iron foundry	2
Tractor work	1
Threshing outfit	1
Butchering	1
Trapping	1
Making sorghum sirup	1
Grading tobacco	1
Pulling hearse	1
Driving taxi	1
Work for telephone company	1
Bricklaying	1

Outside work of farmer—Con.	Number of families
Stone masonry	1
Holding barn dances	1
Plumbing	1
Stationary engineer	1
Railroad agent	1
Surveying	1
Life insurance business	1
Work in grain elevator	1
Work in steel mills	1
Preaching	1
Practicing medicine	1
Unspecified work	54
Other income:	
Family earnings	181
Interest	40
Pensions	31
Other property	17
Life insurance annuity	1
Insurance on buildings	1
Inheritance	1
Bonus for taking back real estate sale	1
Unspecified sources	17

Other Members of Family Help

In the several kinds of outside work of the farmer, as in woods, road work, farm work, and work in oil fields, the farm team was frequently used. Family earnings include earnings of members of the family other than the farmer himself. Usually these members live at home and work off the farm. Sometimes children who have left home send money to help support the family. The kinds of work done are many. Sometimes children—both boys and girls—do farm work on other farms. Children, especially girls, and sometimes the wife teach school. Girls and sometimes the wife do housework in other homes in the community and in towns or cities. Girls are stenographers, clerks, cashiers; they work in restaurants or hotels. Boys work on roads, in the woods, and in mines; they have various jobs in towns or cities.

To make the picture more complete, recognition should be made of the part these upland farms play in furnishing food, fuel, and shelter to the families. While the value of these items, when figured at farm prices for food products and fuel, and at 10 per cent of the value of the house for house rent, is less than for the better agricultural regions, it is larger in proportion to both the sales of farm products and the amount spent for the family living than in the better regions.

For the 503 families in Ohio and Kentucky the value of the farm-furnished items averaged $386 per family, made up of $316 for food, $12 for fuel, and $58 for house rent, while for 1,557 families in more favored agricultural regions it averaged $660, made up of $389 for food, $35 for fuel and $236 for house rent. The family living furnished to the 503 families averaged $386 as compared with sales of farm products amounting to $272 after the farm expenses were paid.

H. W. Hawthorne,
Agricultural Economist, Bureau of Agricultural Economics.

INSECT Resistance in Wheats and Sorghums a Heritable Character

For about 15 years, members of the departments of entomology and agronomy of the Kansas State Agricultural Experiment Station, cooperating with the Bureau of Plant Industry of the United States Department of Agriculture, have been actively interested in the subject of insect resistance in crop plants and have been studying the reaction of varieties of corn, sorghum, and grasses to chinch bugs and of wheat to the Hessian fly.

No varieties of corn have been found that are immune from chinch-bug injury, but repeated tests have shown that varieties well adapted to Kansas are more tolerant than those introduced from Northern States where chinch bugs do not occur. Pride of Saline resists chinch-bug attack as well as or better than any other Kansas variety that has been tested.

In order to test the resistance of sorghums to chinch-bug injury, special plantings are made at one edge of a wheat field. When the wheat

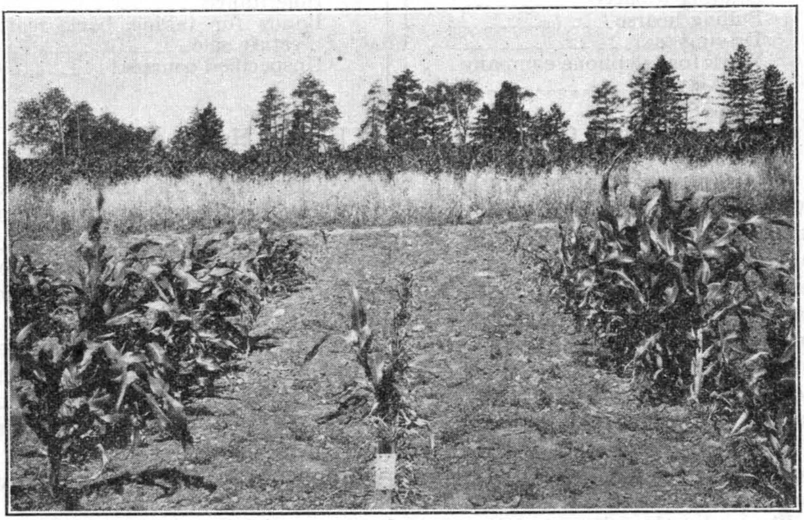


FIGURE 91.—A row of Dwarf Yellow milo (center) mostly destroyed by chinch bugs, and two resistant hybrid selections showing little injury

is cut the chinch bugs migrate to the sorghums, where the injury to the different varieties can be watched carefully. The basis or cause of chinch-bug resistance in sorghums is not known, though it is known to be a heritable character and one that can be combined through hybridization with other desirable characters such as dwarfness, erect heads, and smut resistance.

There are very distinct differences in chinch-bug resistance among the sorghums. The milos are very susceptible. Feterita and some of the kafirs and sorgos are more resistant. Dwarf Yellow milo (very susceptible) and Kansas Orange sorgo (resistant) have been crossed, and hybrid selections that are much more resistant to chinch bugs than the milo parent are now on hand. A row of Dwarf Yellow milo and two very resistant hybrid selections are shown in Figure 91. Nearly all the milo plants have been killed by the chinch bugs, while the resistant hybrid plants are much less injured.

INSECT Resistance in Wheats and Sorghums a Heritable Character

For about 15 years, members of the departments of entomology and agronomy of the Kansas State Agricultural Experiment Station, cooperating with the Bureau of Plant Industry of the United States Department of Agriculture, have been actively interested in the subject of insect resistance in crop plants and have been studying the reaction of varieties of corn, sorghum, and grasses to chinch bugs and of wheat to the Hessian fly.

No varieties of corn have been found that are immune from chinch-bug injury, but repeated tests have shown that varieties well adapted to Kansas are more tolerant than those introduced from Northern States where chinch bugs do not occur. Pride of Saline resists chinch-bug attack as well as or better than any other Kansas variety that has been tested.

In order to test the resistance of sorghums to chinch-bug injury, special plantings are made at one edge of a wheat field. When the wheat

FIGURE 91.—A row of Dwarf Yellow milo (center) mostly destroyed by chinch bugs, and two resistant hybrid selections showing little injury

is cut the chinch bugs migrate to the sorghums, where the injury to the different varieties can be watched carefully. The basis or cause of chinch-bug resistance in sorghums is not known, though it is known to be a heritable character and one that can be combined through hybridization with other desirable characters such as dwarfness, erect heads, and smut resistance.

There are very distinct differences in chinch-bug resistance among the sorghums. The milos are very susceptible. Feterita and some of the kafirs and sorgos are more resistant. Dwarf Yellow milo (very susceptible) and Kansas Orange sorgo (resistant) have been crossed, and hybrid selections that are much more resistant to chinch bugs than the milo parent are now on hand. A row of Dwarf Yellow milo and two very resistant hybrid selections are shown in Figure 91. Nearly all the milo plants have been killed by the chinch bugs, while the resistant hybrid plants are much less injured.

Different species of grasses show different degrees of resistance to injury from chinch bugs. Native perennial species with harsh tissues are able to survive chinch-bug injury and show the most ability to recover.

Early experiments on Hessian-fly injury showed one hard red winter wheat of the Turkey type (Kansas No. 2132) and one soft red winter wheat, Illini Chief, to be resistant. More recent studies have shown that wheat varieties may be placed in three classes, according to Hessian-fly infestation—(1) low, (2) medium, and (3) heavy. The following varieties in class 1 have had only 0 to 3 per cent of infested plants in a series of trials, using Hessian fly from the hard-wheat area of Kansas: Michigan Wonder, Red Rock, Honor, Dawson Golden Chaff, Illini Chief selection, Shepherd, Beechwood, Gypsy, Purkof, Kawvale, and Fulhard. In the same tests from 40 to 60 per cent of the plants of Kanred were infested. All of these fly-resistant varieties except Fulhard, a hard-kerneled selection from Fulcaster made at the Kansas station, are soft or only semihard wheats. The following varieties placed in class 3 have had from 45 to 65 per cent of the plants infested: Minturki, Sherman, Hussar, Nebraska No. 6, Nebraska No. 60, Kharkof, and Turkey.

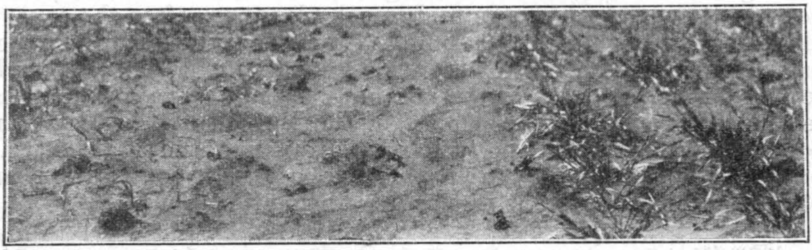


FIGURE 92.—A variety of wheat nearly destroyed by Hessian fly (left), and one tolerant to fly injury (right)

There is no question as to the significance of the difference in resistance to Hessian fly of the varieties in classes 1 and 3. Blackhull and Superhard Blackhull, which are grouped in class 2, may be described as more or less tolerant to Hessian fly, that is, they carry an intermediate amount of infestation, but the larvae and "flaxseed" sometimes do not develop normally and the plants are not always injured by the fly as much as those of Turkey and Kanred.

A very striking difference between a hard red winter wheat, very susceptible to Hessian fly, and a variety tolerant to Hessian fly, observed under field conditions in south-central Kansas in 1928, is shown in Figure 92.

The exact cause of resistance to Hessian fly is not known, but fly resistance is known to be a heritable character. It has been transferred and combined with other desirable characters in crosses between the resistant Illini Chief and Kanred, Marquis, and other susceptible varieties. The several selections of Kanred × Illini Chief have an average fly infestation of only 2 to 3 per cent in a series of tests in which the susceptible Kanred parent had 45 per cent and the resistant Illini Chief parent had 1.7 per cent.

JOHN H. PARKER,
Agronomist, Bureau of Plant Industry.

INSECTICIDAL Plants Investigated as Possible Farm Crops Thousands of people who derive their livelihood from agriculture are vitally interested in means to stay the progress or diminish the destructiveness of the insect pests with which they reluctantly share their crops. As crop production becomes more intensified, the biological balance is disturbed, and insects multiply at a rate faster than ordinary natural checks can control. As the insects increase, man is compelled to seek and develop additional means of warfare to maintain his supremacy or at least his equilibrium in the world of living things. These unbidden and unwelcome boarders of the farmer and the orchardist levy an annual toll estimated at about $100 for every thousand dollars worth of crop value. Research of a chemical, entomological or mechanical character to supply the ammunition needed in this fight has, therefore, tremendous economic significance.

Nowhere else are insecticidal operations more widely practiced than in the United States. Yet a census of both foreign and domestic poisonous plants reveals the surprising fact that few of these plants are utilized commercially as insecticides. With few exceptions, the potentialities of our domestic poisonous plants in this direction have been ignored. Instead of increasing crop returns to the farmer, which perhaps they might be made to do, such plants are often the cause of direct loss through stock poisoning. There may be lurking in these unwelcome plants the ideal insecticide—one that will be cheap, deadly to insects, harmless to vegetation, and will not leave a toxic spray residue. To a group of chemists in the Bureau of Chemistry and Soils has been assigned the task of isolating and studying the active principles of these plants. Knowledge of their constitution and physiological properties is essential to their utilization.

Drawbacks of Pyrethrum and Tobacco

Of the plants now used as insecticides pyrethrum and tobacco approximate the ideal, but each has objectionable features. Pyrethrum is effective against many insects, does not injure foliage, and is not poisonous to man and animals, but its price is high. Moreover, American fruit and vegetable growers are dependent largely upon foreign supplies. The crude pyrethrum and its chemically active components, the pyrethrins, are in great and rapidly increasing demand, and as the domestic supply is wholly insufficient, it is necessary to import annually from Japan and Europe more than 11,000,000 pounds valued at $2,500,000. Efforts are being made to produce pyrethrum in America at a cost to compete commercially with the production of Japan and Dalmatia, the principal sources of foreign supply.

The midribs of the tobacco leaves, leaf scrap, damaged leaves, and the refuse from cigar manufacture furnish the chemical compound nicotine, one of the most valuable insecticides which kill by contact. But the chemically extracted nicotine, nicotine sulphate, and the nicotine dusts are by-products of the tobacco industry, and their supply is limited by the use of tobacco. The demand for nicotine exceeds the supply available from the products of tobacco and the price is correspondingly high. The nicotine content of available tobacco material is usually rather low and its extraction is costly. Consequently producers of nicotine are able to pay only a relatively low price for tobacco material in spite of the high price of the finished product. Other domestic plants of lesser value that are used as insecticides include hellebore, sabadilla, and larkspur, all of which have chemical components which are actively destructive of insect life.

Since the need for harmless but effective insecticides is urgent, scientists of the United States Department of Agriculture have turned their attention recently to the known fish-poisoning plants of the Tropics and through the consular agents of the State Department have procured much material for investigation. Three of these tropical plants have proved to be promising sources of the insecticidal component rotenone. They are Derris, cube, and haiari.

The poisonous character of Derris, a plant grown on the rubber plantation of Sumatra and the Malay Peninsula, has long been known to the natives who throw the crushed roots into streams to kill or stupefy fish, which are then easily taken in nets. In the insecticide division of the Bureau of Chemistry and Soils the roots of cube, a plant native of Peru, have been found to contain the remarkable quantity of 7 per cent of rotenone. Other species of Lonchocarpus, such as timbo and haiari, are believed to be possible dependable sources of a commercial supply of this poison.

Toxicity of Rotenone

Preliminary results indicate that rotenone is more toxic than pure nicotine as a contact insecticide. It rivals pyrethrum in toxicity to many insects, and gives promise as a possible agent to replace arsenic as a stomach insecticide for use against chewing insects. The annual consumption of arsenates in the United States is approximately 60,000,000 pounds with a retail market value of about $7,000,000. From this fact, the potential market for an effective organic material like rotenone can be imagined.

Since rotenone or some of its chemical derivatives give promise of filling the requirements of the ideal insecticide, intense efforts by chemists of the department are being made to produce it synthetically. While this difficult work is under way, consideration should be given to the growing of plants which contain this interesting chemical component, in the warm regions along the Gulf coast and in our insular possessions where tropical conditions prevail.

Crop diversification is badly needed in the Virgin Islands, where large areas of unusued lands are available and unemployment is a problem. The cultivation of insecticidal plants in the Virgin Islands, in Porto Rico, and in the Philippines might possibly provide the the farmer of the United States with a powerful weapon wherewith to fight the insects. The chemists of the department are studying many plants which produce these complex poisonous organic substances, in the hope of finding one or more which can be grown as a field crop in a temperate climate, such as prevails in the United States.

W. W. Skinner,
Assistant Chief, Bureau of Chemistry and Soils.

INSECTS Captured by Airplane Are Found at Surprising Heights

Chasing insects with airplanes sounds like a far-fetched idea, but in reality the Department of Agriculture is actually doing just this in a very serious way in connection with studies on the migration of various insects, particularly those affecting the cotton crop. Different species of insects have their peculiar habits as regards migration; one may move only from plant to plant, another from field to field, while still others have distinct migratory movements extending hundreds or even thousands of miles. It frequently becomes of the utmost importance to have a thorough understanding of these migrations, the facts influencing them, and their direction and extent. Such knowledge aids in preventing the spread of new insects, in checking migrations at their source, or in predicting outbreaks so that proper control measures may be taken.

Many observations have been made on migration by using such equipment as field screens, and there have even been a few cases where such screens have been erected at some height from the ground, but for all practical purposes these gave information only on conditions within the fields and the first few feet of air above them. In making such studies in connection with some of the cotton insects, their travels could not be correlated with the ground wind conditions and were apparently more closely allied with the travel of hydrogen balloons, which were known to blow across country at high altitudes. It is a well-known fact that as we go higher in the air, the wind direction frequently or, in fact, usually changes from that on the ground, and the wind a few thousand feet up may be blowing in an opposite direction from that on the ground. It was obviously of the utmost importance, therefore, to know the altitude at which the various insects traveled, and plans were made to try to catch them with airplanes.

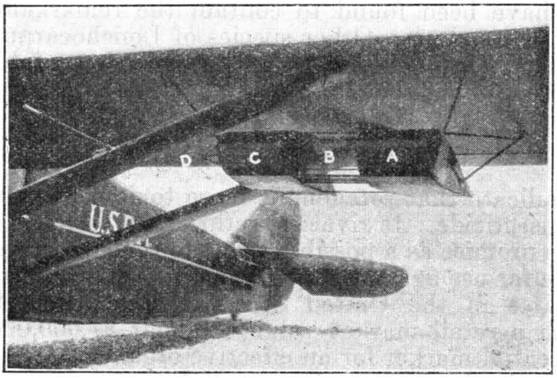


FIGURE 93.—Insect collecting trap attached to wing of monoplane. The unexposed trays are carried in compartment A. At B a tray is shown pulled into position for exposure. After exposure, the tray is pulled into compartment C. These movements are controlled by wires (D) leading to the cockpit of the plane

Special Trap Devised

A special trap was devised as shown in the accompanying illustration. (Fig. 93.) This contained two insect-proof compartments, one at each end, with the center section open. A battery of screen trays were arranged so that they could be stored in one compartment and, whenever the operator desired, any tray could be pulled out to the center section, where it was exposed to the air, left there as long as necessary, and then slipped into the second closed compartment where insects could not reach it. These screens were coated with a light application of a sticky substance which caused any insects striking the screen to remain fastened thereto. When ready to commence operations, the plane was flown to any desired altitude, then a screen would be pulled out and exposed for any desired length of time, following which it was pulled into the protected compartment and the insects were removed after the plane reached the ground. (Fig. 94.) Preliminary flights with such equipment quickly showed that the results were greatly influenced by conditions such as temperature, rainfall, air pressure, and time of day. Consequently, it was necessary to carry out a systematic series of flights to be made at all times of the day and all seasons of the year (figs. 95 and 96), as well as to visit various localities in order to trace out migrations.

As a standard for comparison, all of these records are computed on the basis of the number of cubic feet of air sampled. The ordinary

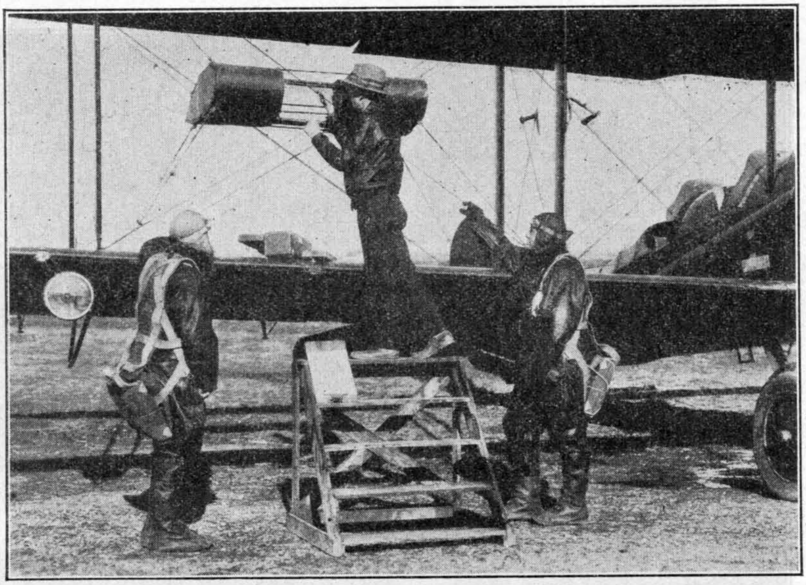


FIGURE 94.—Removing insects from screen trays after the landing of the plane. On account of the low temperatures experienced at high altitudes, heavy flying clothing is necessary

screen tray utilized is 1 foot square, and by computing from the duration of the exposure and the known forward speed of the ship it is easy to figure the volume of air through which this tray has passed for each sample. In this way the insect populations at various altitudes can be computed.

Many Insects at High Altitudes

In these studies the insects below 50 feet altitude are not considered, and the number found in the air above that level is surprising. Of course, the population is denser closer to the earth, but many insects reach a previously unsuspected height. All collections have been made at various altitudes, ranging from 50 feet to 14,000 feet, and insects have been collected at all of these altitudes. Undoubtedly they will be found even higher. The densest population is found in the first 1,000 feet from the ground, but at 2,000 feet we find approximately half as many as at 1,000, and at 3,000 feet we find half as many as at 2,000. From about 3,000 to 5,000 feet there is comparatively little difference, and from 6,000 feet upward the population is considerably lighter, but there are still a remarkable number of insects present. To give some idea of this abundance, computations have been made of the number of insects in a column of air 1 mile square starting 50 feet from the ground and extending 14,000 feet high. Computing from several hundred collections which have been made, it is shown that under all conditions for all seasons of the year in the vicinity of Tallulah, La., an approximate average of 25,000,000 insects is to be found in the upper air over this square mile of ground. The lowest ebb is during January, when the population drops to about 12,000,000, and the highest is during May, when it rises to 36,000,000.

A study of the various species collected at different altitudes reveals many interesting facts, only a few of which can be mentioned here.

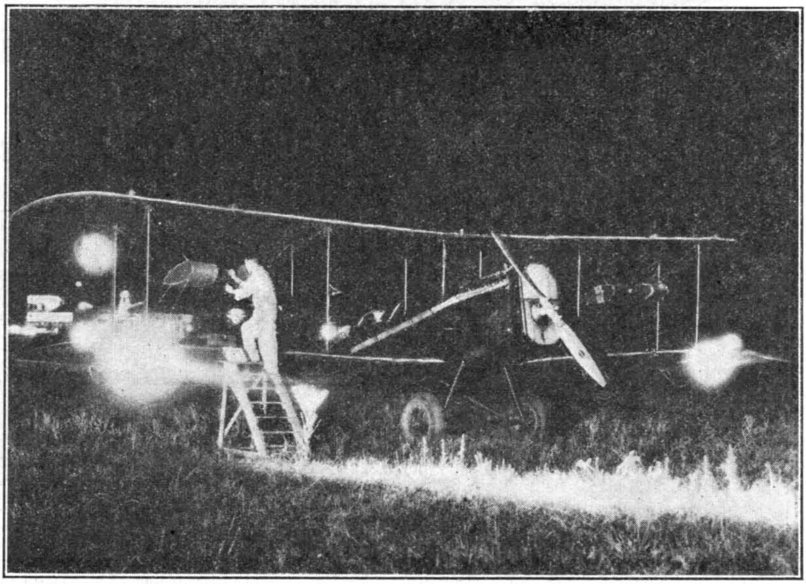


FIGURE 95.—Removing insects from trays following a night flight. Some insects are found in the air only at night

As a rule the larger, stronger flying insects are collected closer to the earth and the smaller, weaker ones at higher altitudes. It is particularly interesting to note that many absolutely wingless insects are collected at very high altitudes; for example, the balloon spiders, which have no powers of flight but are carried entirely by air currents, have been collected as high as 10,000 feet, and numerous other small forms, including mites, are found at similar elevations. Consequently, it is obvious that we are dealing with two distinct classes of air travel. One of these is the voluntary movement of strong flying insects which have sufficient powers of flight to enable them to travel at will and more or less overcome atmospheric conditions. The other extreme is the purely involuntary travel of the weaker-flying insects which are picked up and carried by the rising air currents caused by convection and which do not have sufficient powers of flight to offset these. Between these two extremes we have the intermediate condition of travel which is partly involuntary and partly by actual flight. Generally speaking, the strong-flying insects, such as the cotton leaf-worm moth and similar species, are found at 3,000 feet or lower, although occasional individuals are found as high as 5,000 feet. Boll weevils have been collected only as high as 1,000 feet, tarnished plant bugs up to 3,000 feet; and cotton flea hoppers up to 5,000 feet. Above these we find such insects as the leaf hoppers extending up to 7,000 feet, and still above these we find the minute parasitic flies, wasps, plant lice and similar light, small-bodied insects extending up to 14,000 feet and probably considerably higher. The pink bollworm moth, which had been supposed to be a comparatively weak flier with a decided tendency to remain down among the plants, was found as high as 3,000 feet in the air.

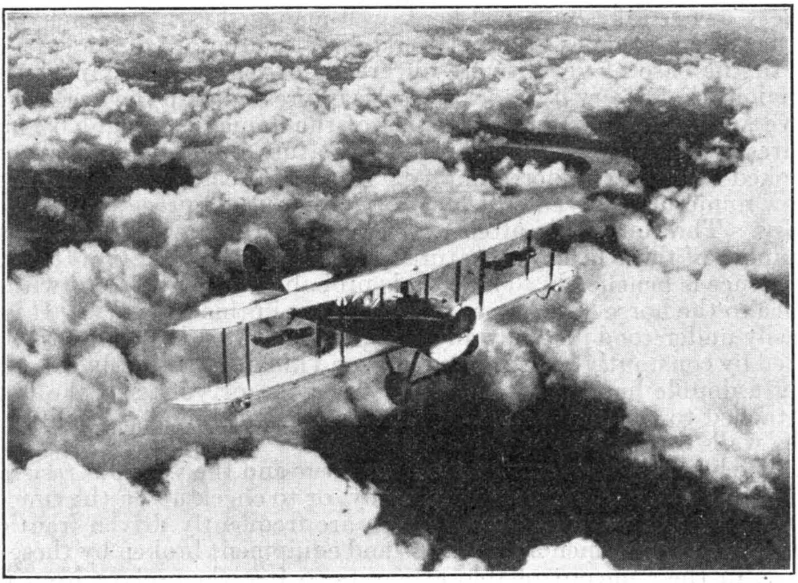


FIGURE 96.—Plane collecting insects at high altitude above clouds. Only small, light-bodied insects are collected at such altitudes

Findings Important to Pest Control

These findings have a most important relation to many of the problems of insect repression or control, and there is no question that as the work is continued and extended they will be even more useful by throwing entirely new light on the manner and method of travel of many insect species. Air currents at the higher altitudes frequently become extremely swift as compared with winds normally experienced on the ground, and it is easy for insects reaching such currents to be carried forward on them for hundreds of miles within a comparatively short time, and then, upon meeting descending currents, return to the earth where they may spread new infestations.

B. R. COAD,
Principal Entomologist, Bureau of Entomology.

INSECTS Harm Livestock to an Extent That Is Frequently Unsuspected

The reduction of losses caused by insect pests of livestock is one of the problems with which stock raisers are seriously concerned. Practical methods of control of several of these pests have been developed, and those farmers who familiarize themselves with these methods and put them into practice are securing substantial returns for the investment in time and equipment.

Some of these insect problems of the stockman, or poultryman, can be met by modifying farm and range practice with little or no added expense or labor. Such modifications often result in the conservation of by-products of the stock farm and substantial increases in crop yields. Others require improvements in building and equipment which add to the attractiveness of the farm and the feeling of pride which every owner takes in a well-kept, well-managed farm or ranch. Still other insect enemies require special direct action or equipment.

In the case of very severe outbreaks of insects the damage is so obvious that every livestock owner is impressed with the need of decisive action. Unfortunately, much of the damage wrought by insect parasites of livestock is of an insidious nature and either entirely overlooked or greatly underestimated. In fact, the determination of just how numerous a given pest must be to produce appreciable loss is not easy. The thought is often expressed that the presence of a certain number of these insects is natural, and some even maintain that their presence is beneficial. This idea is probably more prevalent with refence to the horse bot than any other insect in this category. It is not easily understood just why anyone should assume that a horse is benefited by constantly biting, switching, and kicking at a botfly or by having a double handful of the spiny maggots, or young of the botfly, attached to the stomach and intestine by mouth hooks deeply set in the walls of these organs.

One has only to observe the intense fear and the vigorous resistance of a horse attacked by the nose botfly, or to check up on the time lost by farmers in working horses which are frequently driven frantic by these pests, or in mending harness and equipment broken by these animals in their uncontrollable attempts to free themselves from their annoyers to be thoroughly convinced of the fallacy of such ideas. The improvement in condition of heavily infested horses which have been freed of bots by dosing with carbon disulphide leaves no doubt in a farmer's mind that bots are a positively injurious pest and that a greater output of work on the same feed is assured by elimination of bots from the digestive tract.

Fallacy About the Cattle Grub

The same erroneous idea of benefits accruing to cattle from infestations by the cattle grub, or warble, seems to be held by some. Here again one is forced to conclude that even a smattering of knowledge of the life history and habits of this insect would dispel such a notion. In the case of this pestiferous insect few people are fully aware of the many ways in which injury is produced, because of the fact that the heel fly, which is the parent of the grub, is seldom seen and the stampeding and wild excitement produced by its attack are not attributed to it. Furthermore, the eggs are inconspicuous, and the penetration and migration of the small grubs throughout the bodies of the cattle is, of course, unobserved. The presence of the grubs becomes evident only when, after seven or eight months of burrowing about in the body, they reach the backs of the cattle, cut holes through the skin, and enter upon their final stages of development there. The hide damage in the case of this pest is obvious, but the dockage on account of it is not usually brought to the attention of the producer at the time of marketing. Hence but few livestock raisers or feeders realize that in the matter of defective hides alone a loss of approximately $5,000,000 for our entire country is being sustained each year. It is certain that the loss caused in reduced milk flow, retarded development of young stock, lowered flesh condition, and actual death loss due to cattle stampeding or miring down in their frantic efforts to escape heel-fly attack far outweighs the hide and leather damage.

Either the removal of grubs from the backs of the cattle, or their destruction by applying insecticides, such as Derris or tobacco powder, is an effective method of breaking the heel fly's vicious life cycle. The fact that several such treatments must be given during the winter and spring to accomplish satisfactory control makes these methods rather difficult of practical application, especially on range cattle, but in regions where the grubs are abundant the cost of the treatment involved appears to be fully justified.

The hordes of blood-sucking flies surely account for the loss of millions of dollars in milk and condition. Furthermore, they may carry dangerous diseases, such as anthrax. While no accurate figures on the losses sustained have been obtained, the marked effect of serious outbreaks of stable flies, horn flies, horse flies, mosquitoes, and buffalo gnats on all classes of livestock leaves no room for doubt as to their economic importance. Observations indicate that a few flies of any of these destructive forms are of no material consequence, but that where they become very abundant losses are inevitable.

Stable Flies in Grain Belt

Stable flies are present throughout the country, but are a notorious pest in the grain belt, where they have been found to breed in accumulations of stable manure and especially in straw stacks which ferment upon getting saturated with rain. The spreading of manure at intervals not to exceed three days on fields to be cultivated, the proper stacking of straw, and the elimination of old scattered straw stacks will greatly reduce the numbers of these troublesome bloodsuckers. Manure should not be spread on pasture lands because of the danger of infecting such pastures with internal parasites of livestock.

Horn flies of cattle breed in cow manure. Frequent cleaning of yards and the use of killing fly sprays will hold this pest in check about dairies and farms.

Drainage of marshy areas and pools will do much toward eliminating the horsefly and mosquito pests, and oiling of undrained pools where mosquito wrigglers occur will prevent their breeding.

House flies are dangerous pests on farms as well as elsewhere. They annoy livestock, carry certain parasitic worms, and contaminate dairy and other farm products. Prompt disposal of manure and garbage to prevent breeding, the use of flytraps, the application of killing sprays where the flies congregate, and the protection of food products by screening will give almost complete relief if these steps are consistently carried out.

The screw worm and wool maggot in the Southwest are held by many ranchmen to be the most serious problem with which they have to deal. The damage caused by these pests is dependent very largely on climatic conditions. Warm weather with frequent showers is highly favorable to their multiplication in carcasses and their infestation of every wound, however slight. The prompt destruction of carcasses by burning and the use of flytraps are of much importance in lessening the number of screw-worm flies. During the fly season the number of wounds on animals which give opportunity for the flies to attack should be reduced to a minimum. This can be accomplished by branding, marking, and dehorning out of fly season, using care in handling stock to prevent injuries, practicing dehorning or the breeding of muley strains, and controlling breeding so as to have the offspring dropped when flies are not abundant.

Losses Caused By Lice

The losses caused by biting and sucking lice are widespread and at times exceedingly heavy. Here again, unless very severe, the damage is not easily recognizable or determinable. Sometimes louse infestations of all classes of livestock and poultry become very heavy before the presence of the parasites is noticed. Marked reduction of flesh, decreased milk flow, damaged wool and mohair, and curtailment of egg production are inevitable in such cases. Even when livestock are freed of such heavy infestations, complete recovery from the ill effects is often slow.

These parasitic insects live continuously on the animals which they infest. Dipping the animals in suitable insecticides at proper intervals will completely eradicate the insects from a herd or flock. Since the pests reproduce rapidly it is essential that every animal or fowl be dipped at the same time or that the untreated individuals be kept separate.

Ticks and mites, which are related to insects, are notorious pests of all classes of animals and birds. Some are important carriers of diseases, such as the cattle-fever tick. Others are persistent and serious pests, either sucking blood or living in or on the skin, as in the case of the various itch or scab mites. As persons familiar with itch mites infesting man well know, the annoyance from the presence of these mites is almost intolerable. The decline in flesh and the general debility or even death of animals heavily infested with similar mites is not surprising.

The difficulty of detecting the presence of a few of the small mites, or even of the much larger ticks, makes it hard for even a trained inspector to say with certainty from a single examination when an animal is entirely free. This makes the spread of these pests on infested animals from herd to herd or from one locality to another comparatively easy, and necessitates the application of rigid quarantines against the more dangerous kinds.

The efficacy of insecticides applied as dips and of State and Federal quarantines in eradicating scab from cattle and sheep has been fully demonstrated, and the inconvenience and cost of such eradicative efforts are far outweighed by the results accomplished.

No serious effort has been put forth to restrict the spread or stamp out the fowl tick, chicken mite, or scaly-leg mite. The last two pests are nation-wide in distribution and cause heavy losses to poultry raisers, but the ease with which they can be controlled on individual premises has led most poultry raisers to ignore them until serious infestations have developed. The fowl tick, however, is more difficult to control, as it is a pest of unusual hardihood, living as it may for more than three years without food and being very resistant to insecticides. The fact that it is spreading to new regions and becoming more generally distributed in old territory makes more evident the necessity of the application of known control and restrictive methods.

Not only does the control of insect enemies of livestock give increased returns on the investment, but the comfort and appearance of the stock is a source of great satisfaction to the owner; and the relief from annoyance to man by the direct attack of some of these pests and the peace of mind made possible by their control is in itself perhaps ample remuneration.

F. C. Bishopp,
Principal Entomologist, Bureau of Entomology.

INTER-AMERICAN Meeting on Agriculture Plans Scientific Cooperation

The first Inter-American Conference on Agriculture was held in the Pan American Union Building in Washington, D. C., from September 8 to 20, 1930, at the invitation of the United States Government in accordance with the recommendations of the Sixth International Conference of American States at Habana in February, 1928. Fifty-four official delegates representing the 21 Governments, members of the Pan American Union, and 168 consulting delegates, were registered. The conference organized by electing A. F. Woods, director of scientific work of the Department of Agriculture, as permanent chairman, and his assistant as secretary general.

The program provided for round-table discussions on a series of topics grouped as follows:

Surveys and inventories of soils, forests, pastures, irrigation, plant and animal diseases and pests, censuses, and other statistical surveys.

Problems relating to land, their classification, erosion, and fertilizers.

Forestry problems, systematic management, selective logging, prevention of fires, reforestation, the testing of American woods, and utilization of waste and by-products.

Animal-industry problems, such as breeding for special purposes, nutrition, diseases, sanitation, quarantine, and control service.

Plant-industry problems, introduction of promising plants from foreign countries, breeding and selection of improved varieties, seed testing, weeds and their control, forage crops for warm climates, diseases and insect pests and their control, and production problems of special crops, such as cereals, cotton, tobacco, sugar, rubber, fibers, coffee, cacao, tropical fruits, and vegetables.

Agricultural education, experimental and demonstration stations, extension services, and a proposed central agricultural research station for all the American Republics.

Agricultural economics, competition, cooperative agricultural credit systems, marketing, transportation, standardization and grading, present and future food supply, farm management, and overproduction problems.

Seventy-one Resolutions Adopted

The conference adopted 71 resolutions, recommending: That a second Inter-American Conference on Agriculture be held within five years and a permanent inter-American committee be appointed to prepare for it; that a permanent technical advisory board be appointed to study problems of paramount importance to agriculture, to discuss raisers, but the ease with which they can be controlled on individual premises has led most poultry raisers to ignore them until serious infestations have developed. The fowl tick, however, is more difficult to control, as it is a pest of unusual hardihood, living as it may for more than three years without food and being very resistant to insecticides. The fact that it is spreading to new regions and becoming more generally distributed in old territory makes more evident the necessity of the application of known control and restrictive methods.

Not only does the control of insect enemies of livestock give increased returns on the investment, but the comfort and appearance of the stock is a source of great satisfaction to the owner; and the relief from annoyance to man by the direct attack of some of these pests and the peace of mind made possible by their control is in itself perhaps ample remuneration.

F. C. BISHOPP,
Principal Entomologist, Bureau of Entomology.

INTER-AMERICAN Meeting on Agriculture Plans Scientific Cooperation The first Inter-American Conference on Agriculture was held in the Pan American Union Building in Washington, D. C., from September 8 to 20, 1930, at the invitation of the United States Government in accordance with the recommendations of the Sixth International Conference of American States at Habana in February, 1928. Fifty-four official delegates representing the 21 Governments, members of the Pan American Union, and 168 consulting delegates, were registered. The conference organized by electing A. F. Woods, director of scientific work of the Department of Agriculture, as permanent chairman, and his assistant as secretary general.

The program provided for round-table discussions on a series of topics grouped as follows:

Surveys and inventories of soils, forests, pastures, irrigation, plant and animal diseases and pests, censuses, and other statistical surveys.

Problems relating to land, their classification, erosion, and fertilizers.

Forestry problems, systematic management, selective logging, prevention of fires, reforestation, the testing of American woods, and utilization of waste and by-products.

Animal-industry problems, such as breeding for special purposes, nutrition, diseases, sanitation, quarantine, and control service.

Plant-industry problems, introduction of promising plants from foreign countries, breeding and selection of improved varieties, seed testing, weeds and their control, forage crops for warm climates, diseases and insect pests and their control, and production problems of special crops, such as cereals, cotton, tobacco, sugar, rubber, fibers, coffee, cacao, tropical fruits, and vegetables.

Agricultural education, experimental and demonstration stations, extension services, and a proposed central agricultural research station for all the American Republics.

Agricultural economics, competition, cooperative agricultural credit systems, marketing, transportation, standardization and grading, present and future food supply, farm management, and overproduction problems.

Seventy-one Resolutions Adopted

The conference adopted 71 resolutions, recommending: That a second Inter-American Conference on Agriculture be held within five years and a permanent inter-American committee be appointed to prepare for it; that a permanent technical advisory board be appointed to study problems of paramount importance to agriculture, to discuss and formulate plans for future work, to cooperate with the Pan American Union in carrying out the resolutions of the conference, and to collaborate in preparing for the second inter-American conference; that the Division of Agricultural Cooperation in the Pan American Union be strengthened and organized as a coordinating center of agricultural coöperation in research; that cooperating committees and national agricultural congresses be organized in each Pan American country; that regional conferences be held between representatives of governments having common problems and interests for the purpose of cooperating in the technical study and possible solution of problems common to the group; that each country appoint a special official delegate to be in constant communication with the national committees, with the Pan American Union, and with all other official and private organizations dealing with agriculture in the respective countries; that the various governments cooperate in listing all the agricultural scientific institutions, exchange of publications, and the propagation and exchange of economic plants; that coöperation shall be encouraged between agricultural experiment stations and international agricultural organizations of the various countries; that at the second inter-American conference special consideration shall be given to the study of plant and animal diseases and pests; that a plan be formulated for the establishment of a central Pan American research station and substations for consideration at the next inter-American conference; that annual reports of advances in agricultural scientific research be published; that a Latin American association for the advancement of science be established; that provision be made for the interchange of research workers; that the organization of private associations interested in agriculture be fostered; that a technical commission study the standardization of surveys, terminology, and Spanish equivalents; that soil, forestry, and other surveys be undertaken; that an inter-American livestock advisory board be established and provision made for the exchange of laws relating to livestock and for telegraphic reports of outbreaks of animal diseases; that cacao production be investigated by a commission of experts; that the Pan American Governments provide for the training of agricultural specialists; that the various governments cooperate in developing and perfecting statistical services, in the adoption of standard weights and measures, in promoting better farm management and crop diversification, and in the study of overproduction problems; that a Pan American agricultural bank be established with headquarters in New York; that international committees be formed to advertise coffee and yerba mate and that steps be taken to stabilize coffee production; that special consideration be given to the appointment of agricultural attachés; that Pan American countries modify their customs tariffs so as to encourage the introduction and commercial exchange of insecticides, fungicides, machinery, and equipment for applying them; that plants in American agriculture be listed, with the authorized Latin name for each species and authentic common names in each of the official languages of the American republics; that the bibliographical agencies, libraries, agricultural, and other agencies cooperate in the formulation of a bibliography of agriculture; that the educational films of the United States Department of Agriculture be loaned to the different countries represented in the conference; and that the conference express its high appreciation of the valuable services of the late W. A. Orton and other research workers in tropical agriculture.

Papers and Proceedings Published

The technical papers that were prepared in advance of the conference for the information of the delegates and as bases of the round-table discussions were published in a volume entitled "Documentary Material on the Inter-American Conference on Agriculture, Forestry, and Animal Industry," in English, Spanish, and Portuguese editions; the resolutions and rules of procedure were published in the Final Act, in four languages; and the proceedings were published in the Report of the Delegates of the United States of America to the Inter-American Conference on Agriculture.

From the foregoing it will be seen that the conference was well attended, that the discussions covered a wide range of topics, and that definite and permanent provision was made for continuing cooperation in promoting scientific research in agriculture throughout the American Continent. Among the intangible results of the conference were the contacts made between research workers and institutions of the different countries, and the spirit of good will, mutual respect, understanding, appreciation, and cooperation that developed from the exchange of views and discussion of problems common to many countries. These results will have an important bearing on the future agriculture of the United States, because many problems of agricultural production and marketing, of plant and animal diseases and pests, and of scientific research in connection therewith, are international in scope, are not limited by national boundaries, and can not be successfully solved, confined, or controlled within the boundaries of a single country.

LEON M. ESTABROOK,
Assistant to the Director of Scientific Work.

INTERNATIONAL Action to Aid Agriculture Is Gaining Headway This is an international age. War and postwar experiences have emphasized the economic interdependence of nations. International congresses, conferences, and meetings, by their very number, have become commonplace incidents. The League of Nations in its Handbook of International Organizations published in 1926 listed some 470 international associations, offices, and committees. Agriculture figures conspicuously in the movement. Twenty-six years ago—June 7, 1905—42 nations pledged themselves by treaty to cooperate in promoting the welfare of agriculture, and created the International Institute of Agriculture. Of the thirty-odd international groups directly concerned with agriculture, the greater number have come into being within the last decade. Their activities and scope may be illustrated by special consideration of three of their number.

The idea of the International Institute of Agriculture was conceived by a California merchant—David Lubin. In bringing his plan to fruition Mr. Lubin attempted to enlist the cooperation of the United States as well as that of other nations in the organization of an international clearing house for agricultural information. Failure attended these efforts until the King of Italy, Victor Emanuel III, embraced the proposal and called an international conference to consider it. The conference resulted in the founding of the institute at Rome in 1905. The treaty establishing the institute provided that it should

Papers and Proceedings Published

The technical papers that were prepared in advance of the conference for the information of the delegates and as bases of the roundtable discussions were published in a volume entitled "Documentary Material on the Inter-American Conference on Agriculture, Forestry, and Animal Industry," in English, Spanish, and Portuguese editions; the resolutions and rules of procedure were published in the Final Act, in four languages; and the proceedings were published in the Report of the Delegates of the United States of America to the Inter-American Conference on Agriculture.

From the foregoing it will be seen that the conference was well attended, that the discussions covered a wide range of topics, and that definite and permanent provision was made for continuing cooperation in promoting scientific research in agriculture throughout the American Continent. Among the intangible results of the conference were the contacts made between research workers and institutions of the different countries, and the spirit of good will, mutual respect, understanding, appreciation, and cooperation that developed from the exchange of views and discussion of problems common to many countries. These results will have an important bearing on the future agriculture of the United States, because many problems of agricultural production and marketing, of plant and animal diseases and pests, and of scientific research in connection therewith, are international in scope, are not limited by national boundaries, and can not be successfully solved, confined, or controlled within the boundaries of a single country.

LEON M. ESTABROOK,
Assistant to the Director of Scientific Work.

INTERNATIONAL Action to Aid Agriculture Is Gaining Headway This is an international age. War and postwar experiences have emphasized the economic interdependence of nations. International congresses, conferences, and meetings, by their very number, have become commonplace incidents. The League of Nations in its Handbook of International Organizations published in 1926 listed some 470 international associations, offices, and committees. Agriculture figures conspicuously in the movement. Twenty-six years ago—June 7, 1905—42 nations pledged themselves by treaty to cooperate in promoting the welfare of agriculture, and created the International Institute of Agriculture. Of the thirty-odd international groups directly concerned with agriculture, the greater number have come into being within the last decade. Their activities and scope may be illustrated by special consideration of three of their number.

The idea of the International Institute of Agriculture was conceived by a California merchant—David Lubin. In bringing his plan to fruition Mr. Lubin attempted to enlist the cooperation of the United States as well as that of other nations in the organization of an international clearing house for agricultural information. Failure attended these efforts until the King of Italy, Victor Emanuel III, embraced the proposal and called an international conference to consider it. The conference resulted in the founding of the institute at Rome in 1905. The treaty establishing the institute provided that it should promote the welfare of agriculture in the international sphere. Its principal task was the collection and dissemination throughout the world of information from as many countries as possible on acreages sown, crop conditions, harvest yields, numbers and kinds of livestock, prices, and market supplies.

At the World Economic Conference, held by the League of Nations in May, 1927, agriculture for the first time was placed on the same footing with commerce and industry in the deliberations of that body. Since then the league has given increased attention to agriculture. Its economic consultative committee meeting in Geneva in May, 1928, and in May, 1929, gave a large place to agriculture in its deliberations. In January, 1930, and again in January, 1931, a committee of agricultural experts from 21 countries was convened by the league to discuss the agricultural depression.

A Farmer-Controlled Organization

The International Commission of Agriculture is an organization composed of 92 national farm associations located in 27 countries. This is the only international agricultural group controlled and financed by the organized farmers themselves. Its history illustrates the difficulty of getting unity of action among farmers. For more than 40 years there had been a well-developed movement in Europe to found some sort of international agency controlled by and representing the organized farmers of the world. Rivalry between national groups, and conflicting opinions as to the form this organization should take, presented seemingly insurmountable difficulties. It was an American proposal that resulted in action. The American delegation to the 1924 General Assembly of the International Institute of Agriculture proposed that the farm organizations of all nations should consider the advisability of establishing an international agency to represent the interests of the organized farmers of the world. An organization committee was created which two years later obtained the adoption of a plan whereby the International Commission of Agriculture (an existing body with headquarters in Paris) revised its constitution, and turned its control over to representatives of affiliated national farm groups. The commission has since taken a prominent part in the agricultural meetings held by the League of Nations. It cooperates with the International Labor Office and with the International Institute of Agriculture. Its program deals largely with the extension of the cooperative movement and with the analysis of the causes of the present world-wide agricultural depression.

Cooperation on an international scale in the field of agriculture is not confined to the three agencies mentioned above, but perhaps enough has been said to indicate the substantial nature of the movement, which promises to grow. In many respects agriculture's problems are international in scope and origin. Frequently they suggest international action. Government action designed to benefit farming in one nation may work a hardship to growers in another country. Acts of one country often call forth counter acts in another. Bounties and subsidies in one nation may bring forth countervailing duties elsewhere. The Government of the United States recommends a reduction of wheat acreage. The Government of Australia encourages an expansion of Australia's area in wheat. The wheat-acreage problem interests all wheat-growing countries. Germany and Poland have reached an accord in the cooperative disposal of rye on foreign markets. Unity of action for the relief of agriculture is now being considered seriously by eight eastern European countries. It is reported that Hungary, Yugoslavia, and Rumania have agreed to set up machinery for the joint disposal of grain for export. The question whether international agreement affords an effective means of aiding agriculture is before the statesmen of many countries.

ASHER HOBSON,
In Charge of Foreign Agricultural Service Division,
Bureau of Agricultural Economics.

IRRIGATION Water Supply Increased by Storing Flood Water Underground There are many parts of the West where profitable crop production depends upon irrigation and the principal or only supply of water is from under-ground sources. Where this condition prevails a deficiency in the precipitation or an increased demand, or both, have sometimes depleted the supply to such an extent that the cost of irrigation has approached or even exceeded the economic limit, and the source of supply has sometimes been threatened with exhaustion.

This is especially true of certain portions of southern California. Ground water is found at various depths in all of the valleys, and the extent and depth of the supply are of prime importance, since a lowering of the water table may increase the cost of pumping to the point where it is no longer profitable to irrigate crops with the pumped water.

The original source of the available water, even of that conveyed for long distances, is, of course, precipitation. Under the climatic conditions prevailing in southern California the precipitation falling in the rainy seasons often comes in the form of torrential rains and a large part of it runs off quickly and hence does not reach the water-bearing strata. However, certain geological formations found at the bases of the mountains serve to some extent, even without artificial assistance, to hold back a part of the run-off, and these formations become natural reservoirs from which the water drains slowly. These porous formations occur as cones and fans created by the sand and gravel washed down by streams and deposited at the foot of the mountains. (Fig. 97.) The materials thus deposited are not consolidated or cemented but for the most part are loose and spongy and often occupy the lower stretches of alluvial valleys where ground water is near enough to the surface to permit of profitable pumping. Table 10 illustrates how an increase or a decrease in the supply furnished by feeder streams was directly reflected in a corresponding rise or fall of the water levels in the irrigation wells of a typical southern California area. It will be noted that the pumping lift became greater each year during several successive dry years.

TABLE 10.—*Influence of water supply in streams upon water level in wells used for irrigation*

Date	Flow of feeding stream	Pumping lift at wells	Date	Flow of feeding stream	Pumping lift at wells
	Miner's inches	*Feet*		*Miner's inches*	*Feet*
September, 1917		112	September, 1928	204	279
September, 1925	176	244	September, 1929	236	306
September, 1926	361	245	November, 1929		318
September, 1927	423	228			

reached an accord in the cooperative disposal of rye on foreign markets. Unity of action for the relief of agriculture is now being considered seriously by eight eastern European countries. It is reported that Hungary, Yugoslavia, and Rumania have agreed to set up machinery for the joint disposal of grain for export. The question whether international agreement affords an effective means of aiding agriculture is before the statesmen of many countries.

ASHER HOBSON,
In Charge of Foreign Agricultural Service Division,
Bureau of Agricultural Economics.

IRRIGATION Water Supply Increased by Storing Flood Water Underground There are many parts of the West where profitable crop production depends upon irrigation and the principal or only supply of water is from under-ground sources. Where this condition prevails a deficiency in the precipitation or an increased demand, or both, have sometimes depleted the supply to such an extent that the cost of irrigation has approached or even exceeded the economic limit, and the source of supply has sometimes been threatened with exhaustion.

This is especially true of certain portions of southern California. Ground water is found at various depths in all of the valleys, and the extent and depth of the supply are of prime importance, since a lowering of the water table may increase the cost of pumping to the point where it is no longer profitable to irrigate crops with the pumped water.

The original source of the available water, even of that conveyed for long distances, is, of course, precipitation. Under the climatic conditions prevailing in southern California the precipitation falling in the rainy seasons often comes in the form of torrential rains and a large part of it runs off quickly and hence does not reach the water-bearing strata. However, certain geological formations found at the bases of the mountains serve to some extent, even without artificial assistance, to hold back a part of the run-off, and these formations become natural reservoirs from which the water drains slowly. These porous formations occur as cones and fans created by the sand and gravel washed down by streams and deposited at the foot of the mountains. (Fig. 97.) The materials thus deposited are not consolidated or cemented but for the most part are loose and spongy and often occupy the lower stretches of alluvial valleys where ground water is near enough to the surface to permit of profitable pumping. Table 10 illustrates how an increase or a decrease in the supply furnished by feeder streams was directly reflected in a corresponding rise or fall of the water levels in the irrigation wells of a typical southern California area. It will be noted that the pumping lift became greater each year during several successive dry years.

TABLE 10.—*Influence of water supply in streams upon water level in wells used for irrigation*

Date	Flow of feeding stream	Pumping lift at wells	Date	Flow of feeding stream	Pumping lift at wells
	Miner's inches	*Feet*		*Miner's inches*	*Feet*
September, 1917		112	September, 1928	204	279
September, 1925	176	244	September, 1929	236	306
September, 1926	361	245	November, 1929		318
September, 1927	423	228			

The amount of the precipitation that is stored depends upon a number of conditions, such as the quantity and intensity of rainfall, the character of the watershed surfaces, the topography, the rate of run-off, and the percolation and porosity factors of the strata in which the water is stored. Obviously, any retardation of the run-off tends to increase the penetration to the subterranean reservoirs and, consequently, the quantity of water made available for irrigation. Methods of holding back the run-off have therefore long been sought and among those now in use is that generally known as "water spreading."

The practice of water spreading is not new. Records show that as long ago as 1889 the city of Denver used a modified form of spreading in order to supplement its water supply and tide it over a threatened water famine. In 1896 the practice, on a much broader scale, was adopted in southern California, and now water is spread over large

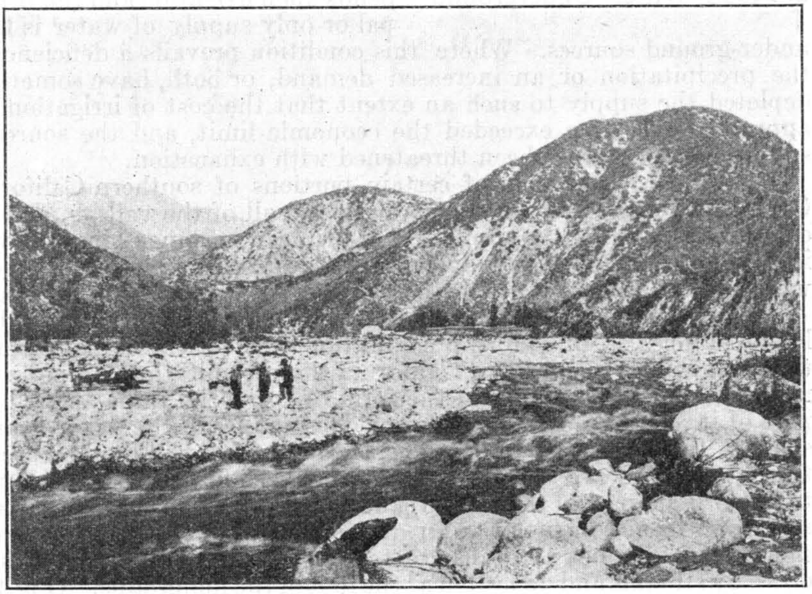


FIGURE 97.—Head of gravel cone at mouth of Santa Ana Canyon, near Mentone, Calif.

areas with complete success. The city of Los Angeles, for example, maintains well-devised spreading and storage works in the San Fernando Valley. Orange, San Bernardino, and Riverside Counties have pooled their interests and formed a tri-county water conservation association with a view to the storage of the flood waters of Santa Ana River and have been more or less successful each year since about 1911. The records of the association show a maximum storage for one year, that of the season of 1921–22, of 81,000 acre-feet. Another association spreads water, whenever enough is available, over an area of about 1,000 acres of the Lytle Creek cone, and there are extensive spreading works in the San Antonio and Cucamonga Creek areas.

The great value of water spreading in the conservation of the run-off of southern California is well illustrated by the fact that the quantity of water thus stored in the San Gabriel cone on a wetted area of not to exceed 40 acres was over 12,000 acre-feet in the season of 1929–30, although that season was one of low precipitation.

Different methods of spreading are employed in different localities. One is to run the water through ditches constructed in porous materials, diverting the streams into smaller and smaller channels from

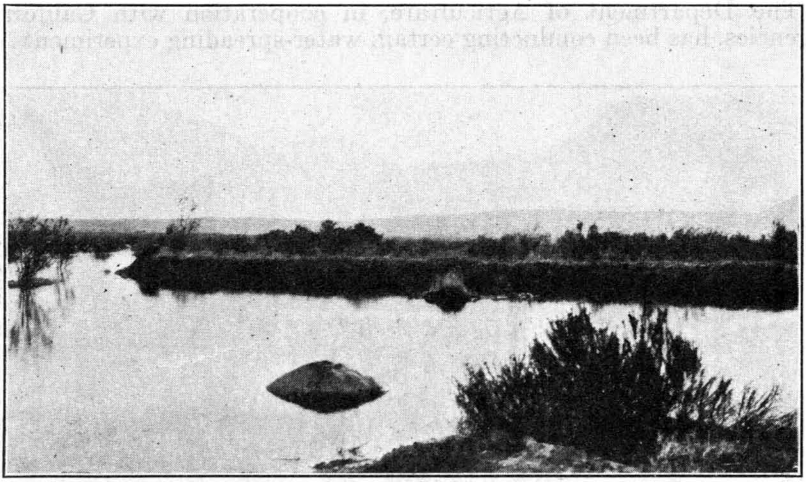


FIGURE 98.—Basins formed by check or contour dams built on the flatter slopes of the gravel cones serving the double purpose of stimulating percolation and settling the storm waters

which the water is distributed in thin films over gravelly areas. In the basin or check method (fig. 98) the water is held in numerous shallow percolation basins created through the construction of low

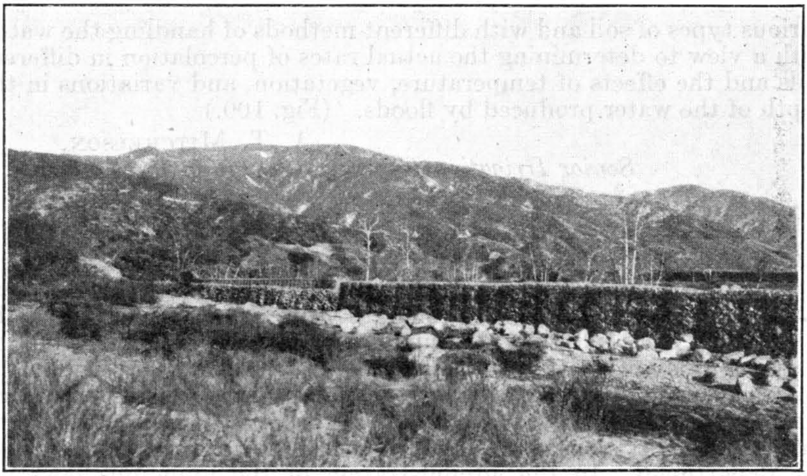


FIGURE 99.—One of the spreading or retarding dams built across the stream bed. Note the construction of this dam, formed by encasing bowlders in a binder of hog wire. The low section on the left end of the dam serves as a spillway thereby causing the overpour to meander over the higher portions of the gravel cone in its passage back to the stream bed. This, of course, stimulates percolation.

rock and earth dams. (Fig. 99). Still another method is to use horizontal tunnels or vertical shafts, or both, to conduct the water to the underground gravel deposits that serve as reservoirs.

Usually all of the works needed for the complete and efficient storage of water by spreading can be quickly and cheaply constructed. The areas utilized are generally of little or no value for other purposes and water thus stored is subject to little loss from evaporation.

The Department of Agriculture, in cooperation with California agencies, has been conducting certain water-spreading experiments on

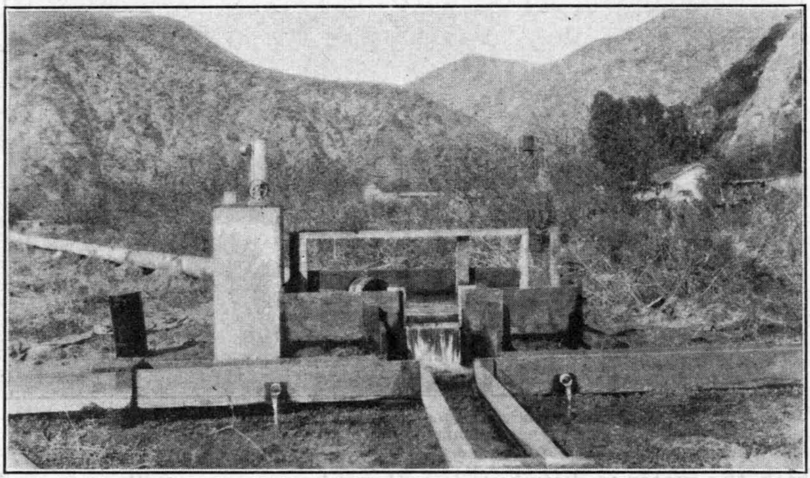


FIGURE 100.—Supply and metering system on the experimental plot of the Department of Agriculture near Azusa, Calif. The water is distributed over the accurately measured area in such a manner as to get an even film of water over the entire surface. Instruments for determining the percolation rate per day, the soil and water temperature, and the evaporation or transpiration losses are installed here

various types of soil and with different methods of handling the water, with a view to determining the actual rates of percolation in different soils and the effects of temperature, vegetation, and variations in the depth of the water produced by floods. (Fig. 100.)

A. T. MITCHELSON,
Senior Irrigation Engineer, Bureau of Public Roads.

LAW Administration by the Department Raises Important Legal Issues By direction of Congress the legal work of the United States Department of Agriculture is performed under the supervision of the solicitor who, by virtue of this authority, acts as legal adviser to the Secretary and to the various administrative officers. The solicitor is assisted in the performance of his duties by a corps of attorneys who are attached to various office divisions, each of which specializes in certain activities of the department. In the administration of the numerous laws enacted by Congress and the regulations promulgated thereunder relating to agriculture and allied subjects, legal questions and controversies of many kinds must necessarily be considered. Some of these controversies are sensational in their developments while others, although lacking in sensational factors of interest, are determinative of questions of great importance to the individual or to the country at large.

On occasions in the enforcement of public rights the Government becomes involved in cases which also concern private interests and at

Usually all of the works needed for the complete and efficient storage of water by spreading can be quickly and cheaply constructed. The areas utilized are generally of little or no value for other purposes and water thus stored is subject to little loss from evaporation.

The Department of Agriculture, in cooperation with California agencies, has been conducting certain water-spreading experiments on

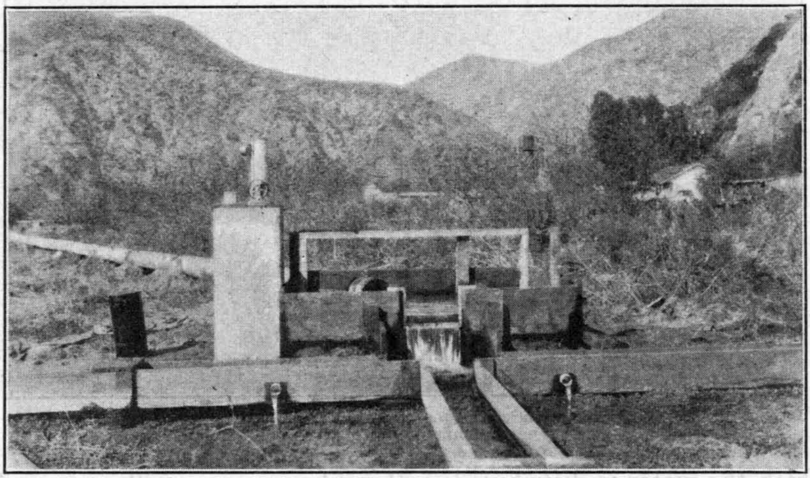


FIGURE 100.—Supply and metering system on the experimental plot of the Department of Agriculture near Azusa, Calif. The water is distributed over the accurately measured area in such a manner as to get an even film of water over the entire surface. Instruments for determining the percolation rate per day, the soil and water temperature, and the evaporation or transpiration losses are installed here

various types of soil and with different methods of handling the water, with a view to determining the actual rates of percolation in different soils and the effects of temperature, vegetation, and variations in the depth of the water produced by floods. (Fig. 100.)

A. T. MITCHELSON,
Senior Irrigation Engineer, Bureau of Public Roads.

LAW Administration by the Department Raises Important Legal Issues By direction of Congress the legal work of the United States Department of Agriculture is performed under the supervision of the solicitor who, by virtue of this authority, acts as legal adviser to the Secretary and to the various administrative officers. The solicitor is assisted in the performance of his duties by a corps of attorneys who are attached to various office divisions, each of which specializes in certain activities of the department. In the administration of the numerous laws enacted by Congress and the regulations promulgated thereunder relating to agriculture and allied subjects, legal questions and controversies of many kinds must necessarily be considered. Some of these controversies are sensational in their developments while others, although lacking in sensational factors of interest, are determinative of questions of great importance to the individual or to the country at large.

On occasions in the enforcement of public rights the Government becomes involved in cases which also concern private interests and at times these private interests far outweigh in monetary considerations the interests of the United States. The participation of the Government in such cases is not due to any desire to take part in private differences but to maintain those principles of justice and equity having for their object impartial enforcement of the laws, which are so necessary to the prosperity and success of an ever-advancing sovereignty.

Many thousands of acres of land in the public-land States of the country are embraced in our national forests which are administered by the Department of Agriculture. Such lands although withdrawn for forest purposes are subject to disposal to individuals under the mining laws of the United States which are administered by the Department of the Interior. This is occasioned by a desire to encourage the development of our mineral resources. But to be so acquired a tract of land must be of a substantial mineral character. Recently a mineral application was filed for a tract of land within the boundaries of the Beaverhead National Forest, Mont. Upon an examination of the land by the forest officials it was found that the land itself was nonmineral in character but supported a vast pile of mineral tailings from mining operations on other lands, confined by a cribbing made of logs and bags. It developed that these tailings had been placed on the land many years ago by a mining company to await improved methods for the extraction of the mineral values remaining in them. Although much precious metal had been recovered from the ore years ago it was estimated by mining engineers that the material is now worth in excess of $1,000,000.

Mineral Character of Land Asserted

While it was evident that the mineral applicant was seeking to acquire possession of valuable mineral tailings, he sought to prove the mineral character of the land itself in support of his claim. Anticipating failure in this respect he also alleged an abandonment by the owner of the tailings in which event it was urged that they would have ceased to be personal property and become a part of the realty thereby rendering the land upon which they rested mineral in character and subject to disposition under the mineral laws of the United States. If successful in this it meant that the United States would lose its land and the successor to the mining company a fortune in the tailings. The applicant sought to show that the cribbing erected was for the purpose of preventing the tailings from contaminating the water in the creek, which was used by cattle, and that the mineral tailings had been abandoned years ago. However, after extended proceedings it was held by the Interior Department that the land in its natural condition was nonmineral in character and that under the circumstances shown no mineral character was imparted to it by the deposit of the tailings. The claim on June 9, 1930, was declared void, the ownership of the land remaining in the United States and the tailings retaining their true character as personal property.

When Congress deems it necessary to regulate a business it is not unusual for those who are restricted in their activities to seek to tie the hands of the executive officers charged with the administration of a particular law. The packers and stockyards act of 1921 was passed to secure the free and unburdened flow of livestock from the ranges and farms to consumers of meat and meat products, or still as livestock to other parts of the country. Then it was desired to provide against the exorbitant charges, duplication of commissions, and deceptive practices in the passage of livestock through the stockyards made possible by collusion between the stockyards, the commission men, the packers, and the dealers. The act declares that persons engaged in the business of buying or selling in interstate commerce, livestock at a stockyard on a commission basis are market agencies; requires such agencies to furnish their services upon reasonable request, without discrimination and at reasonable rates and confers upon the Secretary of Agriculture the power to determine what are just and reasonable rates and charges for their services.

Secretary's Action Upheld

The Secretary of Agriculture prescribed a tariff of maximum charges for such services at the Omaha Union Stockyards. An attempt was made in the courts to enjoin enforcement of this order and to set it aside by 58 concerns comprising the entire membership of the Omaha Livestock Exchange. It was urged by the plaintiffs that the packers and stockyards act does not purport to confer upon the Secretary power to prescribe commission rates and that if it does it is unconstitutional because it provides for the fixing of charges for personal services, in a manner constituting a denial of the liberty guaranteed to the plaintiffs by the Federal Constitution. The Supreme Court of the United States on February 24, 1930, however, pointed out that the plaintiffs enjoyed a substantial monopoly at Omaha of an indispensable service in interstate commerce in livestock, having eliminated rate competition and substituted for it rates fixed by themselves. The court said that there was nothing in the nature of monopolistic personal services which makes it impossible to fix reasonable charges to be made therefor and that there is nothing in the Constitution which limits the Government's power to regulate the businesses which employ substantial capital and that inasmuch as the Secretary's order prescribes only the charges to be made in individual transactions it is not an attempt to fix a maximum wage or net income for anyone. The court upheld the power of the Secretary to prescribe reasonable rates for the buying and selling of livestock at public stockyards and approved the rates prescribed for services at the Omaha Union Stockyards, and the method employed by the department in determining those rates.

Again in the case of Ambruster *v.* Mellon et al., an attempt was made to enjoin the Secretaries of the Departments of Treasury, Agriculture, and Commerce from permitting the importation into this country of certain qualities of ergot of rye which were claimed to be under the legal standard and dangerous to the public health. It was said that such importations resulted in irreparable injury to Ambruster, who was the importer and owner of quantities of ergot of rye of the standard character. It was urged that the duty of the departmental executives was mandatory and permitted the exercise of no official discretion in the determination of the admissibility of drugs. The Court of Appeals of the District of Columbia on May 5, 1930, held, however, that the authority of these executives is not simply ministerial in character in the particular under discussion but calls for a finding of fact and the exercise of judgment upon the facts when found, and stated that the exercise of this authority will not be reviewed by the courts unless it has been capriciously or arbitrarily exercised.

Execution of Road Agreements

Recently the authority of the Secretary of Agriculture under the Federal highway act to withhold approval of contracts for Federal-aid road projects until a particular contractor had made an adjustment with a State under a previous closed contract for road building which the Secretary had found had not been properly performed, was questioned. The contractor denied the right of the Secretary to reopen the question of the contractor's past performances in respect to the execution of road agreements. The Supreme Court of the District of Columbia on May 31, 1930, stated, however, that if the Secretary should be of the opinion that the contractor had failed properly to perform his work in the past and had failed to make good the losses occasioned thereby, it would seem to be common business procedure on the part of the department to decline to approve any further contracts with that particular contractor until he had made good the losses due to his faulty work.

Peaceful and lawful means to determine the legality of acts performed by representatives of the department are not objectionable. But unfortunately recourse is sometimes had to force on the part of those who seek to avoid the requirements of law. An employee of the United States Department of Agriculture in company with other inspectors went to several farms in a middle-western State for the purpose of applying the tuberculin test to cattle in accordance with State and Federal laws. Approximately 1,900 cattle owners out of 1,952 in the particular county had requested this test. The remaining cattle owners opposed a compulsory testing of cattle. The inspector was denied permission to examine the cattle of certain of these owners who stated that they would oppose by force and arms if necessary any attempt to examine their cattle or to apply the tuberculin test. These farmers were reported to have been armed with shotguns and farm implements and to have accompanied their actions with threatening and abusive language. The ringleaders were indicted by a Federal grand jury; convicted on May 5, 1930, in the United States District Court and fined in amounts varying from $100 to $350. The court in pronouncing sentence stated that it did not impose incarceration, because of the novelty of the case, but intimated that further cases of a similar nature would be dealt with more severely.

H. N. Foss,
Attorney, Office of the Solicitor.

LEATHER Injured by Mud, Water, and Heat; Preserved by Grease Leather, although tough, is responsive and an investment of a reasonable amount of attention and treatment in the care of leather goods yields a profitable dividend in greater satisfaction and service.

The arch enemies of leather are mud, water, strong acids and alkalies, extreme dryness, and prolonged exposure to heat and direct sunlight. Among its best friends is oil or grease, preferably of animal or vegetable origin. Oils and greases help to protect the fibers against decay and to lubricate them so that they are flexible and can slide back and forth without cracking or breaking.

Execution of Road Agreements

Recently the authority of the Secretary of Agriculture under the Federal highway act to withhold approval of contracts for Federal-aid road projects until a particular contractor had made an adjustment with a State under a previous closed contract for road building which the Secretary had found had not been properly performed, was questioned. The contractor denied the right of the Secretary to reopen the question of the contractor's past performances in respect to the execution of road agreements. The Supreme Court of the District of Columbia on May 31, 1930, stated, however, that if the Secretary should be of the opinion that the contractor had failed properly to perform his work in the past and had failed to make good the losses occasioned thereby, it would seem to be common business procedure on the part of the department to decline to approve any further contracts with that particular contractor until he had made good the losses due to his faulty work.

Peaceful and lawful means to determine the legality of acts performed by representatives of the department are not objectionable. But unfortunately recourse is sometimes had to force on the part of those who seek to avoid the requirements of law. An employee of the United States Department of Agriculture in company with other inspectors went to several farms in a middle-western State for the purpose of applying the tuberculin test to cattle in accordance with State and Federal laws. Approximately 1,900 cattle owners out of 1,952 in the particular county had requested this test. The remaining cattle owners opposed a compulsory testing of cattle. The inspector was denied permission to examine the cattle of certain of these owners who stated that they would oppose by force and arms if necessary any attempt to examine their cattle or to apply the tuberculin test. These farmers were reported to have been armed with shotguns and farm implements and to have accompanied their actions with threatening and abusive language. The ringleaders were indicted by a Federal grand jury; convicted on May 5, 1930, in the United States District Court and fined in amounts varying from $100 to $350. The court in pronouncing sentence stated that it did not impose incarceration, because of the novelty of the case, but intimated that further cases of a similar nature would be dealt with more severely.

H. N. Foss,
Attorney, Office of the Solicitor.

LEATHER Injured by Mud, Water, and Heat; Preserved by Grease

Leather, although tough, is responsive and an investment of a reasonable amount of attention and treatment in the care of leather goods yields a profitable dividend in greater satisfaction and service.

The arch enemies of leather are mud, water, strong acids and alkalies, extreme dryness, and prolonged exposure to heat and direct sunlight. Among its best friends is oil or grease, preferably of animal or vegetable origin. Oils and greases help to protect the fibers against decay and to lubricate them so that they are flexible and can slide back and forth without cracking or breaking.

To get the most service out of leather goods treat them promptly and periodically. All too often no thought is given to preservation until the leather is cracky, brittle, and powdery and has practically no strength left. It is then really too late. (Fig. 101.) The aim should be to keep the leather in its original sound and serviceable condition.

When oiling leather, use judgment and care. To do any good, the oil must get into the leather—not simply on it. This means that enough oil must be used to satisfy the leather. On the other hand, an excess of oil, which would leave the surface greasy and smeary, usually is undesirable. It is safest to apply but a little oil at a time while carefully noting how the oil is taken up by the leather. Applications should then be repeated until the leather is well oiled. Uniform light applications can be conveniently made with a small wad of oily cheese-cloth. For general oiling, neat's-foot oil, castor oil, lanolin, olive oil, and winter sperm oil, or mixtures of them, are good. It should be remembered that any oil or grease will darken tan or light-colored leathers.

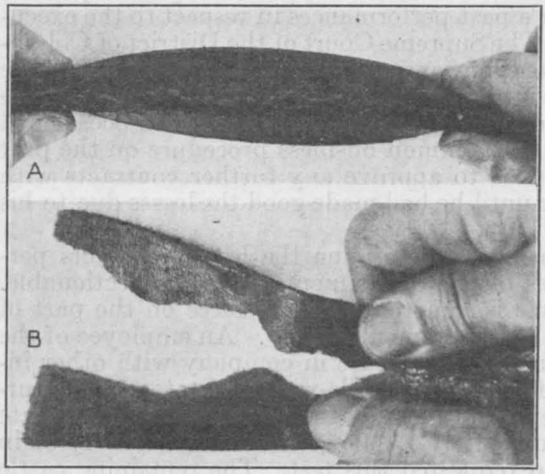


FIGURE 101.—Too late—when leather gets cracky (A) and tears easily (B), treatment will do but little good

Effects of Water

Many leather articles are ruined by the way they are mistreated when wet. In the first place, unless made for continuous use in water, leather goods should not be worn or used while wet any longer than is absolutely necessary. Wet leather wears away rapidly. It is easily stretched out of shape and readily cut through by thread. Much damage is done to wet leather by the way it is dried. Surprising as it may seem, wet leather burns much more readily than dry leather. A temperature hotter than the hand can bear is destructive.

Wet leather should be dried slowly and never at a temperature too hot for the bare hand. Wet shoes and other leather articles should be reshaped as much as possible and kept so with forms or pads while drying. If a polish or shine is not desired, an application of oil to the leather while it is still damp but not wet will make it more pliable and soft when dry.

Many leather articles such as brief cases, suit cases, bags, and upholstery leather can be improved in appearance and condition by dressing them with a saddle-soap preparation according to directions on the container. After treatment, the leather should be thoroughly polished and rubbed until it no longer stains a white cloth.

Direct sunlight is harmful to leather of certain types. Leather-bound books, leather-upholstered furniture, and leather articles destined for long service should be kept out of direct sunlight.

Mildewing of Leather

The molding or mildewing of leather is a frequent occurrence. There are no commercial leathers that under favorable conditions of moisture and heat will not develop mold growth. This is not, however, a condemnation of leather. Molds are present everywhere, and when conditions are right they will grow if they can find a medium on which to live. Molds can not grow without a certain amount of moisture, and the surest way to prevent mold growth on leather articles is to keep them in a dry, well-ventilated, well-lighted place. As a rule, the use of poisons to prevent mildew is not recommended. Molds seldom seriously injure leather. They do, however, frequently change its color. Mildew should be removed with a damp cloth.

Because a high polish and finish is desirable for shoes for street and dress wear, these can not be heavily oiled and greased. Such shoes should always be kept polished not only because of appearance but also because polishing leaves a thin film of wax that helps to turn water to keep the pores of the leather from becoming filled with dirt, and to prevent staining of the uppers.

Old shoe uppers on which polish has accumulated can be improved by scrubbing them thoroughly with clean gasoline or naphtha and then polishing twice.

The uppers of street shoes can be made more pliable, if desired, and more resistant to wetting by oiling them with castor oil. Castor oil is the only oil that can be used if the uppers are to be polished afterward and even castor oil must be applied in very small quantities and the shoes left in a warm place overnight before being polished.

The soles of street shoes can be made more water and wear resistant by brushing them with warm neat's-foot oil, castor oil, or lanolin, being very careful, however, that the oil does not touch the uppers.

Patent leather uppers probably are kept in the best condition by simply washing them when necessary with a soft, wet cloth, without subsequent use of polishes and dressings. A very light oiling of the uppers once or twice a month with castor oil or vaseline will help to prevent cracking.

Work shoes for winter or wet wear will last longer and be more of a protection if waterproofed. A mixture of 8 ounces of neutral wool grease, 4 ounces of petrolatum, and 4 ounces of paraffin wax, or one consisting of 16 ounces of petrolatum and 2 ounces of beeswax makes a good waterproofing compound.

Care of Harness and Belts

Harness should be kept clean and in a soft, pliable condition. It should be washed and oiled from two to four times a year, depending upon its use and condition.

A driving belt can not do its best and last as long as it should if not properly installed. Belts, like harness, should be kept clean, flexible, and nourished. Pasty mixtures of butterlike consistency made from neat's-foot oil, castor oil, tallow, and neutral wool grease are good belt dressings.

Leather bookbindings will last longer if kept well oiled and dressed. Dry, powdery, cracked, and broken leather bindings, starving for oil, are a familiar sight. This condition can be forestalled for many years by keeping the bindings well oiled, using pure 20° C. cold-test neat's-foot oil, United States Pharmacopœia castor oil, United States Pharmacopœia anhydrous lanolin, or a mixture of about equal parts of the lanolin and neat's-foot oil. A good dressing in emulsion form may be made of the following: Anhydrous lanolin, 30 parts; castor oil, 12 parts; Japan wax, 5 parts; powdered sodium stearate, 3 parts; and distilled water, 50 parts. The sodium stearate is dissolved in the water by gentle heating; the lanolin, oil, and wax are melted together and then poured in a thin stream into the sodium stearate solution while the whole is being stirred. When cold, the mixture is beaten or whipped into a cream. An emulsion such as just described can also be used to clean the surface of old, soiled vellum bindings.

Oils and dressings must be worked well into the bindings and as much oil applied as is possible without leaving the binding greasy.

Old powdery and dusty bookbindings can be made more pleasant to handle and more serviceable by lacquering them with a clear, flexible, "soluble-cotton" or cellulose-nitrate brushing lacquer. Before lacquering, such bindings should be oiled as heavily as possible without leaving the surface greasy for they can not be oiled after lacquering. Furthermore, if not well oiled, some of the lacquer is taken up by the leather, which increases its brittleness and consequently promotes breakage, especially at the hinges.

R. W. Frey,
Chemist, Bureau of Chemistry and Soils.

LEGUME Inoculation by Cultures Depends Finally on Field Test

The practice of treating soil with soil for the growth of legumes is not new. Just when this procedure was found to be beneficial is not known but records indicate that it was practiced in Holland, Finland, Italy, and Germany over a hundred years ago. And prior to this—more than a thousand years—historians report that legumes were considered important for their fertilizing value. This early knowledge of certain of the legumes shows that the function of these plants in agriculture was recognized although the underlying principles were unknown.

Nitrogen assimilation by plants was a much discussed question in the early part of the nineteenth century. Boussingault, a Frenchman, in 1838 partially solved this problem by demonstrating that clover could obtain nitrogen from the air but wheat could not. This was only a small advance and did not uncover the agency responsible for the fundamental difference between legumes and nonlegumes. In 1879 it was shown that nodules on legumes could be prevented by sterilizing the soil in which they were to be grown. This indicated that an influence in unsterilized soil was responsible for their formation. It remained for two German investigators, Hellriegal and Wilfarth, in 1886 to show that nodules of legumes are caused by bacteria and by virtue of this invasion of plant roots nitrogen is fixed and the plant benefited. This discovery marked a great advance in the science of agriculture.

Natural Inoculation

The nodule-producing bacteria are found in the soil as well as in the nodules. This explains why the earlier farmers obtained beneficial results by transferring soil from one field to another. While these foot oil, United States Pharmacopœia castor oil, United States Pharmacopœia anhydrous lanolin, or a mixture of about equal parts of the lanolin and neat's-foot oil. A good dressing in emulsion form may be made of the following: Anhydrous lanolin, 30 parts; castor oil, 12 parts; Japan wax, 5 parts; powdered sodium stearate, 3 parts; and distilled water, 50 parts. The sodium stearate is dissolved in the water by gentle heating; the lanolin, oil, and wax are melted together and then poured in a thin stream into the sodium stearate solution while the whole is being stirred. When cold, the mixture is beaten or whipped into a cream. An emulsion such as just described can also be used to clean the surface of old, soiled vellum bindings.

Oils and dressings must be worked well into the bindings and as much oil applied as is possible without leaving the binding greasy.

Old powdery and dusty bookbindings can be made more pleasant to handle and more serviceable by lacquering them with a clear, flexible, "soluble-cotton" or cellulose-nitrate brushing lacquer. Before lacquering, such bindings should be oiled as heavily as possible without leaving the surface greasy for they can not be oiled after lacquering. Furthermore, if not well oiled, some of the lacquer is taken up by the leather, which increases its brittleness and consequently promotes breakage, especially at the hinges.

R. W. Frey,
Chemist, Bureau of Chemistry and Soils.

LEGUME Inoculation by Cultures Depends Finally on Field Test

The practice of treating soil with soil for the growth of legumes is not new. Just when this procedure was found to be beneficial is not known but records indicate that it was practiced in Holland, Finland, Italy, and Germany over a hundred years ago. And prior to this—more than a thousand years—historians report that legumes were considered important for their fertilizing value. This early knowledge of certain of the legumes shows that the function of these plants in agriculture was recognized although the underlying principles were unknown.

Nitrogen assimilation by plants was a much discussed question in the early part of the nineteenth century. Boussingault, a Frenchman, in 1838 partially solved this problem by demonstrating that clover could obtain nitrogen from the air but wheat could not. This was only a small advance and did not uncover the agency responsible for the fundamental difference between legumes and nonlegumes. In 1879 it was shown that nodules on legumes could be prevented by sterilizing the soil in which they were to be grown. This indicated that an influence in unsterilized soil was responsible for their formation. It remained for two German investigators, Hellriegal and Wilfarth, in 1886 to show that nodules of legumes are caused by bacteria and by virtue of this invasion of plant roots nitrogen is fixed and the plant benefited. This discovery marked a great advance in the science of agriculture.

Natural Inoculation

The nodule-producing bacteria are found in the soil as well as in the nodules. This explains why the earlier farmers obtained beneficial results by transferring soil from one field to another. While these bacteria may live indefinitely in a soil suited to their growth, it is believed that in most cases the soil will be better populated with them if the host plant upon which they function is grown from time to time. In the nodule, the bacteria are insulated from other bacteria and propagate therein in the absence of competition from without. When the plant dies or becomes dormant the nodules rot and the bacteria pass back into the soil to await another chance to associate with their particular host.

Since the bacteria which cause nodules are adapted to certain legumes only and are present in soils usually on account of the growth of their specific plants it quite often happens that certain strains of organisms are not present. Sometimes they may have been eliminated by conditions under which it was impossible for them to live.

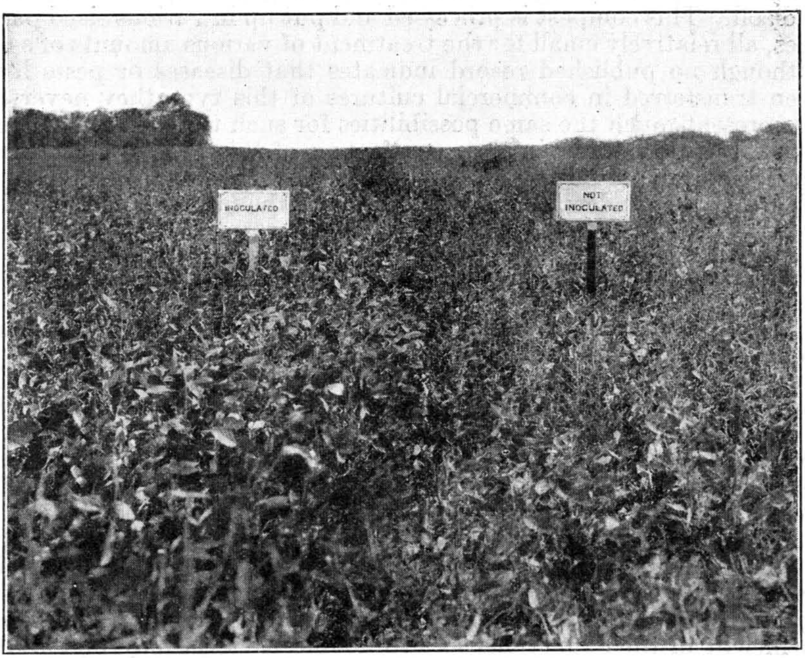


FIGURE 102.—Soybean field which shows the effect of nodule bacteria and of the lack of them

These are mainly acidity, heating, drying, and lack of aeration. The absence of the proper organism makes it necessary for best results to introduce them, correcting, of course, the conditions which are detrimental, in advance of their application. (Fig. 102.)

When the inoculation question was first studied in the United States about 25 years ago the use of naturally inoculated field soil was commonly advised and where satisfactory material and labor for its preparation is available, its use is often recommended to-day. In certain ways the transfer of soil is objectionable; it requires much labor for its collection and distribution; it may be the cause of distributing diseases and pests.

To obviate the extensive drilling of soil over the whole field the Illinois Agricultural Experimental Station proposed in 1904 a method by which seed is treated lightly with a 10 per cent glue solution and then dusted with a small quantity of naturally inoculated field soil. Through this process the soil is glued to the seed and the proper nodule bacteria it contains are in a position to enter the roots promptly when they form. The glue method has been widely practiced and is still used. A modification of this method involves the shaking of naturally inoculated field soil with water and applying the muddy suspension to the seed. In either method the seed is allowed to dry before sowing. Naturally inoculated field soil also has been used by mixing it with an equal part by volume of the seed at the time of sowing. Other ratios of seed to soil have been used, the soil usually being of smaller volume than the seed.

A number of commercial concerns have utilized the fact that in favorable soils the numbers of legume bacteria may be greatly increased by growing legumes and composting plants, roots, nodules, and soil. This compost is processed and put up in various sized packages, all relatively small for the treatment of various amounts of seed. Although no published record indicates that diseases or pests have been transferred in commercial cultures of this type they nevertheless present much the same possibilities for such transfer as field soil. It is also evident that in the manufacture of this type of culture not much equipment beyond that available on the farm is necessary. With a proper understanding of the subject the farmer is in a position to make his own inoculation of this character.

Artificially Prepared Inoculation

Nodule bacteria are found in soil or nodules and from the latter source it has been found possible to isolate them in pure culture. A pure culture of bacteria is a growth of one kind only, usually maintained on a sterile solid nutrient, shielded from external invasion by glass and sterile cotton. Cultures may be maintained pure in sterilized soil and liquid nutrient but for purposes of study and observation a jellylike substance called agar made from certain kinds of seaweed is used. The organisms grow on the surface of this material.

After a pure culture is obtained it is necessary to determine whether it will produce nodules satisfactorily on the plant for which it is intended. This is usually accomplished by tests on plants in large bottles or protected sterile pots. Just as occasional animals and plants are inefficient in their functions so also nodule bacteria may be variable in their ability to fix nitrogen for the benefit of the plant. Some organisms have been found which produce nodules but are detrimental to the plant. It is therefore very necessary that a culture be thoroughly tested before it is distributed for inoculation purposes.

Thirty-four years ago Nobbe and Hiltner of Germany began the commercialization of the pure cultures by distributing them in glass containers to farmers. The Department of Agriculture in 1902 began the preparation of pure cultures after a study of this work by one of its investigators. The first method consisted of adding pure cultures to absorbent cotton and slowly drying this impregnated material at a very gentle heat. Pieces of this inoculant with sugar and other chemicals were sent to farmers for development on the farm. At that time an effort was being made to establish a source of inoculation on the farm for transfer to other local areas.

The preparation of cultures of this type on the farm was not satisfactory and was abandoned in favor of a liquid pure culture. The liquid type of culture is satisfactory for rather prompt usage and has the advantage of being ready to apply without further preparation. More than a half million packages of nodule bacteria for the treatment of more than a million bushels of legume seed have been distributed to farmers for experimental purposes by the department in the last 25 years.

Commercial inoculation derived from pure cultures first appeared in the United States on cotton, then agar and liquid followed, agar being still widely employed. Peat and sand are also used as carriers for legume bacteria, the former finding a wider application than the latter presumably on account of its lightness and ability to retain water.

For selling as an article of commerce, especially over large territories, it is necessary to have a material that will withstand conditions of transit and storage in seed stores for at least the growing season and certain of the manufacturers use ventilated stoppers to help keep alive the organisms on agar in bottles. A number of the producers of inoculation place a date on the package after which it is not desirable to use it.

The method of applying inoculation of the commercial type has not varied greatly in 25 years. The intent is to put the organisms in position to enter the roots when they form. A suspension of the organisms found in a soil, sand, peat, or agar culture is obtained by shaking with water. This mixture applied lightly to the seed dries quickly and permits of prompt sowing which practice is preferable because of the inability of certain strains of nodule bacteria to live very long on dry seed.

Experiments With Dry Applications

A recent development endeavors to put the organisms on the seed by means of dry dusts thereby eliminating water altogether in the process. It is well known that legume bacteria are very susceptible to drying so that one would not expect them to live satisfactorily in carriers containing only a little moisture. Of course, the real test of a culture is the result it will produce in the field. Evidence from this source has at least indicated that quite often the dry applied inoculants do not compare favorably with good quality material prepared for liquid application used according to directions.

With the appearance of the dry inoculants has come seed inoculated at the seed store. It is quite probable that some of the surviving bacteria in the dusts will live on the seed just as natural dirt on seed often retains them alive and is the means of their occasional transferance. However, since the preliminary work shows unfavorable results when dusts are applied at the time of planting no improvement in the efficiency of the bacteria is to be expected by storing on dry seed. Until more evidence is available dry inoculation must be considered in the experimental stage and those who desire to use them may find it advantageous to compare their efficiency with that of those applied with moisture.

Regulation of Commercial Legume Inoculants

In the period during which commercial legume bacteria cultures have been sold there have appeared materials which were rather worthless. Sometimes this condition may have been due to treatment subsequent to leaving the manufacturer, although quite as often it has been traced to faulty handling in the preparing laboratory.

The farmer has no means of telling whether a culture is good or bad. A date on the package may show how old it is, but it gives no idea of its quality. This can be determined only by planting treated and untreated seed side by side on the same soil—a very advisable practice. The only immediate criterion of satisfactory material available to the farmer is the past reputation of the firms which make and sell it, respectively. But this is not entirely sufficient with material of such a perishable nature.

In 1906 an inspection of commercial cultures by the Department of Agriculture revealed that many of them on the market at that time were worthless. Since that time the department has made annual inspections of samples of commercial inoculating materials, and while there has been a more or less gradual advancement in quality there is still much room for improvement. Information concerning materials included in this inspection is available in the form of a sheet which gives the names of the firms whose samples have given satisfactory results as well as the names of public institutions which are engaged in the distribution of inoculating material.

Certain of the States have endeavored to regulate the sale of commercial legume inoculants. New Jersey started in 1919 to make annual tests of material found on sale within the State; Wisconsin put a law to control these materials on the books in 1921; Maryland followed with a similar law in 1922. A Kansas law dealing with inoculants appeared in 1927. Several other States have considered laws for this purpose, but they are not yet on the statute books. All of these efforts in behalf of better quality material are commendable and tend to weed out the deficient manufacturers. However, the farmer should not depend entirely upon those regulatory agencies but should determine for his own circumstances the effect of the culture he purchases by comparing plants from treated seed with those from untreated.

LEWIS T. LEONARD,
Bacteriologist, Bureau of Chemistry and Soils.

LESPEDEZAS Introduced from Asia Thrive in Widening Area in U. S.

In 1846 Thomas C. Porter, of Monticello, Ga., found a plant that was new to him. He sent it to the Gray Herbarium and learned that it was *Lespedeza striata* and that as it was not native to the United States, it must in some way have emigrated from Japan. This plant became known as Japan clover, but the more desirable name of Lespedeza has of late become more common.

How rapidly it spread during the next 20 years there is no way of knowing, but it certainly was noticeably more common and spread over a wider territory after the Civil War than before. Since that time the plant has steadily spread north and west until to-day it is found from eastern Kansas to the Atlantic and from central Indiana to the Gulf. Even during the last few years it has obtained a foothold farther north in Indiana and Ohio than where it was known to have grown 10 years earlier.

This spread of the species northward has resulted from variations in the seeding habits of individual plants. If seed produced in Louisiana to leaving the manufacturer, although quite as often it has been traced to faulty handling in the preparing laboratory.

The farmer has no means of telling whether a culture is good or bad. A date on the package may show how old it is, but it gives no idea of its quality. This can be determined only by planting treated and untreated seed side by side on the same soil—a very advisable practice. The only immediate criterion of satisfactory material available to the farmer is the past reputation of the firms which make and sell it, respectively. But this is not entirely sufficient with material of such a perishable nature.

In 1906 an inspection of commercial cultures by the Department of Agriculture revealed that many of them on the market at that time were worthless. Since that time the department has made annual inspections of samples of commercial inoculating materials, and while there has been a more or less gradual advancement in quality there is still much room for improvement. Information concerning materials included in this inspection is available in the form of a sheet which gives the names of the firms whose samples have given satisfactory results as well as the names of public institutions which are engaged in the distribution of inoculating material.

Certain of the States have endeavored to regulate the sale of commercial legume inoculants. New Jersey started in 1919 to make annual tests of material found on sale within the State; Wisconsin put a law to control these materials on the books in 1921; Maryland followed with a similar law in 1922. A Kansas law dealing with inoculants appeared in 1927. Several other States have considered laws for this purpose, but they are not yet on the statute books. All of these efforts in behalf of better quality material are commendable and tend to weed out the deficient manufacturers. However, the farmer should not depend entirely upon those regulatory agencies but should determine for his own circumstances the effect of the culture he purchases by comparing plants from treated seed with those from untreated.

LEWIS T. LEONARD,
Bacteriologist, Bureau of Chemistry and Soils.

LESPEDEZAS Introduced from Asia Thrive in Widening Area in U. S.

In 1846 Thomas C. Porter, of Monticello, Ga., found a plant that was new to him. He sent it to the Gray Herbarium and learned that it was *Lespedeza striata* and that as it was not native to the United States, it must in some way have emigrated from Japan. This plant became known as Japan clover, but the more desirable name of Lespedeza has of late become more common.

How rapidly it spread during the next 20 years there is no way of knowing, but it certainly was noticeably more common and spread over a wider territory after the Civil War than before. Since that time the plant has steadily spread north and west until to-day it is found from eastern Kansas to the Atlantic and from central Indiana to the Gulf. Even during the last few years it has obtained a foothold farther north in Indiana and Ohio than where it was known to have grown 10 years earlier.

This spread of the species northward has resulted from variations in the seeding habits of individual plants. If seed produced in Louisiana is seeded at the Arlington Experiment Farm near Rosslyn, Va., most of the resulting plants, while making a good growth, will not mature seed; but some will, and it is these earlier plants that establish the species at a new point. There will doubtless be a limit to this northward spread, since the Lespedezas are hot-weather plants and besides appear to be strongly influenced in seed production by the length of day—the longer the summer day the less freely do the plants seed.

On good soil, especially in the more southern part of its range, the common Lespedeza grows tall enough for hay, but on most soils it is useful only for pasture and soil improvement. The giant varieties generally make more hay.

The tendency to vary, referred to above, also is displayed in other directions, and this fact was taken advantage of some years ago when S. H. Essary of the Tennessee Agricultural Experiment Station made

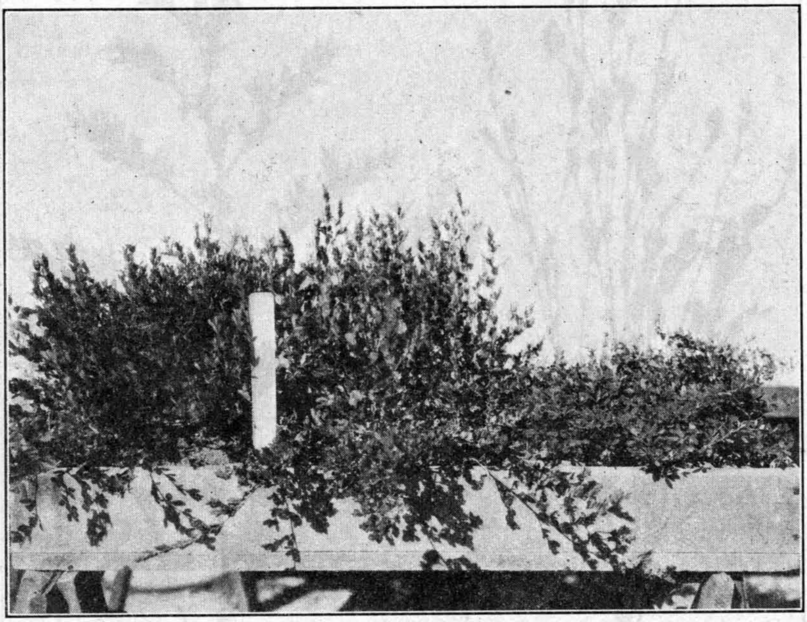


FIGURE 103.—Left to right Kobe, Korean, and common Lespedeza. At Washington, D. C., the Korean grows taller than the other

a number of selections out of the common run of *Lespedeza striata*. Several selections were made, but only one was considered valuable enough to introduce. This is a tall, upright-growing form, especially suited to haymaking, and is now in use as Tennessee 76. Other varieties have been found, and one of these, known as Kobe from the city in Japan where it was found, also has been introduced into the United States. It most nearly resembles Tennessee 76, but lacks the naturally erect habit of that variety and has slightly larger leaves and strikingly larger seeds. Both of these varieties may be called giant forms of the common Lespedeza of the South.

A Species From Korea

Another closely related species has been introduced from Korea, though it also is found in Japan and in China. This is *Lespedeza* *stipulacea,* known in the United States as Korean Lespedeza. This, like the Japanese Lespedeza, is an annual, but it has larger leaves, is much earlier, and has also a distinctive seed. The Korean Lespedeza will ripen farther north than any of the other varieties and is a heavy seeder. One plant has been known to produce 14,799 seeds.

All of these Lespedezas are among the most valuable forage plants for the South. (Fig. 103.) While they respond to lime, they get along

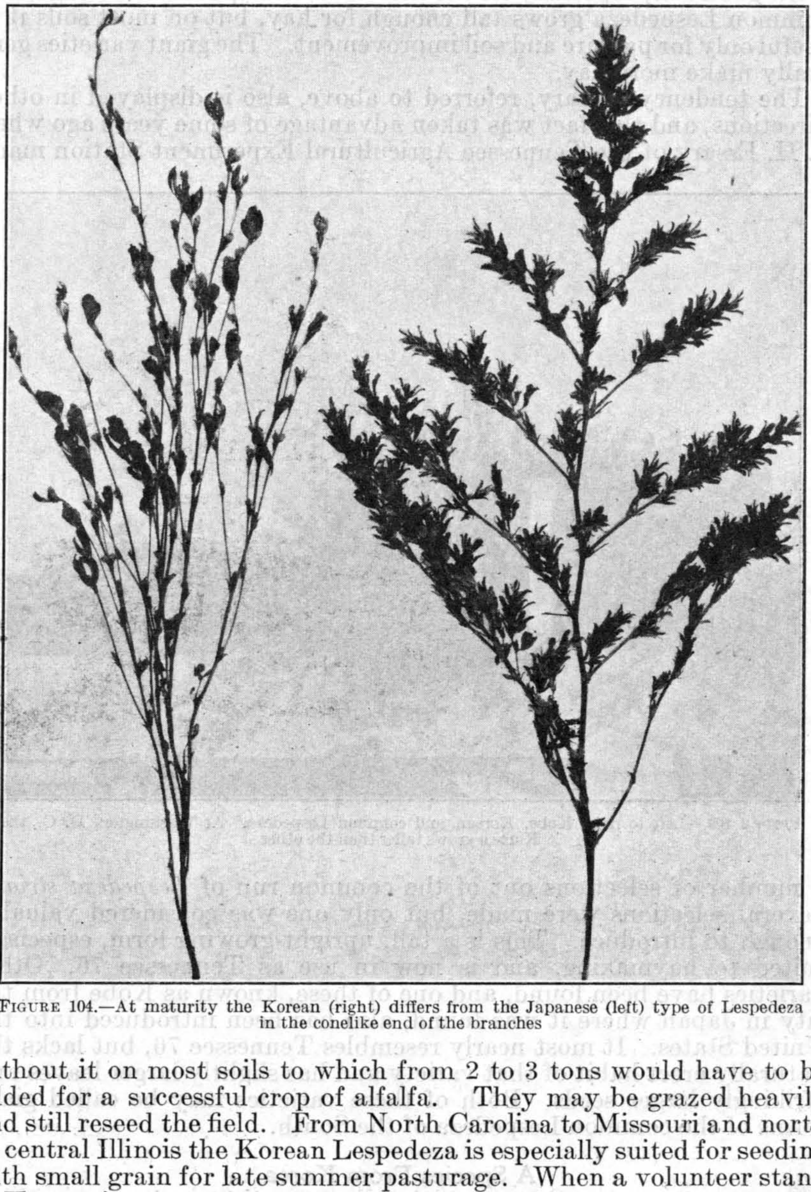


FIGURE 104.—At maturity the Korean (right) differs from the Japanese (left) type of Lespedeza in the conelike end of the branches

without it on most soils to which from 2 to 3 tons would have to be added for a successful crop of alfalfa. They may be grazed heavily and still reseed the field. From North Carolina to Missouri and north to central Illinois the Korean Lespedeza is especially suited for seeding with small grain for late summer pasturage. When a volunteer stand of Korean is secured it is ready to graze a week or two earlier than the later varieties, because of its more rapid growth. Late in the season, however, the late varieties have the advantage, since in the latitude of Washington, D. C., the Korean has matured and died long before the late sorts are killed by frost.

At maturity there is a striking difference between Korean and the other annual Lespedezas (fig. 104), and this is of importance in connection with the harvesting of seed. In the Korean the seeds are borne 1 to 3 in the axils of the leaves near the ends of the branches. The leaves then turn forward at maturity and inclose the seeds, thus making a conelike end to the branch. The protection thus afforded results in less shattering of seed at harvest. The common, the Kobe, and the Tennessee 76 must be harvested with a seed pan if much seed is to be secured. With the Korean a seed pan will catch some seed, especially if the crop is overripe, but frequently this can be dispensed with. There is also a wider latitude in the time at which the Korean may be cut for seed than is the case with the other varieties of Lespedeza.


FIGURE 105.—*Lespedeza sericea*, an oriental perennial species

First-class hay may be made of any of these Lespedezas, but when cutting is delayed until a large part of the seed is ripe the hay is inferior. There seems no reason why Lespedeza hay should not be widely used and be a standard hay in the southern markets which now bring in thousands of tons. To make Lespedeza hay a standard and desirable product, however, it must be cut long before the seed is ripe. Fortunately it is possible to do this and still get seed by cutting early so that a second growth will develop and ripen seed. Unless the season is very dry, enough seed will be made on such second growth at least to reseed the field.

Wild Species Are Perennial

There are wild species of Lespedeza in the United States, but they are all perennial, and, so far as is now known, none are of value in agriculture. There are also many perennial species in the Orient. It is an interesting fact that the genus Lespedeza is found almost exclusively in eastern North America and in eastern Asia. There are no native species on the Pacific coast and none in Europe, Africa, or South America. When, therefore, the Japanese Lespedeza emigrated to the southeastern United States some time before 1846 it was quite at home and proceeded to establish itself firmly. Whether this will happen with the perennial species, some of which have been introduced experimentally, remains to be determined. Some, such as *Lespedeza sieboldi* and its more showy horticultural variety known as *L. japonica*, are offered by nurserymen as ornamentals. They are woody, shrublike herbs, the year's growth in the latitude of Washington, D. C., being killed nearly or quite to the ground and the new growth coming from a permanent crown.

All Lespedezas will thrive on land too poor and too sour for such plants as alfalfa or red clover. Some of the oriental perennials are being experimented with for forage. (Fig. 105.) Whether any one of them will ever become as widely popular as the annual forms remains to be seen.

A. J. Pieters,
Principal Agronomist, Bureau of Plant Industry.

LETTUCE Breeding for Disease Resistance Progresses Rapidly A surprisingly large percentage of the lettuce used in the United States is grown in California and Arizona. It is sold everywhere under the trade name "Iceberg" lettuce. To seedsmen and growers the variety is known as New York or New York Special, of which there are now several similar but distinct strains. In 1929 the car-lot shipments of lettuce for the country were 53,000 cars, of which California shipped 35,000 and Arizona 8,000, making 81 per cent of the total for the country from these two States. In California the two important producing areas are the Imperial Valley, which in 1929 shipped 12,000 cars from December to March, and the Salinas-Watsonville district, which shipped 19,000 cars from April to December, 1929.

Brown Blight

In 1922 the United States Department of Agriculture undertook the investigation of a threatening new disease in the Imperial Valley, now known as brown blight. Affected plants become stunted and yellow and gradually turn brown and die. The trouble was soon found to be a soil-borne disease which increases rapidly from year to year. In the Imperial Valley only one or two crops of lettuce could be grown before the soil became so badly infested that it was necessary to shift to new fields where lettuce had never been previously grown. So far as known lettuce is the only crop attacked by brown blight. The growing of other crops, like alfalfa, for five or six years on infested soil has, however, repeatedly failed even to reduce the disease in the soil. A large part of the lettuce land in the Imperial Valley is now heavily infested with brown blight. In the Salinas-Watsonville district the disease had until recently developed less rapidly, but is now increasing at an alarming rate, with indications that lettuce soils will become generally infested within the next few years. In Arizona the disease is bad in some sections, while there is little or none in others. So far as known brown blight occurs only in California and Arizona.

In the hope of finding resistance to brown blight, about 100 varieties of lettuce were grown on diseased soil in 1923. Two varieties, Big Boston and White Chavigne, proved to be entirely immune, but they are commercially useless in California and Arizona. These varieties were then crossed with the New York variety in order to combine their mentally, remains to be determined. Some, such as *Lespedeza sieboldi* and its more showy horticultural variety known as *L. japonica*, are offered by nurserymen as ornamentals. They are woody, shrublike herbs, the year's growth in the latitude of Washington, D. C., being killed nearly or quite to the ground and the new growth coming from a permanent crown.

All Lespedezas will thrive on land too poor and too sour for such plants as alfalfa or red clover. Some of the oriental perennials are being experimented with for forage. (Fig. 105.) Whether any one of them will ever become as widely popular as the annual forms remains to be seen.

A. J. Pieters,
Principal Agronomist, Bureau of Plant Industry.

LETTUCE Breeding for Disease Resistance Progresses Rapidly A surprisingly large percentage of the lettuce used in the United States is grown in California and Arizona. It is sold everywhere under the trade name "Iceberg" lettuce. To seedsmen and growers the variety is known as New York or New York Special, of which there are now several similar but distinct strains. In 1929 the car-lot shipments of lettuce for the country were 53,000 cars, of which California shipped 35,000 and Arizona 8,000, making 81 per cent of the total for the country from these two States. In California the two important producing areas are the Imperial Valley, which in 1929 shipped 12,000 cars from December to March, and the Salinas-Watsonville district, which shipped 19,000 cars from April to December, 1929.

Brown Blight

In 1922 the United States Department of Agriculture undertook the investigation of a threatening new disease in the Imperial Valley, now known as brown blight. Affected plants become stunted and yellow and gradually turn brown and die. The trouble was soon found to be a soil-borne disease which increases rapidly from year to year. In the Imperial Valley only one or two crops of lettuce could be grown before the soil became so badly infested that it was necessary to shift to new fields where lettuce had never been previously grown. So far as known lettuce is the only crop attacked by brown blight. The growing of other crops, like alfalfa, for five or six years on infested soil has, however, repeatedly failed even to reduce the disease in the soil. A large part of the lettuce land in the Imperial Valley is now heavily infested with brown blight. In the Salinas-Watsonville district the disease had until recently developed less rapidly, but is now increasing at an alarming rate, with indications that lettuce soils will become generally infested within the next few years. In Arizona the disease is bad in some sections, while there is little or none in others. So far as known brown blight occurs only in California and Arizona.

In the hope of finding resistance to brown blight, about 100 varieties of lettuce were grown on diseased soil in 1923. Two varieties, Big Boston and White Chavigne, proved to be entirely immune, but they are commercially useless in California and Arizona. These varieties were then crossed with the New York variety in order to combine their brown-blight resistance with the New York type. This method of obtaining resistance involves the slow procedure of selecting plants that show the sought-for combination of characters over several generations in order to purify strains. It is only now, after several years' work, beginning to give the desired strains of lettuce.

A quicker method of obtaining brown-blight resistance was undertaken at the same time. Diseased fields were searched in the hope of finding resistant individual plants of the New York variety from which resistant strains could be developed. This method yielded quick results, and in 1926 two resistant strains were introduced under the names Imperial No. 2 and Imperial No. 3. (Fig. 106.) A third resistant strain was distributed in 1928 as Imperial No. 6. These strains make normal crops on the most severely diseased soils and have rapidly come into general use in the Imperial Valley. In 1930 they were

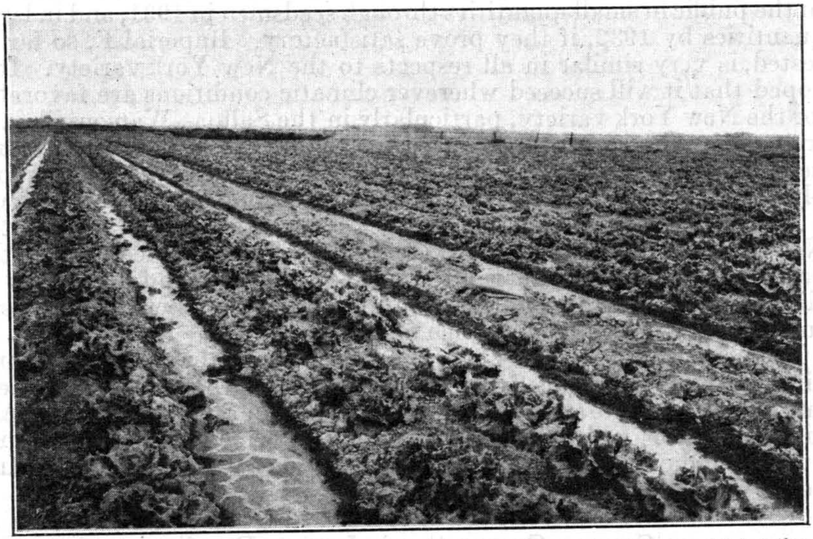


FIGURE 106.—Brown blight resistant lettuce. At right one double row (cap between rows) of the New York variety with all plants attacked by brown blight and dead or dying. All other rows are Imperial brown-blight-resistant strains with all healthy plants

planted on more than 75 per cent of the 38,000 acres in that area. It is generally agreed that without resistant strains, instead of increasing each season, the lettuce industry in the Imperial Valley would be rapidly declining, owing to the exhaustion of disease-free soil. These resistant strains are particularly adapted to the Imperial Valley, where they usually far outyield the original New York variety, even on disease-free soil. Unfortunately, they have proved to be more or less unsatisfactory in other sections.

Lettuce Mildew

Lettuce mildew, caused by the fungus *Bremia lactucae*, frequently injures the quality of the crop in California by attacking and yellowing or browning the outer leaves, although attacked plants usually make marketable heads. The New York variety and the brown blight resistant strains mentioned above are all highly susceptible to mildew.

In 1922 crosses were made between New York and a highly mildew-resistant Cos or Romaine variety from France. Considerable progress had been made in selecting mildew-resistant New York types from this cross when the most promising selections were again crossed in 1925 with the brown blight resistant Imperial No. 2 and Imperial No. 3 strains. Continued selection from these double crosses has finally, in 1930, given strains of the New York type which are highly resistant to both brown blight and mildew, or "double resistant."

"Double-Resistant" Lettuce

Early in 1930 small amounts of seed of the two most promising double-resistant strains, or strains that are resistant to both brown blight and mildew, were distributed to lettuce-seed growers under the names Imperial C and Imperial F. These strains should be available to the public in small quantities through seedsmen in 1931, and in large quantities by 1932, if they prove satisfactory. Imperial F, so far as tested, is very similar in all respects to the New York variety. It is hoped that it will succeed wherever climatic conditions are favorable for the New York variety, particularly in the Salinas-Watsonville district, where there is a pressing need for adapted resistant strains. Imperial C resembles the Imperial Nos. 2, 3, and 6 strains and will probably succeed best under Imperial Valley or similar climatic conditions.

All the disease-resistant strains are of the same general type as the New York variety and are marketed as "Iceberg" lettuce. With the possible exception of Imperial F, however, they respond differently to climatic and cultural conditions and must not be unwittingly substituted for New York by seedsmen or growers.

Lettuce-breeding work is being continued with the purpose of combining disease resistance with further improvements in quality, yield and adaptation to various cultural and climatic conditions. Additional strains will be named according to scheme, Imperial with a number indicating a strain resistant to brown blight only, and Imperial with a letter indicating a double-resistant strain.

Growers Cooperating in Lettuce Breeding

Much of the comparatively rapid progress in this lettuce-breeding work may be attributed to two causes. (1) Numerous growers have taken an active interest and have cooperated by furnishing land and labor for growing, breeding, and trial plots on a large scale. (2) A unique combination of climatic conditions has made possible the growing for breeding purposes of two generations of lettuce seed each year. The crop is planted in the Imperial Valley in September and October and harvested through the winter. The spring season in this reclaimed desert inland valley is warm and bright, maturing seed from the winter lettuce crop in May. This seed, planted immediately only 120 miles distant under the equable coastal climate of southern California, makes a summer crop of lettuce which matures seed in time to plant back in the Imperial Valley in September and October.

Ivan C. Jagger,
Senior Pathologist, Bureau of Plant Industry.

LIVESTOCK Are Healthier Than Formerly, According to Meat-Inspection Data Remarkable progress in the control and eradication of livestock diseases has taken place in recent years through the application of science. It is also gratifying to know that the improved health of domestic animals which scientific discoveries and methods have brought about is being observed at the livestock markets. Because of the millions of animals slaughtered each year and examined in a uniform manner under Federal meat inspection, the records of this service are of particular value in showing the relative extent and importance of each malady. This inspection represents about two-thirds of the estimated total slaughter.

From a commercial standpoint it is noteworthy that of nearly 75,000,000 food animals inspected at the time of slaughter, during the year ended June 30, 1930, only 1 out of 282 was condemned entirely because of disease, parasites, or other abnormal condition. The condemnations consisted principally of parts of carcasses since, in most cases, the abnormal condition was localized in the body. This information is typical of that obtained in other recent years. Although in percentage the loss in 1930 was small, the total quantity of meat condemned amounted to more than 50,000,000 pounds. Moreover, an animal malady is not stationary. Most diseases have a tendency to spread if not recognized promptly and either eradicated or controlled; and the trend of those that can be observed at time of slaughter may be readily portrayed graphically by the use of Federal meat-inspection records. Such a portrayal for the principal cattle diseases is shown in Figure 107. Especially noteworthy is the prominence of tuberculosis, against which an energetic campaign of eradication is now in progress. The reduced extent of this disease since 1926 is distinctly encouraging.

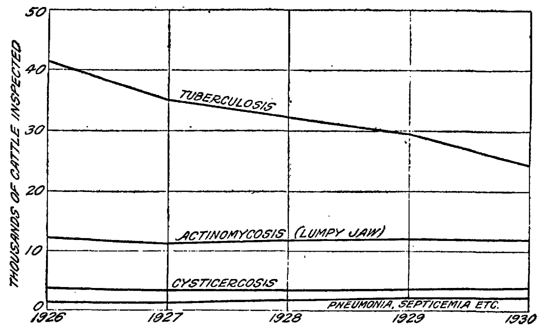


FIGURE 107.—Trend of the principal diseases affecting cattle at time of slaughter, as indicated by Federal meat-inspection records, 1926–1930

It will be noted that actinomycosis, more commonly known as lumpy jaw, has decreased slightly in the last five years, though this malady is of relatively minor economic importance. The disease nevertheless bears watching. The other maladies, cysticercosis and the so-called inflammatory group which includes such diseases as pneumonia, peritonitis, pleurisy, and enteritis, are of less economic importance, though a slight increase in recent years is regrettable.

The diseases in that group are largely incurred by animals while en route to stock centers. Greater care in handling and feeding cattle before shipment, loading proper numbers in cars, and other precautions should help to decrease losses of this kind.

In the case of swine, as with cattle, tuberculosis overshadows all other causes for the condemnation of hogs slaughtered under Federal inspection. Fortunately, many of the lesions are extremely minor, and condemnations are limited to parts rather than to entire carcasses. Though hog cholera, pneumonia, septicemia, and other maladies are observed, each of these, in recent years, has affected less than one hog in every thousand inspected, which makes the loss so small as to be scarcely visible on the same scale with swine tuberculosis in Figure 108. Accordingly, these diseases have been combined, for convenience in graphic portrayal, and the line for them shows the trend of the total infection.

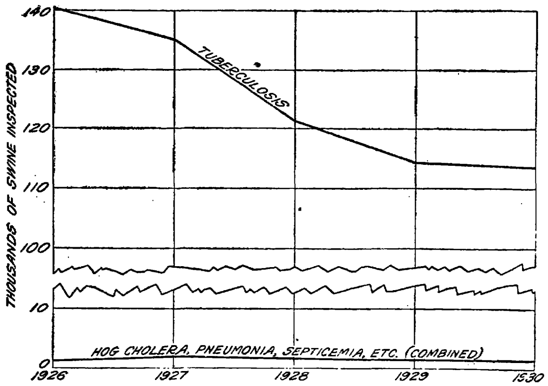


FIGURE 108.—Trend of the principal diseases affecting swine at time of slaughter as indicated by Federal meat-inspection records, 1926–1930. (Note break in scale)

The noticeable decrease in tuberculosis of cattle and swine becomes even more impressive when the condemnations are converted into the value of the meat represented. Such calculations show a saving of approximately $2,000,000 worth of beef and $1,500,000 worth of pork in 1930 as compared with the year of greatest former loss.

Of the maladies affecting sheep at the time of slaughter (fig. 109) caseous lymphadenitis is the most important, but it occurs in less than three per thousand. This disease, peculiar to sheep, claims more victims than the three next important combined.

From these data, which represent the actual findings by trained inspectors of abnormal conditions in animals sent to slaughter, one can readily see that tuberculosis of cattle and swine should be the object of particular concern. This one malady is more important from a meat-inspection viewpoint than are all others combined. Though the charts are based on inspections, during the five years, of more than 335,000,000 food animals, they do not, however, furnish the entire picture of the livestock health situation. Many animals, such as those lost through outbreaks of hog cholera on farms, do not reach the principal markets and consequently are not included in meat-inspection records. Yet the losses on farms are familiar, and the meat-inspection service supplements that knowledge by revealing conditions that otherwise would be obscure.

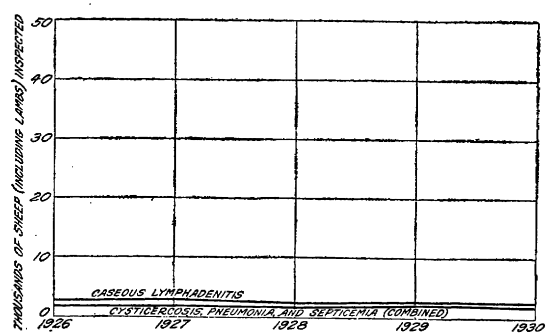


FIGURE 109.—Trend of the principal diseases affecting sheep (including lambs) at time of slaughter as indicated by Federal meat inspection records, 1926–1930

The following comparison summarizes the relative extent to which cattle, swine, and sheep were affected with disease or other abnormal condition in the fiscal years 1926 and 1930, according to Federal meat-inspection records. The figures represent the number of affected animals per 1,000 inspected:

Year	Cattle	Swine	Sheep
1926	58.97	141.63	4.56
1930	42.46	115.44	4.89

It is reasonably clear from the foregoing data that the last five years have witnessed a general improvement in the health of food animals at time of slaughter, chiefly because of less tuberculous infection. Besides being of public interest, this progress is distinctly creditable to all who are engaged in the livestock industry.

J. R. Mohler,
Chief, Bureau of Animal Industry.

LIVESTOCK Parasites in Manure Can be Killed by Means of Heat Generated The control of internal parasites of livestock which cause heavy mortality in young animals and often stunt those that survive, involves, among other practices, the proper disposal of stable and barnyard manure. While the average farmer can do little to overcome pasture pollution resulting from manure deposited by animals on pastures, he can dispose of stable and barnyard manure in a sanitary manner. If he spreads fresh manure on pastures and on fields to which livestock have access, serious consequences may follow, particularly when the manure comes from animals which are heavily infested with internal parasites. Such manure is usually teeming with eggs and larvae of parasitic worms. A heavy intake of such infective material by grazing animals usually leads to serious parasitic infestations, with their attendant evils of stunted growth, lowered vitality, and increased death rate.

Recent investigations carried out in the Bureau of Animal Industry have shown that manure may be stored in a manner which insures the death of a part or of all parasite eggs and larvae present. These investigations, which are still in the experimental stage, have shown, moreover, that certain methods of storing manure are more effective than others in killing eggs and larvae of parasitic worms. The more effective methods require more labor and more expense than the less effective procedures. The additional effort and expense are justified, however, by the good that is accomplished in keeping livestock parasites down to a level where they can do relatively little harm.

The open manure pile which one sees on the average farm has some advantage as a parasite control measure. The interior of such a pile becomes very hot, and the heat which is spontaneously generated kills parasite eggs and larvae. The surface manure, however, is cooled so rapidly by the air that few, if any, parasites there are killed. Thus, while the open manure pile does some good, it has rather

The following comparison summarizes the relative extent to which cattle, swine, and sheep were affected with disease or other abnormal condition in the fiscal years 1926 and 1930, according to Federal meat-inspection records. The figures represent the number of affected animals per 1,000 inspected:

Year	Cattle	Swine	Sheep
1926	58.97	141.63	4.56
1930	42.46	115.44	4.89

It is reasonably clear from the foregoing data that the last five years have witnessed a general improvement in the health of food animals at time of slaughter, chiefly because of less tuberculous infection. Besides being of public interest, this progress is distinctly creditable to all who are engaged in the livestock industry.

J. R. Mohler,
Chief, Bureau of Animal Industry.

LIVESTOCK Parasites in Manure Can be Killed by Means of Heat Generated The control of internal parasites of livestock which cause heavy mortality in young animals and often stunt those that survive, involves, among other practices, the proper disposal of stable and barnyard manure. While the average farmer can do little to overcome pasture pollution resulting from manure deposited by animals on pastures, he can dispose of stable and barnyard manure in a sanitary manner. If he spreads fresh manure on pastures and on fields to which livestock have access, serious consequences may follow, particularly when the manure comes from animals which are heavily infested with internal parasites. Such manure is usually teeming with eggs and larvae of parasitic worms. A heavy intake of such infective material by grazing animals usually leads to serious parasitic infestations, with their attendant evils of stunted growth, lowered vitality, and increased death rate.

Recent investigations carried out in the Bureau of Animal Industry have shown that manure may be stored in a manner which insures the death of a part or of all parasite eggs and larvae present. These investigations, which are still in the experimental stage, have shown, moreover, that certain methods of storing manure are more effective than others in killing eggs and larvae of parasitic worms. The more effective methods require more labor and more expense than the less effective procedures. The additional effort and expense are justified, however, by the good that is accomplished in keeping livestock parasites down to a level where they can do relatively little harm.

The open manure pile which one sees on the average farm has some advantage as a parasite control measure. The interior of such a pile becomes very hot, and the heat which is spontaneously generated kills parasite eggs and larvae. The surface manure, however, is cooled so rapidly by the air that few, if any, parasites there are killed. Thus, while the open manure pile does some good, it has rather definite limitations as an effective control measure for parasites. The surface manure remains unsafe for spreading on pasture, is a source of parasite contamination to livestock because it may be carried by wind to feeding lots and to pastures, and is, moreover, a breeding bed for flies and other insects which are directly or indirectly injurious to livestock. Where the open manure pile must be used, the manure on the outside should be turned over every week or so and buried under the inner material.

Storing manure in closed containers, before spreading it on pastures, appears to offer a more satisfactory solution to the problem of sanitary manure disposal. In this connection, one naturally thinks of a concrete pit as a sanitary structure. Unfortunately this device has been found to be inadequate because the manure in contact with the walls and floor of the pit remains cold, as does the surface manure of the open pile. While the concrete pit eliminates the danger of spreading manure with its parasite content by wind and rain, it falls far below the desired level of effectiveness in the destruction of worm eggs and larvae.

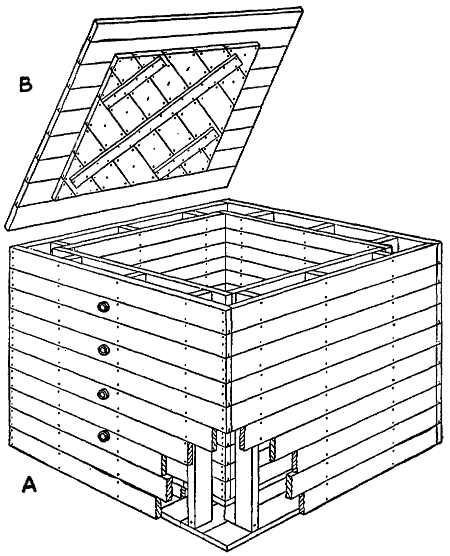


FIGURE 110.—Insulated experimental manure box. Note the double walls and the holes on one side for inserting a thermometer

In the course of experiments with different types of wooden boxes, an insulated box was constructed and tested for a period of about two years, including all seasons. The box, shown in Figure 110, was built of tongue-and-groove lumber. It was 5 feet square, and was provided with double walls and a double floor. The framework was built of 2-by-4's. The 4-inch space between the walls and floor was filled with fine sawdust, and the top was covered with a well-fitting lid made of two layers of ¾-inch tongue-and-groove lumber and covered with substantial composition roofing. This box had a capacity of 2 wagonloads of manure. After being filled with manure, the box was covered with the lid, and a set of holes on one side, designed to admit a thermometer for recording temperatures, were plugged with tight-fitting corks.

Both horse manure and cow manure were placed separately in the box during the various tests, and temperature records were obtained at different times. The maximum temperatures recorded were close to 170° F. but the larvae of parasites present in horse and cow manure are killed after 10 minutes' exposure to a temperature of 125°. After a few days' storage, sufficient heat was developed in the manure-filled box to kill worm eggs and larvae in practically all parts of the box. The box was finally emptied and samples of manure were taken from various parts of the box, so as to cover a wide range of locations. The samples were examined for parasite eggs and larvae.

The results of these tests showed conclusively that after about two weeks' storage, horse manure and cow manure, which were originally infested with live parasite eggs and larvae, no longer contained this infestive material. Such manure was safe for spreading on pastures. In several cases a few live larvae were found in the corners at the bottom of the box. The few larvae which escaped death were negligible as compared with the millions which perished.

While it has not as yet been determined whether the above experimental procedure is applicable to farm practice, it is probable that the principle of storing manure in insulated wooden containers can be utilized to advantage, particularly on farms where valuable purebred stock is raised. In view of the great damage which parasites are capable of producing, it is important that progressive stock owners exert every effort to avoid exposing their stock to the ravages of parasitic worms. An attack on pasture pollution resulting from contamination with stable and barnyard manure is a step in the right direction and is, moreover, a rational control measure which will pay good dividends.

BENJAMIN SCHWARTZ, *Senior Zoologist*,
E. W. PRICE, *Parasitologist*,
ALLEN MCINTOSH, *Assistant Zoologist*,
Bureau of Animal Industry.

LIVESTOCK Performance Is Best Indication of True Breeding Ability

Two kinds of records—pedigree and performance—are used in measuring the breeding value of livestock. The pedigree record indicates what an animal may do. The performance record tells what an animal does. Together, they are a reasonably accurate indication of the value of the animal for breeding purposes.

Many breeders attach undue value to pedigrees. They also fail to interpret them accurately. As a rule remote ancestors in an animal's pedigree have little influence on the breeding value of that animal. For instance, in a 4-generation pedigree showing no inbreeding, and therefore containing 30 individual ancestors, the chance that a great-great-grandparent (fourth generation) will dominate the inheritance of a mating is less than 1 in 30. Even the likelihood that a grandparent will have a great influence is not more than 1 in 6, and the usual influence is very much less, if we assume that all ancestors are equally prepotent. It is mathematically illogical, therefore, to expect an outstanding beef bull, for example, to have any material influence on beef calves which are his remote descendants. In a pedigree covering 10 generations there are 2,046 ancestors, more than half of which are in the tenth generation. Yet cattle sometimes are sold at a premium because an excellent cow or bull appears in the pedigree several generations back, regardless of the merit of animals much more closely related.

On the other hand, if a beef bull is known to have as his dam a cow of outstanding, blocky conformation, approaching the ideal of beef type, and if he has sired a large number of daughters which are of better beef type than their own dams, it is reasonable to say that this bull has proved his worth.

Inheritance sometimes manifests itself in strange ways. The record of performance, however, is always convincing. Geneticists may have

The results of these tests showed conclusively that after about two weeks' storage, horse manure and cow manure, which were originally infested with live parasite eggs and larvae, no longer contained this infestive material. Such manure was safe for spreading on pastures. In several cases a few live larvae were found in the corners at the bottom of the box. The few larvae which escaped death were negligible as compared with the millions which perished.

While it has not as yet been determined whether the above experimental procedure is applicable to farm practice, it is probable that the principle of storing manure in insulated wooden containers can be utilized to advantage, particularly on farms where valuable purebred stock is raised. In view of the great damage which parasites are capable of producing, it is important that progressive stock owners exert every effort to avoid exposing their stock to the ravages of parasitic worms. An attack on pasture pollution resulting from contamination with stable and barnyard manure is a step in the right direction and is, moreover, a rational control measure which will pay good dividends.

Benjamin Schwartz, *Senior Zoologist,*
E. W. Price, *Parasitologist,*
Allen McIntosh, *Assistant Zoologist,*
Bureau of Animal Industry.

LIVESTOCK Performance Is Best Indication of True Breeding Ability Two kinds of records—pedigree and performance—are used in measuring the breeding value of livestock. The pedigree record indicates what an animal may do. The performance record tells what an animal does. Together, they are a reasonably accurate indication of the value of the animal for breeding purposes.

Many breeders attach undue value to pedigrees. They also fail to interpret them accurately. As a rule remote ancestors in an animal's pedigree have little influence on the breeding value of that animal. For instance, in a 4-generation pedigree showing no inbreeding, and therefore containing 30 individual ancestors, the chance that a great-great-grandparent (fourth generation) will dominate the inheritance of a mating is less than 1 in 30. Even the likelihood that a grandparent will have a great influence is not more than 1 in 6, and the usual influence is very much less, if we assume that all ancestors are equally prepotent. It is mathematically illogical, therefore, to expect an outstanding beef bull, for example, to have any material influence on beef calves which are his remote descendants. In a pedigree covering 10 generations there are 2,046 ancestors, more than half of which are in the tenth generation. Yet cattle sometimes are sold at a premium because an excellent cow or bull appears in the pedigree several generations back, regardless of the merit of animals much more closely related.

On the other hand, if a beef bull is known to have as his dam a cow of outstanding, blocky conformation, approaching the ideal of beef type, and if he has sired a large number of daughters which are of better beef type than their own dams, it is reasonable to say that this bull has proved his worth.

Inheritance sometimes manifests itself in strange ways. The record of performance, however, is always convincing. Geneticists may have difficulty in explaining why one bull sires uniformly good bull calves, whereas another excels in the quality of his heifer calves. But when such results are obtained they are worthy of being recorded and often prove useful in interpreting pedigrees.

Pedigree Breeding With Poultry

Pedigree breeding is practiced with poultry at the United States Animal Husbandry Experiment Farm at Beltsville, Md. Yet the value of each pedigree is interpreted in the light of the performance of the individuals contained in it. Not only numbers of eggs laid but size and quality of eggs are recorded. Recently one of the best layers at this farm, a Rhode Island Red pullet, produced 306 eggs in one year but was culled from the flock because her eggs were small and poorly shaped. A minimum weight of 2 ounces for each egg, making 24 ounces to the dozen, is used as a standard in this breeding work. If a pullet lays 200 eggs of good shape, good shell quality, and standard size, she is prized much more highly as a breeder than another that lays 50 or 100 more eggs which are undersized and of poor shape. The principal reason is that it is much simpler to breed up a flock for large numbers of eggs than to increase the size and market quality of that flock's eggs.

It may be contended that keeping the necessary performance records is well enough for experiment farms but impractical for the average farmer. Such does not seem to be the case. Farmers who are conspicuously careless about their record keeping are almost invariably the ones who show no profit at the end of the year. And it is rarely the case that a farmer keeps an itemized account of his year's operations without showing a profit. He learns, through records, which are the unprofitable animals and the unsound enterprises. No farmer will willingly throw away feed. If record keeping will show him, as it did investigators at one of the Government experiment farms, that each time one of his sows farrows a dead pig he is in reality losing 140 pounds of feed, he will be more likely to look into the cause of such a loss. Even a simple set of records showing the number of pigs farrowed and raised by each of the sows on his farm will be of great value to the owner. When he increases his breeding herd he will save gilts from those sows which have proved to be good mothers in addition to possessing other desirable qualities.

Performance records are doubly important to a sheepman because of a sheep's two crops a year—wool and lambs. Many sheepmen do not appreciate this. Some specialize on lamb production and regard the fleece merely as something to be clipped once a year and sold for what it will bring. Others give little attention to such carcass characteristics as width of loin and fullness of the leg of mutton in their flocks, and regard the carcass merely as a means of growing the fleece. Still others, and these are usually the successful ones, appreciate that the most profitable type of sheep must produce a fleece of high quality and one or two meaty lambs each year.

Method of Herd Improvement

The value of any herd or flock is the aggregate worth of its individual members. It can be improved by weeding out the poor producers and retaining and breeding from the high producers. This can be accomplished only through careful performance records, honestly interpreted and rigidly followed. Without them there can be no sure progress in the field of livestock improvement. With them one can determine and retain the prepotent sires and high-producing dams. Very often the excellence of a great sire or dam has not been discovered until the animal had been slaughtered, frequently before its usefulness had been exhausted.

Individual excellence and breeding excellence unfortunately are not always synonymous. Some of the best animals at stud, for instance, have never won a prize in the show ring. Records of performance disclose the ability in sires and dams to produce those qualities for which they are fed and bred, not mere beauty of form and carriage, but, in beef cattle, for instance, a large quantity and a desirable quality of flesh.

The breed associations could do nothing more constructive in the field of livestock development than to set up standards of excellence for superior breeding animals, based upon performance. Such standards should be reasonably uniform for each class of livestock. Not only quantity of market product but also quality should be taken into account because both influence the final judgment of purchasers as to merit in our domestic animals.

E. W. Sheets,
Chief, Animal Husbandry Division,
Bureau of Animal Industry.

MANGANESE and Other Less Common Elements Have Fertilizer Value

The 10 elements—nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, carbon, hydrogen, oxygen, and iron—have been considered necessary for the growth and maturing of our agricultural crops. In fertilizer practice we have chiefly applied nitrogen, phosphorus, and potassium to our soils, with lime to correct soil acidity and not as plant food, on the assumption that soils, fertilizers, and manures supply sufficient of the other mineral elements for profitable crop production. Modern research has shown that magnesium, iron, sulphur, and manganese deficiencies can exist in large soil areas. It has shown that a marked phosphorus deficiency exists in some middle-western soil regions of the United States devoted to sugar-beet culture, and that the application of even small amounts of this element produces large increases in sugar-beet production, and in the sugar content of the beets.

Agricultural chemists naturally give first attention to those elements present in plants and animals in largest amount. Recently the less common elements, considered previously as nonessential, have been found to be most important factors in plant and animal nutrition and health. Reference is made especially to the part which manganese, copper, boron, iodine, zinc, and other elements play in the newer research in plant and in animal physiology.

The use of manganese in agriculture has been increased in the last few years as the result of some practical demonstrations with tomatoes and other truck crops in southern Florida. Research by the Bureau of Chemistry and Soils over a period of years tended to show that manganese was essential to plant growth. Without it plants showed abnormal symptoms, analogous to disease conditions.

plished only through careful performance records, honestly interpreted and rigidly followed. Without them there can be no sure progress in the field of livestock improvement. With them one can determine and retain the prepotent sires and high-producing dams. Very often the excellence of a great sire or dam has not been discovered until the animal had been slaughtered, frequently before its usefulness had been exhausted.

Individual excellence and breeding excellence unfortunately are not always synonymous. Some of the best animals at stud, for instance, have never won a prize in the show ring. Records of performance disclose the ability in sires and dams to produce those qualities for which they are fed and bred, not mere beauty of form and carriage, but, in beef cattle, for instance, a large quantity and a desirable quality of flesh.

The breed associations could do nothing more constructive in the field of livestock development than to set up standards of excellence for superior breeding animals, based upon performance. Such standards should be reasonably uniform for each class of livestock. Not only quantity of market product but also quality should be taken into account because both influence the final judgment of purchasers as to merit in our domestic animals.

E. W. Sheets,
*Chief, Animal Husbandry Division,
Bureau of Animal Industry.*

MANGANESE and Other Less Common Elements Have Fertilizer Value The 10 elements—nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, carbon, hydrogen, oxygen, and iron—have been considered necessary for the growth and maturing of our agricultural crops. In fertilizer practice we have chiefly applied nitrogen, phosphorus, and potassium to our soils, with lime to correct soil acidity and not as plant food, on the assumption that soils, fertilizers, and manures supply sufficient of the other mineral elements for profitable crop production. Modern research has shown that magnesium, iron, sulphur, and manganese deficiencies can exist in large soil areas. It has shown that a marked phosphorus deficiency exists in some middle-western soil regions of the United States devoted to sugar-beet culture, and that the application of even small amounts of this element produces large increases in sugar-beet production, and in the sugar content of the beets.

Agricultural chemists naturally give first attention to those elements present in plants and animals in largest amount. Recently the less common elements, considered previously as nonessential, have been found to be most important factors in plant and animal nutrition and health. Reference is made especially to the part which manganese, copper, boron, iodine, zinc, and other elements play in the newer research in plant and in animal physiology.

The use of manganese in agriculture has been increased in the last few years as the result of some practical demonstrations with tomatoes and other truck crops in southern Florida. Research by the Bureau of Chemistry and Soils over a period of years tended to show that manganese was essential to plant growth. Without it plants showed abnormal symptoms, analogous to disease conditions.

As manganese is widely distributed throughout the United States, most soils contain sufficient for profitable crop production, but in certain sections where manganese is rare in rocks and soils, or where conditions are such that the manganese is unavailable to plants, serious difficulties are experienced.

Large areas south of Miami, Fla., are periodically covered with water each year. This soil is composed almost entirely of calcium carbonate deposited from the sea water. These areas, known as glades, are being used largely for the production of tomatoes.

A chlorotic condition of the foliage of the tomato plants grown on this soil showed itself in white spots and areas between the veins. Analysis of the soil showed that the difficulty was a lack or a deficiency of manganese. This could not be remedied with liberal applications of ordinary fertilizer salts, but the addition of minute quantities of manganese—50 pounds of manganese sulphate per acre—produced strong, vigorous plants, deep green in color, with luxuriant blossoming and greatly increased fruit production. In fact, without manganese there is no fruit production, and the plants soon fade and die. In all of these tests the commercial fertilizers were used at the rate of 2 tons per acre. Even with 2 tons of fertilizer to the acre the tomatoes would not grow and flourish unless the manganese was present.

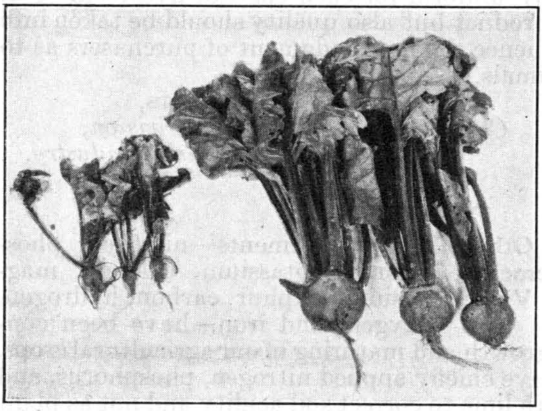


FIGURE 111.—Beet plants grown on calcareous glade soil, Dade County, Fla. Both plots received liberal applications of ordinary commercial fertilizer. The plants on the right were fertilized with a small amount of manganese sulphate; those on the left received no manganese

Manganese Sulphate for Tomatoes

Tomato growers of southern Florida have begun to use manganese sulphate on a large scale within the last two years, and this has replaced stable manure to a large extent. Formerly, train loads of compost were carried to the fields where to-day a few carloads of manganese sulphate are giving the same results. Growers who till these calcareous glade soils haul out a few bags of manganese sulphate instead of truck loads of manure.

Manganese sulphate is now also used generally in the area south of Miami in the growing of beets, carrots, lettuce, cabbages, corn, potatoes, beans, ornamentals, and forage crops. Formerly these crops were considered failures on this land. All the crops grown without manganese were chlorotic and mottled, made a poor growth, and produced little or no marketable vegetables. The growth was very good where manganese was used. Only 50 pounds per acre were required to produce this remarkable difference in yield. (Fig. 111.)

Another interesting case of manganese deficiency has occurred in a section on the east coast of Florida. This section produces beans and peppers. The soil is sandy and the surface slightly acid. At intervals in the section, small areas occur which contain shell deposits. These shell areas appear as pockets and lie slightly lower and are alkaline. Both beans and peppers were found to fail in the pocket areas. The plants became yellow, were dwarfed, failed to grow, and produced no vegetables. A small amount of manganese overcame the trouble. The crops grew normally and produced as much as the surrounding section which showed no chlorosis.

Throughout eastern North Carolina there occur in fields unproductive spots on which corn, and also soybeans, show symptoms of chlorosis resembling manganese deficiency. These soil spots are approximately neutral or alkaline, while adjacent soils in the same fields, bearing normal crops, are acid. These spots often result from local overliming, due to lime piles, when spreading lime on the fields, or to the burning of brush heaps in clearing. The chlorotic poor growth of the soybeans can be completely obviated by the application of manganese sulphate.

It is of some importance to bear in mind that soluble manganese in the soil may easily become a source of trouble when the soil reaction is allowed to become too acid. Thus we have the practical situation that if the soil becomes too alkaline, symptoms of manganese deficiency may develop, while on the other hand when the soil becomes rather strongly acid in reaction, manganese toxicity may result even though this element is not included in the fertilizer.

Observations in Australia

Comment on the action and essential character of manganese has recently been made by some Australian investigators. They found that the plants might grow with the amount of manganese stored in the seed, in certain cases for weeks, and that then the manganese deficiency symptoms developed with diseaselike suddenness. They obtained astonishing differences in growth as a result of the complete absence of manganese on the one hand, and the presence of mere traces on the other, amounting to from three to fifty times the weight. Different plants require different amounts of manganese to enable them to complete their development. Therefore, certain types of soil, which do not possess sufficient available manganese for the growth of cereals, may support an apparently normal growth of pasture plants and weeds, but such plants nevertheless contain less manganese than when grown on normal soil, which fact, according to these investigators, may be found to have some connection with certain animal diseases which occur on these manganese-deficient soils in South Australia.

Here a word of caution should be added against too liberal use of manganese. Not only is this uneconomic, but a too liberal supply of manganese will cause harm.

Results have been obtained thus far only with soluble manganese salts. The sulphate is the most effective. Manganese is well distributed in nature and most soils contain some of it. Manganese occurs in a number of localities of the United States where it can be mined. When sufficiently pure, it is manufactured into the various manganese preparations used in the arts and industries. Manganese sulphate, pure or containing iron and some other metals, is frequently obtained as a by-product, which can be used in fertilizers for supplying water-soluble available manganese to soils deficient in manganese.

With the utilization of modern pure fertilizer materials of chemical manufacture, especially in the leachy sandier soils, the problem may be extended to include not only manganese but also such elements as zinc, copper, nickel, boron, and so forth, the relation of which to plant growth is not yet so fully understood.

There are many troublesome and little-understood plant diseases which may be directly traced in the future to manganese deficiency or to a deficiency of some other little-understood essential element. There are many so-called physiological plant diseases which have baffled the pathologists. A disease of oats occurring in South Australia on certain soil types and also on alkaline soils in Germany and Sweden is a manganese-deficiency disease. Although manganese occurs in the Australian soil, it is not soluble and available in sufficient quantity. This condition, no doubt, occurs on many of our own soils. A small amount of soluble manganese may become desirable in fertilizers as a kind of insurance against unfavorable climatic factors.

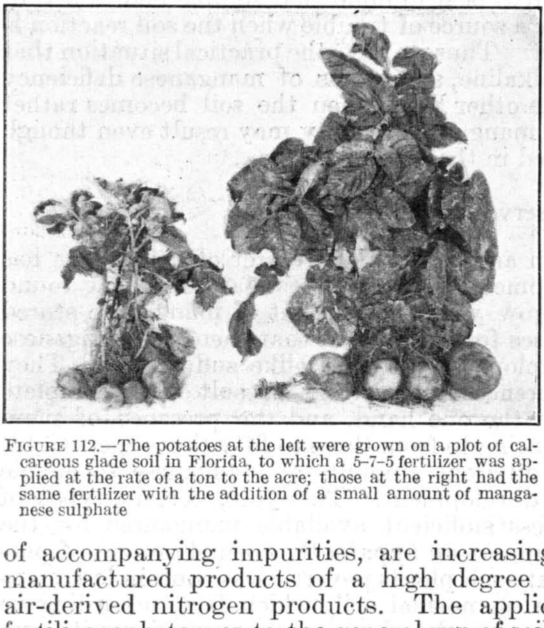


FIGURE 112.—The potatoes at the left were grown on a plot of calcareous glade soil in Florida, to which a 5-7-5 fertilizer was applied at the rate of a ton to the acre; those at the right had the same fertilizer with the addition of a small amount of manganese sulphate

Probable Relation to Fertilizer Practice

These problems are likely to become more pressing as pure and concentrated chemicals supplant the older ordinary fertilizers. The older fertilizers, consisting of plant and animal by-products, and even the inorganic fertilizer salts originating in natural deposits and containing greater or less amounts of accompanying impurities, are increasingly being supplanted by manufactured products of a high degree of purity, especially the air-derived nitrogen products. The application of these chemical fertilizer substances to the general run of soils containing sufficient reserves of the lesser inorganic constituents is not likely to involve any problem of deficiency. On the other hand, in soils, especially sandy soils, where the amount of these less-common constituents may be small or unavailable, deficiency will probably be noticed in time if pure chemicals only are used.

Recent experiments have also shown that small quantities of other less common elements are important in crop production. A striking illustration of the effect of minute quantities of copper occurs in the work of the Florida Agricultural Experiment Station on Everglades peat lands. These lands present many problems, among them a lack of response to fertilizers. Plant growth responses have been obtained on a long list of plants by using such unusual fertilizing elements as zinc, antimony, nickel, tin, barium, copper, and manganese. (Fig. 112.) The most favorable results were obtained with copper. By the use of copper, plant growth has been enormously stimulated. The treatment of Everglade peat lands with copper sulphate has reached commercial proportions. A considerable acreage devoted to sugarcane is now thus treated in the region south of Lake Okeechobee. Previous attempts to grow sugarcane on a large scale in the Everglades north of Miami practically failed. Experiments using all possible combinations of fertilizers gave no promising leads. The new treatment, together with the use of proper fertilizer, is giving very encouraging results.

Interesting in this connection also is the now common practice of applying copper sulphate to citrus trees suffering from die-back, which is considered a physiological disease. The symptoms of die-back are many, among them chlorosis or mottled leaf, gum pockets in the new shoots, multiple buds, and split fruits. Originally, the crystals of copper sulphate were inserted under the bark with only moderate success. For the last 10 years or more, the copper sulphate has been applied in fertilizers or separately to the soil. Beneficial results are obtained often enough to encourage citrus growers in the practice of using copper sulphate as a cure for die-back.

Double Benefit From Copper

The use of Bordeaux mixture which contains copper, as a spray for potatoes, citrus, and numerous other plants, has been followed by crop improvement as well as disease control. It seems probable that the increased growth is due to the specific action of the copper on the plant functions. Some very valuable work has been done on the effect of the less common elements on plants at the University of California and the University of Minnesota laboratories. Copper is proving absolutely essential for the normal growth of sunflowers and tomatoes. The amount necessary is exceedingly small. Yet mere traces of copper in the culture solutions caused an increase in growth of tomato plants over 10 times that produced with copper absent. A single leaf of the copper-treated plant was often greater than the entire plant without copper.

Research has also been done with boron and with zinc. Experiments with zinc suggest that it too may be essential to growth. The evidence, however, is rather conflicting, and no agricultural value can as yet be assigned to its compounds.

Boron illustrates the principle that these rarer plant foods must be handled with care and understanding. Without boron there is no plant development, no maturation, no fruition. Excessive amounts, however, cause damage and crop failure. Scientific control of the amounts supplied in seed, soil, irrigation water, and fertilizer are essetial and show us that the old ways of haphazard experimentation and practice are not possible, when these new forces and factors are brought into play. The subject has since been very ably investigated at Rothamsted in England. It has been studied also by scientists in California and in Maryland, and by specialists in the United States Department of Agriculture.

Work at Rothamsted with leguminous plants showed the necessity of boron to plant growth, and demonstrated that, in the broad bean, boron is absolutely essential in the production of the ducts which enable the plant to obtain nitrogenous matter from the nodule, and in return to supply sugars and other food substances to the bacteria in the nodules. This is a truly remarkable system of cooperation.

Effects of Minute Quantities

Boron has been shown to be essential to a long list of plants. Experiments with the tomato have been conclusive. An interesting growth effect was noted with boron-free potato plants, in which the leaves showed the characteristic symptoms of what is known as the potato leaf-roll disease. All the abnormal symptoms are obviated by adding as little as one part per two million to the solution; but toxicity was reached with as little as five parts per million.

Boron is so widely distributed in minute amounts throughout natural soils and fertilizer materials, that its addition for agricultural use is probably nowhere necessary except possibly in sandy soils with high rainfall where purely synthetic nitrogen and other fertilizer salts are used continuously. This boron question from a fertilizer viewpoint is a problem of the future rather than the present, but it illustrates the accurate scientific control that must be exercised in the study and use of some of these less common but nevertheless essential plant food substances.

The rarer elements are of tremendous value to human and animal life. Freedom from disease may depend on their presence in human food and in the feed given to livestock. Iodine is essential to prevent goiter in man, abortion in cattle, and hairlessness in young pigs. Copper and manganese play their part in the formation of blood, and in the prevention of anemia. These constituents are stored up in the unborn child or animal to enable it to function properly until it can get its own supply later, since mother's milk or cow's milk does not supply them. Liver, which contains copper compounds, is prescribed for pernicious anemia. Low calcium and phosphorus content, cause many serious diseases in cattle. The best and normal way to supply these elements, to animals and to man, is through their feed and food—through plants, vegetables, and fruits, grown on well-fertilized soils.

OSWALD SCHREINER,
Chief, Division of Soil Fertility,
Bureau of Chemistry and Soils.

MANURE Substitutes Are Made from City Wastes by Various Processes

Roses and sweet peas, glorious rhododendrons, and lowly asparagus and celery, meet on common ground in their need for organic matter in the soil of their beds. Their response to soil enrichment is well known, and the confirmed home gardener will almost jeopardize his next winter's coal supply to buy manure for his flowers. And, if his home is close to one of our great cities, he pretty nearly has to. With makeshift substitutes for barnyard manure not uncommonly bringing $25 a ton, in the vicinity of New York City, the suburban gardener is often hard pressed to obtain adequate supplies of suitable organic material for preparing his beds and mulches.

It has long been common knowledge that properly cared for barnyard manure makes an excellent fertilizer; and the demand for it has far exceeded the available supply, particularly in the great urban districts. There, gardeners, florists, and truck growers are using various substitutes. Peat, composted with a substantial amount of manure, "artificial manure," prepared by rotting straw; the more expensive

Effects of Minute Quantities

Boron has been shown to be essential to a long list of plants. Experiments with the tomato have been conclusive. An interesting growth effect was noted with boron-free potato plants, in which the leaves showed the characteristic symptoms of what is known as the potato leaf-roll disease. All the abnormal symptoms are obviated by adding as little as one part per two million to the solution; but toxicity was reached with as little as five parts per million.

Boron is so widely distributed in minute amounts throughout natural soils and fertilizer materials, that its addition for agricultural use is probably nowhere necessary except possibly in sandy soils with high rainfall where purely synthetic nitrogen and other fertilizer salts are used continuously. This boron question from a fertilizer viewpoint is a problem of the future rather than the present, but it illustrates the accurate scientific control that must be exercised in the study and use of some of these less common but nevertheless essential plant food substances.

The rarer elements are of tremendous value to human and animal life. Freedom from disease may depend on their presence in human food and in the feed given to livestock. Iodine is essential to prevent goiter in man, abortion in cattle, and hairlessness in young pigs. Copper and manganese play their part in the formation of blood, and in the prevention of anemia. These constituents are stored up in the unborn child or animal to enable it to function properly until it can get its own supply later, since mother's milk or cow's milk does not supply them. Liver, which contains copper compounds, is prescribed for pernicious anemia. Low calcium and phosphorus content, cause many serious diseases in cattle. The best and normal way to supply these elements, to animals and to man, is through their feed and food—through plants, vegetables, and fruits, grown on well-fertilized soils.

Oswald Schreiner,
*Chief, Division of Soil Fertility,
Bureau of Chemistry and Soils.*

MANURE Substitutes Are Made from City Wastes by Various Processes

Roses and sweet peas, glorious rhododendrons, and lowly asparagus and celery, meet on common ground in their need for organic matter in the soil of their beds. Their response to soil enrichment is well known, and the confirmed home gardener will almost jeopardize his next winter's coal supply to buy manure for his flowers. And, if his home is close to one of our great cities, he pretty nearly has to. With makeshift substitutes for barnyard manure not uncommonly bringing $25 a ton, in the vicinity of New York City, the suburban gardener is often hard pressed to obtain adequate supplies of suitable organic material for preparing his beds and mulches.

It has long been common knowledge that properly cared for barnyard manure makes an excellent fertilizer; and the demand for it has far exceeded the available supply, particularly in the great urban districts. There, gardeners, florists, and truck growers are using various substitutes. Peat, composted with a substantial amount of manure, "artificial manure," prepared by rotting straw; the more expensive dried manures, and organic ammoniates like cottonseed meal, have helped to stop the gap. But the prices paid for satisfactory substitutes are evidence enough that the supply is far from adequate.

By an interesting working of the law of compensation, prospects for producing large quantities of organic materials, that may in part take the place of barnyard manure, are brightest just where this commodity is scarcest. Our larger cities must continually dispose of great quantities of organic waste in the form of garbage and sewage, and these are potential sources of fertilizer materials.

Fertilizer Material From Municipal Garbage

Attempts to utilize raw garbage as fertilizer have proved decidedly unsatisfactory in this country. Such disposal is conducive to the breeding of flies and vermin, and, on truck farms, to the spread of truck-crop diseases by infected parts of vegetables in the garbage.

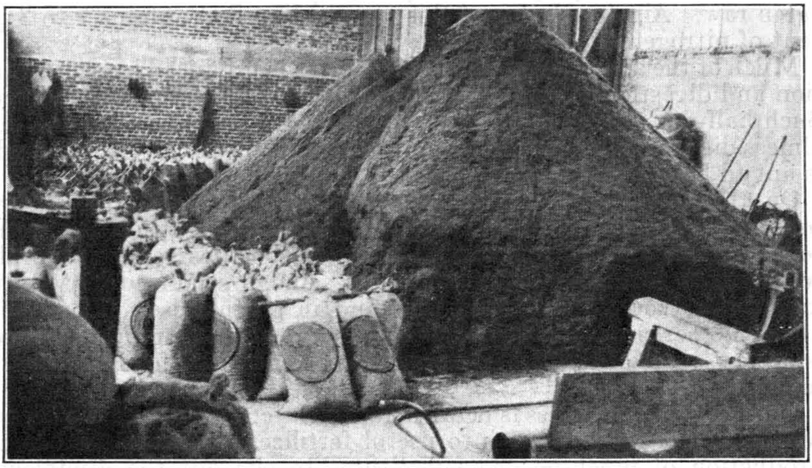


FIGURE 113.—Garbage tankage dried, ground, and screened, when used in mixed fertilizers, furnishes some nitrogen and improves the physical condition and drillability of the mixtures

But, a number of large cities steam-render their garbage for the production of household grease, and the residual tankage is useful fertilizer material. The steaming kills disease germs, and removal of the grease improves the product for fertilizer purposes. Garbage tankage is low in plant-food value, however, since the dry material contains only about 3 per cent of nitrogen, 5 to 10 per cent of bone phosphate, and 1 per cent of potash. When used in mixed fertilizers, dried, ground, and screened garbage tankage improves their physical condition and drillability. (Fig. 113.)

Moist garbage tankage, degreased but not heat dried, has been used direct in fairly large quantities as a makeshift substitute for farm manure. With a water content of 50 per cent, it contains two to three times as much total plant food as manure, but its nitrogen is less readily available. However, a well-decomposed compost of moist garbage tankage and manure will more than equal the latter alone, in plant-food content; and such a compost fortified with superphosphate and potash salts should make a satisfactory fertilizer as well as manure substitute.

Humuslike material is being produced directly from raw garbage by an adaptation of the Beccari reduction process, which depends on high-temperature fermentation in closed concrete cells. Chemical analysis shows that the air-dried "humus" contains very nearly the same amount of total plant food as equally dry garbage tankage, and about 10 per cent of calcium oxide derived from added lime. Some of this humus has been used in lieu of manure in the vicinity of New York City.

Sewage Sludge Fertilizers

The composition and fertilizer value of sludges obtained in municipal sewage disposal vary rather widely, and depend chiefly on the type of process used in purifying the sewage.

Sludges produced by plain sedimentation, or in septic tanks, are usually foul-smelling and septic—possibly unsafe for use as fertilizer on certain truck crops, particularly on vegetables that are customarily eaten raw. Air-dry sludge of this type ordinarily contains 1 to 3 per cent of nitrogen of low availability.

Much of the sewage sludge in this country is produced by sedimentation and digestion in Imhoff tanks, followed by draining on sand beds. Such half-dry sludge contains but little more nitrogen than manure. Unless digestion has been long continued and thorough, Imhoff sludge is apt to be offensive and unsuited to use in the home garden.

On the other hand, sludge produced by the "activated-sludge" process of sewage treatment is rapidly gaining recognition as satisfactory organic fertilizer material. State authorities report favorable results with the heat-dried "activated" sludge produced at Milwaukee, and advocate its use on turf and in greenhouses. Containing about 5.6 per cent of nitrogen and 2 per cent of phosphoric acid of satisfactory availability, it has several times the plant-food strength of manure.

On the whole, progress is being made in the conversion of the organic wastes of our large cities into useful fertilizer materials, and in the production of much-needed substitutes to eke out the diminishing supplies of barnyard manure.

G. P. Walton,
Associate Biochemist, Bureau of Chemistry and Soils.

MARKET News Services Specially Adapted to Various Requirements Increasing demand for authoritative agricultural market news reports has led to some extension and specialization of the official information services of the Bureau of Agricultural Economics and to more attention to adapting the market information to readers in the various producing areas and to requirements of the different news mediums.

There are two general classes of agricultural market news readers: Producers and dealers who wish to follow reports promptly and closely, who may keep in touch currently with the market through the daily press and radio; and producers who are not operating in the market throughout the season and whose needs are met by the weekly, monthly, quarterly, or seasonal summary or review.

The first class of readers want original facts and figures on conditions, grades, shipments, and prices and must depend upon the prompt

Humuslike material is being produced directly from raw garbage by an adaptation of the Beccari reduction process, which depends on high-temperature fermentation in closed concrete cells. Chemical analysis shows that the air-dried "humus" contains very nearly the same amount of total plant food as equally dry garbage tankage, and about 10 per cent of calcium oxide derived from added lime. Some of this humus has been used in lieu of manure in the vicinity of New York City.

Sewage Sludge Fertilizers

The composition and fertilizer value of sludges obtained in municipal sewage disposal vary rather widely, and depend chiefly on the type of process used in purifying the sewage.

Sludges produced by plain sedimentation, or in septic tanks, are usually foul-smelling and septic—possibly unsafe for use as fertilizer on certain truck crops, particularly on vegetables that are customarily eaten raw. Air-dry sludge of this type ordinarily contains 1 to 3 per cent of nitrogen of low availability.

Much of the sewage sludge in this country is produced by sedimentation and digestion in Imhoff tanks, followed by draining on sand beds. Such half-dry sludge contains but little more nitrogen than manure. Unless digestion has been long continued and thorough, Imhoff sludge is apt to be offensive and unsuited to use in the home garden.

On the other hand, sludge produced by the "activated-sludge" process of sewage treatment is rapidly gaining recognition as satisfactory organic fertilizer material. State authorities report favorable results with the heat-dried "activated" sludge produced at Milwaukee, and advocate its use on turf and in greenhouses. Containing about 5.6 per cent of nitrogen and 2 per cent of phosphoric acid of satisfactory availability, it has several times the plant-food strength of manure.

On the whole, progress is being made in the conversion of the organic wastes of our large cities into useful fertilizer materials, and in the production of much-needed substitutes to eke out the diminishing supplies of barnyard manure.

G. P. WALTON,
Associate Biochemist, Bureau of Chemistry and Soils.

MARKET News Services Specially Adapted to Various Requirements Increasing demand for authoritative agricultural market news reports has led to some extension and specialization of the official information services of the Bureau of Agricultural Economics and to more attention to adapting the market information to readers in the various producing areas and to requirements of the different news mediums.

There are two general classes of agricultural market news readers: Producers and dealers who wish to follow reports promptly and closely, who may keep in touch currently with the market through the daily press and radio; and producers who are not operating in the market throughout the season and whose needs are met by the weekly, monthly, quarterly, or seasonal summary or review.

The first class of readers want original facts and figures on conditions, grades, shipments, and prices and must depend upon the prompt and accurate work of market reporters and upon quick distribution. The second class of readers relies on the studies of these reports as checked, compared, summarized, and reviewed by the bureau's editorial specialists, their work supplemented with reports from field representatives and special news correspondents.

The completed market news articles or reviews are circulated mainly through the farm papers and trade periodicals; also, through standard newspapers having large country circulation. Some of the smaller trade papers use rather sectional matter or that on specific products, arranged and treated somewhat according to the demand. Many publications are served by press associations, which send out material in syndicated form. Some press associations, news syndicates, and various private market writers prepare reviews of their own, based on the official news information. The radio service uses market news material somewhat like the articles prepared for the press, but preferably adapted for reading aloud, and usually arranged with regard to location and interest of the majority of the station listeners.

Combined Summary Issued

A recent development in market news reviews is a combined summary of market news features for all of the leading farm products, including the more significant items, stated in one or two paragraphs for each class of products, whether grain, livestock, dairy and poultry products, or fruits and vegetables. This type of review of special market news has been found suitable for many of the representative agricultural weekly or monthly periodicals, for the trade and commercial journals, and for a number of news agencies and large newspapers. Since the whole range of farm production is considered in the space of a column or less, these articles are acceptable to papers which devote only limited attention to agricultural market material. The short general reviews, including the whole list of leading farm products, are suitable for readers who most of the time do not wish to follow the day-to-day markets closely but who desire to keep in touch with the general agricultural market situation and its bearing on future developments.

For the preparation of the various forms of market literature, the larger branch offices of the bureau are manned by a group of reporters and writers, each a specialist in his particular field. These reporters collect information in the various markets and supply the material for the daily reports. Editorial writers at Washington headquarters of the bureau, or in the principal branch offices, prepare reviews based on these reports. The writers are equipped with charts, graphs, and tabular statements of receipts, prices, supply, and distribution over long periods, arranged for easy comparison. Long experience enables them to prepare promptly the market reviews or special news articles which are ready for distribution soon after the close of the markets for the period under review.

Leased telegraph wires, air mail, and regular mail service complete the work of distribution. Each of the various commodity divisions within the bureau prepares special reviews on the various classes of farm products during the season, and in some instances the distribution is assisted by State marketing agencies which reproduce the reviews, and sometimes combine them with local material.

40442°—31——24

Distribution of Market News

Distribution of market news depends somewhat on its nature. Information relating to shipments, receipts, condition and price, and present state of the market require prompt action and the use of telegraph, telephone, radio, and the daily press. The long-range studies, comparisons, and conclusions may still be useful even if delayed a little in getting to the reader, and such material is well suited to distribution by mail and through periodicals of various kinds. This part of the service almost assumes that the public already has the underlying facts given from day to day regarding the market. It is implied further that the reader desires to have the meaning of the facts brought out by comparison of conditions on the different markets and with the market of the past week or the previous season. To be considered also in this connection and to be included perhaps in the summary is the market bearing of the current news about crops, production, business conditions, foreign trade, and the like.

The total circulation of market material through these various means is not easy to estimate closely. One commodity division which had been adding up the circulation of its reviews and market articles through the news press, counting only the periodicals actually printing all or part of the material, concluded that their reviews found at least 9,500,000 takers, according to the circulation rating by the directories. Two other divisions each reckoned a total of fully 4,000,000 press circulation. Reviews of one line of farm products were being used by from 200 to 300 papers, and by numerous radio stations, and were posted by 4,000 country banks, and in the offices of numerous boards of trade, county agents, and State officials. Members of the writing staff also send out special signed reports to a dozen representative trade papers. Another division has depended greatly upon the radio stations and has supplied material, daily or weekly, to about 80 of these stations, covering nearly the whole country in a network of direct publicity.

All the market news material is distributed by substantially the same means, the main difference being in the relative emphasis placed upon the different agencies for reaching the public, according to the nature of the product, the apparent demand, and the style in which the material is prepared. All the news services on the various farm products make extensive use of local, metropolitan, and commercial papers, press associations, news agencies, mail distribution, and the radio; but emphasis placed on each of these differs somewhat, according to the nature of the products and the scope of its marketing field, the general availability of reliable news from normal sources, and the proved effectiveness in each instance of the methods of publicity employed.

G. B. Fiske,
Associate Editor, Bureau of Agricultural Economics.

MARKETING Legislation Calls for Federal and State Cooperation

Marketing work now conducted by the Bureau of Agricultural Economics had its legislative origin in an item in the appropriation act for the fiscal year 1914. This authorization was "to enable the Secretary of Agriculture to acquire and diffuse among the people of the United States useful information on subjects connected with the marketing and distribution of farm products * * * ."

Distribution of Market News

Distribution of market news depends somewhat on its nature. Information relating to shipments, receipts, condition and price, and present state of the market require prompt action and the use of telegraph, telephone, radio, and the daily press. The long-range studies, comparisons, and conclusions may still be useful even if delayed a little in getting to the reader, and such material is well suited to distribution by mail and through periodicals of various kinds. This part of the service almost assumes that the public already has the underlying facts given from day to day regarding the market. It is implied further that the reader desires to have the meaning of the facts brought out by comparison of conditions on the different markets and with the market of the past week or the previous season. To be considered also in this connection and to be included perhaps in the summary is the market bearing of the current news about crops, production, business conditions, foreign trade, and the like.

The total circulation of market material through these various means is not easy to estimate closely. One commodity division which had been adding up the circulation of its reviews and market articles through the news press, counting only the periodicals actually printing all or part of the material, concluded that their reviews found at least 9,500,000 takers, according to the circulation rating by the directories. Two other divisions each reckoned a total of fully 4,000,000 press circulation. Reviews of one line of farm products were being used by from 200 to 300 papers, and by numerous radio stations, and were posted by 4,000 country banks, and in the offices of numerous boards of trade, county agents, and State officials. Members of the writing staff also send out special signed reports to a dozen representative trade papers. Another division has depended greatly upon the radio stations and has supplied material, daily or weekly, to about 80 of these stations, covering nearly the whole country in a network of direct publicity.

All the market news material is distributed by substantially the same means, the main difference being in the relative emphasis placed upon the different agencies for reaching the public, according to the nature of the product, the apparent demand, and the style in which the material is prepared. All the news services on the various farm products make extensive use of local, metropolitan, and commercial papers, press associations, news agencies, mail distribution, and the radio; but emphasis placed on each of these differs somewhat, according to the nature of the products and the scope of its marketing field, the general availability of reliable news from normal sources, and the proved effectiveness in each instance of the methods of publicity employed.

G. B. Fiske,
Associate Editor, Bureau of Agricultural Economics.

MARKETING Legislation Calls for Federal and State Cooperation

Marketing work now conducted by the Bureau of Agricultural Economics had its legislative origin in an item in the appropriation act for the fiscal year 1914. This authorization was "to enable the Secretary of Agriculture to acquire and diffuse among the people of the United States useful information on subjects connected with the marketing and distribution of farm products * * * ."

Soon after the organization of the marketing work in the Department of Agriculture, requests began to be received from the States for assistance in the formation of an effective bureau of markets in which to conduct the State work. As a result, a draft of a State law was prepared and with minor changes remains as a model upon which it is believed the States may rely in shaping their marketing work. This draft of bill was designed to include only the more general powers necessary for conducting the work. Provision was made for investigational, educational, and demonstrational work in marketing, but, broadly speaking, regulatory features were not included. Such regulation as might be deemed necessary, as of warehousing, cold storage, commission merchants, etc., was left for treatment in separate laws.

As the work has progressed and as the results of the bureau's investigations, as well as the practical application of the principles involved, have become known and recognized, there has been an increasing call from the States for assistance and cooperation in the shaping of policies and the working out of their marketing problems. This is evidenced by the cooperative projects now in effect with the States, representing a substantial proportion of the bureau's marketing undertakings. It is logical to expect that the States will cooperate and will desire to take advantage of the careful study given the subject by the Federal Government. This applies particularly to standards for agricultural products, the market inspection of such products, and the market news service. Development of these activities has continued steadily, and they are perhaps as well known as any of the phases of marketing work.

Two Classes of Standards

Standardization and grading, from the inception of the marketing work, has held a prominent place. Standards fall within two classes—mandatory and permissive. Except in the cases of grain and cotton, it is with the latter type that the larger part of the work in marketing is conducted. The use of these standards is optional—that is, there is no law which compels their use and makes it obligatory upon shippers and others to designate their products as falling within a certain grade. The permissive feature allows for latitude and makes it possible for one to dispose of his products, regardless of grade, as "unclassified."

Upon this point there has arisen a difference of opinion. Some of the State officials hold out for mandatory grades and insist that the surest way of improving the quality of agricultural commodities is to permit them to be marketed only by recognized definite grades. On the other hand, with permissive grades it is possible to market every part of the crop which is marketable or adaptable to any purpose.

The character of a law, whether mandatory or permissive, is determined by its object—that is, whether some regulatory action is to be enforced or a service is to be rendered. Both types of laws are administered by the bureau.

The farm products inspection service is an example of a permissive service which is meeting the needs of the industry. While authorization exists for the inspection of perishable agricultural products at shipping points and at central markets under rules and regulations of the Secretary of Agriculture, it applies only to those interested parties who may wish to have their products inspected.

The question of jurisdiction has at times been raised—that is, whether the Federal Government under some of its marketing laws has not encroached upon the functions of the States. Apparently some apprenhension existed in the minds of certain State enforcement officers as to the attitude of the Federal officials, but it is now well understood that there is no thought of undue assumption of authority, that the dominant idea is cooperation, that friction in enforcement or administration is unnecessary, and that wherever there is a job to be done which requires action by both State and Federal officials their duty is to do it in the most efficient and helpful manner, rendering such service, if it be a permissive law, or such enforcement, if it be a mandatory statute, as will best serve the interests of the public.

Federal Legislation Welcomed

Limited jurisdiction of the States sometimes acts as a preventive of thorough treatment of a particular situation where remedial action is necessary. In such cases there is now a growing recognition of the desirability of Federal legislation in a field already occupied by the States. This is exemplified in the recently enacted perishable agricultural commodities act of 1930, approved by the President on June 10, 1930, under which commission merchants, dealers, and brokers in fresh fruits and fresh vegetables are required to be licensed by the Secretary of Agriculture. The so-called commission merchants' laws have been on the statute books in several of the States for a number of years. By reason of the limited jurisdiction of the States, however, it has been felt that they have not been fully effective; that the unjust and fraudulent practices of certain members of the fruit and vegetable industry have not been nor could not be stamped out without a jurisdictional authority embracing both the shipping point and the receiving end of a transaction.

Demand for agricultural marketing legislation continues. A large number of bills are introduced at each session of Congress having for their purpose the amendment of existing laws or the enactment of provisions covering additional features considered desirable by their proponents. Such bills are invariably subjected to close scrutiny, and rarely does one pass without undergoing careful examination and full discussion.

The Trend in State Legislation

The States continue to cooperate with the Federal Government legislatively. A perusal of their session laws for any of the recent sessions will indicate such a trend with respect to agricultural legislation and a disposition so to shape their laws as to profit by the investigations or the experience of the Federal Government. A potent factor in this trend toward amity and understanding between the State and Federal officials has been the National Association of Marketing Officials, an organization composed of representatives of the State marketing bureaus and of the Federal Government. At the eleventh annual meeting of this association held in December, 1929, 25 States and the District of Columbia were represented, as well as research associations, producers, shippers, dealers, etc. This association is filling an important rôle in the field of marketing in bringing together the various public marketing officials for discussion of the many problems that confront them in the performance of their duties.

H. F. Fitts,
Assistant to the Chief, Bureau of Agricultural Economics.

MEAT Keeping in Home Refrigerators Studied in Varying Conditions The keeping of meat in the household refrigerator is a subject of concern to the housewife. It is one of the foods which normally is digestible, palatable, and nutritive. When proper care is not exercised in its production and storage, decomposition takes place which renders it unpalatable, and harmful toxins may be formed.

The money loss incurred through the spoilage of food by improper storage is high. The possible injury to health and life is of greater consideration and can not be estimated. In the past, many cases of food poisoning have occurred due to the use of meat. This possibility has been greatly reduced through the thorough inspection of livestock and meat products by Federal and local authorities. The protection thus afforded, however, loses its value if the meat is not properly stored from the time of purchase until it is used.

Local health authorities are responsible for the conditions under which the meat is handled in its local distribution. The housewife's responsibility commences with its choice at the local store and the handling of the meat after it reaches home. In connection with the refrigeration investigations of the Bureau of Home Economics, a series of studies has been made to determine the conditions of home storage which will help preserve the quality of the meat.

Bacterial activity is responsible for the advancement of spoilage of meat. The housewife can only by choice safeguard the contamination of meat before it reaches her. She does have a responsibility, however, in choosing meat of good quality and in handling the meat after it reaches her, (1) to prevent contamination, and (2) to provide storage conditions which will retard the development of the bacteria present.

Temperature plays the most important part in controlling the development of microorganisms in food. To determine the temperatures desirable for home refrigeration of meat, a study was made of the effect of different temperatures on the increase of bacteria in meat. The temperatures used were 35°, 40°, 45°, 50°, and 55° F. for periods of one to four days. The meat selected for this work was a good grade of the top round of beef—uncooked—cut in solid cubes. It was stored in covered and uncovered containers, since preliminary studies had shown that spoilage proceeded more rapidly in tightly covered dishes. In making the tests, samples were taken from 10 different places on the cube and the results given represent the averages from 24 series. The comparative rate of growth taking place at each temperature is shown in Table 11.

TABLE 11.—*Effect of storage temperature upon the number of bacteria in meat*

Meat stored in uncovered containers

Temperature	Original sample	Rate of increase in—			
		24 hours	48 hours	72 hours	96 hours
° F.					
35	2	1	2	4	4
40	2	3	3	5	11
45	2	5	20	143	1,301
50	2	12	92	2,929	9,145
55	2	21	3,356	22,261	97,294
Meat stored in covered containers					
35	2	3	2	7	8
40	2	3	4	24	221
45	2	11	32	2,083	4,894
50	2	32	137	7,420	24,197
55	2	32	4,525	18,879	390,130

From these results, it will be seen that not only was the increase greater at the higher temperatures but it was also greater in the covered dishes as compared with the uncovered. Table 11 shows the rate of bacterial increase taking place in the meat stored in uncovered and in covered containers at temperatures of 35°, 40°, 45°, 50°, and 55° F. It is of particular interest to note the quickened rate of growth taking place in the uncovered container at 50° as compared with that at 45°. The meat in the covered containers shows a more advanced state of spoilage than meat in the uncovered containers—signified in large measure by a greater acceleration in bacterial growth—as may be observed in the table. The use of a covered container for meat was found to enrich the conditions favoring the growth of bacteria, and produced a quickened growth rate equal, in many instances, to that produced by a 5° rise in temperature.

The Temperatures Required

A study of Table 11 indicates that the home refrigerator, if the meat is to be kept for more than 24 hours, should provide a temperature of below 50° F. and wherever possible a temperature of 45° or below. If the meat is to be kept longer than two days, a temperature of 45° or below ought to be provided. These temperatures coincide with those which are recommended for the safeguarding of milk. That means that meat should be placed in the milk compartment or in that portion of the refrigerator which is quite as low in temperature as the milk compartment.

These studies also show that fresh meat should have the wrapper removed and be placed in a clean vessel, loosely covered if at all. A slight drying out of the surface of the meat does not interfere seriously with its palatability and certainly retards bacterial development. Cooked meat has the number of bacteria reduced markedly. It should be loosely covered so as to prevent unnecessary drying out, which does interfere seriously with its palatability. While the temperature is not so important in its storage, it should be placed in the coldest portion available and care should be taken to avoid holding it too long. It is especially important that ground-cooked meat should be handled with care, for in the process of grinding there is so much opportunity for recontamination that food poisoning may result from its use. This is especially important in salads and sandwiches where there is no heating after grinding or chopping to kill the bacteria which may be introduced, and in the case of recooked meat, like croquettes, that may be simply heated through but not cooked to a temperature which would help destroy the bacteria or toxins present. Especially to be avoided are situations in which meat is ground or chopped while still warm and allowed to stand without proper refrigeration—as refrigeration retards development, higher temperature stimulates it.

A. M. Pabst,
Junior Bacteriologist, Bureau of Home Economics.

MEATS (Fresh) Graded and Sold in Packages Win Consumers' Favor

Distribution of nonperishable food products from manufacturer to consumer has undergone a complete change in the last 20 years. Retailers have found that the inducements to handle large and unwieldy containers have progressively diminished in favor of the convenience of

From these results, it will be seen that not only was the increase greater at the higher temperatures but it was also greater in the covered dishes as compared with the uncovered. Table 11 shows the rate of bacterial increase taking place in the meat stored in uncovered and in covered containers at temperatures of 35°, 40°, 45°, 50°, and 55° F. It is of particular interest to note the quickened rate of growth taking place in the uncovered container at 50° as compared with that at 45°. The meat in the covered containers shows a more advanced state of spoilage than meat in the uncovered containers—signified in large measure by a greater acceleration in bacterial growth—as may be observed in the table. The use of a covered container for meat was found to enrich the conditions favoring the growth of bacteria, and produced a quickened growth rate equal, in many instances, to that produced by a 5° rise in temperature.

The Temperatures Required

A study of Table 11 indicates that the home refrigerator, if the meat is to be kept for more than 24 hours, should provide a temperature of below 50° F. and wherever possible a temperature of 45° or below. If the meat is to be kept longer than two days, a temperature of 45° or below ought to be provided. These temperatures coincide with those which are recommended for the safeguarding of milk. That means that meat should be placed in the milk compartment or in that portion of the refrigerator which is quite as low in temperature as the milk compartment.

These studies also show that fresh meat should have the wrapper removed and be placed in a clean vessel, loosely covered if at all. A slight drying out of the surface of the meat does not interfere seriously with its palatability and certainly retards bacterial development. Cooked meat has the number of bacteria reduced markedly. It should be loosely covered so as to prevent unnecessary drying out, which does interfere seriously with its palatability. While the temperature is not so important in its storage, it should be placed in the coldest portion available and care should be taken to avoid holding it too long. It is especially important that ground-cooked meat should be handled with care, for in the process of grinding there is so much opportunity for recontamination that food poisoning may result from its use. This is especially important in salads and sandwiches where there is no heating after grinding or chopping to kill the bacteria which may be introduced, and in the case of recooked meat, like croquettes, that may be simply heated through but not cooked to a temperature which would help destroy the bacteria or toxins present. Especially to be avoided are situations in which meat is ground or chopped while still warm and allowed to stand without proper refrigeration—as refrigeration retards development, higher temperature stimulates it.

A. M. Pabst,
Junior Bacteriologist, Bureau of Home Economics.

MEATS (Fresh) Graded and Sold in Packages Win Consumers' Favor

Distribution of nonperishable food products from manufacturer to consumer has undergone a complete change in the last 20 years. Retailers have found that the inducements to handle large and unwieldy containers have progressively diminished in favor of the convenience of handling packaged goods. Consumers generally prefer small, neat, original packages.

In the case of nonprocessed and perishable products, which require constant refrigeration at relatively low temperatures, packaging has been somewhat slow in developing. The distribution of frozen meats precut in convenient consumer packages received attention by commercial interests for the first time during 1929. It is still in the experimental stage.

Beef bearing the Government grade stamp has been available in many sections of the country since May, 1927, but it was not until April, 1930, that cut and packaged fresh meats (unfrozen) bearing the official grade label were available to consumers. At that time a large meat-packing company with slaughtering plants in eight cities started an experiment in the sale of precut and packaged fresh meats of all kinds in New York City.

The aim of the company is to provide meats of uniformly high quality in convenient size packages to meet the needs of consumers. To insure a high degree of uniformity in quality, the department's grading service is used. Government graders select all meats and place the official grade stamp on them before they are sent to the cutting room. Only meats that meet the requirements of the official grade choice are used. From these are cut rib roasts, chuck roasts, steaks, cutlets, chops, and in fact practically all cuts which might be purchased in any modern retail market. Practically all bone and surplus fat are trimmed off before putting the cuts into packages. The retail cuts are neatly wrapped in cellophane and placed in attractive cardboard containers with "window" arrangement for the convenience of customers. The process of packaging is supervised by Government employees who see that the package carries the correct grade label. Packages containing two pork chops, two lamb chops, or one small steak are always available for the needs of the small family; likewise larger packages of all well-known cuts are on sale constantly.

Careful Refrigeration Needed

The need for suitable display and the highly perishable nature of the product required special attention in the matter of refrigeration. Specially constructed cases were built in which relatively low uniform temperatures ranging between 32° and 34° F. could be maintained. After a 3-month experiment in which approximately 30 refrigerated cases have been placed in retail stores, the plan promises to become a factor of considerable importance in retail meat distribution generally. The reaction of consumers has been highly favorable and no criticisms resulting from dissatisfaction with purchases have been received.

From the economic side the plan also has much in its favor. All meats are cut at a central point by experienced meat cutters under the direction of a competent supervisor. Special attention is given the matter of trim, thickness, and uniformity of size between cuts, especially the smaller cuts such as chops and steaks, when several are placed in the same package. Savings which would result from centralized cutting operations are greater conservation of trimmings and fats for conversion into edible products than has been possible under the old system in the average small market.

Another economic factor which should receive consideration by the retailer who handles precut, packaged meat, is that of lower operating costs. Under the new plan, the services of meat cutters in the market are dispensed with. No racks, blocks, or other equipment including butcher tools are necessary. Full time of employees can be given to selling. The Government grade label on each package gives the consumer an index of quality, and largely eliminates the possibility of consumer dissatisfaction. Reports from satisfied customers and constantly increasing sales are indicative of what can reasonably be expected when precut, packaged, fresh meats bearing the Government grade label are made available to consumers generally.

W. C. Davis,
Senior Marketing Specialist,
Bureau of Agricultural Economics.

MEDITERRANEAN Fruit-Fly Eradication Program Is Making Rapid Progress

The attempt to exterminate the Mediterranean fruit fly in Florida, one of the most extensive pest-eradication programs ever undertaken, has shown remarkable progress in the direction of eliminating this insect completely from the United States. From the conditions existing during the early summer of 1929, when 1,000 properties were found infested and serious commercial losses were being experienced within the center of the infested area, the work has progressed to a point where now (October, 1930) no fly-infested fruit whatever is found.

The Mediterranean fruit fly is an accidentally imported pest, which, before 1929, had never been present in the United States. It is probably the worst of all fruit pests, having a long record of serious damage to the tropical and subtropical fruit industries of southern Europe, South Africa, Hawaii, Australia, and other countries. When first found in Florida, in April, 1929, the grapefruit crops on several premises in the center of the infested area at Orlando were already practically a complete loss. Surveys to determine the extent to which the fruit fly had already spread in the State showed its presence in 20 counties on approximately 1,000 properties. While the manner in which it reached this country is not known, the spread in Florida was clearly due to the general distribution of fruit from infested groves, and to the carrying of adult flies with the wind.

Suppressive Measures

In other countries, Mediterranean fruit fly invasions have resulted so disastrously to fruit-growing interests that total eradication appeared to offer the only hope of protecting this industry in the United States. Under generous appropriations promptly made available by Congress and by the State of Florida, suppressive measures were accordingly undertaken at once.

The methods used to exterminate the fruit fly included (1) the clean-up of infested properties as rapidly as found, and the removal of such host fruits and vegetables as appeared necessary to eliminate infestation on the infested properties; (2) the application to trees in infested localities of sweetened poisoned bait to destroy the adult flies; and (3) the destruction of all summer-ripening host fruits and vegetables in the infested zones (areas 1 mile in radius around points of costs. Under the new plan, the services of meat cutters in the market are dispensed with. No racks, blocks, or other equipment including butcher tools are necessary. Full time of employees can be given to selling. The Government grade label on each package gives the consumer an index of quality, and largely eliminates the possibility of consumer dissatisfaction. Reports from satisfied customers and constantly increasing sales are indicative of what can reasonably be expected when precut, packaged, fresh meats bearing the Government grade label are made available to consumers generally.

W. C. Davis,
Senior Marketing Specialist,
Bureau of Agricultural Economics.

MEDITERRANEAN Fruit-Fly Eradication Program Is Making Rapid Progress

The attempt to exterminate the Mediterranean fruit fly in Florida, one of the most extensive pest-eradication programs ever undertaken, has shown remarkable progress in the direction of eliminating this insect completely from the United States. From the conditions existing during the early summer of 1929, when 1,000 properties were found infested and serious commercial losses were being experienced within the center of the infested area, the work has progressed to a point where now (October, 1930) no fly-infested fruit whatever is found.

The Mediterranean fruit fly is an accidentally imported pest, which, before 1929, had never been present in the United States. It is probably the worst of all fruit pests, having a long record of serious damage to the tropical and subtropical fruit industries of southern Europe, South Africa, Hawaii, Australia, and other countries. When first found in Florida, in April, 1929, the grapefruit crops on several premises in the center of the infested area at Orlando were already practically a complete loss. Surveys to determine the extent to which the fruit fly had already spread in the State showed its presence in 20 counties on approximately 1,000 properties. While the manner in which it reached this country is not known, the spread in Florida was clearly due to the general distribution of fruit from infested groves, and to the carrying of adult flies with the wind.

Suppressive Measures

In other countries, Mediterranean fruit fly invasions have resulted so disastrously to fruit-growing interests that total eradication appeared to offer the only hope of protecting this industry in the United States. Under generous appropriations promptly made available by Congress and by the State of Florida, suppressive measures were accordingly undertaken at once.

The methods used to exterminate the fruit fly included (1) the clean-up of infested properties as rapidly as found, and the removal of such host fruits and vegetables as appeared necessary to eliminate infestation on the infested properties; (2) the application to trees in infested localities of sweetened poisoned bait to destroy the adult flies; and (3) the destruction of all summer-ripening host fruits and vegetables in the infested zones (areas 1 mile in radius around points of infestation) and in parts of the surrounding protective zones which were 9 miles wide.

These measures were especially adapted to destroying the fruit fly, many of the details of the life history and habits of which were well-known from its record in foreign countries. Nearly all kinds of fruits, both citrus and deciduous, and several kinds of vegetables, are attacked. The adult flies puncture the rind or surface of the fruit or vegetable to deposit eggs. The eggs hatch into small larvae or maggots which burrow into the fruit until they reach maturity. The fruit soon drops to the ground and the larvae leave it to rest in a pupal stage in the soil.

Larvae Killed By Destruction of Fruit

The destruction of fruit in infested and surrounding groves killed the larvae which were working in the fruit at the time. Since no satisfactory soil disinfectant was discovered, it was necessary for such insects as were in the soil to develop through the pupal stage into adult flies before they could be killed. Their destruction was then accomplished by means of the poisoned bait sprays mentioned, and in the absence of fruit and fruit juices in the infested zones, this spray was especially attractive to the flies and effective in destroying them. The removal of the fruit in the infested zones accomplished the further purpose of providing no near-by fruit within which the flies could breed, and most of those not poisoned by the bait lost their lives before they reached fruit in which breeding could be continued.

This work was pressed vigorously by the United States Department of Agriculture in cooperation with the State Plant Board of Florida from April, 1929, to January, 1930. By that time clean-up activities had covered the 120,157 acres of citrus groves in the infested zones an average of approximately four times, and had involved the destruction of the equivalent of approximately 608,864 boxes of citrus fruit. The infested zones included all properties within 1 mile of the point of infestation. Over 60,000 acres outside these zones were covered, an average of two and three times. The poisoned bait spray was used within the infested zones so far as possible each week throughout the winter and was resumed again this past summer. Spray applications in other parts of the eradication area were made at greater intervals.

The eradication program has been so successful that since August 27, 1929, up to the time of the writing of this article, only three infestations were found, one each in November, 1929, and March, 1930, respectively, near Orlando; and one at St. Augustine in July, 1930. Only one, two, or three fruits were involved in each of these cases. The St. Augustine infestation consisted of only two puparia found in the soil below an orange which had fallen to the ground. While these three infestations, meager as they are and scattered over a period of more than a year, show that the fruit fly can not as yet be considered exterminated, the record indicates that great strides have been made in that direction and that the suppresive measures employed promise to be completely successful if they can be continued.

Prevention of Spread

When the fruit fly was first found in Florida more than three-fourths of the fruit of the district concerned had already been shipped out of the State. This situation meant that there was danger that the pest had already been carried to many other points in the United States. To determine whether these shipments had resulted in the widespread establishment of the fly, as much as possible of such fruit was examined wherever it was still held at local markets or in storage. The quarantine officers and extension services of the Cotton Belt States were especially active in making these inspections. The work resulted in the discovery of 17 shipments of infested fruit distributed to 12 localities in Arkansas, Georgia, Louisiana, North Carolina, Texas, New York, and Ohio. The infested materials were in all cases destroyed and the containers and locations cleaned up, with the result that so far as can be determined the Mediterranean fruit fly did not become established at any point outside Florida.

The shipment of further infested fruit was prevented by the issuance of a Federal plant quarantine, bringing under control the transportation of host fruits and vegetables from all parts of the State. From May 16 to November 21, 1929, no such fruits or vegetables from any part of Florida were permitted to be shipped into Southern and Western States, as the previous record of the fruit fly in other parts of the world showed that it was in these States that the Mediterranean fruit fly promised to become especially injurious if established.

Treatment of Host Fruits for Shipment

Similarly, throughout the summer of 1929 and until the new crop was ready to move that fall, no host fruits or vegetables were permitted to be moved to any destination or sold locally, if they had been produced within 1 mile of points of infestation. All such material was required to be destroyed. Early in the fall shipping season of 1929, however, experimental work had shown that it was possible to eliminate risk of infestation either by refrigerating it to 28° F. or by heating it to 110°. Thereafter infested-zone fruit was allowed to be moved under sterilization, and sterilization was also required for fruit shipped from most other parts of the 20 counties concerned, except as to fruit moved into the extreme Northeastern States where there was the least possibility of the establishment of infestation. During midwinter, from the latter part of November to the end of February, sterilized fruit was also allowed to be shipped into the Southern and Western States. Sterilization was never used as a measure to authorize the shipment of infested fruit, all of which has been consistently destroyed from the time the fruit fly was first discovered, but was employed to eliminate risk of infestation from fruit which had been more or less exposed to fruit-fly attack.

The quarantine measures adopted to prevent the spread of the fly were highly successful. Not a single case of the discovery of infestation in fruit moved after the Federal quarantine became effective, on May 1, 1929, has been reported.

The Mediterranean fruit fly eradication campaign in general has been so successful as to give great encouragement to the possibility of eradicating new outbreaks of insect pests when they are discovered soon after their first appearance in this country. The most economical method of fighting a foreign insect pest is never to permit it to reach the United States. If it eludes the protective measures set up against it and becomes established in this country, an eradication program may be an expensive and difficult undertaking, but, in the case of the Mediterranean fruit fly, the work thus far has cost so much less than the losses which could have been anticipated from the permanent establishment of the pest in this country, that the eradication campaign has been a highly profitable one. The disastrous results to fruit-growing in other countries which have followed Mediterranean fruit fly invasions in the past, and the severity of its attack in the center of the infested section of Florida in 1929, showed how great a drain it might have become on the horticultural resources of the country.

S. B. Fracker,
Principal Plant Quarantine Administrator,
Plant Quarantine and Control Administration.

MEXICAN Bean Beetles' Spread Checked in 1930 by Drought and Heat

Few insect pests of its type are so susceptible to the influence of climatic conditions as the Mexican bean beetle. After surviving the winter in large numbers over most of the infested territory of the eastern part of the United States and causing much damage during the spring and early summer of 1929, the infestation decreased in many areas during dry, hot summer weather.

This natural check on reproduction of the beetle has been observed almost annually in the Southeastern States at some time during each season since it has been studied there. The tendency of bean leaves to turn upward during hot weather, when moisture is insufficient, exposes the eggs and immature stages to the heat from the sun. Recent research has shown that when the temperature reaches 101° F. the beetle is killed within three hours if the relative humidity of the air is low or very high. At 109° the beetle is killed at any humidity. This work confirms the field observations that either hot dry weather or extremely wet weather in summer reduces the numbers of the insects.

Probably the most conclusive demonstration of the effect of climate on the Mexican bean beetle was evident in the spring and summer of 1930. After a favorable winter (1929–30) in general for hibernation over much of the eastern infested area, reproduction was almost entirely checked by the prolonged droughts and unusually high spring temperatures. Large numbers of eggs were deposited by the female beetles, but only a very small percentage survived and hatched. As a result, injury by the beetle was reduced to a point below commercial damage in areas where defoliation of untreated beans had occurred in 1929 and undoubtedly would have occurred in 1930 had not the dry, hot weather prevailed.

Survival in Spring of 1930

Survival from hibernation in the spring of 1930 reached the high percentage of 33.33 in eastern Virginia and a still higher percentage in southeastern Virginia. In southeastern Ohio more beetles survived the winter than in the previous winter. Field observations in other sections indicated a high survival and emergence. Emergence from hibernation, which depends largely on rainfall for a stimulus, after required temperatures prevail, was delayed by dry weather, although the beetles emerged earlier than in 1929.

The susceptibility of the insect to high summer temperatures undoubtedly accounts for its failure to thrive in the southern portions of Mississippi, Alabama, Georgia, and South Carolina and explains its the losses which could have been anticipated from the permanent establishment of the pest in this country, that the eradication campaign has been a highly profitable one. The disastrous results to fruit-growing in other countries which have followed Mediterranean fruit fly invasions in the past, and the severity of its attack in the center of the infested section of Florida in 1929, showed how great a drain it might have become on the horticultural resources of the country.

S. B. FRACKER,
Principal Plant Quarantine Administrator,
Plant Quarantine and Control Administration.

MEXICAN Bean Beetles' Spread Checked in 1930 by Drought and Heat

Few insect pests of its type are so susceptible to the influence of climatic conditions as the Mexican bean beetle. After surviving the winter in large numbers over most of the infested territory of the eastern part of the United States and causing much damage during the spring and early summer of 1929, the infestation decreased in many areas during dry, hot summer weather.

This natural check on reproduction of the beetle has been observed almost annually in the Southeastern States at some time during each season since it has been studied there. The tendency of bean leaves to turn upward during hot weather, when moisture is insufficient, exposes the eggs and immature stages to the heat from the sun. Recent research has shown that when the temperature reaches 101° F. the beetle is killed within three hours if the relative humidity of the air is low or very high. At 109° the beetle is killed at any humidity. This work confirms the field observations that either hot dry weather or extremely wet weather in summer reduces the numbers of the insects.

Probably the most conclusive demonstration of the effect of climate on the Mexican bean beetle was evident in the spring and summer of 1930. After a favorable winter (1929–30) in general for hibernation over much of the eastern infested area, reproduction was almost entirely checked by the prolonged droughts and unusually high spring temperatures. Large numbers of eggs were deposited by the female beetles, but only a very small percentage survived and hatched. As a result, injury by the beetle was reduced to a point below commercial damage in areas where defoliation of untreated beans had occurred in 1929 and undoubtedly would have occurred in 1930 had not the dry, hot weather prevailed.

Survival in Spring of 1930

Survival from hibernation in the spring of 1930 reached the high percentage of 33.33 in eastern Virginia and a still higher percentage in southeastern Virginia. In southeastern Ohio more beetles survived the winter than in the previous winter. Field observations in other sections indicated a high survival and emergence. Emergence from hibernation, which depends largely on rainfall for a stimulus, after required temperatures prevail, was delayed by dry weather, although the beetles emerged earlier than in 1929.

The susceptibility of the insect to high summer temperatures undoubtedly accounts for its failure to thrive in the southern portions of Mississippi, Alabama, Georgia, and South Carolina and explains its disappearance from some sections of those States which have been invaded from time to time.

The northern limits of the insect are becoming more definite as its spread into new territory continues. After being present in parts of southern Michigan and New York and southern Canada since 1927, it has not survived the winter in those areas in sufficient numbers to become a pest. Relatively little damage occurs in northern portions of Ohio and Indiana. In explaining the northern limits, results obtained to date indicate that low temperature during the winter is one of the critical factors.

The history of the Mexican bean beetle proves that it varies in abundance from year to year, owing in part to the factors mentioned. However, the likelihood of its eradication by natural or other causes over much of the infested area is extremely slight. With such great capability of rapid reproduction, heavy infestations can be and are built up in one or two seasons. The beneficial effects of climatic control can be further enhanced by continuous repressive methods. The destruction of crop remnants after the bean crop is harvested is very important, but the importance is not as generally recognized as it should be. Spraying should be practiced even during seasons of light infestations in areas where damage occurs at intervals and where it is known that the beetle thrives under normal conditions. An infestation may be too light to cause an appreciable loss, or may occur too late to reduce the yield, but still may harbor sufficient beetles to cause a heavy infestation on later plantings.

NEALE F. HOWARD,
Senior Entomologist, Bureau of Entomology.

MEXICAN Fruit-Fly Invasion Fought by Novel Eradication Plan

Crop diversification is such a common and effective method of reducing insect losses that a Mexican fruit fly eradication plan now in use in southern Texas appears strikingly novel. It consists of confining fruit production in the lower Rio Grande Valley almost solely to citrus, although such fruits are the most favored products attacked by the insect. The plan is based on the fact that oranges and grapefruit ripen during the fall and winter and leave no fruit on which the pest can breed during the spring and summer.

The southern and western portions of the United States have for many years been almost the only parts of the world in which oranges and grapefruit can be grown without a certain amount of fly infestation within the fruit itself. Accordingly, the citrus growers have watched with concern the gradual spread northward in Mexico of an insect at first known as the Morelos orange maggot which was originally discovered southwest of Mexico City over 70 years ago. Through the shipment of infested fruit this pest has spread to other sections of the Republic until eventually it reached the border of the United States.

Meanwhile, beginning in 1907, a citrus-growing industry of large proportions has been developing in the lower Rio Grande Valley of southern Texas. The region was found especially adapted to grapefruit, and grove planting has continued until there are now about 6,000,000 citrus trees in the area, of which less than one-fourth have disappearance from some sections of those States which have been invaded from time to time.

The northern limits of the insect are becoming more definite as its spread into new territory continues. After being present in parts of southern Michigan and New York and southern Canada since 1927, it has not survived the winter in those areas in sufficient numbers to become a pest. Relatively little damage occurs in northern portions of Ohio and Indiana. In explaining the northern limits, results obtained to date indicate that low temperature during the winter is one of the critical factors.

The history of the Mexican bean beetle proves that it varies in abundance from year to year, owing in part to the factors mentioned. However, the likelihood of its eradication by natural or other causes over much of the infested area is extremely slight. With such great capability of rapid reproduction, heavy infestations can be and are built up in one or two seasons. The beneficial effects of climatic control can be further enhanced by continuous repressive methods. The destruction of crop remnants after the bean crop is harvested is very important, but the importance is not as generally recognized as it should be. Spraying should be practiced even during seasons of light infestations in areas where damage occurs at intervals and where it is known that the beetle thrives under normal conditions. An infestation may be too light to cause an appreciable loss, or may occur too late to reduce the yield, but still may harbor sufficient beetles to cause a heavy infestation on later plantings.

NEALE F. HOWARD,
Senior Entomologist, Bureau of Entomology.

MEXICAN Fruit-Fly Invasion Fought by Novel Eradication Plan

Crop diversification is such a common and effective method of reducing insect losses that a Mexican fruit fly eradication plan now in use in southern Texas appears strikingly novel. It consists of confining fruit production in the lower Rio Grande Valley almost solely to citrus, although such fruits are the most favored products attacked by the insect. The plan is based on the fact that oranges and grapefruit ripen during the fall and winter and leave no fruit on which the pest can breed during the spring and summer.

The southern and western portions of the United States have for many years been almost the only parts of the world in which oranges and grapefruit can be grown without a certain amount of fly infestation within the fruit itself. Accordingly, the citrus growers have watched with concern the gradual spread northward in Mexico of an insect at first known as the Morelos orange maggot which was originally discovered southwest of Mexico City over 70 years ago. Through the shipment of infested fruit this pest has spread to other sections of the Republic until eventually it reached the border of the United States.

Meanwhile, beginning in 1907, a citrus-growing industry of large proportions has been developing in the lower Rio Grande Valley of southern Texas. The region was found especially adapted to grapefruit, and grove planting has continued until there are now about 6,000,000 citrus trees in the area, of which less than one-fourth have yet reached bearing age. The commercial citrus crop of 1929–30 in that section was reported as 4,854 carloads shipped to outside points and about 57 carloads utilized locally in canning and bottling plants.

After the Morelos orange maggot, now known as the Mexican fruit fly, reached northern Mexico, first on the local fruit markets and later attacking the fruit on dooryard trees, it finally made its way to the Texas side of the river. The insect was found there by representatives of the Texas Agricultural Experiment Station in March, 1927, and a few days later was picked up independently in another part of the valley by collaborators of the United States Department of Agriculture.

Threatened Untold Damage

When, in April, the specimens were definitely determined by specialists as this insect, it was at once recognized that the fruit fly not only seriously endangered the prosperity of the expanding grapefruit industry of that section but also might spread to the other citrus-growing districts of the United States and cause untold damage. Total eradication of the outbreak was proposed as the only satisfactory solution of the problem, and the State and Federal Governments joined hands with the growers to accomplish that end.

Surveys at that time showed the pest in 12 orchards located at various points in Cameron and Hidalgo Counties. These groves were so scattered as to involve more or less the whole irrigated section of the lower valley, a region about 90 miles long by about 30 wide. The only fruits found infested there were grapefruit and some oranges, although the insect in Mexico attacks nearly all citrus fruits (except lemons and sour limes), as well as such other fruits as peaches, plums, pears, apples, apricots, and various tropical products such as guavas and mangoes.

The first step in eradication consisted of the destruction of all citrus fruit remaining on the trees in commercial orchards and the clean-up of other possible host fruits. This program was undertaken in May and June, 1927, and was followed up in July. Through the hearty cooperation of the citizens of the valley the needed measures were most faithfully carried out.

The eradication program in 1927 was apparently successful, and no further specimens of the pest were seen in the valley for about two years. In 1929 it was twice accidentally reintroduced from Mexico, once in April in the western end of the valley and once in the fall at Brownsville. Each time eradication measures were promptly undertaken and these appear to have eliminated the infestation successfully. In the case of the Brownsville outbreak, the suppressive measures previously employed were supplemented by using a poison spray to kill the adult flies.

Infested Fruit Reaches Markets

While the agricultural authorities of Mexico are heartily cooperating by assisting in the maintenance of a continuous control and spraying program in the Mexican towns on the south side of the Rio Grande, infested fruit repeatedly reaches the markets there from interior points. This means that a permanent plan of grove management must be maintained which so far as possible will prevent the establishment of the fruit worm and will tend to eliminate the pest automatically whenever it reaches the Texas plantings. The maintenance of the fruit-free period throughout the area from the first of March to the end of September, to a large extent, fills this requirement. The fact that the insect breeds more or less continuously, normally passing through about four generations a year, makes such a plan of attack effective.

The adult of the Mexican fruit fly is a small fly (*Anastrepha ludens*) scarcely larger than a house fly but of brownish color and with the wings crossed by oblique dusty bars. This fly places its eggs directly in or through the skin or rind of fruits, and these eggs hatch into larvae or "worms" which work inside the fruit. They leave scarcely an indication on the outside until they are nearly full grown, when they leave the fruit to pass through a pupal or resting stage. The complete absence, for seven months each year, of host fruits on which such breeding could take place means that it would be very difficult for flies which might reach the area to establish a permanent infestation there. Those which emerge from the pupal or resting stage in the spring after the fruit-free period had begun would be exposed to all the chances of injury by weather conditions, starvation, and other vicissitudes before eggs could be laid in the fruit of the next crop season the following fall.

The volume of work involved in removing the green fruit from the noncitrus summer-fruiting trees and shrubs such as peaches, pears, and guavas showed that such measures would be impracticable as a recurring annual method of permanent protection of the region. It became clear that the only feasible plan of carrying out such a method of prevention of future outbreaks would be the elimination of all fruit trees and shrubs which normally bear fruit during the spring and summer months.

The total number of summer-fruiting trees found in the valley in connection with this undertaking has exceeded 40,000. Many of these were destroyed by the owners at the beginning of the work and are therefore unrecorded. Since that time 38,761 have been taken out, all of them voluntarily by, or with the consent of, the owners. On July 1, 1930, only 187 such trees and shrubs could be discovered in the entire area. Thus far the owners of this small remaining number are in all cases removing the green fruit from the trees before it ripens, and fulfilling the host-free period requirements in that manner.

High Degree of Community Cooperation

The entire program is an instance of almost unequaled community coöperation and, in some instances, extraordinary self-sacrifice on the part of citizens of the district. For its success the citrus fruit industry is greatly indebted to many citizens whose incomes are not dependent on fruit-growing and whose action has been wholly altruistic. By this remarkable instance of united effort throughout an area with a population of over 160,000 persons it has become possible for citrus production to continue its expansion there on a sound basis of freedom from any serious hazard of Mexican fruit fly establishment. Combined with a plant-quarantine policy which enables the valley fruit to reach the Nation's markets under Federal inspection and certification, the citrus industry of the section has continued to grow and prosper.

S. B. Fracker,
Principal Plant Ouarantine Administrator,
Plant Ouarantine and Control Administration.

MILK-BOTTLE Losses Partly Traceable to Consumers' Negligence Nearly $15,000,000 is spent annually by the milk dealers of the United States for the purchase of between 300,000,000 and 400,000,000 milk and cream bottles, most of which are used to replace bottles that are lost or broken. Carelessness in handling the bottles in the home is responsible for a large part of this loss. In a survey of the records kept by 76 milk dealers in various cities of the country, the Bureau of Dairy Industry found that the life of a milk bottle varied from 6 to 91 trips; the average was 37.32 trips, while the most common figures given ranged between 20 and 30 trips. About one-third of this loss is due to breakage in the bottling plants, much of which is unavoidable. About two-thirds of the loss, however, is due to the fact that the bottles never

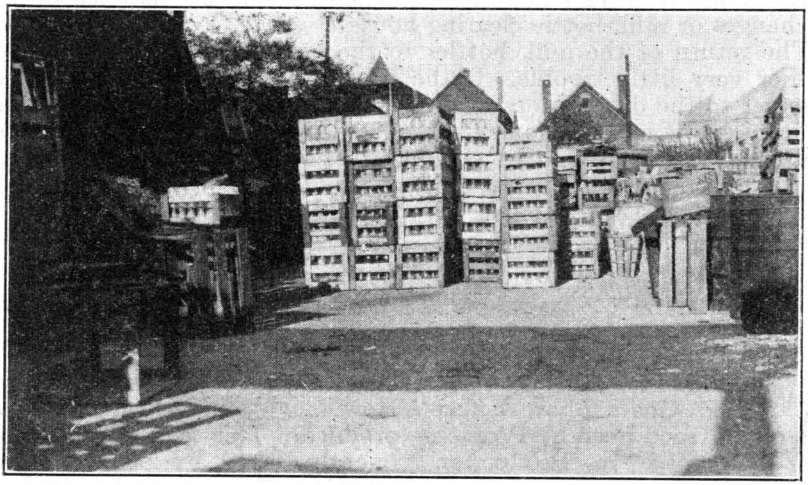


FIGURE 114.—The storage yard of a milk-bottle collector. These bottles were misplaced by household consumers. They will be transferred to the milk-bottle exchange, where they will be washed, sorted, and returned to the distributor who owns them

get back to the dealer who delivered them, and the consumer, usually unintentionally, is responsible for a large part of this loss.

Many housewives buy milk from the store. Instead of returning the empty bottles to the store where the milk was bought, they often set them out for the milkman to collect, who, in many instances, does not represent the owner of the bottles. Although these bottles may eventually get back to the dealer who owns them, oftentimes the process is a roundabout one and involves unnecessary expense. Some housewives, especially those living in flats and apartment houses, may set the bottles out for the janitor, who may or may not deliver them to a milkman; or they may even throw the bottles into the refuse can, in which case they may be picked up by a junk man or may find their way to the city dump.

Milk Bottle Exchanges

In many cities the milk dealers have established what are known as milk-bottle exchanges. These exchanges are clearing houses for lost and misplaced bottles. Many of these exchanges receive bottles from milkmen who have picked up bottles which belong to other milkmen;

from junk men who have picked them up from alleys, refuse cans, etc; and from city dumps.

In one large city the exchange receives and returns to the owners more than 1,000,000 bottles a week. About two-thirds of these bottles are received from milkmen who have picked up bottles that were set out for them by the housewife but which belonged to others. The other third comes from collectors, junk men, and the city dumps. Thus, more than one-third of 1,000,000 bottles come into the hands of one exchange each week because of the carelessness of householders in not returning them to the concerns which own them. Many bottles, however, are never received by the exchange but are lost.

Consumers have to pay for the bottles that are destroyed. They also have to stand the cost of collecting, washing, treating to kill bacteria, sorting, and returning the millions of bottles that are handled by the exchanges or milk-bottle clearing houses.

The return of the milk bottles to the owner need give the householder very little trouble. If the bottles were returned in a direct manner to the distributors who own them, the cost of milk distribution might be reduced somewhat. If milk is received from a regular milkman, the empty bottles should be set out for him every morning. If the milk is bought from a store, the bottles should be returned to the store if possible. If not, they should be set out for the regular milkman.

C. E. Clement,
Associate Market-Milk Specialist,
Bureau of Dairy Industry.

MILK Goats Show Effect of Good Feed by Prompt Increase in Production

How much milk will a milk goat produce? This is a question frequently asked by persons interested in these animals. It is a pertinent question, since goats vary greatly in the quantity of milk produced daily and also in the length of their lactation periods, which is an important factor in annual production. A doe producing 6 pounds of milk a day during a lactation period of from 8 to 10 months is considered an excellent milker.

Feed has a great influence on the milk flow, notwithstanding the general belief that goats can be fed almost any kind with success. Maximum production can be expected only when proper feeding methods and good-quality feeds are used.

Experiments conducted with the milk-goat herd at the United States Animal Husbandry Experiment Farm, Beltsville, Md., indicate that does respond readily to good feeding and that satisfactory production can be maintained by supplying good-quality grains and roughages throughout the lactation period. Purebred and high-grade does of the Saanen and Toggenburg (fig. 115) breeds were used to test the comparative feeding value of alfalfa and clover hays of low and high quality. In order to be of high quality, legume hays such as these must be cut at a stage of growth when they are high in nutritive value and cured so that they will be bright and leafy.

The experiment was of two years' duration. The first year, when low-quality hay was fed, 18 does produced 12,300 pounds of milk, or an average of 683 pounds per doe. The following year, when high-from junk men who have picked them up from alleys, refuse cans, etc; and from city dumps.

In one large city the exchange receives and returns to the owners more than 1,000,000 bottles a week. About two-thirds of these bottles are received from milkmen who have picked up bottles that were set out for them by the housewife but which belonged to others. The other third comes from collectors, junk men, and the city dumps. Thus, more than one-third of 1,000,000 bottles come into the hands of one exchange each week because of the carelessness of householders in not returning them to the concerns which own them. Many bottles, however, are never received by the exchange but are lost.

Consumers have to pay for the bottles that are destroyed. They also have to stand the cost of collecting, washing, treating to kill bacteria, sorting, and returning the millions of bottles that are handled by the exchanges or milk-bottle clearing houses.

The return of the milk bottles to the owner need give the householder very little trouble. If the bottles were returned in a direct manner to the distributors who own them, the cost of milk distribution might be reduced somewhat. If milk is received from a regular milkman, the empty bottles should be set out for him every morning. If the milk is bought from a store, the bottles should be returned to the store if possible. If not, they should be set out for the regular milkman.

C. E. Clement,
Associate Market-Milk Specialist,
Bureau of Dairy Industry.

MILK Goats Show Effect of Good Feed by Prompt Increase in Production

How much milk will a milk goat produce? This is a question frequently asked by persons interested in these animals. It is a pertinent question, since goats vary greatly in the quantity of milk produced daily and also in the length of their lactation periods, which is an important factor in annual production. A doe producing 6 pounds of milk a day during a lactation period of from 8 to 10 months is considered an excellent milker.

Feed has a great influence on the milk flow, notwithstanding the general belief that goats can be fed almost any kind with success. Maximum production can be expected only when proper feeding methods and good-quality feeds are used.

Experiments conducted with the milk-goat herd at the United States Animal Husbandry Experiment Farm, Beltsville, Md., indicate that does respond readily to good feeding and that satisfactory production can be maintained by supplying good-quality grains and roughages throughout the lactation period. Purebred and high-grade does of the Saanen and Toggenburg (fig. 115) breeds were used to test the comparative feeding value of alfalfa and clover hays of low and high quality. In order to be of high quality, legume hays such as these must be cut at a stage of growth when they are high in nutritive value and cured so that they will be bright and leafy.

The experiment was of two years' duration. The first year, when low-quality hay was fed, 18 does produced 12,300 pounds of milk, or an average of 683 pounds per doe. The following year, when high-quality hay was fed, the same does produced 18,150 pounds of milk, or an average of 1,008 pounds. This was an increase of 5,850 pounds of milk, or approximately 47 per cent. The length of the lactation periods was approximately nine months, each of the two years. All other factors and conditions except the hay were likewise the same. The grain ration remained constant and consisted of the following mixture: 8 parts corn, 4 parts oats, 2 parts bran, and 1 part linseed meal, by weight. The does received 1.5 pounds of this mixture, per head, daily throughout each year.

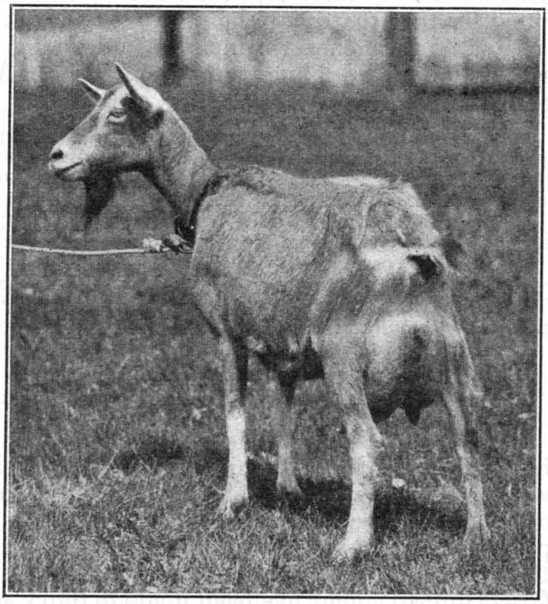


FIGURE 115.—Toggenburg doe of the type used in the feeding tests with good and poor hay

Similar studies were made by feeding a good-quality hay one month and a poor quality the next. In March of one year alfalfa hay of good quality was fed to 10 milking does and their total production for the month was 1,727 pounds. The following month a very poor quality of clover hay was fed in place of the alfalfa hay. The clover hay was coarse, improperly cured, and stemmy. The total production for the month dropped to 1,439 pounds, a decrease of 16.7 per cent, in spite of the fact that in April of preceding years milk production had increased over that in March.

As roughage usually constitutes at least 50 per cent of the feeding value of the ration for milk goats, it is evident that the very best quality should be provided.

V. L. SIMMONS,
Junior Animal Husbandman, Bureau of Animal Industry.

MILK Improvement on Nation-Wide Basis Is Dairy Extension Aim

Amid almost revolutionary changes in methods of marketing, one basic factor remains important—quality. There has seldom been a time when a superior product failed to gain or hold a better market than an inferior article. As trade competition increases, and when supply exceeds demand, the low-grade commodity usually is the first to suffer.

Dairy products are no exception. More and more market channels are being filled with milk, butter, cheese, and other products of higher grades, while low-grade products sell at lower prices or go without a market. Demand for foodstuffs depends largely upon the quality hay was fed, the same does produced 18,150 pounds of milk, or an average of 1,008 pounds. This was an increase of 5,850 pounds of milk, or approximately 47 per cent. The length of the lactation periods was approximately nine months, each of the two years. All other factors and conditions except the hay were likewise the same. The grain ration remained constant and consisted of the following mixture: 8 parts corn, 4 parts oats, 2 parts bran, and 1 part linseed meal, by weight. The does received 1.5 pounds of this mixture, per head, daily throughout each year.

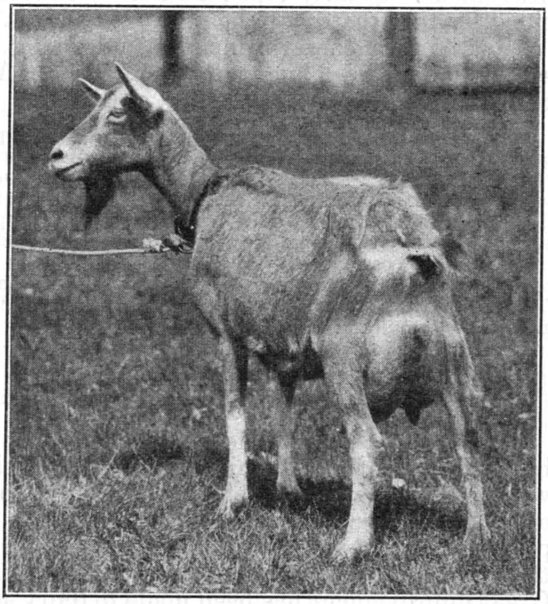


FIGURE 115.—Toggenburg doe of the type used in the feeding tests with good and poor hay

Similar studies were made by feeding a good-quality hay one month and a poor quality the next. In March of one year alfalfa hay of good quality was fed to 10 milking does and their total production for the month was 1,727 pounds. The following month a very poor quality of clover hay was fed in place of the alfalfa hay. The clover hay was coarse, improperly cured, and stemmy. The total production for the month dropped to 1,439 pounds, a decrease of 16.7 per cent, in spite of the fact that in April of preceding years milk production had increased over that in March.

As roughage usually constitutes at least 50 per cent of the feeding value of the ration for milk goats, it is evident that the very best quality should be provided.

V. L. SIMMONS,
Junior Animal Husbandman, Bureau of Animal Industry.

MILK Improvement on Nation-Wide Basis Is Dairy Extension Aim

Amid almost revolutionary changes in methods of marketing, one basic factor remains important—quality. There has seldom been a time when a superior product failed to gain or hold a better market than an inferior article. As trade competition increases, and when supply exceeds demand, the low-grade commodity usually is the first to suffer.

Dairy products are no exception. More and more market channels are being filled with milk, butter, cheese, and other products of higher grades, while low-grade products sell at lower prices or go without a market. Demand for foodstuffs depends largely upon the following factors: (1) Familiarity of the consumer with the product; (2) price, in relation to other foods and to purchasing power; (3) necessity in the diet; (4) palatability; and (5) quality.

No attempt is made here to list these factors in the order of their importance. The last two are of special value, and the Department of Agriculture is making a vigorous campaign to bring about improvement. Quality and palatability in milk are almost wholly decided by the treatment the product receives in the dairy industry.

Most of the general principles underlying the production of clean, safe milk have been known for a long time. As long ago as 1794 James Stele wrote:

> For the industrious farmer would be able to produce considerably larger quantities of these now very valuable, as well as useful commodities (butter and cheese) from his farm into the market without almost any additional expense whatever. At the same time he would derive a larger share of gain from the mere increase of weight, he would beside receive a proportionable advancefromthe superior quality of the articles, and a quicker market. * * * in order to have butter and cheese cleanly prepared, much caution and attention, no doubt, is requisite; yet a little more pains will be found to make all the difference, and, in fact, is all that is necessary for obtaining this notable and honorable end; in general, we would have people more careful to study cleanliness, in every respect, in the management of milk and its produce.

Wider Improvement Desirable

Of course the development of bacteriology and sanitary science has been almost entirely within the past generation; but even when Stele wrote, 136 years ago, the effect of cleanliness and cooling on the quality of milk was recognized. Although many leading dairymen have practiced approved methods, there has been a lamentable lack of thorough application of such principles throughout the industry. Great improvement has been made in dairy sanitation in this country, which on the whole has the safest milk supply in the world. But much of this improvement has taken place in fairly restricted localities, such as city milk sheds, and among patrons of individual plants. It has become increasingly evident to leaders in the industry that the time has arrived when an extensive country-wide program of quality improvement should be inaugurated. Such a program of information and demonstration should be available to every dairyman in the United States and, being an agricultural problem, it should be brought to him through agencies properly trained and equipped to handle agricultural questions. Fortunately the Congress, by the Smith-Lever Act, has established machinery for such purposes. This act provides funds for cooperative agricultural extension work by the State agricultural colleges and the United States Department of Agriculture. By over 2,700 county agents and 100 dairy extension specialists in the various States the latest information from the State agricultural colleges and the department is carried direct to farmers and their families.

The Office of Cooperative Extension Work and the Bureau of Dairy Industry of the Department of Agriculture have worked out two complete programs as suggestions for milk quality improvement work in the various States. The first of these is a project capable of being applied on the area plan in milk-producing sections. It provides for a preliminary survey of market requirements and present production methods and conditions. This is followed by a meeting of dairy specialists, county agents, representatives of dairy organizations, and milk-control officials, at which results of the survey are presented and methods of improvement discussed. A permanent committee is formed and a series of farmers' meetings and demonstrations follow. In this way, cooperators are secured who have special problems to deal with. The program also includes follow-up work and the measurement of results obtained during the year.

Project for Boys and Girls

For farm boys and girls, a somewhat different form of project has been devised. This is adapted for incorporation in whole or in part into the programs of the 4-H dairy clubs. The subject matter is divided into 12 lessons which deal with the fundamental principles of quality milk production. Each step calls for the production of milk samples by different methods. Simple tests for milk quality are applied to these samples at the club meeting. In this way every boy and girl has a vivid visual demonstration of quality improvement through the use of improved methods. At the end of the year there is a field day at which a demonstration team performs the tests for milk quality, a visit is made to an especially fine dairy, a picnic dinner is enjoyed by club members and parents, and awards for proficiency are made.

Although these projects have only recently been definitely formulated, several States have already begun work on both the adult and 4-H club programs. As dairymen see more clearly the tremendous economic advantage of this line of work and give it their wholehearted support, progress will be even more rapid. The time is not far off when dairymen will unite to jealously guard their markets against the influx of any inferior products. Theirs is the gain, and upon their shoulders rests the responsibility.

ERNEST KELLY,
Chief of the Division of Market-Milk Investigations,
Bureau of Dairy Industry.

MILK Plants of Small Size Must Be Carefully Planned and Operated Many farmers or groups of farmers have gone into the milk-distributing business, either as a side line or as their main occupation. For the most part their plants are small, supplying the fluid milk for the local community. Although the volume of the individual plant is not large, the plants are so numerous that in the aggregate they handle a considerable proportion of the bottled milk of the country.

For the most part these small plants are not prominently located. They are usually situated at the rear of the owner's home site, or on a small side street, or back from the main road on a farm. In the case of the town plant the location is usually picked with a view to economy in the cost of the site, and for convenience in the case of the farm plants. As to the town plant, although the use of the cheaper land for the site might seem to be a proper saving, it seems reasonable to suppose that the higher land value of a well-located site would often be more than offset by the advertising value and the counter sales that might be made if the plant were in a prominent location.

The Bureau of Dairy Industry is constantly receiving requests for information on the construction, arrangement, equipment, and man-milk-control officials, at which results of the survey are presented and methods of improvement discussed. A permanent committee is formed and a series of farmers' meetings and demonstrations follow. In this way, cooperators are secured who have special problems to deal with. The program also includes follow-up work and the measurement of results obtained during the year.

Project for Boys and Girls

For farm boys and girls, a somewhat different form of project has been devised. This is adapted for incorporation in whole or in part into the programs of the 4-H dairy clubs. The subject matter is divided into 12 lessons which deal with the fundamental principles of quality milk production. Each step calls for the production of milk samples by different methods. Simple tests for milk quality are applied to these samples at the club meeting. In this way every boy and girl has a vivid visual demonstration of quality improvement through the use of improved methods. At the end of the year there is a field day at which a demonstration team performs the tests for milk quality, a visit is made to an especially fine dairy, a picnic dinner is enjoyed by club members and parents, and awards for proficiency are made.

Although these projects have only recently been definitely formulated, several States have already begun work on both the adult and 4-H club programs. As dairymen see more clearly the tremendous economic advantage of this line of work and give it their wholehearted support, progress will be even more rapid. The time is not far off when dairymen will unite to jealously guard their markets against the influx of any inferior products. Theirs is the gain, and upon their shoulders rests the responsibility.

ERNEST KELLY,
Chief of the Division of Market-Milk Investigations,
Bureau of Dairy Industry.

MILK Plants of Small Size Must Be Carefully Planned and Operated Many farmers or groups of farmers have gone into the milk-distributing business, either as a side line or as their main occupation. For the most part their plants are small, supplying the fluid milk for the local community. Although the volume of the individual plant is not large, the plants are so numerous that in the aggregate they handle a considerable proportion of the bottled milk of the country.

For the most part these small plants are not prominently located. They are usually situated at the rear of the owner's home site, or on a small side street, or back from the main road on a farm. In the case of the town plant the location is usually picked with a view to economy in the cost of the site, and for convenience in the case of the farm plants. As to the town plant, although the use of the cheaper land for the site might seem to be a proper saving, it seems reasonable to suppose that the higher land value of a well-located site would often be more than offset by the advertising value and the counter sales that might be made if the plant were in a prominent location.

The Bureau of Dairy Industry is constantly receiving requests for information on the construction, arrangement, equipment, and management of these small plants. In all processing plants, the best arrangement permits the product to enter at one end of the plant, then go from one process to another in a straight line, the finished product leaving the plant at the other end. In a milk-pasteurizing plant this means that the raw milk and empty bottles enter at one end; the bottles go to the washer and the milk to the pasteurizer; then the pasteurized and cooled milk, and the clean bottles, meet at the filler; the filled bottles move on to the cold-storage room and from there out of the plant to the delivery equipment. This system eliminates all back-tracking, interference, and confusion. Although it is not always practicable to have exactly this arrangement, the principle is correct and should be followed as closely as possible.

Sanitary Standards

The sanitary standard of the small plant depends upon two things—the intelligence of the owner, and the efficiency of the inspector. Generally the owners of these plants take a great personal pride not only in keeping their plants clean and sanitary but also in delivering pure and wholesome milk to the consumer. To maintain a high sanitary standard and a high quality of flavor and odor of the bottled milk, it is necessary to separate the plant into rooms. The pasteurizing and bottling room should be separate from all other rooms. The bottle washing and milk-receiving may be done in the same room if there is enough space to allow for a reasonable separation of the two operations. The boiler and toilet must be separate from the other rooms with, preferably, no direct opening into the rest of the plant; there may be, however, a door opening from the boiler room into the bottle-washing room if it is kept closed when not in use.

Data gathered in three Eastern States on the construction, equipment, and arrangement of 120 small pasteurizing plants, show that the small plants of to-day are advancing very rapidly as to equipment and management. It was found that 97 per cent of the plants covered by the survey were using electricity for their operating power. Of the plants which handled less than 300 gallons of milk a day, 68 per cent were using mechanical refrigeration. The milk pasteurizing, cooling, and bottling equipment was usually of modern design and construction and the motor truck had almost entirely superseded the horse for delivery purposes. In general the owners were using modern labor-saving devices and equipment and were constantly trying to improve their operations and management.

FRED M. GRANT,
Assistant Market-milk Specialist,
Bureau of Dairy Industry.

MILK Secretion Shown by Experiments to be a Continuous Process

The firm, distended condition of the cow's udder just before milking, and the looser and more mellow condition immediately after the milk is drawn, are common observations. Sometimes the distention before milking is so great that streams of milk leak from the teats, and the cow appears to be in pain. In spite of these common observations, however, the belief has persisted rather generally among teachers and other professional men in dairy-cattle and veterinary work, that the capacity of agement of these small plants. In all processing plants, the best arrangement permits the product to enter at one end of the plant, then go from one process to another in a straight line, the finished product leaving the plant at the other end. In a milk-pasteurizing plant this means that the raw milk and empty bottles enter at one end; the bottles go to the washer and the milk to the pasteurizer; then the pasteurized and cooled milk, and the clean bottles, meet at the filler; the filled bottles move on to the cold-storage room and from there out of the plant to the delivery equipment. This system eliminates all back-tracking, interference, and confusion. Although it is not always practicable to have exactly this arrangement, the principle is correct and should be followed as closely as possible.

Sanitary Standards

The sanitary standard of the small plant depends upon two things—the intelligence of the owner, and the efficiency of the inspector. Generally the owners of these plants take a great personal pride not only in keeping their plants clean and sanitary but also in delivering pure and wholesome milk to the consumer. To maintain a high sanitary standard and a high quality of flavor and odor of the bottled milk, it is necessary to separate the plant into rooms. The pasteurizing and bottling room should be separate from all other rooms. The bottle washing and milk-receiving may be done in the same room if there is enough space to allow for a reasonable separation of the two operations. The boiler and toilet must be separate from the other rooms with, preferably, no direct opening into the rest of the plant; there may be, however, a door opening from the boiler room into the bottle-washing room if it is kept closed when not in use.

Data gathered in three Eastern States on the construction, equipment, and arrangement of 120 small pasteurizing plants, show that the small plants of to-day are advancing very rapidly as to equipment and management. It was found that 97 per cent of the plants covered by the survey were using electricity for their operating power. Of the plants which handled less than 300 gallons of milk a day, 68 per cent were using mechanical refrigeration. The milk pasteurizing, cooling, and bottling equipment was usually of modern design and construction and the motor truck had almost entirely superseded the horse for delivery purposes. In general the owners were using modern labor-saving devices and equipment and were constantly trying to improve their operations and management.

FRED M. GRANT,
Assistant Market-milk Specialist,
Bureau of Dairy Industry.

MILK Secretion Shown by Experiments to be a Continuous Process

The firm, distended condition of the cow's udder just before milking, and the looser and more mellow condition immediately after the milk is drawn, are common observations. Sometimes the distention before milking is so great that streams of milk leak from the teats, and the cow appears to be in pain. In spite of these common observations, however, the belief has persisted rather generally among teachers and other professional men in dairy-cattle and veterinary work, that the capacity of the udder for the storage of milk was not more than about one-half pint to each quarter, and that nearly all of the milk obtained at a milking was secreted during the milking process. Supposedly, the manipulation of the udder and teats in milking stimulated, in some way, the rapid secretion of milk during this brief period. Even as recently as 1924 a textbook appeared with a discussion of milk secretion which contained the following statements:

> The udder contains only a small amount of milk, usually between a pint and a quart, when one starts milking. This is found in the four milk cisterns. The enlargement of the udder which occurs before milking is doubtless due to the storing up of the ingredients out of which milk is to be made. For the most part—milk is really made during the milking process. A cow killed just before milking time will be found to have no milk in the udder except that present in the milk cisterns.

In order to test this theory, which seemed illogical, 11 cows have been included in an experiment in which each was first kept for several days on a carefully controlled program of feeding and watering, and milked at uniform intervals until her level of production could be determined. With a single exception this preliminary period extended over 10 days. Milking always took place at a definite hour in the morning. In the case of one or two heavy milkers an intermediate milking was performed. The plan was to have the udder well distended at the morning milking, and whether the interval between this milking and the last previous one was 12 hours or 24 hours, the quantity of milk obtained at the morning milking was averaged for the 10 days to determine the lactating level of the cow at that milking. On the eleventh morning, at exactly the same hour, she was killed, either by a blow on the head or by shooting through the brain and suspended for bleeding, after which, in rapid succession, her udder was amputated, suspended in a natural position by its surrounding skin and median septum from an iron frame, and milked out in the usual manner by hand.

Two Post-Mortem Milkings

It is taken for granted that when the circulatory and nervous systems and all other body connections have been severed and the blood supply removed, milk secretion can not continue. That being true, any milk drawn from the amputated udder must have been present in the udder at the time of death. Two post-mortem milkings were performed on each udder—one immediately after its amputation and suspension and one four hours later. The second post-mortem milking was performed for the purpose of obtaining any milk which had drained into the cisterns and larger ducts. The total milk obtained in both post-mortem milkings was then compared with the lactating level of the cow during the previous 10-day period to show the percentage of the ante-mortem yield obtained by milking the amputated udder post-mortem. For brevity this is referred to as the "per cent post-mortem recovery."

The first four cows were felled by a blow on the head. In two of these cases the first blow was not entirely effective and the cows struggled vigorously, became almost violent and died with tensely contracted muscles. The milk from these two udders was released more slowly and the per cent post-mortem recovery was lower than for the others. The next seven cows were killed by shooting into the brain. Death in almost every case was nearly instantaneous and very little struggling or tenseness of muscles was observed. In each case the milk was released quite rapidly and the per cent of post-mortem recovery was relatively high. Table 12 shows that the first four cows (Group 1) were producing at an average level of 16.41 pounds at a milking before death and that an average of 9.22 pounds of milk, or 61.10 per cent of the quantity obtained at corresponding milkings before death, was obtained from their amputated udders. In the second group of seven cows conditions were more carefully controlled. The average ante-mortem milking level was 19.88 pounds at a milking and an average of 14.83 pounds of milk or 75.32 per cent of the ante-mortem production was obtained from these udders after amputation. In one instance the ante-mortem production was 18.51 pounds and 18.70 pounds was obtained post-mortem. When both groups were combined the ante-mortem level of production was 18.62 pounds at a milking, and the post-mortem recovery of milk was 12.79 pounds or 70.15 per cent of the ante-mortem level. Of the total quantity of milk obtained from amputated udders 81.9 per cent was obtained at the first and 18.1 per cent was obtained at the second post-mortem milking.

TABLE 12.—*Quantity of milk obtained before and after death of cow and amputation of the udder*

Cow No.	Average production for 10 days, ante mortem	Total milk, post-mortem	Proportion of ante-mortem production obtained post-mortem
	Pounds	*Pounds*	*Per cent*
459	[1] 12.07	10.27	85.09
292	21.38	10.60	49.58
123	10.37	7.20	69.43
272	21.83	8.80	40.31
Average of Group 1	16.41	9.22	61.10
846	18.51	18.70	101.03
903	16.27	11.60	71.30
811	15.20	9.70	63.82
257	24.73	15.35	62.07
253	21.25	15.45	72.71
443	17.41	15.20	87.31
255	25.80	17.80	68.99
Average of Group 2	19.88	14.83	75.32
Average of Groups 1 and 2	18.62	12.79	70.15

[1] 3-day average.

Samples Chemically Analysed

Samples of the milk from each udder on the last two days before slaughter and at both post-mortem milkings, were taken for chemical analysis. In the first four cases no attempt was made to maintain body temperature in the udder from the time of amputation until after completion of the second post-mortem milking, and the udders undoubtedly became chilled throughout. In the first post-mortem milking the average butterfat test was only 57.29 per cent as high as in the ante-mortem and in the second post-mortem milking it was only 27.45 per cent as high as in the ante-mortem milk. In other words the butterfat test was only about half as high in the first post-mortem as in the ante-mortem milk and only half as high in the second post-mortem as in the first post-mortem milk. Changes less extreme were noted in some of the other constitutents. It seemed probable that the low butterfat test in the post-mortem milk may have been at least partly due to the chilling of the udder and the consequent solidification and adhesion of the butterfat to the lining of the ducts within the udder.

The next seven udders were kept as nearly as possible at body temperature until after the second post-mortem milking was finished. The average butterfat test of the first post-mortem milking from these cows was only 51.80 per cent but that of the second post-mortem milking was 58.68 per cent of the ante-mortem. Controlling the temperature, therefore, did not prevent the lowering of the butterfat test from the ante-mortem to the first post-mortem milking, but appeared to be responsible for maintaining the butterfat test of the second post-mortem milking at an equal or slightly higher level than that of the first post-mortem milking. The reason for the 50 per cent decline in butterfat test in the first post-mortem as compared with the ante-mortem milk has not been definitely determined.

The post-mortem milk differed from that obtained before the death of the cow in several other respects. The total solids declined steadily and markedly from ante-mortem to second post-mortem, the solids not fat were nearly normal in the first post-mortem but low in the second post-mortem, the ash content increased steadily from ante-mortem to second post-mortem, the total protein varied very little from the ante-mortem in either post-mortem, and the lactose was about normal in the first post-mortem but distinctly low in the second post-mortem milk.

Milk Secretion Apparently Continuous

The results obtained with the 11 cows studied offer almost conclusive evidence that milk secretion is to a great extent a continuous process and that a very large proportion, in fact nearly all, of the milk obtained at any milking is present in the udder before the milking process is commenced. The low butterfat test, as well as abnormalities in other constituents of the milk obtained from amputated udders has been noted as a matter of interest.

But what is the significance of this work and the information obtained by it? In the first place it will provide a scientific rather than an unsound theoretical basis for teaching this particular phase of the subject of milk secretion. The fact that nearly all of the milk is stored within the udder before the milking process is commenced also raises the question of the importance of the frequent milking of cows which produce heavily. The importance of size of udder is immediately suggested and the necessity for more frequent milking for high producing cows is indicated. On the other hand, the quantity of fluid which can be forced through the teats into the secretory system of an amputated udder is much greater than it has been supposed the udder was capable of holding. The 11 udders on which the post-mortem milking tests were conducted showed an average capacity for holding fluid equivalent in volume to slightly more than 50 pounds of milk. This would appear to indicate ample space for storing within the secretory system of the udder all of the milk obtained at a milking. In all probability, however, the living udder is not able to hold a quantity of milk as great as the capacity indicated because at the time of measuring the capacity the blood had been removed and the pressure employed in filling was undoubtedly greater than that of the milk within the living udder.

A theory which has been advanced and which seems reasonable, is that as the milk accumulates, the pressure within the udder increases and that the rate of secretion is inversely proportional to the pressure. The most rapid secretion should, therefore, take place soon after milking and the greatest total secretion should be obtained from udders that are milked sufficiently often to keep their internal pressure below the point at which the activitiy of the secreting cells commences to be inhibited. This is in accord with the common practice of milking heavy producing cows more than twice daily whereas two milkings daily is probably sufficient for cows of moderate production.

W. W. Swett,
Senior Dairy Husbandman, Bureau of Dairy Industry.

MORTGAGE Planning as Important to Farmers as Planning of Crops

The large annual volume of farm-mortgage loans and the large number of farm foreclosures in recent years suggest the importance of giving careful consideration to what can be done to obtain favorable long-term loans when needed and how to avoid being distressed by them later. That past practice can be improved is suggested by the fact that most farmers give better attention to planning their cropping program of a single season than they do to their finances, yet the value of the crop may be but a fraction of the mortgage, and the one is an annual event while the mortgage debt may continue for a generation.

Studies of long-term farm financing in the United States indicate that more loans have been made at high rates than at low rates and that most loans are made for an average of 5 years although the debt continues for an average of 30 years. The great part of the annual billion-and-one-half mortgage business represents refinancing which takes place not at a selected time but whenever the previous mortgage expires or when credit stringency prompts local creditors to demand payment.

Careful management of a farm-mortgage debt generally requires that it should be placed or renewed when the supply and cost of money are favorable, that the term of the mortgage should be related to the length of time the farm is likely to carry the debt, that the ratio of debt to value of the farm should not exceed the ratio of net income to the annual interest charge and that the method of repayment should accord with the receipt of income.

Study of Money Markets Necessary

Selection of a favorable loan-cost period requires close observation of central money markets. Reference to the accompanying chart of rates on short-term commercial loans and mortgage loans to farmers from 1917 to 1930 indicates that changes in mortgage rates have followed changes in short-term rates and bond yields by at least six months or a year, both on the rise and on the fall. High yields on bonds, however, may cut off the supply of mortgage funds from that source and hence may affect the supply of credit more promptly than its retail rate. This occurred in 1921 and 1929. Although a farmer may have a prepayment privilege clause included with loans incurred at high cost, the process of transferring the loan causes both expense and trouble. It is apparent from Figure 116 that the farmer with

A theory which has been advanced and which seems reasonable, is that as the milk accumulates, the pressure within the udder increases and that the rate of secretion is inversely proportional to the pressure. The most rapid secretion should, therefore, take place soon after milking and the greatest total secretion should be obtained from udders that are milked sufficiently often to keep their internal pressure below the point at which the activitiy of the secreting cells commences to be inhibited. This is in accord with the common practice of milking heavy producing cows more than twice daily whereas two milkings daily is probably sufficient for cows of moderate production.

W. W. Swett,
Senior Dairy Husbandman, Bureau of Dairy Industry.

MORTGAGE Planning as Important to Farmers as Planning of Crops The large annual volume of farm-mortgage loans and the large number of farm foreclosures in recent years suggest the importance of giving careful consideration to what can be done to obtain favorable long-term loans when needed and how to avoid being distressed by them later. That past practice can be improved is suggested by the fact that most farmers give better attention to planning their cropping program of a single season than they do to their finances, yet the value of the crop may be but a fraction of the mortgage, and the one is an annual event while the mortgage debt may continue for a generation.

Studies of long-term farm financing in the United States indicate that more loans have been made at high rates than at low rates and that most loans are made for an average of 5 years although the debt continues for an average of 30 years. The great part of the annual billion-and-one-half mortgage business represents refinancing which takes place not at a selected time but whenever the previous mortgage expires or when credit stringency prompts local creditors to demand payment.

Careful management of a farm-mortgage debt generally requires that it should be placed or renewed when the supply and cost of money are favorable, that the term of the mortgage should be related to the length of time the farm is likely to carry the debt, that the ratio of debt to value of the farm should not exceed the ratio of net income to the annual interest charge and that the method of repayment should accord with the receipt of income.

Study of Money Markets Necessary

Selection of a favorable loan-cost period requires close observation of central money markets. Reference to the accompanying chart of rates on short-term commercial loans and mortgage loans to farmers from 1917 to 1930 indicates that changes in mortgage rates have followed changes in short-term rates and bond yields by at least six months or a year, both on the rise and on the fall. High yields on bonds, however, may cut off the supply of mortgage funds from that source and hence may affect the supply of credit more promptly than its retail rate. This occurred in 1921 and 1929. Although a farmer may have a prepayment privilege clause included with loans incurred at high cost, the process of transferring the loan causes both expense and trouble. It is apparent from Figure 116 that the farmer with mortgage financing to do will do well to keep the same watch on the course of the money market that he is accustomed to give to the crop and livestock markets.

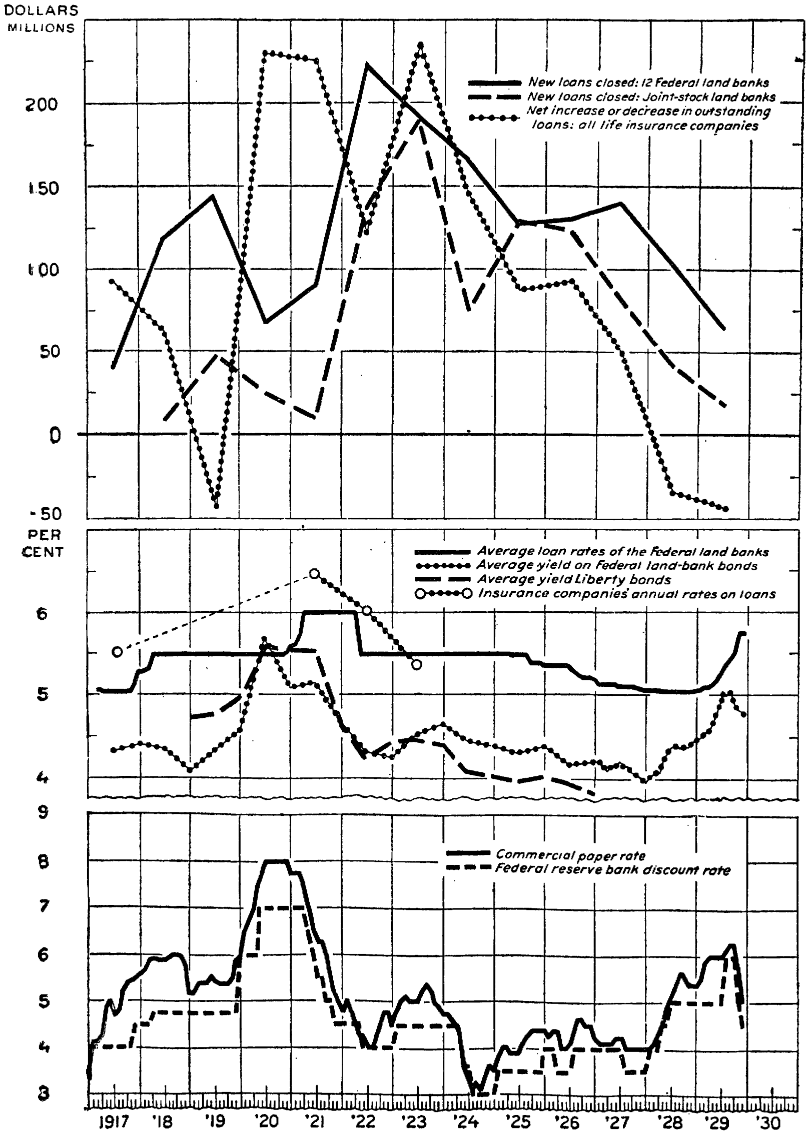


FIGURE 116.—The lower section of the chart shows the course of commercial paper rates and Federal reserve discount rates in New York from 1917 to 1930. The middle section shows the yields on Federal land-bank bonds and liberty bonds and the rates on farm-mortgage loans by the Federal land banks and insurance companies. While the bond market follows closely the course of short-term rates, the quoted rates lag behind. The upper section, showing annual loans by the land banks and insurance companies, reflects the influence which major changes in money rates had on the amount of funds available for farm mortgages at that time. (During most of 1920 and 1921 the Federal land banks and joint-stock land banks were not making loans because of litigation)

A further problem arises out of the fact that the average mortgage debt, either in the same or in a renewed form, remains on the land for at least 30 years. Since an average of only about 3 per cent of mortgaged farms are cleared of debt each year the farmer must have due regard for possible changes in soil fertility, foreign competition, and price level during that time. The question of loan term becomes of prime importance. The usual term of five years may be suitable for some cases, but the farmer who depends largely on his farm for his income usually has to renew the loan five or six times with the expense, uncertainty, and inconvenience which that involves.

This difficulty of renewal is avoided by the amortization loan which provides for gradual retirement of the principal by means of small regular payments over a long period of 20 to 35 years. Furthermore, it has the advantage of repaying a part of the principal with income reflecting the same price level. Before the war, farmers generally believed that the lapse of years would bring only increases in land value. The steady decline of land values and other prices since 1920 have shown that a debt incurred at one price level may have to be paid with sale of products at much lower prices.

A third vital question is the size of the loan and its relation to the value and income of the farm. Although most lending agencies limit loans to about half of the land values, second mortgages or purchase money mortgages given to the seller may be used to obtain an amount of credit equal to most of the farm's current value. In this situation the farmer will usually do better to gauge the amount of the loan by the amount which the average land income can carry rather than by the current sale value of the farm. A loan with a rate of interest higher than the net rental rate for the farm carries a danger of making trouble if the ratio of debt to value is very high. Debt-carrying cost in excess of the farm-rental rate tends to accumulate unpaid balances which gradually consume the remaining equity in the farm; the sale price may keep ahead of the debt during periods of rising land values, but with stationary or declining prices the encroachment on equity means eventual foreclosure.

Means of Paying Principal

The means and facility of paying the principal of the loan constitute a further problem which can best be considered at the time the loan is negotiated. Since most loans are too large to be paid off by the amount of savings possible during the few years of the loan term, such savings rarely prove adequate for the purpose and the average farmer can care for them only by means of a new loan or an extension of the old one. Moreover, most people do not save systematically unless they have previously budgeted their income carefully. The long-term amortization loan provides for annual or semiannual payments whereby a fraction added to the regular interest makes renewals unnecessary.

Although straight loans for short terms may save the farmer some temporary inconvenience and sacrifice in paying regular installments on the principal, the ultimate gain from this course is questionable. If land values continue low at the end of the short term of years the lender may require a reduction of the principal as a condition of renewal. Many farmers encountered this difficulty in 1928 and 1929. An abrupt reduction is likely to cause more inconvenience than a small amortization payment which could be provided for in advance. Moreover, a system of small annual payments steadily increases the safety margin also, so that lenders are less likely to foreclose.

David L. Wickens,
Agricultural Economist, Bureau of Agricultural Economics.

MOUNTAIN Pine Beetle, Epidemic in Northwest, Fought by Two Methods In the last few years the losses of white pine throughout the forests of northern Idaho and western Montana, resulting from the attacks of the mountain pine beetle, have increased from an endemic, or so-called normal infestation, to an epidemic condition. Although white pine is the most valuable of all commercial tree species within our western forests, it is an expensive forest type to maintain, as it is grown under extremely hazardous fire conditions and requires from 100 to 120 years to reach maturity, resulting in high protective charges and long-time investments. The infestation within certain areas of this region was very heavy, the loss varying from 6 to 10 per cent of the total white-pine volume. In other areas the outbreak was not so severe, the loss of pine being confined to a small part of the stand. An exceedingly alarming situation exists within the white-pine forests of Idaho and Montana, and it is apparent that unless the rapidly increasing outbreak can be reduced through the use of artificial control measures a large proportion of the total pine volume will be destroyed. In addition to the economic loss of timber, thousands of inflammable snags will be scattered throughout the region, creating a more serious fire hazard than that which already exists. Such snags, standing for 20 years or more, will always be the fire fighter's mortal enemy, increasing the severity of the task and the danger of the operation.

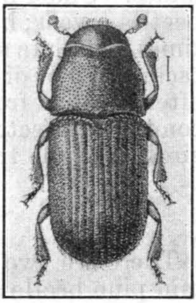


FIGURE 117.—Mountain pine beetle (*Dendroctonus monticolae*). About four times natural size.

FIGURE 118.—Inner surface of white-pine bark showing egg galleries and larval mines of the mountain pine beetle. About three-eighths natural size

The Mountain Pine Beetle

The mountain pine beetle (fig. 117) is a small, black, cylindrical bark beetle, about one-third of an inch in length, which attacks and kills healthy, mature white-pine, sugar pine, yellow pine, lodgepole pine, white-bark pine, and sometimes Engelmann spruce when occurring in association with white-pine infestations. The attack is made by the adult beetles boring through the bark and constructing perpendicular galleries, varying from 18 to 24 inches in length, between the bark and the wood, along which eggs are deposited. (Fig. 118.) These eggs hatch into small, white, legless grubs that in turn construct, while feeding, short larval mines at right angles to the egg galleries, also between the bark and the wood. When mature the grubs, or larvae, transform to new adults within small cells constructed at the end of the larval mines. Under normal conditions there is but one generation of these beetles a year; however, during long, dry seasons a partial and sometimes complete second generation occurs. The number of insects attacking a foot of bark surface ranges from 14 to 20, and the infestation often extends from the base of the tree to a height of 130 feet. The combined effect of the egg galleries and larval mines results in the girdling of the tree, causing its death.

Methods of Control Practiced

There are two methods of control used in the suppression of mountain pine beetle outbreaks in white pine. In thinking of bark-beetle control one must remember that after a tree has been successfully attacked it can not be saved; so control measures are directed toward the destruction of the insect broods within the infested trees to prevent their emergence and subsequent attack of other trees. To destroy the broods the trees are felled, cut into logs, piled, and burned, or else the bark is peeled from the infested portion of the bole. The effectiveness of the first method is, of course, self-evident, but concerning the second a word of explanation is necessary. As the complete development of these beetles takes place beneath the bark, its removal exposes the immature insects to the attacks of predacious insects, birds, and small mammals, as well as unfavorable climatic conditions, which together completely destroy the insect broods exposed by removing the bark. (Fig. 119.) Both these methods have their special advantages, being adapted to certain types of infestations or conditions of terrain. With the burning method there is, of course, the danger of fire, which prevents its being used when the forests are dry. Wherever the infestation is heavy, horses are used to skid the logs into large decks. Where infested trees are scattered throughout a large area, the infested bole can be cut into short lengths and hand-logged into decks for burning. When trees are peeled, for which a heavy peeling spud is used, the bole is cut only sufficiently to permit its being rolled so that the bark can be removed from the underside.

Organization of Control Projects

The first and most important task in connection with a bark-beetle control project is the locating of the infested trees for treatment. This is accomplished by a spotting crew, consisting of three or five men, making a 100 per cent survey of all the infested areas. These spotting crews are organized with a chief spotter who runs the compass, paces the distance traveled, constructs a map of the region showing the location of the trees marked for treatment, and is responsible for the proper marking of all insect-killed trees located by the spotters, who cover strips of a certain width on each side of the compass man. The completed maps are turned over to the treating crew foreman to be used in relocating the trees marked for treatment.

Control Projects Under Way

During 1930 control operations directed against mountain pine beetle outbreaks in white pine were conducted on the Coeur d'Alene, Clearwater, and Kootenai National Forests, and Glacier National Park. In 1929 control measures had been applied on the Coeur d' Alene Forest on a very small scale, insufficient to affect the general infestation, but showing very good results within the area covered. On the Kootenai Forest control operations had been conducted in 1928 and 1929 on a fairly adequate scale, showing a very satisfactory reduction in the general infestation of white pine. On the Clearwater Forest and Glacier National Park control operations were instituted for the

FIGURE 119.—Treating infested white pine by removing the bark

first time in 1930. The most serious situation existed on the Coeur d'Alene National Forest where the infestation was found to be established throughout the entire white-pine type. On the four areas mentioned some 29,000 trees were treated during May and June, 1930, at an average cost of $5.10 per tree. The majority of these trees (22,841) were on the Coeur d'Alene National Forest. The actual results obtained from the intensive control operations of 1930 are, of course, not available at this time, but, knowing the potential danger of an infested tree, it is safe to assume that there could have been sufficient insects emerging during July, 1930, from the 29,000 trees treated during May and June, to have attacked and killed at least 100,000 trees, which would have required $500,000 for treatment in 1931.

JAMES C. EVENDEN,
Entomologist, Bureau of Entomology.

MUSHROOM Disease Known as "Bubbles" Controlled by Exclusion and Eradication

Most commercial growers are familiar with the symptoms of the destructive disease of cultivated mushrooms known in the United States as bubbles or mycogone and in France as la môle. It is caused by a fungus called *Mycogone perniciosa*, which grows into the mushroom and transforms it to a distorted putrid mass. Soon after the parasite attacks a mushroom it produces a layer of white or brown spores over the surface of the diseased mushroom. These spores are spread about by currents of air, by insects, workmen, etc. They may be lifted or deposited by convection currents and blown about through the air like dust particles too small to be seen unless floating through a beam of light in a dark room. Like many other fungous spores, they are able to germinate and grow immediately if conditions are favorable, or to live through a long rest period under unfavorable conditions. They may infect healthy mushrooms, grow in soil or compost, or remain in a resting stage for several months or even years.

The recurrence or accumulation of the disease from one crop to another indicates that the Mycogone fungus either is remaining alive inside the house from one crop to another or is being carried into the house during one of the cultural operations. There are several possible methods of introducing the fungus into the house: (1) By air or on insects entering through doors or ventilators, (2) in water, (3) spawn, (4) compost, (5) soil, and (6) by workmen.

Burning sulphur and fumigating with formaldehyde between crops are practical methods of eradicating Mycogone from the house. Experiments have shown that the burning of one-fourth pound of sulphur per 1,000 cubic feet of air space in a closed container will kill Mycogone spores. When it is used as a combination insecticide and fungicide, sulphur should be burned at the rate of 5 pounds per thousand cubic feet of air space. Formaldehyde is used at the rate of 1 pound of the commercial preparation per 1,000 cubic feet of air space. Detailed methods of using formaldehyde are given in United States Department of Agriculture Circular 27. If either of these methods of disinfection is used there will be little or no disease due to inoculum persisting within the house from one crop to another.

The danger of infection due to spores carried into the house in the air or by insects can be materially reduced by removing spent mushroom manure and all mushroom refuse from the immediate vicinity of the house and occasionally disinfecting the soil around the house. Various solutions are suitable, such as lysol, 2 per cent; formalin, 2 per cent; or bichloride of mercury, 1 pound to 60 gallons.

Infection from contaminated water or spawn can be largely avoided by using water direct from deep wells and by using bottle spawn. To prevent the growth of green mold and other contamination in spawn bottles, spawn makers transfer bottle spawn under as nearly aseptic conditions as possible. Because of this there is little chance for Mycogone to be distributed in bottle spawn. Furthermore, if clear-cut cases of the distribution of disease in spawn should arise it would be a comparatively simple matter for the spawn maker to trace the source of infection and start again with clean cultures.

Mycogone Eradicated by Heat

A good "heat" in the mushroom house during the final fermentation is the most effective method known of eradicating Mycogone from mushroom compost. All of the evidence at hand indicates than an air temperature of 120° F. for 48 hours in a mushroom house will eradicate the fungus from the air, compost, and soil. Obviously, this temperature must be obtained in all parts of the house to eradicate the fungus completely. Therefore it is advisable to use some means to circulate the air to prevent temperature layering. Some growers accomplish this by opening the ventilators very slightly, others set large electric fans tilted up at an angle of 45° in the center aisle. It is also advisable to raise the lower beds off the floor to allow a circulation of air under them. Even when these precautions are taken it often happens that the manure is too wet or overcomposted to heat the air in the house to 120°. To insure against this condition some growers are providing themselves with auxiliary steam-heating systems to obtain artificially the desired temperature in the house during the "heat." This practice has given satisfactory results in the United States Department of Agriculture experimental mushroom house since it was first used in 1928 and seems to be a logical step in the right direction.

Outbreaks From Infested Casing Soil

Circumstantial evidence indicates that most of the severe outbreaks of "bubbles" in commercial houses in the United States are due to infested casing soil. Losses from this source can be eliminated by avoiding the use of contaminated casing soil, which usually is soil from fields that have been fertilized with spent mushroom manure or that have been subject to the drainage overflow from such fields. To determine whether soil is contaminated, small test beds may be cased with soil samples out of fields from which soil will be taken for subsequent crops. If soil infestation becomes general and there is no Mycogone-free soil available, the fungus can be eradicated from the soil by placing it inside the mushroom house during the "heat." Soil to be treated in this way should be placed near the top of the house, where the temperature is highest, and a temperature of at least 120° F. must be maintained in the soil for 48 hours or more.

The spread of the disease by workmen can be largely prevented by a few common-sense rules. For example, men who have been working with contaminated casing soil should not be allowed to cut mushrooms without first washing their hands; likewise, the removal of the occasional diseased mushroom often occurring on beds that are otherwise clean should be made a separate job and not done by men who are cutting mushrooms for market.

After infection has become widespread in a house a moderate amount of loss is inevitable, but the disease can be somewhat reduced by growing the crop at a low temperature, 50° to 55° F.

From the foregoing discussion it is apparent that a complete program of control is necessary to combat the disease effectively. So far as possible the spores and mycelium of Mycogone must be eradicated from the house and all avenues of entrance must be closed. Since the causal organism is capable of rapid reproduction, the neglect of one source of inoculum may render useless the measures taken to control others. Because of the various conditions under which mushrooms are cultivated, each grower must plan a control program to suit best his individual needs. The measures outlined above apply particularly to the prevention of the disease in standard mushroom houses. In heavily infested areas they will not assure a 100 per cent control, but if carefully followed they will prevent serious outbreaks and control the disease sufficiently for practical purposes.

EDMUND B. LAMBERT,
Associate Pathologist, Bureau of Plant Industry.

MUSHROOM Growing Risky Without Control Action for Insects and Mites

The growers of the cultivated mushroom *Agaricus campestris* have long been troubled with insect pests and mites, the infestations of which have gradually increased with the localization and growth of the industry to the point where they have made mushroom culture rather hazardous unless measures of prevention and control are constantly practiced.

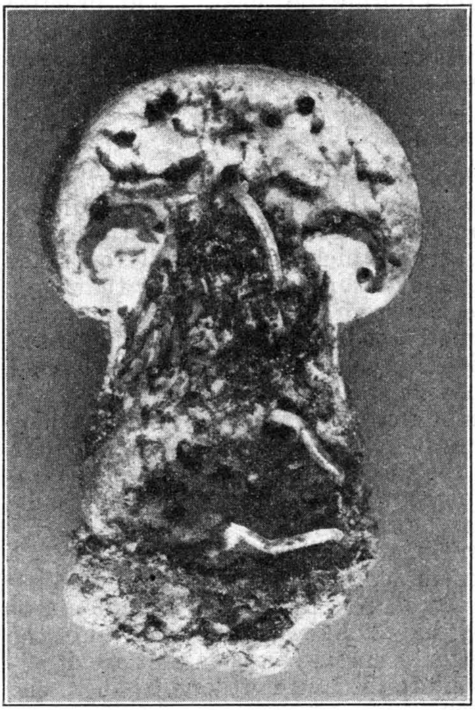


FIGURE 120.—Mushroom button showing maggots of fungus gnats and damage done chiefly by them

The chief pests causing commercial damage to mushrooms are the fungus gnats, mites, and springtails.

In general, the fungus gnats, of the genus Sciara, are productive of the most injury to the mushroom industry. They are prevalent in almost every type of mushroom house or cave, since they enter, as a rule, in the compost when it is taken into the houses. The larvae or maggots of these flies cause injury both by destroying the mycelium in the beds and by feeding on the small mushrooms, which they completely devour in many instances. These maggots are also capable of rendering the large sporophores unfit for market by tunneling upward through the stem and cap. (Fig. 120.) The adult flies often transport injurious mites, which attach themselves to the bodies of the flies, from one mushroom house to another and they also aid in the dissemination of some diseases of mushrooms.

The mites, while not so prevalent in general as the fungous gnats, are capable, nevertheless, of causing serious losses, once they become established in a range of mushroom houses. The mushroom mite proper, *Tyroglyphus lintneri* Osb., feeds on the mushroom, producing dark pits which result in decay, destroy the mycelium in the beds, and cut off the feeder "root system" (fig. 121) so that the sporophores do not mature, resulting in decreased yields. A severe infestation of this mite was experienced by an Ohio grower during the past season, resulting in a crop damage of approximately $25,000.

infested areas they will not assure a 100 per cent control, but if carefully followed they will prevent serious outbreaks and control the disease sufficiently for practical purposes.

EDMUND B. LAMBERT,
Associate Pathologist, Bureau of Plant Industry.

MUSHROOM Growing Risky Without Control Action for Insects and Mites The growers of the cultivated mushroom *Agaricus campestris* have long been troubled with insect pests and mites, the infestations of which have gradually increased with the localization and growth of the industry to the point where they have made mushroom culture rather hazardous unless measures of prevention and control are constantly practiced.

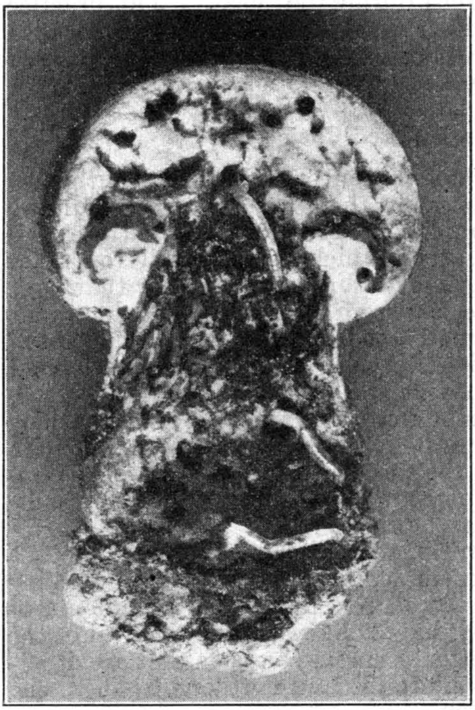


FIGURE 120.—Mushroom button showing maggots of fungus gnats and damage done chiefly by them

The chief pests causing commercial damage to mushrooms are the fungus gnats, mites, and springtails.

In general, the fungus gnats, of the genus Sciara, are productive of the most injury to the mushroom industry. They are prevalent in almost every type of mushroom house or cave, since they enter, as a rule, in the compost when it is taken into the houses. The larvae or maggots of these flies cause injury both by destroying the mycelium in the beds and by feeding on the small mushrooms, which they completely devour in many instances. These maggots are also capable of rendering the large sporophores unfit for market by tunneling upward through the stem and cap. (Fig. 120.) The adult flies often transport injurious mites, which attach themselves to the bodies of the flies, from one mushroom house to another and they also aid in the dissemination of some diseases of mushrooms.

The mites, while not so prevalent in general as the fungous gnats, are capable, nevertheless, of causing serious losses, once they become established in a range of mushroom houses. The mushroom mite proper, *Tyroglyphus lintneri* Osb., feeds on the mushroom, producing dark pits which result in decay, destroy the mycelium in the beds, and cut off the feeder "root system" (fig. 121) so that the sporophores do not mature, resulting in decreased yields. A severe infestation of this mite was experienced by an Ohio grower during the past season, resulting in a crop damage of approximately $25,000.

It is much more widely distributed, apparently, than the mite *Linopodes antennaepes* Banks, which was recently found causing commercial damage to mushrooms in several plants and which resulted in a loss of approximately $50,000 to one grower.

Springtails cause very little damage to mushrooms in the East, but are one of the most serious pests with which the growers operating in the sandstone caves of the Northwest have to contend. While the species found in the sandstone caves has never been described in this country and apparently is not present in the East, it is doubtful whether it would cause a great amount of damage in the modern eastern houses on account of unfavorable atmospheric conditions for rapid development and reproduction.

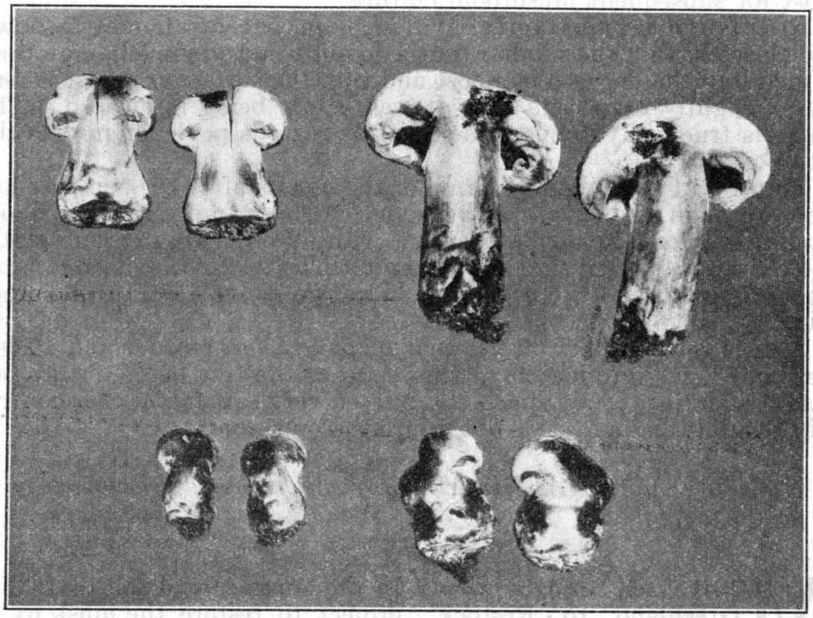


FIGURE 121.—Mushrooms showing damage caused by the mushroom mite, *Tyroglyphus lintneri*

Measures of Prevention and Control

In view of the extreme sensitivity of the mushroom mycelium as well as the mushroom itself to most fumigants, it is necessary to take certain precautionary measures prior to placing the spawn in the beds in order to prevent heavy infestations of these pests and subsequent damage to the crop.

Experiments have shown that the manure, if properly composted before it is put into the beds in the house, will undergo a secondary decomposition process and heat up sufficiently (if aided by forced circulation) to either kill the pests in the compost or drive them to the surface where fumigants can be effectively used. Forced circulation is obtained by the use of electric fans of the oscillating type while the compost is undergoing its secondary decomposition process in the beds. By means of two 16-inch fans it is possible to equalize the air temperature all over the house and to get the temperature in the compost fairly even in all the beds, making it possible to kill off the various pests by fumigation while the temperatures are at the peak.

Calcium cyanide, at the rate of 1 pound per 1,000 cubic feet of air space, scattered on the floor in the alleyways, has been most widely used to date, but the burning of sulphur, in view of its cheapness and its double rôle as a fungicide and insecticide, is gradually replacing cyanide for this purpose. The practice of burning sulphur at the rate of 2 pounds per 1,000 cubic feet of air space while the compost is at its peak heat in the beds and leaving the house closed for five hours after all the sulphur has burned has proved to be very effective against any pests which may inhabit the house at this time, and, judging from results of yield tests, it has not injured the compost for subsequent mushroom culture.

Results of determinations of hydrogen-ion concentration have shown conclusively that the sulphur fumes do not penetrate much more than 1 inch into the uncased compost and that the surface compost is rendered slightly more acid than it was before being fumigated. The same is true of hydrocyanic-acid gas as regards penetration into the compost.

To prevent possible infestation of the houses after the compost has gone through its heat in the beds and has been fumigated, the doors and ventilators should be screened with 30-mesh copper-wire cloth. To prevent rapid development and multiplication of insects and mites the temperature of the house should not go above 55° F. while cropping.

A dust consisting of 60 per cent of pyrethrum powder and 40 per cent of a finely ground clay, when used at the rate of 2½ ounces per 1,000 cubic feet of air space, has proved very satisfactory for control of the adult flies and does not injure the mushrooms.

O. E. Gahm,
Assistant Entomologist, Bureau of Entomology.

MUSK Oxen Brought from Greenland to Restock Alaska's Tundra Lands

In the summer and fall of 1930 a project to restore the musk ox to Alaska, where formerly it lived in small numbers, resulted in the transportation from northeastern Greenland of a herd of 34 young animals. These were captured by a Norwegian collector, and after transshipment in Norway traveled on an ocean liner to New York. Following a 30-day quarantine period, the animals were taken by rail to Seattle, thence by ship to Seward, Alaska, and again by rail to the reindeer experiment station maintained by the Bureau of Biological Survey near Fairbanks. Here they are being held for feeding and breeding studies with a view to the eventual liberation of stock in suitable parts of the Territory to add another large animal to Alaska's wild-life resources.

When the liner tied up at a Brooklyn wharf about the middle of one of September's warmest days, these hardy animals must have wondered, in their silent, stolid way, what next adventure was in store for them. Taken from their associates, and in most cases from their mothers (for half the individuals were only about 4 months old), put into strong crates barely large enough to allow for turning around, shipped to the various pests by fumigation while the temperatures are at the peak.

Calcium cyanide, at the rate of 1 pound per 1,000 cubic feet of air space, scattered on the floor in the alleyways, has been most widely used to date, but the burning of sulphur, in view of its cheapness and its double rôle as a fungicide and insecticide, is gradually replacing cyanide for this purpose. The practice of burning sulphur at the rate of 2 pounds per 1,000 cubic feet of air space while the compost is at its peak heat in the beds and leaving the house closed for five hours after all the sulphur has burned has proved to be very effective against any pests which may inhabit the house at this time, and, judging from results of yield tests, it has not injured the compost for subsequent mushroom culture.

Results of determinations of hydrogen-ion concentration have shown conclusively that the sulphur fumes do not penetrate much more than 1 inch into the uncased compost and that the surface compost is rendered slightly more acid than it was before being fumigated. The same is true of hydrocyanic-acid gas as regards penetration into the compost.

To prevent possible infestation of the houses after the compost has gone through its heat in the beds and has been fumigated, the doors and ventilators should be screened with 30-mesh copper-wire cloth. To prevent rapid development and multiplication of insects and mites the temperature of the house should not go above 55° F. while cropping.

A dust consisting of 60 per cent of pyrethrum powder and 40 per cent of a finely ground clay, when used at the rate of 2½ ounces per 1,000 cubic feet of air space, has proved very satisfactory for control of the adult flies and does not injure the mushrooms.

O. E. Gahm,
Assistant Entomologist, Bureau of Entomology.

MUSK Oxen Brought from Greenland to Restock Alaska's Tundra Lands

In the summer and fall of 1930 a project to restore the musk ox to Alaska, where formerly it lived in small numbers, resulted in the transportation from northeastern Greenland of a herd of 34 young animals. These were captured by a Norwegian collector, and after transshipment in Norway traveled on an ocean liner to New York. Following a 30-day quarantine period, the animals were taken by rail to Seattle, thence by ship to Seward, Alaska, and again by rail to the reindeer experiment station maintained by the Bureau of Biological Survey near Fairbanks. Here they are being held for feeding and breeding studies with a view to the eventual liberation of stock in suitable parts of the Territory to add another large animal to Alaska's wild-life resources.

When the liner tied up at a Brooklyn wharf about the middle of one of September's warmest days, these hardy animals must have wondered, in their silent, stolid way, what next adventure was in store for them. Taken from their associates, and in most cases from their mothers (for half the individuals were only about 4 months old), put into strong crates barely large enough to allow for turning around, shipped to

Norway, transshipped to the upper deck of this great ocean liner, and finally, after rolling for several days on the cool, breezy waters of the North Atlantic, slipped into this strange medley of metropolitan noises, queer sights, and unaccustomed odors, in a climate that to musk oxen must have seemed well-nigh intolerable—theirs was certainly an experience new in the history of the race. But whatever may have been their thoughts they gave no sign of surprise or alarm. Apparently unconcerned, they munched the wild hay brought along with them, and drank from a long-handled dipper as if they had never known any other life. Toward their keeper, who had tended them through the long voyage, they were gentle, but a stranger attempting to stroke their furry faces would draw back with celerity when greeted by a sharp coughing grunt and a stamping start. Though evidently unafraid they did not court familiarity.

Long Ancestry Shown in Fossils

What kind of creatures are these, thus snatched from the icy wastes of arctic Greenland and taken on this far journey through scenes so strange and by ways so devious? They are the most truly arctic of our large American mammals, and they have a long and interesting ancestry. The presence in North America of fossilized remains of animals that appear to be remotely ancestral to our modern musk ox, and the absence of any such types in Eurasia, where, however, musk oxen closely resembling our own species had a wide distribution in Pleistocene times, point to an origin in the New World. Several genera of extinct bovines, more or less distantly related though not directly ancestral to the musk ox of to-day, are represented by fossils that have been unearthed as far south as Ohio, Kentucky, Arkansas, and New Mexico, and remains more distinctly referable to our recent animal, in Pennsylvania, Iowa, Indiana, Kansas, and southern British Columbia. In the Old World, remains of musk oxen not widely different from our own North American species have been found in northern Siberia, European Russia, Germany, Austria, France, and England. Over all the Old World range, however, there seems to be no record of the animal's presence within historic times.

Living musk oxen were first discovered in North America by the fur traders of the Hudson's Bay Co., who, during the closing years of the seventeenth century, built several trading posts on the shores of Hudson Bay. None of these early posts were actually in musk-ox country. It was a long time, therefore, before any of the traders came into personal contact with the living animals, and much later when the first specimen reached Europe. This happened about the year 1772, through the efforts of Samuel Hearne, who was the first white man to observe musk oxen in numbers and to study them in their haunts. Not long after this the Hudson Bay species was given its first scientific name, *Bos moschatus*. The later generic name, Ovibos, translates the erroneous notion that the animal has characters intermediate those of sheep and cattle. Anatomical studies, however, show that the supposed affinities with the sheep are nonexistent, but that the musk ox, as its vernacular name indicates, has its closest affinities with wild and domestic cattle. At about the same time that the first American specimen reached Europe, fossil skeletons came to light from the River Ob, in northern Siberia, and these were later described as *Ovibos pallantis*, a name that is now generally applied to the animals that in Pleistocene times were widely distributed in Eurasia.

Greenland Animals a Separate Race

For more than a hundred years all the musk oxen of North America were supposed to belong to one form, but lately the species has been studied rather intensively by systematists, with the result that the animals from Greenland and the neighboring islands have been found to constitute a race separable from the mainland animal, being smaller, lighter in color, and having a white patch about the base of the horns. The animals now being taken to Alaska, therefore, probably differ slightly in characters from the former inhabitants of its barrens, which we must presume were essentially like those of the Mackenzie River and Hudson Bay regions. From the practical standpoint, however, the differences are so slight as to be negligible.

Musk oxen are considerably smaller than domestic cattle. Adult males commonly reach a weight of 700 pounds, and as a very old and large one that was weighed piecemeal by Seton aggregated 850 pounds; allowing for loss of blood, it might well have reached 900 pounds when alive. It was 8 feet long from the point of its muzzle to the end of its diminutive tail, and the height at shoulder was 59 inches. The cows are considerably smaller than the bulls.

The areas north of the limit of tree growth, where alone musk oxen are content, is a pleasant land in summer. By May most of the snow is gone, and the well-watered and rich-soiled tundra quickly bursts into life. Grasses and sedges spring up, the prostrate shrubs put forth their young leaves and bright blossoms, and the lowly life is aroused from its winter sleep. Myriads of birds come from the south, some even from far-off Argentina, to rear their young in this plenteous feeding ground. Amid these pleasant pastures the mother musk ox leads about her single young one, which usually is born on the last of the snow in April. By late summer the young are strong and active, though for another year or two they will be dependent upon the older ones for protection.

In the musk-ox country winter succeeds summer with a suddenness that leaves but little of autumn, and with its arrival the scene changes. Snow, though it is not excessively deep, usually comes in September, and covers the ground for the next seven months, and during this period blizzards are frequent. The migrant birds have raised their young, and all have left. The pleasant land of summer days is changed to a waste whose depths of desolation are incomprehensible to the inhabitants of temperate lands. Most of the caribou, the only other herbivore that shares with the musk ox its habitat, have migrated south to find better pastures. But the musk ox remains on its chosen ground, moving only from one valley to another as necessary, and saving its energy for defense against its enemies. The animals keep in small herds, and when beset by wolves gather in a circle, with their young either in the center or between the adults. (Fig. 122.) The enemy is thus confronted with an impenetrable wall of sharp horns and is forced to give up the attack.

Winter Food Supply

The winter food of musk oxen, which the animals can reach only by pawing away the snow with their broad hoofs, consists principally of dwarf willows, though other depauperate shrubs, saxifrage, and various herbaceous plants and grasses also are eaten. The summer food is similar, though naturally the animals' preference at that season seems to be for the fresh grasses.

Until musk oxen encountered man they prospered, though their native land was one of the bleakest regions of the earth. Against primitive tribes they long held their ground, or retreated only slowly. But before the weapons of modern man they have declined rapidly, and unless he stays his hand they must soon join the ranks of those wild creatures that have been destroyed forever through human greed and thoughtlessness. It is significant that the hunter is usually accompanied by dogs, and these easily hold the musk oxen at bay, perhaps being mistaken for wolves. But the tactics that have so well served these courageous creatures through the centuries fail them when the supposed wolves are backed by men with modern rifles. The confidence and courage that impel them to stand by their helpless young make them as easy to kill as cattle in a barnyard, and in consequence many a herd has been wiped out within a few minutes. Men have journeyed to the Arctic with no other purpose in mind than to obtain a few musk-ox heads under these conditions.

FIGURE 122.—Group of musk oxen on Devon Island, Northwest Territories, Canada, August, 1928

Ever since the use of improved firearms became widespread in the north, man's pursuit of the musk ox has been relentless. In its mainland range and on the Arctic islands eastward of the Mackenzie, its gradual diminution began about 1860. In the relatively small area that was inhabited by the animal in northern Alaska, it had almost certainly disappeared before that date, as there seems to be no authentic record of its observation there by Europeans, though some of the natives say that their grandfathers killed the animals. Up to about 1870 a few were still found not far east of the lower Mackenzie, but the activities of the fur trade in that section soon led to the extermination of these small herds.

Slaughter By Whalers

A little later, with the more intensive operations of whalers, large vessels wintered in the harbors about Franklin Bay and elsewhere, and most of the herds of musk oxen in the region tributary to these bases were soon destroyed. At about this same period, 1890–1900, a rather brisk trade in skins, carried on by the Mackenzie River traders, together with some pursuit by visiting sportsmen, resulted in the extirpation of the musk ox all about the southwestern and western borders of its range, and this persecution was supplemented by vigorous pursuit in all the region bordering northwestern Hudson Bay by the crews and native associates of the whalers of that section. To make this sad story of commercial exploitation a short one, it may be said that the only herds of musk oxen now known to be living on the mainland of North America are a few animals, estimated to aggregate not more than 250 head, that remain in the Thelon River region in the Northwest Territories of Canada, in an area that fortunately has lately been set aside as a game sanctuary.

And so we will leave our little herd of 34 hardy, courageous, arctic cattle, taken from their bleak habitat on the ice-bound plains of Greenland and transplanted to the scarcely less rigorous setting of northern Alaska. For a time their lot will be relatively easy. They will be given surroundings approximating as closely as practicable those of their native land, and still compatible with the requirements of the feeding and breeding studies to be pursued by the Biological Survey. It is the purpose to build up a herd that will allow the stocking of various parts of the treeless Arctic, to the end that the vast tundras lying north of the Arctic Circle may yield another resource in meat and leather to supplement those now available to persons who choose our northern territory as their permanent homes.

Edward A. Preble,
Senior Biologist, Bureau of Biological Survey.

NATIONAL-FOREST Range Management Assisted by Livestock Associations

Organized cooperation between the stockmen and the United States Forest Service in the Pacific Northwest region, which embraces the States of Oregon and Washington, is resulting in distinct benefits to both the stock and the range. On the 22 national forests included in this region approximately 110,000 head of cattle and horses owned by 1,500 individuals, are now grazed under permit. Most of these owners are active members of small neighborhood associations organized to include all owners who run stock on a particular range. In the Pacific Northwest region the Forest Service now recognizes 104 of these small associations and encourages and fosters them to the fullest extent possible. Once a year the local forest supervisor, or a member of his staff, meets with each association on his forest and at these meetings all matters relating to the use and management of the range are informally discussed. In this way a Federal bureau is brought into intimate contact with each individual with whom it does business, and an opportunity is afforded for direct interchange of ideas between Forest officers and the stockmen.

Among the accomplishments of lasting benefit to both the stock and the range, brought about through these associations, are:

A more economical control of the stock on the forest range through construction of drift and division fences.

Development of watering holes and seeps to furnish an ample supply of water for the grazing stock. (Fig. 123.)

most of the herds of musk oxen in the region tributary to these bases were soon destroyed. At about this same period, 1890–1900, a rather brisk trade in skins, carried on by the Mackenzie River traders, together with some pursuit by visiting sportsmen, resulted in the extirpation of the musk ox all about the southwestern and western borders of its range, and this persecution was supplemented by vigorous pursuit in all the region bordering northwestern Hudson Bay by the crews and native associates of the whalers of that section. To make this sad story of commercial exploitation a short one, it may be said that the only herds of musk oxen now known to be living on the mainland of North America are a few animals, estimated to aggregate not more than 250 head, that remain in the Thelon River region in the Northwest Territories of Canada, in an area that fortunately has lately been set aside as a game sanctuary.

And so we will leave our little herd of 34 hardy, courageous, arctic cattle, taken from their bleak habitat on the ice-bound plains of Greenland and transplanted to the scarcely less rigorous setting of northern Alaska. For a time their lot will be relatively easy. They will be given surroundings approximating as closely as practicable those of their native land, and still compatible with the requirements of the feeding and breeding studies to be pursued by the Biological Survey. It is the purpose to build up a herd that will allow the stocking of various parts of the treeless Arctic, to the end that the vast tundras lying north of the Arctic Circle may yield another resource in meat and leather to supplement those now available to persons who choose our northern territory as their permanent homes.

Edward A. Preble,
Senior Biologist, Bureau of Biological Survey.

NATIONAL-FOREST Range Management Assisted by Livestock Associations

Organized cooperation between the stockmen and the United States Forest Service in the Pacific Northwest region, which embraces the States of Oregon and Washington, is resulting in distinct benefits to both the stock and the range. On the 22 national forests included in this region approximately 110,000 head of cattle and horses owned by 1,500 individuals, are now grazed under permit. Most of these owners are active members of small neighborhood associations organized to include all owners who run stock on a particular range. In the Pacific Northwest region the Forest Service now recognizes 104 of these small associations and encourages and fosters them to the fullest extent possible. Once a year the local forest supervisor, or a member of his staff, meets with each association on his forest and at these meetings all matters relating to the use and management of the range are informally discussed. In this way a Federal bureau is brought into intimate contact with each individual with whom it does business, and an opportunity is afforded for direct interchange of ideas between Forest officers and the stockmen.

Among the accomplishments of lasting benefit to both the stock and the range, brought about through these associations, are:

A more economical control of the stock on the forest range through construction of drift and division fences.

Development of watering holes and seeps to furnish an ample supply of water for the grazing stock. (Fig. 123.)

Salting and distributing cattle in accordance with systematic plans which at the same time produce fatter stock and protect the range from overgrazing.

Building up a better type of beef animal through breeding only to purebred bulls of some recognized beef breed.

Elimination of complaints through working out of all differences of opinion on the ground.

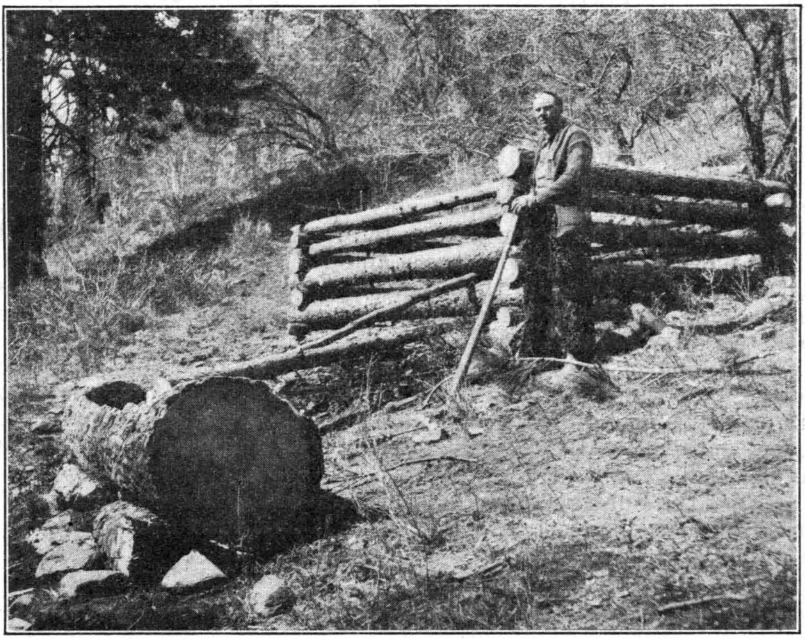


FIGURE 123.—Development of watering holes and seeps on national-forest range provides the stock with an ample supply of clean water

Furnishing a medium through which the stockman may voice his opinions and be heard on all matters of policy affecting the use of the range on which his cattle are permitted.

Development of a stronger social and community cohesion in the neighborhood represented.

W. L. DUTTON,
Regional Forest Inspector, Forest Service.

NATIONAL Forests Have Municipal Recreation Camps in California Fifteen recreation camps on the national forests in California are operated by municipalities to provide opportunities to their taxpayers for summer outings at cost. The plan was first put into effect by Los Angeles, followed by Oakland, Berkeley, San Francisco, Stockton, Sacramento, and Riverside, and by Los Angeles County. The demand for the use of these camps, which are located from 25 to 300 miles from the municipality that maintains them, has been so great as to call for the establishment of two camps by several of the cities; Los Angeles has four.

Salting and distributing cattle in accordance with systematic plans which at the same time produce fatter stock and protect the range from overgrazing.

Building up a better type of beef animal through breeding only to purebred bulls of some recognized beef breed.

Elimination of complaints through working out of all differences of opinion on the ground.

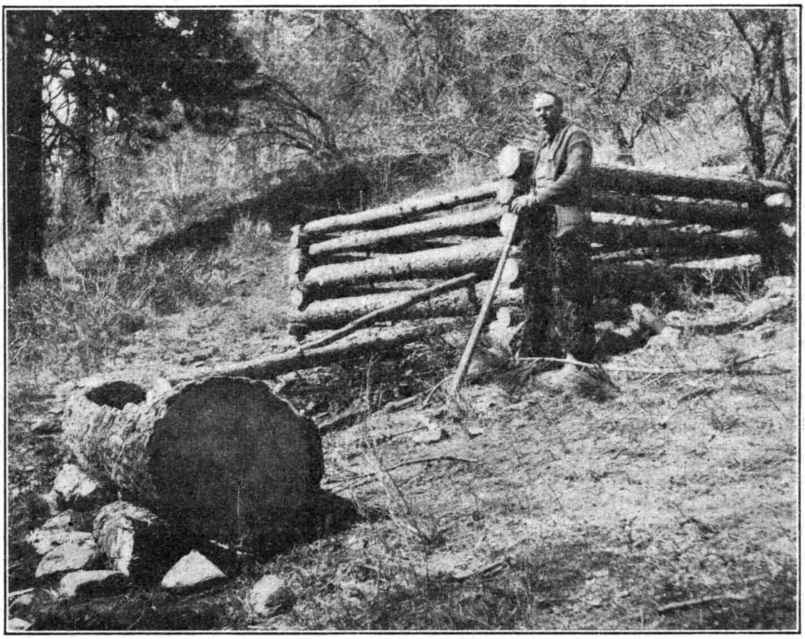


FIGURE 123.—Development of watering holes and seeps on national-forest range provides the stock with an ample supply of clean water

Furnishing a medium through which the stockman may voice his opinions and be heard on all matters of policy affecting the use of the range on which his cattle are permitted.

Development of a stronger social and community cohesion in the neighborhood represented.

W. L. DUTTON,
Regional Forest Inspector, Forest Service.

NATIONAL Forests Have Municipal Recreation Camps in California Fifteen recreation camps on the national forests in California are operated by municipalities to provide opportunities to their taxpayers for summer outings at cost. The plan was first put into effect by Los Angeles, followed by Oakland, Berkeley, San Francisco, Stockton, Sacramento, and Riverside, and by Los Angeles County. The demand for the use of these camps, which are located from 25 to 300 miles from the municipality that maintains them, has been so great as to call for the establishment of two camps by several of the cities; Los Angeles has four.

The 15 camps represent an investment of over $500,000. The land they occupy is furnished by the Forest Service free of rental charges. At some camps the guests participate in the maintenance of the camps and thus help to keep down the cost. It is possible for a person to get a 2-week outing for about $1.50 a day, excluding transportation. Guests are housed in attractive, well-ventilated cabins, or tent houses and are furnished with individual iron cots and mattresses. Every camp provides plenty of wholesome food. Stores and libraries are maintained, and interesting pack-train or hiking trips are conducted for the benefit of the guests. Nearly all camps have natural or developed swimming pools as well as athletic fields with an instructor in charge. Every camp is in charge of a trained camp director.

Guests at the camps come from all walks in life. Generally taxpayers of the municipality are the only persons eligible to make reservations. Some of the camps provide for family parties; some for organizations like Boy Scouts and Camp Fire Girls. Other camps provide for all classes of residents by designating certain periods for family parties and others for boys' and girls' organizations, so arranging the summer schedule that there is no conflict. Where there is a heavy demand for camp accommodations it is the policy to limit guests to a stay of two weeks.

Plain living in a fine natural environment is the fundamental objective, and though these camps provide all forms of diversion, the camp spirit finds best expression about the open fire, around which the guests gather nightly for song and story, impromptu stunts, and discussion.

All that the Forest Service asks of the guests of these camps is to be careful of fire in the woods and to see to it that the rules of camp sanitation and cleanliness are strictly observed.

L. A. Barrett,
Assistant Regional Forester, Forest Service.

NATIONAL Forests in California Increase Revenues of Counties Federal ownership of land and property means a loss of taxes to the community, as the Federal Government pays no taxes. Federal buildings, military reservations, Indian reservations, national parks, and national forests are forms of Government ownership. In most cases the benefits received are obvious and the area is comparatively small. But the national forests of California embrace about 19,000,000 acres and withdraw from private ownership and taxation nearly one-fifth of the land area of the State. Therefore the question arises as to their effect on the State and counties because of the withholding of potentially taxable lands in Government ownership with a consequent loss of revenue.

As long ago as 1906 Congress recognized that the withdrawal of public lands for national-forest purposes meant a reduction in future tax returns. Beginning that year the Forest Service was authorized to turn over to the State 10 per cent of all receipts derived from the sale and use of national-forest resources, for distribution to the counties in which national forests are located, the money to be used for road and school purposes. Two years later, in 1908, this return was increased to 25 per cent of the total receipts. In 1912, Congress

The 15 camps represent an investment of over $500,000. The land they occupy is furnished by the Forest Service free of rental charges. At some camps the guests participate in the maintenance of the camps and thus help to keep down the cost. It is possible for a person to get a 2-week outing for about $1.50 a day, excluding transportation. Guests are housed in attractive, well-ventilated cabins, or tent houses and are furnished with individual iron cots and mattresses. Every camp provides plenty of wholesome food. Stores and libraries are maintained, and interesting pack-train or hiking trips are conducted for the benefit of the guests. Nearly all camps have natural or developed swimming pools as well as athletic fields with an instructor in charge. Every camp is in charge of a trained camp director.

Guests at the camps come from all walks in life. Generally taxpayers of the municipality are the only persons eligible to make reservations. Some of the camps provide for family parties; some for organizations like Boy Scouts and Camp Fire Girls. Other camps provide for all classes of residents by designating certain periods for family parties and others for boys' and girls' organizations, so arranging the summer schedule that there is no conflict. Where there is a heavy demand for camp accommodations it is the policy to limit guests to a stay of two weeks.

Plain living in a fine natural environment is the fundamental objective, and though these camps provide all forms of diversion, the camp spirit finds best expression about the open fire, around which the guests gather nightly for song and story, impromptu stunts, and discussion.

All that the Forest Service asks of the guests of these camps is to be careful of fire in the woods and to see to it that the rules of camp sanitation and cleanliness are strictly observed.

L. A. Barrett,
Assistant Regional Forester, Forest Service.

NATIONAL Forests in California Increase Revenues of Counties Federal ownership of land and property means a loss of taxes to the community, as the Federal Government pays no taxes. Federal buildings, military reservations, Indian reservations, national parks, and national forests are forms of Government ownership. In most cases the benefits received are obvious and the area is comparatively small. But the national forests of California embrace about 19,000,000 acres and withdraw from private ownership and taxation nearly one-fifth of the land area of the State. Therefore the question arises as to their effect on the State and counties because of the withholding of potentially taxable lands in Government ownership with a consequent loss of revenue.

As long ago as 1906 Congress recognized that the withdrawal of public lands for national-forest purposes meant a reduction in future tax returns. Beginning that year the Forest Service was authorized to turn over to the State 10 per cent of all receipts derived from the sale and use of national-forest resources, for distribution to the counties in which national forests are located, the money to be used for road and school purposes. Two years later, in 1908, this return was increased to 25 per cent of the total receipts. In 1912, Congress authorized the Forest Service to spend an additional 10 per cent of all receipts on cooperation with the State and counties for minor road and trail construction within the national forests.

Contribute to Road Development

Following the acceleration of the national road-building program since 1916, Congress has passed several acts appropriating money for major roads that form part of the State, interstate, and county highway systems, both within and adjoining the national forests. This enabled the Forest Service to fulfill its obligation as a landowner by contributing its share toward the development of the country where national forests are located.

The Forest Service is therefore contributing directly to the counties by giving income in the form of payment of 25 per cent of all receipts and in giving assistance in the way of cooperation in road and trail construction, both from the 10 per cent fund for trails and minor roads and by special appropriation for State and county highways.

Indirect Contributions to Counties

In order to determine accurately the effect of national forests on county revenues, the Forest Service in 1927–28 made a special study covering all of the national forests of the United States. It was found that in addition to income and assistance to schools and roads the Forest Service was also making indirect contributions to the counties by developing free camp grounds and recreational resources, granting free timber for the use of settlers and prospectors for home use, making sales of timber at cost to farmers and settlers for farm improvements, issuing free grazing permits for work and milk stock owned by ranchers residing in the national forests, and by cooperating with the State authorities in enforcing fish and game laws and in planting fish fry in the streams and lakes—all this in addition to administering and protecting forest resources.

Data for this tax study covered a 5-year period and the figures given are the average for the years 1923 to 1927, inclusive. A recapitulation of the results of this study for the national forests within the State of California follows:

Direct returns and benefits	Annual average 1923–1927
25 per cent fund	$297, 554
Road and trail expenditures	1, 205, 564
Indirect contributions	12, 065
Total	1, 515, 183

This is equivalent to a tax of 8 cents per acre, per year, for all national-forest lands, including rocky and barren areas or other lands of no value for grazing or timber production and from which no revenue can be derived by the Forest Service, although considerable money must be spent each year for their protection and development. (Fig. 124.)

Forest Benefits Exceed Potential Taxes

The next step was to draw a comparison between this figure and what the counties would probably receive in tax revenue if the potentially taxable land were in private ownership. The tax study classified the 18,971,409 acres of Government land within the national forests of California by comparing them to similar land in private ownership and it was found that only 4,179,148 acres were in the taxable category. The remaining 14,792,261 acres consist of inaccessible timber stands, nonmerchantable stands of young growth and inferior timber, brush lands and considerable areas of barren lava or granite along the summits of the mountain ranges. The potentially taxable timber and grazing lands were then assessed exactly at the tax rates and by the same system in effect in the county in which they were located. The results follow:

Probable annual tax returns on 4,179,148 acres of national-forest land if in private ownership, based on the assessment rates applying to similar private land in county concerned, $1,168,770.

Difference between $1,515,183, which represents the income, assistance, and benefits received from the Forest Service, and $1,168,770, or the amount the counties would receive in taxes, $346,413.

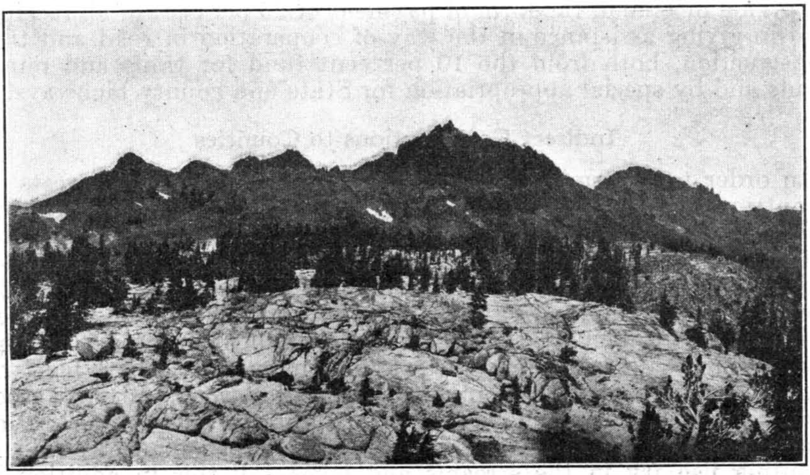


FIGURE 124.—There are a million and a half acres of land in the national forests of California of no value for grazing or timber that are now helping to contribute 8 cents per acre annually to the State and counties

The actual situation is, therefore, that the national forests, under the administration of the Forest Service, are not only paying their full share of taxes, but are actually contributing $346,413 more to the State and counties than would be received if the same lands were taxable under private ownership. These figures are for present conditions. Conservative estimates, made on the basis of present stumpage prices, grazing fees, and rentals of Government land show that the annual returns from the national forests to the State and counties will, when the national forests are fully developed, be double the present return.

R. W. AYRES,
Logging Engineer, Forest Service.

NATIONAL Forests Policy Is to Perpetuate While Using Their Resources The 151 national forests of the United States are administered by the Forest Service of the United States Department of Agriculture under a policy which provides that all national-forest land is to be devoted to its most productive use for the permanent good of the whole people.

and it was found that only 4,179,148 acres were in the taxable category. The remaining 14,792,261 acres consist of inaccessible timber stands, nonmerchantable stands of young growth and inferior timber, brush lands and considerable areas of barren lava or granite along the summits of the mountain ranges. The potentially taxable timber and grazing lands were then assessed exactly at the tax rates and by the same system in effect in the county in which they were located. The results follow:

Probable annual tax returns on 4,179,148 acres of national-forest land if in private ownership, based on the assessment rates applying to similar private land in county concerned, $1,168,770.

Difference between $1,515,183, which represents the income, assistance, and benefits received from the Forest Service, and $1,168,770, or the amount the counties would receive in taxes, $346,413.

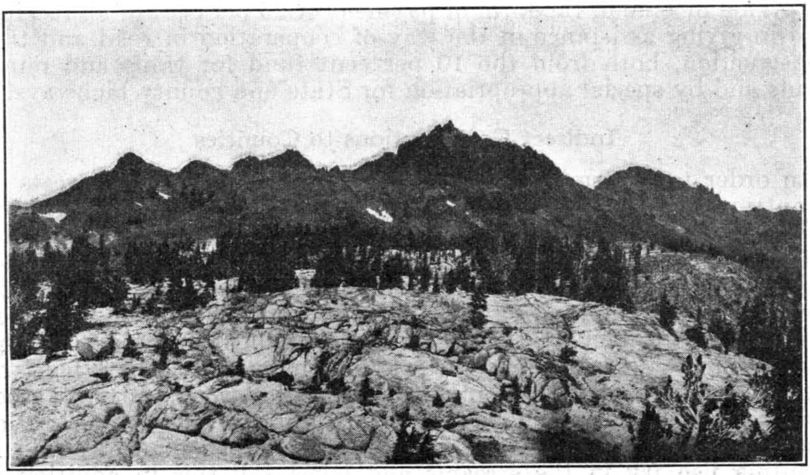


FIGURE 124.—There are a million and a half acres of land in the national forests of California of no value for grazing or timber that are now helping to contribute 8 cents per acre annually to the State and counties

The actual situation is, therefore, that the national forests, under the administration of the Forest Service, are not only paying their full share of taxes, but are actually contributing $346,413 more to the State and counties than would be received if the same lands were taxable under private ownership. These figures are for present conditions. Conservative estimates, made on the basis of present stumpage prices, grazing fees, and rentals of Government land show that the annual returns from the national forests to the State and counties will, when the national forests are fully developed, be double the present return.

R. W. AYRES,
Logging Engineer, Forest Service.

NATIONAL Forests Policy Is to Perpetuate While Using Their Resources The 151 national forests of the United States are administered by the Forest Service of the United States Department of Agriculture under a policy which provides that all national-forest land is to be devoted to its most productive use for the permanent good of the whole people.

Conservation through the protection and wise use of the forest resources of water, wood, forage, recreation, and wild life not only is of great importance to the Nation as a whole, but it is particularly vital to the communities adjacent to the national forests whose welfare is directly dependent upon these resources. To illustrate this, a brief description is given of one of the western national forests and the manner in which it functions. (Fig. 125.)

This national forest has a net area of 1, 354,986 acres of timbered mountainous territory adjacent to a region in which farming, livestock production, lumbering, and mining are the principal industries. On the arable land outside the forest, water for irrigation, which is an absolute necessity for the production of agricultural crops, is obtained from streams originating within the forest. The forest cover aids in regulating stream flow. The forage crops from irrigated fields are used locally in the winter feeding of sheep and cattle, and the national

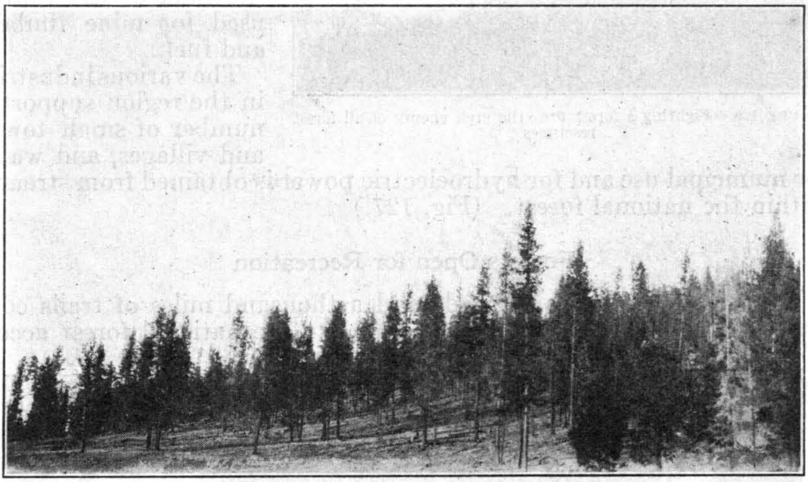


FIGURE 125.—The mature and overmature trees on this area have been cut and sold; a second crop is already growing

forest furnishes summer grazing for most of this stock, 15,000 cattle and 127,000 sheep. The owners of the stock pay the Government moderate annual fees for grazing permits.

The ranchers secure wood for their own use from the national forest—dead material free of charge and live trees at a rate which merely compensates the Government for the cost of handling the sale.

Timber Handled as Crop

A dozen small sawmills in and adjacent to the national forest furnish lumber for local use, and three large mills cut lumber for distant markets. Between 20 and 30 per cent of the lumber is cut from national-forest land, and the purchaser pays the full commercial value for this timber except for material used on the local ranches. (Fig. 126.)

In the near future the supply of privately owned timber will be greatly depleted and the lumber industry, which provides 30 per cent of the local pay roll, will become more and more dependent upon the national forest for its existence. As the need for Government timber increases, the annual cut from the national forest can be increased until a sustained annual cut of approximately 50,000,000 board feet is reached. It is estimated that under sound forest management this amount of timber can be cut each year perpetually. On the national forest, only mature or decadent trees are cut, and unnecessary damage to young trees and seedlings is prohibited so that a new crop of trees will replace the timber cut.

FIGURE 126.—Fighting a forest fire—the arch enemy of all forest resources

The national forest is open for prospecting and mineral development, and it furnishes the bulk of the timber used for mine timbers and fuel.

The various industries in the region support a number of small towns and villages, and water for municipal use and for hydroelectric power is obtained from streams within the national forest. (Fig. 127.)

Forests Open for Recreation

Three hundred miles of roads and a thousand miles of trails constructed by the Forest Service help make the national forest acces-

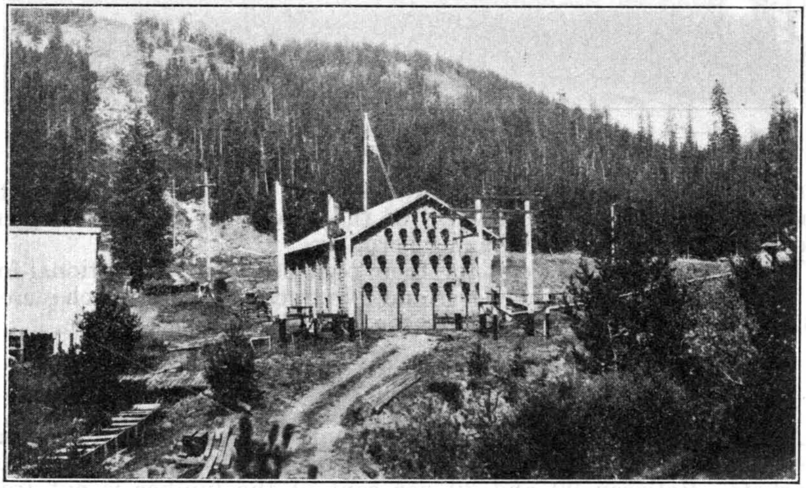


FIGURE 127.—A hydroelectric power plant on a national forest

sible to those who seek outdoor recreation. The scenic beauty of the mountains, well-stocked streams and lakes, and good hunting attracted 17,000 visitors to this forest in 1929. The more popular camping places have been improved for the free use of the public. For those who wish to rough it, over 200,000 acres have been set aside as a "primitive area" which will be kept in its original wilderness condition.

Aside from a very few very reasonable and necessary requirements as to care with fire, the public have free and unrestricted use of the national forests for recreational purposes. A charge is made only where exclusive use of a tract of land is granted.

Although service rather than revenue is the objective of national-forest administration, this forest has turned into the United States Treasury an average income of over $100,000 annually during the past decade, of which 25 per cent has been paid to the counties in which the forest is located for roads and schools.

In order to handle all business efficiently and facilitate the work of preventing and suppressing forest fires, the arch-enemy of all forest resources, it has been necessary for the local forest organization to construct and maintain roads, trails, bridges, lookout houses, cabins, horse pastures, drift fences, stock-watering places, and also simple fire-prevention and sanitation improvements on recreation areas.

The yearlong forest organization consists of a supervisor, assistant supervisor, eight district rangers, and a small staff of clerical and technical assistants and specialists. These forest officers live in and are a part of the communities adjacent to the national forest and are familiar with the interests and problems of the forest users. During the summer months a temporary force of 60 fire guards and laborers in construction crews also is employed.

Local officers are responsible for comprehensive plans for the administration of each resource and for the efficient utilization of each forest officer's time, and to the fullest extent possible all national-forest business is handled by the local organization.

The national forests are located in many parts of the United States and present such a wide diversity of conditions that the volume and character of business entailed in handling the different resources varies greatly. All national forests, however, are administered with the same objective in view, that is, to perpetuate the forest resources through wise use.

JOHN C. KUHNS,
Supervisor, Forest Service.

NITRATE Bacteria, Main Source of Soil Nitrates, Depend on Farm Practice

This is the story of the nitrate. The farmer already has met it for it comes in the bag of fertilizer and costs more to the pound than any other kind. But it is necessary since the crop plants must have nitrates in abundance, especially when they begin to grow in the spring and again when they produce their fruits or seed. What we spread out of the bag is ordinarily only a negligible contribution, a kind of appetizer. Our chief source of nitrates is the activity of the nitrate bacteria in the soil itself. Whether he knows it or not, therefore, the farmer is quite dependent upon these nitrate bacteria; success or failure in crop production is involved in supplying these organisms with favorable conditions for their activity.

To adjust his practice then so as to make the most of nitrate production in the soil he must first consider the conditions under which it occurs. To begin with, there is the factor of temperature. Nitrate bacteria, just as our crop plants, are inactive in the winter; they begin aside as a "primitive area" which will be kept in its original wilderness condition.

Aside from a very few very reasonable and necessary requirements as to care with fire, the public have free and unrestricted use of the national forests for recreational purposes. A charge is made only where exclusive use of a tract of land is granted.

Although service rather than revenue is the objective of national-forest administration, this forest has turned into the United States Treasury an average income of over $100,000 annually during the past decade, of which 25 per cent has been paid to the counties in which the forest is located for roads and schools.

In order to handle all business efficiently and facilitate the work of preventing and suppressing forest fires, the arch-enemy of all forest resources, it has been necessary for the local forest organization to construct and maintain roads, trails, bridges, lookout houses, cabins, horse pastures, drift fences, stock-watering places, and also simple fire-prevention and sanitation improvements on recreation areas.

The yearlong forest organization consists of a supervisor, assistant supervisor, eight district rangers, and a small staff of clerical and technical assistants and specialists. These forest officers live in and are a part of the communities adjacent to the national forest and are familiar with the interests and problems of the forest users. During the summer months a temporary force of 60 fire guards and laborers in construction crews also is employed.

Local officers are responsible for comprehensive plans for the administration of each resource and for the efficient utilization of each forest officer's time, and to the fullest extent possible all national-forest business is handled by the local organization.

The national forests are located in many parts of the United States and present such a wide diversity of conditions that the volume and character of business entailed in handling the different resources varies greatly. All national forests, however, are administered with the same objective in view, that is, to perpetuate the forest resources through wise use.

JOHN C. KUHNS,
Supervisor, Forest Service.

NITRATE Bacteria, Main Source of Soil Nitrates, Depend on Farm Practice

This is the story of the nitrate. The farmer already has met it for it comes in the bag of fertilizer and costs more to the pound than any other kind. But it is necessary since the crop plants must have nitrates in abundance, especially when they begin to grow in the spring and again when they produce their fruits or seed. What we spread out of the bag is ordinarily only a negligible contribution, a kind of appetizer. Our chief source of nitrates is the activity of the nitrate bacteria in the soil itself. Whether he knows it or not, therefore, the farmer is quite dependent upon these nitrate bacteria; success or failure in crop production is involved in supplying these organisms with favorable conditions for their activity.

To adjust his practice then so as to make the most of nitrate production in the soil he must first consider the conditions under which it occurs. To begin with, there is the factor of temperature. Nitrate bacteria, just as our crop plants, are inactive in the winter; they begin to grow about the time our crops do, and reach a peak of activity about the time our grains and vegetables are growing most rapidly, enlarging their root systems and bearing their fruit, and hence most dependent upon constant supplies of nitrates. They slow down again in the fall, and finally reach the inactive condition characteristic of winter. But temperature is not alone in controlling nitrate formation; moisture is essential. In sections where moisture is abundant in spring and fall, and dryness prevails in midsummer, nitrate production reaches a peak in the spring, falls to a low point in summer, and rises again during the moist period of the fall. In other sections, where rainy weather prevails in midsummer, and drier periods in spring and fall, maximum nitrate production seems to follow the rainfall by being highest in midsummer. Again, these bacteria seem to work best in the presence of air. Plowing and harrowing aerate the soil and favor nitrate production. Good cultivation is then favorable to this process.

Nitrates are produced from nitrites which are derived from ammonia. They are end products of the decay of organic matter. Farm manure, vegetable stuffs like cornstalks, straw, stubble, roots, weeds, and brush, and waste animal substances are not used by crop plants directly but must go through the rotting process in which they are attacked by a hungry horde, consisting of such organisms as bugs, worms, bacteria, yeasts, molds, etc. All contribute to reduce waste matter to earthy forms. Only toward the end of this reducing process do we find ammonia, later nitrites, then finally the nitrates for which the competition is so keen that those plants unable to obtain their share are often starved out.

Rate of Nitrate Production

The organic matter used up in this process may be that stored in the soil and thus destroyed for current crop production, or material added from year to year and from crop to crop. In land already rich in organic matter, the rate of nitrate formation is often great enough to show an excess throughout the growing season. In land low in organic matter, crop plants remove nitrates often so rapidly that no excess can be found during the actively growing season. The crop residues, such as dead root systems, stubble, cornstalks and weeds, all contribute their part. Many of these substances themselves contain so little nitrogen that they scarcely supply the bacteria necessary to rot them, leaving no nitrogen over for the crop plants during the period of active rotting. Their contribution to the nitrate supply is often very tardily delivered. Aside from resorting to the fertilizer bag, other sources and intermediate products are to be sought.

Since ammonia formation in the soil precedes nitrate formation, sources of ammonia in the soil become important. The easiest way to get it is to add ammonium salts directly to the soil, care being taken that the residue after the removal of the ammonia does not create an acid condition of the soil. This method is used frequently where quick results are wanted. Rotted barnyard manure formerly was the chief source of ammonia and is still preferred where it is easily obtainable. This has an advantage over the ammonium salt in supplying organic matter to the soil which besides serving as food for bacteria and other forms of microscopic life improves the physical condition of the soil and spreads its effects over a longer period.

Plowing under green manures, especially legumes, provides a source of ammonia as the material rots. Obviously some time is necessary for such rotting to take place. Bacteria in the presence of food require moisture and a warm or at least a mild temperature for activity. The physical condition of the soil when plowing under a green manure, therefore, will greatly affect the process of rotting. Green manure or other organic matter plowed into dry soil will decay much more slowly than if the soil is moist, due to the slower activity of the microorganisms under these conditions. The same holds true as to temperature, cool weather being less favorable to the process than warm weather. Under greenhouse conditions of optimum moisture and temperature green manures have been found to decay in seven days to such an extent that only faint traces of them could be found. In two weeks, the nitrates were increasing rapidly. A crop planted 10 days after green manuring made good growth. Such conditions are not generally found in the field. Under field conditions green manure plowed under in cool and very dry weather disappeared so slowly that the more resistant stems of the rye and vetch could be taken from the soil two months after plowing. Under these conditions ammonia was formed slowly from the decaying mass and consequently nitrates were low and rose slowly. Planting a crop under such conditions places a handicap on it. Undoubtedly this may be one of the reasons for certain crop failures after green manuring. Practices must be adjusted to climate, soil, and often to the particular crop grown.

Nitrate Formation Begins in Spring

Nitrate formation begins in the spring about the time our young crop plants begin to need nitrates. The demand differs with the kind of crop and with climatic conditions. Naturally, nitrates are taken up by the crop plants most rapidly during the most actively growing period. At such times, they are often absorbed as rapidly as they are formed. A test for nitrates if made at this stage may show none remaining in the soil. But as the crop matures and the call for nitrates is less there may be an accumulation of nitrates in the soil. Fall rains leach out such soluble nitrates, and by winter none are found under usual conditions. Saving these nitrates and holding the soil against washing seem to be major problems confronting the farmer. This is especially true in sections where the season is long and where conditions are favorable for the formation of nitrates for some time after the removal of the crop.

Planting a cover crop under these conditions has long been recommended. The choice of the crop to be used will vary with the soil and the locality. A legume is to be preferred. By the aid of bacteria growing in the nodules on their roots, these plants are able to use the nitrogen of the air, thus adding to the store of soil nitrogen if they are plowed in. On the other hand, if a nonlegume such as rye is grown and turned under nothing is added to the soil which was not there before the rye was grown. However, any cover crop is preferable to leaving the ground bare. It will absorb the nitrates produced in the fall, keep soil from washing, and maintains a better physical condition.

The nitrate bacteria are, therefore, an important factor in crop production. Fortunately, their association with crop plants is so close that conditions which favor one usually favor the other during the growing season. But the bacteria remain in the soil whether it is covered by a crop or not. Losses of nitrogen occur when nitrates are formed without crop plants to use them. Crop failures sometimes occur when crops are planted without remembering their dependence upon nitrate formation. Difficult as these adjustments may sometimes be, it is often easier to alter the farm practice than to change the habits of the nitrate organisms.

Nathan R. Smith, *Senior Bacteriologist*,
Charles Thom, *Principal Mycologist*,
Bureau of Chemistry and Soils.

NITROGEN Fixation by Legumes Essentially a Cooperative Process

A large number of species of common agricultural plants, known as legumes, possess the ability of growing independent of the supply of nitrogen in the soil, provided the proper bacteria are present. Their ability to use the free nitrogen of the air has been known for a long time; hence the common practice of inoculating the seeds of alfalfa, clover, soybeans, and other legumes at the time of planting if the bacteria are not already known to be present.

How do these inoculated plants obtain their nitrogen? This question has been under consideration by this department for a number of years but the complete answer has not yet been obtained. We know that the leguminous plants when grown free of the bacteria are unable to use gaseous nitrogen. Under such conditions they make a stunted growth on the nitrogen stored up in the seed and die prematurely unless available nitrogenous compounds are supplied. The nodule-producing bacteria are, therefore, essential for the nitrogen fixation to take place.

Extensive studies of the relation of the nodule bacteria to free nitrogen, recently completed in the Bureau of Chemistry and Soils, gave no indication that the bacteria growing apart from the legume plants could ever use free nitrogen. On artificial culture media the organisms made little or no growth in the absence of combined nitrogen. Where nitrates, ammonium salts, and various types of organic nitrogenous compounds were supplied the growths obtained were excellent in most cases, but no increase in the nitrogen content of the media occurred. Various attempts to duplicate conditions in the nodule in an artificial way also gave negative results.

Cooperative Principle Demonstrated

These findings show beyond a reasonable degree of doubt that nitrogen fixation by legumes is a strictly cooperative process between the higher plants and the bacteria which live in the nodules on the roots. Until recently it has usually been assumed that the bacteria were the agents responsible for the nitrogen fixation and that the higher plant played a secondary rôle. According to this theory the bacteria obtain their energy for growth and fixation in the form of sugars which the legume furnishes. The legume, in turn, constantly removes the products of the bacteria, including the nitrogenous compounds being formed. Our present information indicates that this theory is essentially correct with the exception of the assumption that the bacteria growing season. But the bacteria remain in the soil whether it is covered by a crop or not. Losses of nitrogen occur when nitrates are formed without crop plants to use them. Crop failures sometimes occur when crops are planted without remembering their dependence upon nitrate formation. Difficult as these adjustments may sometimes be, it is often easier to alter the farm practice than to change the habits of the nitrate organisms.

NATHAN R. SMITH, *Senior Bacteriologist*,
CHARLES THOM, *Principal Mycologist*,
Bureau of Chemistry and Soils.

NITROGEN Fixation by Legumes Essentially a Cooperative Process

A large number of species of common agricultural plants, known as legumes, possess the ability of growing independent of the supply of nitrogen in the soil, provided the proper bacteria are present. Their ability to use the free nitrogen of the air has been known for a long time; hence the common practice of inoculating the seeds of alfalfa, clover, soybeans, and other legumes at the time of planting if the bacteria are not already known to be present.

How do these inoculated plants obtain their nitrogen? This question has been under consideration by this department for a number of years but the complete answer has not yet been obtained. We know that the leguminous plants when grown free of the bacteria are unable to use gaseous nitrogen. Under such conditions they make a stunted growth on the nitrogen stored up in the seed and die prematurely unless available nitrogenous compounds are supplied. The nodule-producing bacteria are, therefore, essential for the nitrogen fixation to take place.

Extensive studies of the relation of the nodule bacteria to free nitrogen, recently completed in the Bureau of Chemistry and Soils, gave no indication that the bacteria growing apart from the legume plants could ever use free nitrogen. On artificial culture media the organisms made little or no growth in the absence of combined nitrogen. Where nitrates, ammonium salts, and various types of organic nitrogenous compounds were supplied the growths obtained were excellent in most cases, but no increase in the nitrogen content of the media occurred. Various attempts to duplicate conditions in the nodule in an artificial way also gave negative results.

Cooperative Principle Demonstrated

These findings show beyond a reasonable degree of doubt that nitrogen fixation by legumes is a strictly cooperative process between the higher plants and the bacteria which live in the nodules on the roots. Until recently it has usually been assumed that the bacteria were the agents responsible for the nitrogen fixation and that the higher plant played a secondary rôle. According to this theory the bacteria obtain their energy for growth and fixation in the form of sugars which the legume furnishes. The legume, in turn, constantly removes the products of the bacteria, including the nitrogenous compounds being formed. Our present information indicates that this theory is essentially correct with the exception of the assumption that the bacteria fix the nitrogen. It is possible, of course, that the bacteria do fix nitrogen in the nodule even though they do not do so on the outside, but it is difficult to obtain direct evidence on this point.

A study of nodule growth in relation to plant growth further emphasizes the interdependence of the bacteria and the higher plant. Unusually favorable conditions for the growth of the legume are usually followed by a corresponding increase in the mass of nodules formed and apparently greater activity on the part of the bacteria. Conversely, if there is a marked slowing down in the growth rate of the host plant because of unfavorable conditions or approaching maturity the nodules may show evidence of decomposition.

The effect of leguminous crops on other crops which follow in the rotation is almost always beneficial. This fact is well known and is one of the many reasons for including legumes in the rotation. Investigations have shown that a marked residual effect may occur even though the legume crop is harvested and the tops removed. Among the many reasons advanced for this effect is the fact that the growing of the crop leaves the soil heavily inoculated with the nodule bacteria, which are supposed to fix nitrogen in the soil independently of the host.

Organic Matter Added to Soil

The recent investigations in this bureau fail to substantiate this idea. More likely the residual effect of the leguminous crop is due more to the addition of organic matter in the heavy root growths and in some cases to the deepening of the soil by penetration of these roots to lower depths. There are also many reasons for believing that the soils are in many instances left with more nitrogen than before cropping even though the tops are removed. This is especially true on soils very deficient in available nitrogen, but even on rich soils legumes fix considerable quantities of nitrogen. These plants seem to possess the ability of using free nitrogen gas nearly as readily as nitrogenous compounds, provided conditions are favorable for vigorous plant growth.

Even though the recent investigations have failed to show that the legume nodule bacteria, living apart from the host plant, can fix nitrogen this does not detract in the least from their great economic importance. The results, on the contrary, emphasize the necessity for inoculating legume seed at the time of planting unless the soil is known to contain the proper bacteria.

F. E. Allison,
Senior Chemist, Bureau of Chemistry and Soils.

NURSERY Stock Rid of Japanese Beetles by Hot-Water Treatment

The immersion of the roots of certain dormant or semidormant nursery plants in hot water has been found to be a simple, quick, and effective method for destroying infestations of the Japanese beetle in the soil about the roots of these plants. In preparing the plants for treatment, loose soil is removed, the roots are pruned, and the large clumps are divided as much as possible without causing injury to the plants. Small plants, bulbs, and root stocks may be treated in mass in wire baskets but the large plants should be handled individually.

The roots are immersed completely in water held at a constant temperature of 112° F. After the soil about the roots of the plants is heated fix the nitrogen. It is possible, of course, that the bacteria do fix nitrogen in the nodule even though they do not do so on the outside, but it is difficult to obtain direct evidence on this point.

A study of nodule growth in relation to plant growth further emphasizes the interdependence of the bacteria and the higher plant. Unusually favorable conditions for the growth of the legume are usually followed by a corresponding increase in the mass of nodules formed and apparently greater activity on the part of the bacteria. Conversely, if there is a marked slowing down in the growth rate of the host plant because of unfavorable conditions or approaching maturity the nodules may show evidence of decomposition.

The effect of leguminous crops on other crops which follow in the rotation is almost always beneficial. This fact is well known and is one of the many reasons for including legumes in the rotation. Investigations have shown that a marked residual effect may occur even though the legume crop is harvested and the tops removed. Among the many reasons advanced for this effect is the fact that the growing of the crop leaves the soil heavily inoculated with the nodule bacteria, which are supposed to fix nitrogen in the soil independently of the host.

Organic Matter Added to Soil

The recent investigations in this bureau fail to substantiate this idea. More likely the residual effect of the leguminous crop is due more to the addition of organic matter in the heavy root growths and in some cases to the deepening of the soil by penetration of these roots to lower depths. There are also many reasons for believing that the soils are in many instances left with more nitrogen than before cropping even though the tops are removed. This is especially true on soils very deficient in available nitrogen, but even on rich soils legumes fix considerable quantities of nitrogen. These plants seem to possess the ability of using free nitrogen gas nearly as readily as nitrogenous compounds, provided conditions are favorable for vigorous plant growth.

Even though the recent investigations have failed to show that the legume nodule bacteria, living apart from the host plant, can fix nitrogen this does not detract in the least from their great economic importance. The results, on the contrary, emphasize the necessity for inoculating legume seed at the time of planting unless the soil is known to contain the proper bacteria.

F. E. Allison,
Senior Chemist, Bureau of Chemistry and Soils.

NURSERY Stock Rid of Japanese Beetles by Hot-Water Treatment The immersion of the roots of certain dormant or semidormant nursery plants in hot water has been found to be a simple, quick, and effective method for destroying infestations of the Japanese beetle in the soil about the roots of these plants. In preparing the plants for treatment, loose soil is removed, the roots are pruned, and the large clumps are divided as much as possible without causing injury to the plants. Small plants, bulbs, and root stocks may be treated in mass in wire baskets but the large plants should be handled individually.

The roots are immersed completely in water held at a constant temperature of 112° F. After the soil about the roots of the plants is heated throughout to the temperature of the bath, the plants are kept in the water for an additional period of 70 minutes. The water must be maintained at a temperature of 112° for the entire period of treatment. If the temperature falls below 111.5° the insect may not be destroyed; if it rises above 112.5° the plants may be injured. The insecticidal action is practically complete when the plants are removed from the hot water. The plants should be cooled slowly to room temperature and, in some cases, dried before being packed for storage or shipment.

The treatment has been applied successfully to the roots of many dormant or semidormant plants in the commercial nurseries. Among these plants were *Allium* sp., *Amsonia* sp., *Astilbe* sp., *Baptisia* sp., *Clematis* sp., *Convallaria* sp., *Coreopsis* spp., *Dahlia* spp., *Forsythia* sp., *Franklinia* sp., *Hemerocallis* spp., *Humulus* sp., *Iris* spp., *Liatris* sp., *Limonium* sp., *Lychnis* spp., *Lythrum* sp., *Paeonia* spp., *Phlox* spp., *Polygonum* sp., *Spiraea* spp., *Symphoricarpos* sp., *Syringa* sp., *Vaccinium* sp., and *Weigela* sp. The treatment killed or seriously retarded the subsequent growth of some plants among which were *Azalea* spp., *Canna* sp., *Chrysanthemum* spp., *Cibotium* sp., *Hydrangea* spp., *Lonicera* spp., *Picea* sp., and *Thuja* sp. Many of the species of plants which were severely injured under commercial conditions have been treated successfully experimentally. Consequently, it is probable that many of these doubtful varieties could be treated commercially if the methods of handling the stock after treatment were changed in the commercial nurseries.

WALTER E. FLEMING,
Entomologist, Bureau of Entomology.

OATS of Hardier Strains Needed for Fall Sowing in the Southern States

Fall-sown oats are grown in two widely separated sections of the United States—in the Southern States and in the Pacific Coast States. Although of considerable economic importance in both areas, the crop is more important in the South.

The growing of oats from fall seeding in the South is attended always with uncertainty owing to probable losses from winterkilling. In abnormally cold seasons there may be an almost complete loss of the crop from winterkilling. There is usually a reduction in the acreage of fall-sown oats following years of severe losses from winterkilling, and this acreage is partly replaced by spring oats. Spring-sown oats, however, usually are decidedly less productive, and the ratio between the acreages of spring-sown and fall-sown oats soon is restored. The wide annual fluctuation in the acreages of fall-sown oats in the South emphasizes the need for hardier varieties. The methods of meeting this need are by breeding and by exploration for new varieties.

The 16 Southern States, including Delaware, Maryland, West Virginia, Kentucky, Arkansas, Oklahoma, and those southward, grow approximately 5,000,000 acres of oats annually. Available information indicates that approximately half the total annual oat acreage in this region is fall-sown, and that in the area including the Carolinas, Georgia, Florida, Alabama, Mississippi, and Louisiana, fall-sown oats occupy a proportion varying from 50 to 75 per cent of the total oat acreage. The estimated fall-sown acreage for Texas varies from about 30 to over 50 per cent. In the more northern States of the southern group the spring-sown area always exceeds the fall-sown acreage.

throughout to the temperature of the bath, the plants are kept in the water for an additional period of 70 minutes. The water must be maintained at a temperature of 112° for the entire period of treatment. If the temperature falls below 111.5° the insect may not be destroyed; if it rises above 112.5° the plants may be injured. The insecticidal action is practically complete when the plants are removed from the hot water. The plants should be cooled slowly to room temperature and, in some cases, dried before being packed for storage or shipment.

The treatment has been applied successfully to the roots of many dormant or semidormant plants in the commercial nurseries. Among these plants were *Allium* sp., *Amsonia* sp., *Astilbe* sp., *Baptisia* sp., *Clematis* sp., *Convallaria* sp., *Coreopsis* spp., *Dahlia* spp., *Forsythia* sp., *Franklinia* sp., *Hemerocallis* spp., *Humulus* sp., *Iris* spp., *Liatris* sp., *Limonium* sp., *Lychnis* spp., *Lythrum* sp., *Paeonia* spp., *Phlox* spp., *Polygonum* sp., *Spiraea* spp., *Symphoricarpos* sp., *Syringa* sp., *Vaccinium* sp., and *Weigela* sp. The treatment killed or seriously retarded the subsequent growth of some plants among which were *Azalea* spp., *Canna* sp., *Chrysanthemum* spp., *Cibotium* sp., *Hydrangea* spp., *Lonicera* spp., *Picea* sp., and *Thuja* sp. Many of the species of plants which were severely injured under commercial conditions have been treated successfully experimentally. Consequently, it is probable that many of these doubtful varieties could be treated commercially if the methods of handling the stock after treatment were changed in the commercial nurseries.

WALTER E. FLEMING,
Entomologist, Bureau of Entomology.

OATS of Hardier Strains Needed for Fall Sowing in the Southern States

Fall-sown oats are grown in two widely separated sections of the United States—in the Southern States and in the Pacific Coast States. Although of considerable economic importance in both areas, the crop is more important in the South.

The growing of oats from fall seeding in the South is attended always with uncertainty owing to probable losses from winterkilling. In abnormally cold seasons there may be an almost complete loss of the crop from winterkilling. There is usually a reduction in the acreage of fall-sown oats following years of severe losses from winterkilling, and this acreage is partly replaced by spring oats. Spring-sown oats, however, usually are decidedly less productive, and the ratio between the acreages of spring-sown and fall-sown oats soon is restored. The wide annual fluctuation in the acreages of fall-sown oats in the South emphasizes the need for hardier varieties. The methods of meeting this need are by breeding and by exploration for new varieties.

The 16 Southern States, including Delaware, Maryland, West Virginia, Kentucky, Arkansas, Oklahoma, and those southward, grow approximately 5,000,000 acres of oats annually. Available information indicates that approximately half the total annual oat acreage in this region is fall-sown, and that in the area including the Carolinas, Georgia, Florida, Alabama, Mississippi, and Louisiana, fall-sown oats occupy a proportion varying from 50 to 75 per cent of the total oat acreage. The estimated fall-sown acreage for Texas varies from about 30 to over 50 per cent. In the more northern States of the southern group the spring-sown area always exceeds the fall-sown acreage.

Advantages of Fall Seeding

Where oats survive the winter, higher acre yields usually result from fall than from spring seeding. Results of varietal experiments in the South indicate that higher average yields usually are obtained from fall-sown than from spring-sown oats, even when no allowance is made for those years in which yields are reduced by winterkilling. Winter oats mature earlier and more uniformly, which often contributes to increased yield and quality. They are removed from the land earlier, permitting earlier seeding of the succeeding crop. Fall-sown oats make an excellent winter cover crop, and are useful for winter pasturage. They are especially satisfactory as pasturage for dairy cows. Fall-sown oats also contribute to a better distribution of farm labor. In some sections of the South cotton picking may interfere with seeding operations, but fall seeding allows more time and labor for other farm operations in the spring.

Fall-sown oats are less winter hardy than winter wheat or rye, and even in the South loss from winter injury is relatively frequent. In years when the oat production in the South is highest, winterkilling usually is not serious. Statistics on abandonment of fall-sown oats because of winterkilling are meager, but estimates on acreages of fall-sown oats harvested in nine States for the nine years from 1922 to 1930, inclusive, show that in three of these years (1925, 1928, and 1930) harvested acreages of fall-sown oats were below average, owing to winterkilling. This 9-year period is fairly typical, indicating clearly the relative uncertainty of the crop and the need for hardier varieties than are now grown.

New Varieties Needed

Two distinct types of cold-resistant oats are needed. The southern part of the winter-oat area, which is the most important, conforms closely to the Cotton Belt proper. Strains of the Red Rustproof and Fulghum varieties are now grown almost exclusively in this section. They are the only sorts at all adapted to it, being early maturing and somewhat resistant to heat during the flowering and ripening stages. On the other hand, they lack resistance to severe cold. Winter forms of Fulghum, considerably hardier than the parent variety, have been selected, but their susceptibility to crown rust limits their value. Resistance to crown rust should be combined with the cold resistance of these selections by breeding, and this is now under way.

Common varieties of true winter oats such as Winter Turf are best adapted to the northern part of the southern oat area in Virginia, Tennessee, and Arkansas. The discovery or development of earlier-maturing varieties still more winter-hardy than Winter Turf would make the crop much more certain throughout this region and also would make possible the advancement of the fall-sown oat area northward.

For a number of years the United States Department of Agriculture has conducted experiments to develop improved oat varieties for fall seeding. Several hundred strains have been introduced from foreign countries and tested under fall-sown conditions. So far, none has proved significantly superior to varieties previously grown. Thousands of selections have been made from the leading fall-sown varieties. As yet none of these has shown exceptional value, although several are somewhat better than parent varieties in yield and quality. More recently, numerous crosses between the more winter-resistant sorts have been made, and while tests have not been continued long enough to be entirely conclusive, the results are promising.

Two Promising New Varieties

The Lee and the Custis are two promising new varieties produced by crossbreeding. In these varieties the cold resistance of Winter Turf has been combined with the earliness and excellent kernel characters of Aurora. The new combinations seem particularly adapted to the northern part of the winter-oat area, and, so far as tested, are most promising. Further improvement should be possible through continued hybridization and selection.

Since a degree of winter hardiness not now available is highly desirable, a search for more hardy material from foreign sources must be continued. If found, such varieties, even though not adapted to the region in question, or though lacking agronomic value, can be used in breeding operations through combinations with adapted sorts.

The development of hardier winter-oat varieties can be accomplished only through careful, patient effort. It may not be possible to extend winter-oat culture northward to any extent with present material, but it should be possible to effect decided improvements for the southern part of the area. A winter oat 20 per cent more resistant to cold than any now available and resistant to crown rust and other diseases would go far toward increasing the certainty of oats in the Cotton Belt. This seems possible with material now available, although it must be recognized as a difficult and exacting undertaking requiring time and labor.

T. R. Stanton, *Senior Agronomist,*
F. A. Coffman, *Associate Agronomist,*
Bureau of Plant Industry.

ORANGES Impaired in Vitamin C Content by Arsenical Spray

The theory that the chemical composition of a growing plant can not be modified to a marked extent by environment because the character of a plant is determined primarily by heredity is being broken down as new facts are accumulated. An insufficient quantity of water or of any of the necessary elements in the soil will result in retardation of growth rate. There is a fairly constant ratio between the mineral elements in any one of our cereal grains, and it differs from that in the other grains. Also a fairly constant ratio exists between protein, starch, and fat or oil in any of these species.

There are many exceptions to the rule that the influence of environment is negligible. A well known example is the difference in chemical composition between wheat grown in the north-central part of the United States and that grown in the southeastern part. The hard wheat of the Dakotas is uniformly higher in protein than the soft wheat of southern Indiana. A more striking example of the rôle of external influences in modifying the composition of plant tissue has been brought about inadvertently in an attempt to control insect pests. An arsenical spray, containing a small amount of molasses as a bait, was found to be very effective in combating insect infestations. There is nothing in the development or appearance of the fruit from orange trees treated with this spray which would lead one to believe that they have been made, and while tests have not been continued long enough to be entirely conclusive, the results are promising.

Two Promising New Varieties

The Lee and the Custis are two promising new varieties produced by crossbreeding. In these varieties the cold resistance of Winter Turf has been combined with the earliness and excellent kernel characters of Aurora. The new combinations seem particularly adapted to the northern part of the winter-oat area, and, so far as tested, are most promising. Further improvement should be possible through continued hybridization and selection.

Since a degree of winter hardiness not now available is highly desirable, a search for more hardy material from foreign sources must be continued. If found, such varieties, even though not adapted to the region in question, or though lacking agronomic value, can be used in breeding operations through combinations with adapted sorts.

The development of hardier winter-oat varieties can be accomplished only through careful, patient effort. It may not be possible to extend winter-oat culture northward to any extent with present material, but it should be possible to effect decided improvements for the southern part of the area. A winter oat 20 per cent more resistant to cold than any now available and resistant to crown rust and other diseases would go far toward increasing the certainty of oats in the Cotton Belt. This seems possible with material now available, although it must be recognized as a difficult and exacting undertaking requiring time and labor.

T. R. Stanton, *Senior Agronomist,*
F. A. Coffman, *Associate Agronomist,*
Bureau of Plant Industry.

ORANGES Impaired in Vitamin C Content by Arsenical Spray The theory that the chemical composition of a growing plant can not be modified to a marked extent by environment because the character of a plant is determined primarily by heredity is being broken down as new facts are accumulated. An insufficient quantity of water or of any of the necessary elements in the soil will result in retardation of growth rate. There is a fairly constant ratio between the mineral elements in any one of our cereal grains, and it differs from that in the other grains. Also a fairly constant ratio exists between protein, starch, and fat or oil in any of these species.

There are many exceptions to the rule that the influence of environment is negligible. A well known example is the difference in chemical composition between wheat grown in the north-central part of the United States and that grown in the southeastern part. The hard wheat of the Dakotas is uniformly higher in protein than the soft wheat of southern Indiana. A more striking example of the rôle of external influences in modifying the composition of plant tissue has been brought about inadvertently in an attempt to control insect pests. An arsenical spray, containing a small amount of molasses as a bait, was found to be very effective in combating insect infestations. There is nothing in the development or appearance of the fruit from orange trees treated with this spray which would lead one to believe that they are abnormal. However, the juice from these oranges is unusually sweet, and the refreshing acid flavor is noticeably absent.

The Protein and Nutrition Division and Food Research Division of the Bureau of Chemistry and Soils cooperated with the Bureau of Plant Industry in a study to determine the nature of the modification in chemical composition and possible change in nutritive value of oranges from trees sprayed with lead arsenate. Oranges were obtained from trees that had been sprayed at least 10 times during the growing season, and compared with oranges of unsprayed trees from the same section.

Citric Acid Content Reduced

Chemical examination of the sprayed fruits showed that the amount of citric acid in the juice had been very markedly reduced and, although the amount of sugar in the juice was about normal, it was different from that of the ordinary orange. The term sugars is here used in the chemical sense, that is, to designate a group of compounds that are similar in composition and character. Cane or beet sugar ordinarily used in the household is only one of this group of compounds. The chemical composition of the fruit from sprayed trees accounts very well for the taste of the juice. The lower citric acid content would make the juice rather insipid, and the change in the character of the sugars would make it sweeter.

The juice from two lots of oranges was also fed to guinea pigs to determine whether any difference in vitamin C content could be detected. Briefly, the method consists in putting young guinea pigs on a diet free from vitamin C and determining what level of the material to be tested must be fed to prevent vitamin C deficiency. It was found that whereas a given daily dose of orange juice from normal fruit would produce a certain response in the experimental animals the dose had to be increased by more than 50 per cent to produce the same response when the juice of oranges from oversprayed trees was fed.

The changes in the oversprayed oranges determined by chemical studies are not significant from the standpoint of nutrition. All sugars that are utilized by the body are changed to the same compound and serve as a source of energy. Citric acid is not essential as a food, but its presence in the juice is very desirable, in that it imparts a flavor which is relished. However, oranges have become recognized as an important source of vitamin C, and a practice or condition which is shown to modify the amount of that vitamin is bound to receive serious consideration. Doctor Eddy, of Columbia University, has interpreted his recent work to indicate that we can benefit by increasing the vitamin C content of our diet. Because of its vitamin C content feeding of orange juice to infants is generally recommended by the medical profession.

No Danger of Arsenical Poisoning

From a scientific standpoint, the observation that a chemical element can modify the character of plant material is very interesting. How it acts has not been established, but it suggests new possibilities of determining some of the chemical changes taking place within the plant which have been difficult to unravel. In the control of insect pests there are other sprays which are effective and which do not change the appearance or taste of oranges. They will perhaps be used in preference to arsenates unless further studies similar to those described show them to be undesirable. The consumer, however, need not be apprehensive of danger of arsenic poisoning when eating oranges from sprayed trees, as chemical examination has shown that the juice and pulp are not contaminated with that element even in the most extreme cases of over spraying with arsenates.

E. M. NELSON,
Senior Chemist, Bureau of Chemistry and Soils.

OVEN Canning Tests Show Factors Governing Heat-Penetration Rates

With the development of stoves equipped with heat-regulating devices recommendations have been made by manufacturers that ovens may be used for home canning. The advantages of oven canning are that no extra equipment need be brought into the kitchen, and that the jars of food can be placed in the oven and given no further attention until the processing time is up. A brief study has been made in the Bureau of Home Economics on the rates of heat penetration in jars of different foods processed in an oven.

It has been found in these tests that the rates of heat penetration into jars of food in an oven vary with the consistency and initial temperature of the food and the temperature of the oven. Size of the jar is also a factor. The temperature inside of the jars rises most slowly in foods which are thick in consistency, and in which liquid can not circulate easily. This is illustrated by the rates of heat penetration into 40 jars of eight different kinds of food.

In these experiments the oven temperatures, 250° and 275° F., generally recommended for oven canning were used. Quart glass jars were used in all tests. Temperatures were registered by thermometers from the centers of the jars. In the following temperatures corrections have been made for the heat of the oven, which in these instances was 275°. Cubed squash, with an initial temperature of 108°, reached 175° in 70 minutes and 212° in 2 hours. Crushed squash with a higher initial temperature, 147°, required 95 minutes to reach 175°, and 2 hours to reach the boiling temperature. Sliced carrots with initial temperatures of 158° to 162° required 53 to 55 minutes to reach 212°; while similar jars with initial temperatures of 140° to 147° reached 212° in 65 to 75 minutes. Green beans cut into 1-inch lengths with initial temperatures of 180° to 183° reached 212° in 30 minutes and others with initial temperatures of 167° to 169° required 60 to 75 minutes to reach 212°. Spinach, with an initial temperature of 171° reached 212° in 78 minutes, whereas another jar with an initial temperature of 165° reached 212° in 95 minutes. Plums with an initial temperature of 163° reached 213° in 55 minutes, but a similar jar with an initial temperature of 133° required 86 minutes to reach 213°. Applesauce, with an initial temperature of 156°, reached boiling in 60 minutes, while with an initial temperature of 86° another jar required 95 minutes to reach the boiling point.

Preheating Effective

These figures show that heating the food before placing in the jars is very effective in reducing the period before temperatures near 212° F. are reached. If food is heated to boiling and placed in jars at once, the initial temperature is generally around 180°. Heat penetration was scribed show them to be undesirable. The consumer, however, need not be apprehensive of danger of arsenic poisoning when eating oranges from sprayed trees, as chemical examination has shown that the juice and pulp are not contaminated with that element even in the most extreme cases of over spraying with arsenates.

E. M. NELSON,
Senior Chemist, Bureau of Chemistry and Soils.

OVEN Canning Tests Show Factors Governing Heat-Penetration Rates With the development of stoves equipped with heat-regulating devices recommendations have been made by manufacturers that ovens may be used for home canning. The advantages of oven canning are that no extra equipment need be brought into the kitchen, and that the jars of food can be placed in the oven and given no further attention until the processing time is up. A brief study has been made in the Bureau of Home Economics on the rates of heat penetration in jars of different foods processed in an oven.

It has been found in these tests that the rates of heat penetration into jars of food in an oven vary with the consistency and initial temperature of the food and the temperature of the oven. Size of the jar is also a factor. The temperature inside of the jars rises most slowly in foods which are thick in consistency, and in which liquid can not circulate easily. This is illustrated by the rates of heat penetration into 40 jars of eight different kinds of food.

In these experiments the oven temperatures, 250° and 275° F., generally recommended for oven canning were used. Quart glass jars were used in all tests. Temperatures were registered by thermometers from the centers of the jars. In the following temperatures corrections have been made for the heat of the oven, which in these instances was 275°. Cubed squash, with an initial temperature of 108°, reached 175° in 70 minutes and 212° in 2 hours. Crushed squash with a higher initial temperature, 147°, required 95 minutes to reach 175°, and 2 hours to reach the boiling temperature. Sliced carrots with initial temperatures of 158° to 162° required 53 to 55 minutes to reach 212°; while similar jars with initial temperatures of 140° to 147° reached 212° in 65 to 75 minutes. Green beans cut into 1-inch lengths with initial temperatures of 180° to 183° reached 212° in 30 minutes and others with initial temperatures of 167° to 169° required 60 to 75 minutes to reach 212°. Spinach, with an initial temperature of 171° reached 212° in 78 minutes, whereas another jar with an initial temperature of 165° reached 212° in 95 minutes. Plums with an initial temperature of 163° reached 213° in 55 minutes, but a similar jar with an initial temperature of 133° required 86 minutes to reach 213°. Applesauce, with an initial temperature of 156°, reached boiling in 60 minutes, while with an initial temperature of 86° another jar required 95 minutes to reach the boiling point.

Preheating Effective

These figures show that heating the food before placing in the jars is very effective in reducing the period before temperatures near 212° F. are reached. If food is heated to boiling and placed in jars at once, the initial temperature is generally around 180°. Heat penetration was more rapid in an oven at 275° than at 250°. The use of pans beneath jars in an oven retards heat penetration. Jars were found to heat as well in an oven filled to capacity as when only one jar was present. In filling an oven to capacity about 2 inches of space for air circulation were left on all sides of the jars.

The maximum temperature reached in these experiments was 212° F. in all jars of food except some fruits containing a considerable quantity of sugar, and in them the temperatures were only slightly higher. Since jars in an oven are not fully sealed, the steam escapes as formed, and the temperature of the food can not rise above 212° unless a considerable quantity of sugar or some other material is present to increase the boiling point of the liquid. Sealing the jars to hold the steam and force up the temperature would result in broken jars.

Repeated research has shown that some of the bacteria causing spoilage in canned foods of low acidity are likely to survive the temperature of boiling water unless the heating period is very prolonged, and that some may survive indefinitely. The spores of *Clostridium botulinum*, which have been the cause of serious cases of food poisoning, are not destroyed by canning at 212° F. As the temperature reached in jars of nonacid foods in an oven does not go above 212°, this method of canning, like the water-bath method, is not recommended for the nonacid vegetables, meats, and shellfish, and may be questionable for low-acid fruits, such as pears, although it may be used safely for tomatoes and the more acid fruits. The use of higher temperatures, 240° to 250°, is recommended for adequate sterilization of foods low in acidity. These temperatures can be obtained in the interiors of the jars and cans only in steam-pressure cookers.

MABEL C. STIENBARGER,
Associate Specialist in Foods,
Bureau of Home Economics.

PAPER Industry Concerns Farmer as Raw-Material Producer and Consumer

The farmer's interest in paper is not limited to his daily newspaper. As in so many other products of industry, he has an interest in paper which is more comprehensive than that of any other class of citizens. The raw materials—wood, cotton, flax, hemp, and other plants—from which paper is made are all products of the farm or forests; all are grown, harvested, and marketed by the farmer, a term which here includes the forest-land owner. Finally, being the largest single group of citizens, the farmer as a class is among the larger users of paper. He is interested in newspapers, in books and in magazines, in the wrapping paper in which he gets his supplies, in the building paper and insulating board with which his house is sheathed, and finally in the paper on which his contracts, deeds, wills, and other legal documents are recorded for his and for posterity's protection. The papers used in the records preserved in the county courthouse, their durability, of what they are made, are all of vital importance to him.

Paper and board making afford a large market for certain classes of farm and forest products. Wood is by far the most generally used paper-making material. The farms and forests of this country supply annually more than 5,500,000 cords of wood for paper making, and in addition the farms supply 350,000 tons of straw for making box board, more rapid in an oven at 275° than at 250°. The use of pans beneath jars in an oven retards heat penetration. Jars were found to heat as well in an oven filled to capacity as when only one jar was present. In filling an oven to capacity about 2 inches of space for air circulation were left on all sides of the jars.

The maximum temperature reached in these experiments was 212° F. in all jars of food except some fruits containing a considerable quantity of sugar, and in them the temperatures were only slightly higher. Since jars in an oven are not fully sealed, the steam escapes as formed, and the temperature of the food can not rise above 212° unless a considerable quantity of sugar or some other material is present to increase the boiling point of the liquid. Sealing the jars to hold the steam and force up the temperature would result in broken jars.

Repeated research has shown that some of the bacteria causing spoilage in canned foods of low acidity are likely to survive the temperature of boiling water unless the heating period is very prolonged, and that some may survive indefinitely. The spores of *Clostridium botulinum*, which have been the cause of serious cases of food poisoning, are not destroyed by canning at 212° F. As the temperature reached in jars of nonacid foods in an oven does not go above 212°, this method of canning, like the water-bath method, is not recommended for the nonacid vegetables, meats, and shellfish, and may be questionable for low-acid fruits, such as pears, although it may be used safely for tomatoes and the more acid fruits. The use of higher temperatures, 240° to 250°, is recommended for adequate sterilization of foods low in acidity. These temperatures can be obtained in the interiors of the jars and cans only in steam-pressure cookers.

MABEL C. STIENBARGER,
Associate Specialist in Foods,
Bureau of Home Economics.

PAPER Industry Concerns Farmer as Raw-Material Producer and Consumer The farmer's interest in paper is not limited to his daily newspaper. As in so many other products of industry, he has an interest in paper which is more comprehensive than that of any other class of citizens. The raw materials—wood, cotton, flax, hemp, and other plants—from which paper is made are all products of the farm or forests; all are grown, harvested, and marketed by the farmer, a term which here includes the forest-land owner. Finally, being the largest single group of citizens, the farmer as a class is among the larger users of paper. He is interested in newspapers, in books and in magazines, in the wrapping paper in which he gets his supplies, in the building paper and insulating board with which his house is sheathed, and finally in the paper on which his contracts, deeds, wills, and other legal documents are recorded for his and for posterity's protection. The papers used in the records preserved in the county courthouse, their durability, of what they are made, are all of vital importance to him.

Paper and board making afford a large market for certain classes of farm and forest products. Wood is by far the most generally used paper-making material. The farms and forests of this country supply annually more than 5,500,000 cords of wood for paper making, and in addition the farms supply 350,000 tons of straw for making box board, thousands of tons of sugarcane bagasse for making building and insulating board. More than 100,000 tons of jute and manila for making strong wrapping paper and paper for wrapping electric cables are imported annually. The total quantity of paper and board (exclusive of building and insulating board on which no exact figures are available) made annually in this country is about 15,000,000 tons, or an average of approximately 250 pounds for each man, woman, and child.

The public usually thinks of the farmer as the producer of the world's food and clothing, but he is much more than that. The world has other important needs that are filled by some of the vegetable growth that to such a large extent has no use as food or as clothing. In the production of these two primary products, food and fiber, fully an equal weight of by-products, such as stalks of corn, sorghum, and sugarcane, straws of wheat, rye, oats, barley, cotton, flax, and hemp, and the limbs and tops of trees, must of necessity be grown, for which some profit-yielding outlet is desirable.

Cellulose in Farm Wastes

Cellulose, a chemical compound, usually of a fibrous nature, which forms the supporting structure of plants and which is made from starch and sugars in the wonderful laboratory of nature, by methods that man has not yet been able to imitate and about which he knows but little, is one of the most important constituents of waste straws, stalks, cotton, flax, and wood, both from the point of view of the composition of these wastes and of industrial use.

Cellulose constitutes from 35 to 55 per cent of the weight of all vegetable matter. It is very resistant to chemicals and to the action of air, light, and living organisms, and when freed from other plant constituents by the proper means or when produced in nature as a practically pure product, such as the fiber of cotton, flax, and hemp, it is capable of being made into a flexible, durable sheet, such as paper, or into a strong durable board such as building and insulating boards.

The farmer needs an outlet for the by-products of his primary industry of producing food, clothing, and fuel, and the paper and board industries afford this outlet, although it must be borne in mind that these industries can at present use but a small fraction of the raw materials that the farm produces and has available in the form of wood, straws, and stalks. The development of more efficient and cheaper processes for pulping farm products, and the cutting out of the principal commercial forests in certain parts of the country, may bring about a better demand for such by-products as straws and stalks, and for farm timber for paper and board making. To what extent or how rapidly this may develop can not be foretold, but it seems probable that the demand for paper and pulp boards of all kinds will steadily increase. If board manufacturing plants are established in the farming districts to supply the local demand for such products, there is promise that the farmer will profit through the disposal of a large part of what has long been waste.

Farmer's Interest in Paper Materials

The interest of the farmer in supplying the raw material for paper is direct and clearly evident. His interest in paper as a user, as a citizen, is quite as evident but perhaps indirect. For every dollar he receives for paper-making raw materials he must on the average pay out $3, or more, for the finished paper, made therefrom, and while he does not use more than his proportionate share of paper, the cost of that share in the form of insulating boards, building boards, fiber containers, newspapers, legal documents, magazines, farm journals, Government and State publications, school books, experiment-station publications, and the thousand and one other uses of paper runs into millions of dollars. He is directly concerned with the suitability of the paper for the purpose for which he uses it. In newspapers he has but to-day's interest except that in common with other citizens he is interested in the preservation of the historical record unfolding day by day in the papers. In wrapping paper he is interested only so far as it serves its purpose satisfactorily.

In books, Government and State reports and bulletins the paper should not be needlessly heavy and bulky, the surface of the paper and the printing should not be injurious to the eyes and, since some of them at least are worth keeping, they should be reasonably durable and of good appearance. It is, however, in the papers used for record purposes, wills, deeds, and other documents of historic, financial, and legal importance, that in common with other citizens the farmer is peculiarly interested. These papers must be of the utmost durability, permanent if such a thing is possible; they must be of a quality that will withstand the frequent handling to which such documents are subjected during hundreds of years; they must not discolor, but must remain clear and legible. And since with the passing time such documents accumulate, they should be as light as is consistent with durability under the conditions of use and storage to which they are subjected. The literature and the history of civilization would have been lost if the earliest written records had been committed to paper of the quality of newspapers of to-day instead of to papers of great durability.

Thus we see that the farmer has an interest as the producer of the raw materials for making paper, and as a user of the finished product. It is because of this preponderant interest of the farmer in paper that the Department of Agriculture for more than 40 years has given attention to paper-making raw materials, to paper making, and to the rational use of paper, and has conducted research work and supplied technical and economic information on these subjects.

F. P. VEITCH, *Principal Chemist,*
T. D. JARRELL, *Associate Chemist,*
Bureau of Chemistry and Soils.

PASTURE Improvement the First Need in Strengthening South's Livestock Industry If we grant, as most agricultural authorities do, that an expansion in livestock production throughout the Southeastern States is warranted, then the first consideration is, What are the additional animals going to eat? If there were at present, in this particular section of the United States, an oversupply of forage and other animal feeds agitation for an increase in the number of livestock unqualified and unassociated with related agricultural programs, might be warranted. Such is not the case. The natural pastures are unproductive, and the people long accustomed to growing cotton are not educated in the methods of efficient feed production.

is quite as evident but perhaps indirect. For every dollar he receives for paper-making raw materials he must on the average pay out $3, or more, for the finished paper, made therefrom, and while he does not use more than his proportionate share of paper, the cost of that share in the form of insulating boards, building boards, fiber containers, newspapers, legal documents, magazines, farm journals, Government and State publications, school books, experiment-station publications, and the thousand and one other uses of paper runs into millions of dollars. He is directly concerned with the suitability of the paper for the purpose for which he uses it. In newspapers he has but to-day's interest except that in common with other citizens he is interested in the preservation of the historical record unfolding day by day in the papers. In wrapping paper he is interested only so far as it serves its purpose satisfactorily.

In books, Government and State reports and bulletins the paper should not be needlessly heavy and bulky, the surface of the paper and the printing should not be injurious to the eyes and, since some of them at least are worth keeping, they should be reasonably durable and of good appearance. It is, however, in the papers used for record purposes, wills, deeds, and other documents of historic, financial, and legal importance, that in common with other citizens the farmer is peculiarly interested. These papers must be of the utmost durability, permanent if such a thing is possible; they must be of a quality that will withstand the frequent handling to which such documents are subjected during hundreds of years; they must not discolor, but must remain clear and legible. And since with the passing time such documents accumulate, they should be as light as is consistent with durability under the conditions of use and storage to which they are subjected. The literature and the history of civilization would have been lost if the earliest written records had been committed to paper of the quality of newspapers of to-day instead of to papers of great durability.

Thus we see that the farmer has an interest as the producer of the raw materials for making paper, and as a user of the finished product. It is because of this preponderant interest of the farmer in paper that the Department of Agriculture for more than 40 years has given attention to paper-making raw materials, to paper making, and to the rational use of paper, and has conducted research work and supplied technical and economic information on these subjects.

F. P. Veitch, *Principal Chemist,*
T. D. Jarrell, *Associate Chemist,*
Bureau of Chemistry and Soils.

PASTURE Improvement the First Need in Strengthening South's Livestock Industry

If we grant, as most agricultural authorities do, that an expansion in livestock production throughout the Southeastern States is warranted, then the first consideration is, What are the additional animals going to eat? If there were at present, in this particular section of the United States, an oversupply of forage and other animal feeds agitation for an increase in the number of livestock unqualified and unassociated with related agricultural programs, might be warranted. Such is not the case. The natural pastures are unproductive, and the people long accustomed to growing cotton are not educated in the methods of efficient feed production.

There are no natural grasslands in this part of the country. It was originally an almost completely forested area, and from Texas eastward to the Atlantic Ocean, below the southern boundary of Tennessee, there is hardly one native grass or legume that ranks high as a pasture plant. All of the productive pastures are a result of the introduction of plant immigrants such as Lespedeza and Bermuda, carpet, and Dallis grasses. (Figs. 128 and 129.) The coarse forage also comes from other introduced plants such as Japanese cane, sorghum, and Napier grass.

It is recognized that the forage and livestock programs are interdependent. Increase in forage production would be futile without a corresponding increase in livestock. A surplus of forage, however, would be less disastrous than a forage deficiency caused by an ill-considered increase in the number of animals to be fed. An abundant supply of

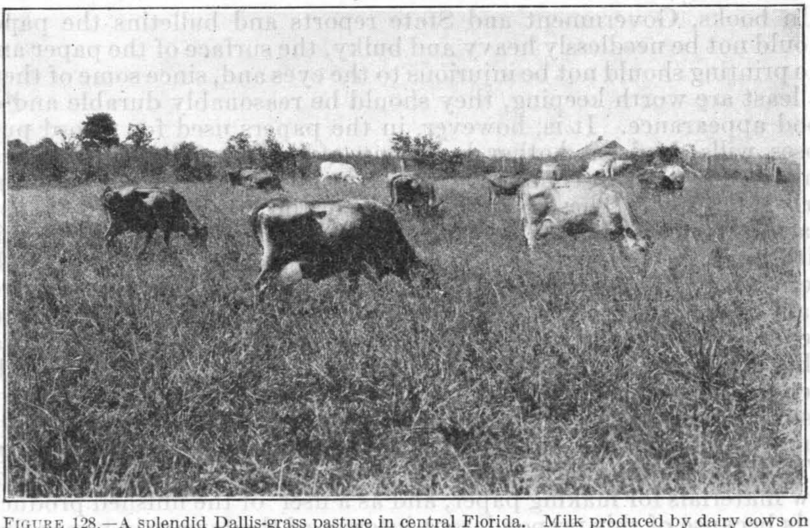


FIGURE 128.—A splendid Dallis-grass pasture in central Florida. Milk produced by dairy cows on such pasture can be sold at a profit

cheap raw material is one of the prerequisites of success in any manufacturing industry. The bovine animal is manufacturing either meat or milk from the feed available. If that feed is expensive, the cost of the product is often so high as to prevent marketing it at a profit. The first thing to do in the South, therefore, is to make sure of an abundance of cheap feed. Pasture supplies such a feed. It costs less than harvested feed because of the low labor cost in connection with pastures. In Pennsylvania[8] the labor cost of a ton of digestible nutrients in the form of silage was $21.21; as pasture the labor cost was only 66 cents. One ton of digestible nutrients supplied by a grain rotation on cultivated land, involved a labor cost of $15.94 as against the labor cost of 66 cents for the same quantity of feed from pasture. These results are from a farm-cost survey made in 1921 in Lancaster County, Pa.

Southern Pastures Must Be Improved

To be productive, southern pastures must be improved by the introduction of carpet grass, Bermuda grass, Dallis grass, Bahia grass,

[8] WHITE, J. W. and HOLBEN, F. J. DEVELOPMENT AND VALUE OF KENTUCKY BLUE-GRASS PASTURES. Penn. Agri. Expt. Sta. Bul. 195., p. 15, 1925.

Lespedeza, white clover, black medic, etc. Unimproved or natural pastures will support cattle only at the rate of 1 animal unit for each 10 acres of pasture, and the gains made on such pastures are small. Improved pastures, on the other hand, will support cattle at the rate of 1 animal for each 2 acres, and the gains are almost double those on the natural pastures. The census of 1920 reported only 20 per cent of the southern pastures as improved. Until this situation is remedied there can be no extensive development of the livestock industry in these States.

The total pasture acreage in the eight States of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, and South Carolina according to the agricultural census of 1925 was 22,411,162 acres. If 20 per cent of this were improved pasture there would be

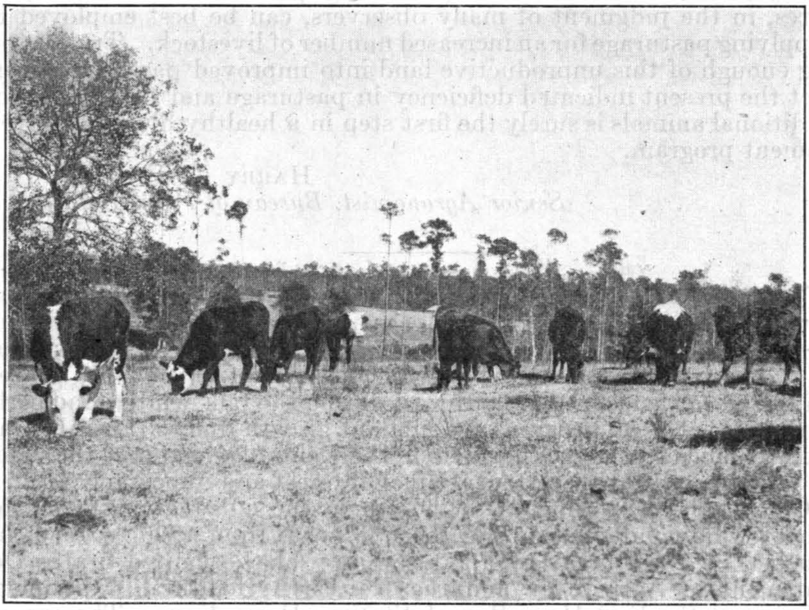


FIGURE 129.—Beef cattle grazing an improved pasture on typical flat-woods land in the coastal plain of Mississippi. Good pasture was obtained here on cut-over land by the introduction of carpet grass and Lespedeza

4,482,232 acres of such pasture, capable of supporting 2,241,116 animal units for the grazing season of approximately nine months. The remaining 17,928,930 acres of unimproved pasture would graze 1,792,893 animal units at the rate of 10 acres for each cow or the equivalent thereof. There was, therefore, according to the census in 1925, pasturage in these States sufficient for a total of 4,034,009 mature cattle or their equivalent.

Animal Surplus in Relation to Pasture

Disregarding the question of whether there is normally sufficient harvested feed to care for these 4,000,000 animal units during the remaining three months of the year, what is the relation of the actual supply of livestock of these States to the available pasture? Referring again to the 1925 census and considering only grazing animals (cattle, horses, sheep, and goats), we find a total of 5,604,003 animal units[9] reported in these eight States. It would appear that there is already a surplus of over 1,500,000 animal units in these States from the standpoint of available pasturage. Can anything be more obvious than the necessity of correcting this situation before we encourage an increase in the number of livestock in this region?

Potential pasture land in this part of the United States is indicated by the area of cut-over and burned-over land. It is estimated that there are over 110,000,000 acres of this class of land in the States under consideration.

The unproductive condition of this immense body of land constitutes a serious handicap to the prosperity of these States. Some of this land should undoubtedly be reforested, and a very small part might be profitably devoted to cultivated crops. A large portion of this 110,000,000 acres, in the judgment of many observers, can be best employed in supplying pasturage for an increased number of livestock. Transforming enough of this unproductive land into improved pastures to correct the present indicated deficiency in pasturage and to provide for additional animals is surely the first step in a healthy livestock development program.

HARRY N. VINALL,
Senior Agronomist, Bureau of Plant Industry.

PASTURING Winter Wheat In Central Plains Pays If Properly Managed

The utilization of winter wheat as a pasture is a common practice in the central Great Plains area. Thousands of cattle were grazed on the wheat fields of the Southwest during the fall, winter, and early spring of 1929–30 because of abundant growth due to favorable fall rains. The effect of pasturing upon the yields of wheat and the value of wheat pasture are matters of much interest and importance.

Cooperative experiments to determine the effect of pasturing on wheat were conducted during the five years from 1926 to 1930, inclusive, by the Bureau of Plant Industry of the United States Department of Agriculture and the Kansas Agricultural Experiment Station at the Fort Hays Branch Station, Hays, Kans. The experiments involved (1) the reduction of excessive growth and tillering by pasturing, (2) the effect of grazing on yields of wheat, and (3) the carrying capacity of wheat pasture. Two series of plots were used, one on land where wheat followed fallow, and the other on cropped land where wheat followed wheat. The crop usually makes a heavy growth after fallow, but less growth is expected on wheat-stubble land, on which most of the wheat in western Kansas is sown. The plots were sown the last week in September, the optimum time to seed wheat in the Hays section for grain yields.

The wheat sown on fallow land usually made an excessive growth, particularly in the spring. Pasturing such wheat judiciously for a period of 45 days in the fall resulted in an average gain of 2.9 bushels per acre. When the wheat was pastured moderately for 105 days and not later than April 15, there was an average gain in yield of 2.3 bushels. When it was grazed to the ground for 120 days during fall

[9] The number of animals was reduced to equivalent units by the process customarily used. See Department of Agriculture Yearbook for 1923, p. 321.

horses, sheep, and goats), we find a total of 5,604,003 animal units[9] reported in these eight States. It would appear that there is already a surplus of over 1,500,000 animal units in these States from the standpoint of available pasturage. Can anything be more obvious than the necessity of correcting this situation before we encourage an increase in the number of livestock in this region?

Potential pasture land in this part of the United States is indicated by the area of cut-over and burned-over land. It is estimated that there are over 110,000,000 acres of this class of land in the States under consideration.

The unproductive condition of this immense body of land constitutes a serious handicap to the prosperity of these States. Some of this land should undoubtedly be reforested, and a very small part might be profitably devoted to cultivated crops. A large portion of this 110,000,000 acres, in the judgment of many observers, can be best employed in supplying pasturage for an increased number of livestock. Transforming enough of this unproductive land into improved pastures to correct the present indicated deficiency in pasturage and to provide for additional animals is surely the first step in a healthy livestock development program.

Harry N. Vinall,
Senior Agronomist, Bureau of Plant Industry.

PASTURING Winter Wheat In Central Plains Pays If Properly Managed The utilization of winter wheat as a pasture is a common practice in the central Great Plains area. Thousands of cattle were grazed on the wheat fields of the Southwest during the fall, winter, and early spring of 1929–30 because of abundant growth due to favorable fall rains. The effect of pasturing upon the yields of wheat and the value of wheat pasture are matters of much interest and importance.

Cooperative experiments to determine the effect of pasturing on wheat were conducted during the five years from 1926 to 1930, inclusive, by the Bureau of Plant Industry of the United States Department of Agriculture and the Kansas Agricultural Experiment Station at the Fort Hays Branch Station, Hays, Kans. The experiments involved (1) the reduction of excessive growth and tillering by pasturing, (2) the effect of grazing on yields of wheat, and (3) the carrying capacity of wheat pasture. Two series of plots were used, one on land where wheat followed fallow, and the other on cropped land where wheat followed wheat. The crop usually makes a heavy growth after fallow, but less growth is expected on wheat-stubble land, on which most of the wheat in western Kansas is sown. The plots were sown the last week in September, the optimum time to seed wheat in the Hays section for grain yields.

The wheat sown on fallow land usually made an excessive growth, particularly in the spring. Pasturing such wheat judiciously for a period of 45 days in the fall resulted in an average gain of 2.9 bushels per acre. When the wheat was pastured moderately for 105 days and not later than April 15, there was an average gain in yield of 2.3 bushels. When it was grazed to the ground for 120 days during fall

[9] The number of animals was reduced to equivalent units by the process customarily used. See Department of Agriculture Yearbook for 1923, p. 321.

and spring and as late as April 20, the average loss in acre yield was 3.2 bushels. When the wheat was grazed to the ground from the time it started growth in the spring until April 15, there was a loss in average yield of 1.7 bushels. On fallowed land, pasturing begun after April 15 caused an average reduction in acre yield of 6.3 bushels. (Fig. 130.)

Effects of Grazing on Cropped Land

On cropped land, where there was less stored moisture than in the fallowed land, there was an average loss in yield of from 1.2 to 5.3 bushels per acre, depending on the severity and time of pasturing. In two of the five years moderate pasturing in fall and spring gave an increase in yield on cropped land. These were both seasons of plentiful moisture, and conditions were similar to those for the fallow land in ordinary years.

The experiments, verified by observations, lead to the conclusion that wheat sown in a well-prepared seed bed with a plentiful supply of subsoil moisture and making excessive growth may be benefited by moderate pasturing. When the season is dry and growth is limited, grazing reduces the yields of wheat.

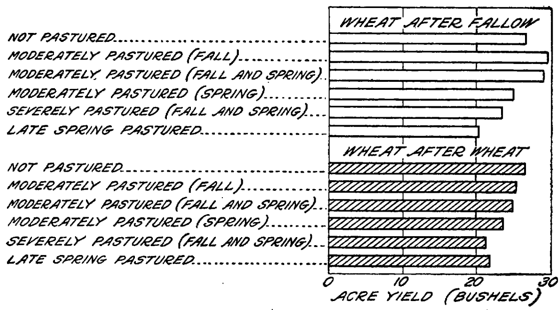


FIGURE 130.—Average acre yield of winter wheat after different intensities of pasturing, grown on fallow and on fall-plowed wheat land at Hays, Kans.

The grazing capacity of winter wheat varies from year to year, depending on the growth of the crop. Wheat may or may not make sufficient growth for pasturing in the fall, but usually some pasture can be expected in the spring. The carrying capacity is always lowest in the fall, when as many as 5 to 7 acres may be needed to feed one horse or cow. In a season of abundant moisture, wheat sown early in September may make enough fall growth so that half of the above acreage will be sufficient for one animal unit. In the early spring from 2 to 3 acres will carry one cow while in the late spring after April 15 from one-half to 1 acre is enough if the wheat has not been pastured previously.

Wheat sown in late September in a well-prepared seed bed with plenty of reserve moisture usually makes a good top growth. The crop may be grazed moderately during November and part of December, the livestock then being withdrawn until the wheat makes new growth in the early spring. From the beginning of spring growth the wheat may be pastured moderately until about April 15, the exact date depending on the crop development and varying somewhat with season. The greatest injury from pasturing occurs after April 15, because by this time the wheat stems have jointed and the animals destroy the young heads.

Early Grazing Desirable

Grazing should be started in the early spring when the wheat begins to grow. Livestock will then graze more evenly than when turned into the fields after the wheat has attained some height. In the latter case the animals tend to graze in spots, which causes unevenness of growth and maturity. In general, grazing delays maturity from one to five days, depending on the severity and length of the pasturing period.

Limited observations show that grazing reduces the number of tillers in wheat. When wheat tillers too profusely early in a season of abundant moisture, a reduction in number of tillers appears to be beneficial. When the stand is thin and growth limited, a reduction in number of tillers is decidedly harmful. During a dry season, soil blowing also may be induced by overpasturing.

Pasturing sometimes reduces the yields of wheat but the feed value of the pasture may compensate wholly or in part for grain losses. Chemical analyses made at the Kansas experiment station show that green wheat is high in its content of protein and mineral nutrients. The greatest value of wheat pasture is as a supplement to other feeds, rather than as the only source of feed, although it is largely used for the latter purpose before other pastures are available.

Green wheat may cause occasional bloating in cattle. The danger seems to be greatest when the green wheat is pastured while wet with dew or rain.

A. F. SWANSON,
Associate Agronomist, Bureau of Plant Industry.

PEANUT Seed May be Kept for Several Years Under Proper Conditions

The effect of age on the vitality of peanut seed, and its storage under conditions that do not impair its quality, are factors of prime importance, because it is often desirable to keep peanut seed for extended periods.

Recent experimental work carried on in cooperation with the South Carolina Agricultural Experiment Station has yielded facts showing the effect of age and storage under different conditions on the vitality of peanut seed. The results of this work are of considerable practical importance to growers of peanuts, as they indicate that peanut seed if stored under proper conditions may be kept for several years without serious impairment of its vitality. Heretofore there has been hesitancy about using peanut seed more than 1 or 2 years old.

Stock of known character was used for growing a supply of seed of the Improved Spanish and Valencia varieties at the Pee Dee Experiment Station, Florence, S. C., in 1921, and each year thereafter through 1926. The peanuts were well cured in the stack before picking, but they were not otherwise dried. The seed was stored in the shells in muslin bags placed in large galvanized cans in a storeroom in Washington, D. C. The temperature conditions were normal for an office building, with winter temperatures of about 70° to 72° F., and summer temperatures as determined by weather conditions. These cans were covered with rather loose-fitting hinged lids and had no special equipment for ventilation.

All lots of seed were fumigated every spring and autumn with carbon bisulphide for the control of insects.

turned into the fields after the wheat has attained some height. In the latter case the animals tend to graze in spots, which causes unevenness of growth and maturity. In general, grazing delays maturity from one to five days, depending on the severity and length of the pasturing period.

Limited observations show that grazing reduces the number of tillers in wheat. When wheat tillers too profusely early in a season of abundant moisture, a reduction in number of tillers appears to be beneficial. When the stand is thin and growth limited, a reduction in number of tillers is decidedly harmful. During a dry season, soil blowing also may be induced by overpasturing.

Pasturing sometimes reduces the yields of wheat but the feed value of the pasture may compensate wholly or in part for grain losses. Chemical analyses made at the Kansas experiment station show that green wheat is high in its content of protein and mineral nutrients. The greatest value of wheat pasture is as a supplement to other feeds, rather than as the only source of feed, although it is largely used for the latter purpose before other pastures are available.

Green wheat may cause occasional bloating in cattle. The danger seems to be greatest when the green wheat is pastured while wet with dew or rain.

A. F. Swanson,
Associate Agronomist, Bureau of Plant Industry.

PEANUT Seed May be Kept for Several Years Under Proper Conditions

The effect of age on the vitality of peanut seed, and its storage under conditions that do not impair its quality, are factors of prime importance, because it is often desirable to keep peanut seed for extended periods.

Recent experimental work carried on in cooperation with the South Carolina Agricultural Experiment Station has yielded facts showing the effect of age and storage under different conditions on the vitality of peanut seed. The results of this work are of considerable practical importance to growers of peanuts, as they indicate that peanut seed if stored under proper conditions may be kept for several years without serious impairment of its vitality. Heretofore there has been hesitancy about using peanut seed more than 1 or 2 years old.

Stock of known character was used for growing a supply of seed of the Improved Spanish and Valencia varieties at the Pee Dee Experiment Station, Florence, S. C., in 1921, and each year thereafter through 1926. The peanuts were well cured in the stack before picking, but they were not otherwise dried. The seed was stored in the shells in muslin bags placed in large galvanized cans in a storeroom in Washington, D. C. The temperature conditions were normal for an office building, with winter temperatures of about 70° to 72° F., and summer temperatures as determined by weather conditions. These cans were covered with rather loose-fitting hinged lids and had no special equipment for ventilation.

All lots of seed were fumigated every spring and autumn with carbon bisulphide for the control of insects.

Germination Counts Made

In the spring of 1922 a portion of seed of each variety was removed from storage and shelled by hand just prior to planting. Germination counts of these were made for the purpose of determining the original vitality of the seed. The germination of the 1921-grown Valencia seed at the beginning of the experiment in 1922 was 52.5 per cent. In 1927 the same stock gave a germination of 47.2 per cent.

Beginning with the crop season of 1924, lots of seed of the two varieties from each year's crop were removed from storage in the spring, shelled by hand, and two 90-foot rows of each were planted at the Pee Dee Experiment Station. Germination counts and yields were recorded. This test was repeated each year through 1927, after which time the work was discontinued.

There was but little difference in the yield of peanuts and hay from the old and new seed. With the Improved Spanish variety there was a drop in germination from 84.5 per cent in 1922 to 56.4 per cent in 1927, but this decline was slow until after the seed had reached the age of 3 years. Yield records for this variety showed less variation than the germination tests, but varied rather widely from year to year, probably on account of different weather conditions. The work would seem to justify the conclusion that peanut seed may be kept under favorable conditions for from three to four years without serious loss of vitality. There is apparently no reason why good lots of peanut seed can not be kept in storage to guard against seed shortage during any particular season.

The Cold Storage of Peanut Seed

The cold storage of peanuts is an important commercial practice, and the effect, if any, of this kind of storage on peanuts to be used for seed purposes is one of some moment to the industry. The work upon which these conclusions are based was a cooperative enterprise with the Clemson Agricultural College at the Pee Dee Experiment Station, Florence, S. C.

Beginning with crop material of 1921, including the African, Improved Spanish, Jumbo, Spanish, and Valencia varieties, lots of each, in both the shelled and unshelled states, were placed in cold storage at 32° and 40° F. and in common storage at about 70° F. The seed was removed from storage during the spring of 1922 and planted at the Pee Dee station, and germination records were taken. Similar work was carried on with seed grown during the years 1922 to 1926, inclusive.

The average germination, over a period of four years, of the five varieties where the seed was stored shelled at 32°, 40°, and 70° F. was practically the same. That of the unshelled seed was a little higher, but also about the same for all storage temperatures. The yields over a period of three years for the different storage temperatures were practically alike, but the seed stored unshelled gave a slightly higher yield. This is probably due to the protection of the shell during storage.

It would seem that the cold storage of peanut seed is not injurious and that the seed keeps somewhat better when stored unshelled.

J. H. Beattie,
Associate Horticulturist, Bureau of Plant Industry.

PINE-BEETLE Control Costs Reduced Through Logging and Salvage The western pine beetle has been considered for many years as the most destructive insect enemy of mature western yellow-pine timber in the virgin forests of California and Oregon. During the last decade its destructive activities have been particularly severe in southern Oregon and northern California, where, on an area of 1,600,000 acres, over two and a half billion board feet of merchantable timber has been destroyed—a loss conservatively estimated as amounting to $10,000,000.

The Federal timber-managing agencies, such as the Forest Service and Indian Service, in cooperation with the private timber owners of the region, have carried on a determined campaign since 1921 to control this pest, using the methods which have been devised by the Bureau of Entomology.

These control methods consist of running strip surveys through the affected forests during the fall, winter, and spring and locating the infested trees. At these seasons the beetles are all to be found within the bark of trees attacked during the preceding summer. Then treating crews go through the woods, fell the designated trees, and peel or burn the bark containing the injurious beetle larvae and new adults. The timber of the felled trees is, for the most part, only slightly damaged by the treatment and, except for some lowering in grade by blue stain, is still merchantable. However, the trees cut in this work are so widely scattered through the forest as to make their salvage difficult and uneconomical. So they are usually left in the woods to rot. The cost of the treating work has averaged about $4.50 per tree containing a thousand board feet of lumber (M b. m.).

Control Work Should Pay Its Way

The control work has had the effect of reducing the losses but has not permanently stopped the inroads of the beetles, and the work has to be repeated to secure more lasting benefits. In any case it is doubtful whether more than temporary relief can be secured from such work until growth conditions are improved in the forests or the old mature trees removed through cutting operations. It is therefore essential that the control work should currently pay its way.

It will be readily seen that the control methods used in the past have been cumbersome and expensive. The timber cut in the work has usually been a total loss and the timber owner received no returns except in a reduction of subsequent killing. In view of the results secured, it is thought that if the timber to be cut is valued at less than the cost of the treating work, control can not be profitably undertaken.

For some years the Bureau of Entomology has advocated logging the beetle-killed timber, burning the insect-infested bark at the mill, and salvaging the lumber as a means of reducing the net cost of the control operation. But only a few serious attempts have been made to put this method into practice.

In 1923 the Weyerhaeuser Timber Co. sold the logs left in the woods, after the completion of a beetle-control job, to a contractor who removed many of the best logs to a mill some 5 miles distant and paid $1 per M b. m. for the logs taken. But the undertaking was not profitable to the contractor, and further salvage work of this character was abandoned.

Later this same company purchased a small portable sawmill and tried salvaging the logs felled in beetle-control work by sawing them into lumber in the woods and hauling the lumber to the nearest market. Because the felled trees were scattered over a very large area, necessitating frequent moves of the portable mill, this operation also proved unprofitable.

In the fall of 1928 the Pickering Lumber Co., having contracted to carry on beetle control on a unit of 15,000 acres in Modoc County, Calif., comprising both the company's and national forest lands, decided to salvage this timber and burn the infested bark at the mill. A small mill was constructed near the center of the area. The infested trees were located by a survey crew in the usual manner. The trees were felled and then, with tractors and fair-lead arches equipped with

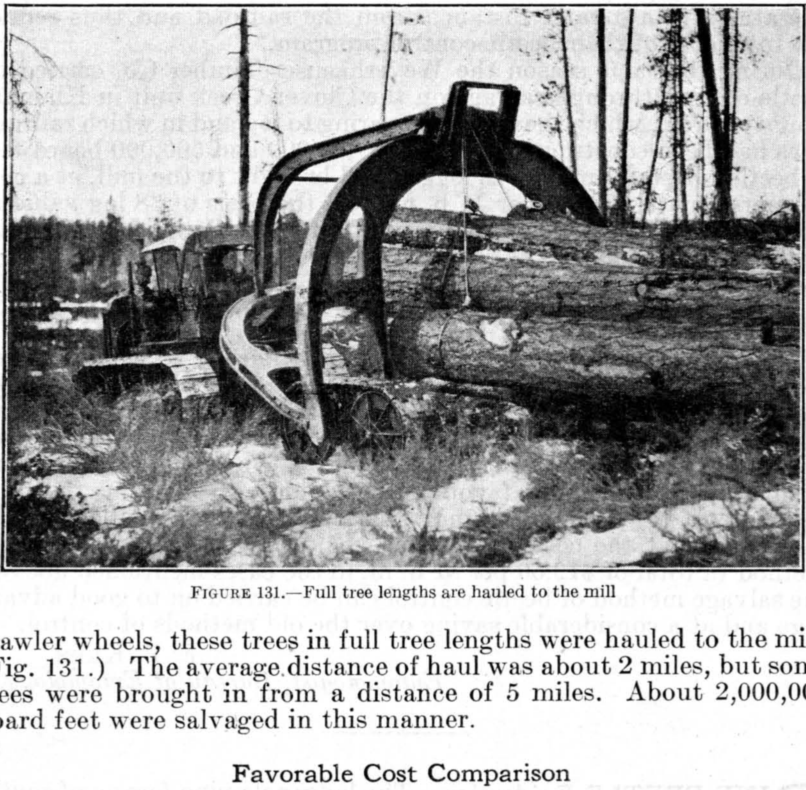


FIGURE 131.—Full tree lengths are hauled to the mill

crawler wheels, these trees in full tree lengths were hauled to the mill. (Fig. 131.) The average distance of haul was about 2 miles, but some trees were brought in from a distance of 5 miles. About 2,000,000 board feet were salvaged in this manner.

Favorable Cost Comparison

The costs of this operation compared very favorably with the cost of the old burning method and the treatment was every bit as satisfactory from the standpoint of disposing of the bark beetles. Where the old method would have involved a direct outlay of $4.50 per M b. m. of timber treated, with no return from salvage, the method used cost $6.58 per M b. m. to bring the trees to the mill, with an estimated value at the mill of $8 per M b. m., or a net profit on the operation of $1.42 per M b. m. This cost does not include any charge for the investment in the mill, which in this case was to be used for other purposes later, and which in any case would be a charge against the milling costs.

40442°—31——28

In the spring of 1929 the McCloud River Lumber Co., having extended their logging railroad into a unit of their holdings in Modoc County, in preparation for logging, decided to log out the beetle-infested trees within easy reach of their lines as a beetle-control measure. Tractors were again used, and for a distance of 2 miles on either side of the tracks the beetle-killed trees were skidded to decking points along the railroad and about 1,000,000 board feet of salvaged timber sent to the mill. On the remainder of the area the usual method of peeling and burning was resorted to, and 2,000,000 board feet were treated and left in the woods. The cost of the burning method was $4.45 per M b. m., while the felling and skidding operation cost $5.20 per M b. m., with a return of at least $8 per M b. m. for the timber so salvaged, leaving a net profit of $2.80 per M b. m. It is probable that this company could well have afforded to extend the salvage operations to a greater distance from the railroad and thus reduce the total cost of their beetle-control program.

During the same season the Weyerhaeuser Timber Co. carried on beetle control through salvage on the Clover Creek unit in Klamath County, Oreg., which they were preparing to log and in which railroad lines had been constructed. Between 400,000 and 500,000 board feet of beetle-infested timber was logged and brought to the mill, at a cost of approximately $5.06 per M b. m. On the basis of $8 log value at the mill, this operation yielded a profit of $2.94 per M b. m. for the timber treated.

Value of Salvaging Timber Demonstrated

The results of this work show very plainly that where beetle-infested trees can be salvaged and brought to a mill to be cut into lumber, the cost of the control work can be greatly reduced. It has been demonstrated that under certain conditions it is feasible to send tractors out for 4 and 5 miles to bring in the infested logs. In fact, this radius may even be extended under favorable conditions. So long as the total logging cost to the mill does not exceed the value of the logs at the mill plus what the cost of treating would have been under the old method (a total of $12.50 per M b. m. in the cases mentioned above), the salvage method of beetle control can be carried on to good advantage and at a considerable saving over the old methods of control.

F. P. Keen,
Entomologist, Bureau of Entomology.

PINE-BEETLE Epidemics Are Now Controlled by Burning Standing Trees

The lodgepole pine forests of southeastern Idaho, western Wyoming, and northern Utah are experiencing a mountain-pine-beetle infestation which has threatened to develop into a serious epidemic within the region and to spread into the valuable timber stands of the Yellowstone National Park. This infestation was first discovered in 1927 on a few mature trees of the national forests in southeastern Idaho and western Wyoming. Realizing the seriousness of such epidemics the Forest Service and the Bureau of Entomology immediately began to plan artificial control measures.

In the spring of 1929 the McCloud River Lumber Co., having extended their logging railroad into a unit of their holdings in Modoc County, in preparation for logging, decided to log out the beetle-infested trees within easy reach of their lines as a beetle-control measure. Tractors were again used, and for a distance of 2 miles on either side of the tracks the beetle-killed trees were skidded to decking points along the railroad and about 1,000,000 board feet of salvaged timber sent to the mill. On the remainder of the area the usual method of peeling and burning was resorted to, and 2,000,000 board feet were treated and left in the woods. The cost of the burning method was $4.45 per M b. m., while the felling and skidding operation cost $5.20 per M b. m., with a return of at least $8 per M b. m. for the timber so salvaged, leaving a net profit of $2.80 per M b. m. It is probable that this company could well have afforded to extend the salvage operations to a greater distance from the railroad and thus reduce the total cost of their beetle-control program.

During the same season the Weyerhaeuser Timber Co. carried on beetle control through salvage on the Clover Creek unit in Klamath County, Oreg., which they were preparing to log and in which railroad lines had been constructed. Between 400,000 and 500,000 board feet of beetle-infested timber was logged and brought to the mill, at a cost of approximately $5.06 per M b. m. On the basis of $8 log value at the mill, this operation yielded a profit of $2.94 per M b. m. for the timber treated.

Value of Salvaging Timber Demonstrated

The results of this work show very plainly that where beetle-infested trees can be salvaged and brought to a mill to be cut into lumber, the cost of the control work can be greatly reduced. It has been demonstrated that under certain conditions it is feasible to send tractors out for 4 and 5 miles to bring in the infested logs. In fact, this radius may even be extended under favorable conditions. So long as the total logging cost to the mill does not exceed the value of the logs at the mill plus what the cost of treating would have been under the old method (a total of $12.50 per M. b. m. in the cases mentioned above), the salvage method of beetle control can be carried on to good advantage and at a considerable saving over the old methods of control.

F. P. Keen,
Entomologist, Bureau of Entomology.

PINE-BEETLE Epidemics Are Now Controlled by Burning Standing Trees The lodgepole pine forests of southeastern Idaho, western Wyoming, and northern Utah are experiencing a mountain-pine-beetle infestation which has threatened to develop into a serious epidemic within the region and to spread into the valuable timber stands of the Yellowstone National Park. This infestation was first discovered in 1927 on a few mature trees of the national forests in southeastern Idaho and western Wyoming. Realizing the seriousness of such epidemics the Forest Service and the Bureau of Entomology immediately began to plan artificial control measures.

Timber Values Requiring Protection

Lodgepole pine in the national forests of this region has a large commercial value for railroad ties, mine and farm timbers, poles, etc. There is an even greater intangible value in the scenic forests of Yellowstone Park, Jackson's Hole, and summer resorts in the region. In addition to the actual destruction of scenic and commercial timber stands by the pine beetles, fire hazards are created through the vast accumulation of dead timber on the forest floor. Fires inevitably follow beetle epidemics—fires that are practically impossible to check while burning in such areas. Artificial control measures were necessary, therefore, to prevent the destruction of timber and the creation of fire hazards which might result in a complete devastation of the forests following the epidemic.

FIGURE 132.—Showing mountain-pine-beetle work on inside of bark

Practicability of Spraying Demonstrated

At first an attempt was made to control this outbreak by removing the infested timber for ties and farm timbers. As little progress was made in this manner, forest officers were detached from their regular duties in 1928 and assigned to actual control work. The methods of control in common use at that time were to fell the trees and either to peel the bark from the infested portion of the bole, exposing the immature insects to predatory insects and mammals, or to cut the trees into logs which were piled and burned. As both of these methods were laborious and expensive, a more economical procedure was sought. Representatives of the Forest Service and the Bureau of Entomology in Montana had previously found that if a light fuel oil were sprayed upon thin-barked lodgepole pine and then fired the temperature would be raised sufficiently to destroy the insects beneath the bark. (Fig. 133.)

FIGURE 133.—Burner spraying oil on infested trees

Forest officers working on the present infestation set about developing a field application of the method, believing it offered the economical procedure desired.

Though in 1928 the spraying equipment used was not satisfactory, it demonstrated the effectiveness and practicability of the method. Marked improvements have been made in this equipment, and in 1930 very satisfactory results were secured. An air-pressure hand pump, commonly used for spraying small fruit trees, was adopted. With a tank pressure of 25 or 30 pounds, a 9-foot light, steel-tubing extension, and a specially developed nozzle, trees could be sprayed to a height of 32 feet. The fire carries considerably above the actual height of the oil and it was possible to destroy the beetles in practically all of the infested trees. A light fuel oil, commonly called gas oil, was used. Its most important specification, besides being clean, of low viscosity, and with a flash point not exceeding 160° (PM), is that it burns freely in the open. Control projects in this region are instituted very early in the spring, while the snow is still on the ground, or at least the forest is very wet, to avoid all possible danger of fire spreading. In the spring of 1930 approximately 70,000 trees were treated by this method, at a cost of considerably less than $1 per tree, including regular forest officers' time.

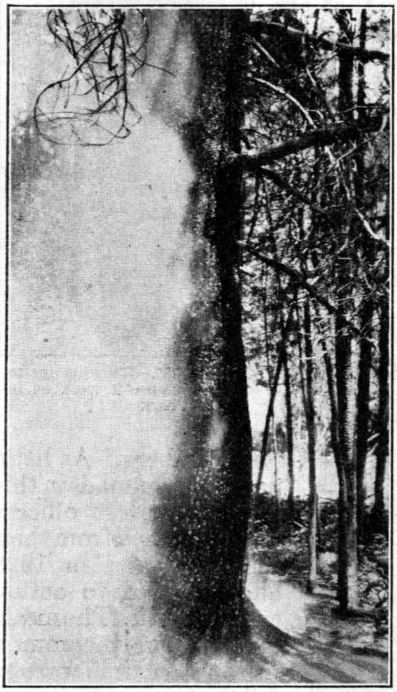


FIGURE 134.—Burned infested tree. White specks on black bark shows effective burn

Unless unknown areas of infestation are discovered, it is thought that the worst of the epidemic in the five national forests affected has been broken. It is necessary to treat some trees in the spring of 1931 within the areas previously covered by control, but the task will not be so great as that just completed. The potential danger of infested trees is large; sufficient beetles often emerge from one tree to attack and kill from three to five additional ones. It is therefore safe to assume that as a result of the 1930 operation, from 200,000 to 350,000 trees were saved from insect attack by the beetles which would have emerged from the trees treated and that a practically uncontrollable epidemic has been averted.

C. B. Morse,
Assistant Regional Forester, Forest Service.

PISTACHE Nuts Are a Promising Crop for Some Sections of U. S. During the last six years imports of the pistache nut into the United States have averaged 1,134,627 pounds of shelled nuts a year with an average yearly value of $501,564. In view of the fact that this is one of the most expensive nuts on our market, selling at times as high as $1 a pound wholesale, Forest officers working on the present infestation set about developing a field application of the method, believing it offered the economical procedure desired.

Though in 1928 the spraying equipment used was not satisfactory, it demonstrated the effectiveness and practicability of the method. Marked improvements have been made in this equipment, and in 1930 very satisfactory results were secured. An air-pressure hand pump, commonly used for spraying small fruit trees, was adopted. With a tank pressure of 25 or 30 pounds, a 9-foot light, steel-tubing extension, and a specially developed nozzle, trees could be sprayed to a height of 32 feet. The fire carries considerably above the actual height of the oil and it was possible to destroy the beetles in practically all of the infested trees. A light fuel oil, commonly called gas oil, was used. Its most important specification, besides being clean, of low viscosity, and with a flash point not exceeding 160° (PM), is that it burns freely in the open. Control projects in this region are instituted very early in the spring, while the snow is still on the ground, or at least the forest is very wet, to avoid all possible danger of fire spreading. In the spring of 1930 approximately 70,000 trees were treated by this method, at a cost of considerably less than $1 per tree, including regular forest officers' time.

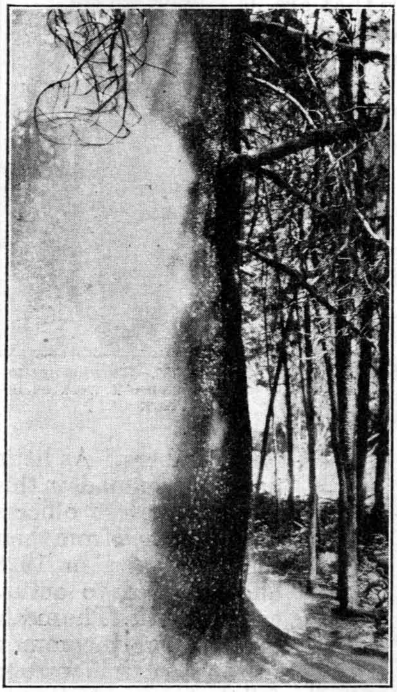


FIGURE 134.—Burned infested tree. White specks on black bark shows effective burn

Unless unknown areas of infestation are discovered, it is thought that the worst of the epidemic in the five national forests affected has been broken. It is necessary to treat some trees in the spring of 1931 within the areas previously covered by control, but the task will not be so great as that just completed. The potential danger of infested trees is large; sufficient beetles often emerge from one tree to attack and kill from three to five additional ones. It is therefore safe to assume that as a result of the 1930 operation, from 200,000 to 350,000 trees were saved from insect attack by the beetles which would have emerged from the trees treated and that a practically uncontrollable epidemic has been averted.

C. B. MORSE,
Assistant Regional Forester, Forest Service.

PISTACHE Nuts Are a Promising Crop for Some Sections of U. S. During the last six years imports of the pistache nut into the United States have averaged 1,134,627 pounds of shelled nuts a year with an average yearly value of $501,564. In view of the fact that this is one of the most expensive nuts on our market, selling at times as high as $1 a pound wholesale, an increase in importations from 547,673 pounds in 1924 to 1,491,339 pounds in 1929 suggests that the American people are rapidly acquiring a taste for this nut. Syria, Italy, India, and Persia, in the order named, are the four countries from which we get most of our supply, this nut being grown in the Mediterranean region and Asia Minor. In the United States it is used mainly in confections and ice cream, and should it become as popular with us as it is with the people in those countries where it is now grown, our importations would continue to increase.

Botanists mention some 17 species of the genus Pistacia, but the edible nuts of commerce are produced by *Pistacia vera*. This species grows wild in scattered areas through the foothills of the mountains which border southern and eastern Russian Turkestan. Although the

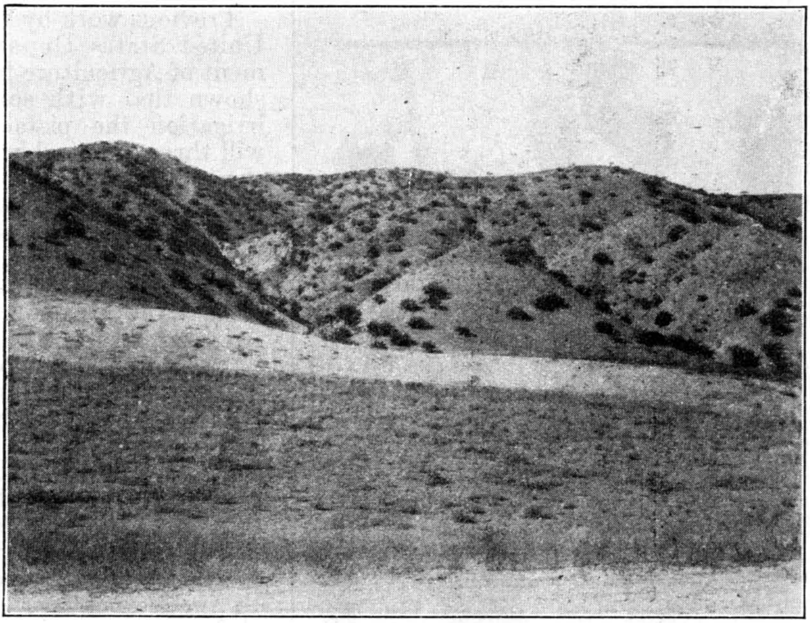


FIGURE 135.—Pistache trees (*Pistacia vera*) growing wild in the foothills near Djalalabad, Turkestan, U. S. S. R.

nuts from these wild trees are much smaller than from those of the cultivated forms, they are highly prized by the nomadic Kirghiz who live in these hills, who gather the nutritious nuts as they ripen and use them as part of their diet during the winter when food is scarce. The trees also supply firewood for these people, who cut them frequently, with the result that the trees are kept low and bushlike in appearance. Although the fruits of these wild trees are small, they are of interest in the United States for testing as stocks and for use in breeding for better varieties. (Fig. 135.)

The pistache nut is such an old fruit, dating back some 3,500 years, that the historians vary in opinion as to the area in which it was first native. The cultivated varieties of *Pistacia vera* probably originated in Syria, Asia Minor, and Palestine, and later were disseminated throughout the hot, dry region of the Mediterranean. The cultivated pistache is widely grown in Sicily. Although the trees have been known and cultivated for centuries, few varieties have been produced, compared with the almond or walnut, both of which have numerous easily recognized varieties. Botanists suggest that the long-continued practice of grafting the best varieties of *P. vera* on the wild *P. teribinthus* may explain the relatively few varieties in Sicily. The writer found that with few exceptions the pistache orchards of Persia were composed of *P. vera* seedlings and that there was considerable variability in the size and shape of the nuts borne on the different seedlings. Although many of them were producing nuts inferior in size to those already introduced into the United States from other countries, some were as good or better in size. Buds of these better types were brought back to this country. (Fig. 136.)

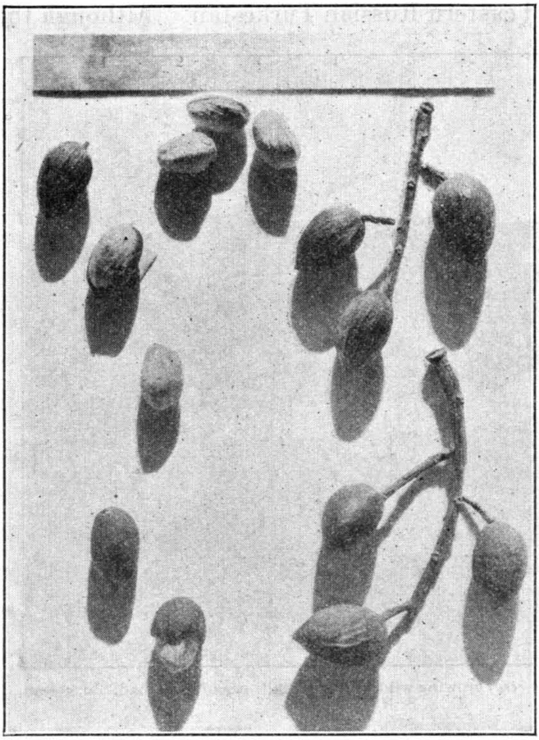


FIGURE 136.—Large, well-developed pistache nuts from Persia. Bud wood of this tree was successfully introduced into the United States last year

Previous work by the United States Department of Agriculture has shown that with some irrigation the pistache will thrive admirably in the early peach belt of the Sierra Nevada foothills in California; also that it promises to be successful in parts of Texas, New Mexico, and Arizona.

The American people, however, are abundantly supplied with other kinds of nuts, and to be successful the campaign to educate the public to eat the pistache nut must be backed by a product that will appeal to the consumer. In their native country the pistache nuts are roasted and salted. A large part of the crop is consumed in this manner. There is a limited sale of salted pistache nuts in the United States, but the small size of the nuts, added to the fact that many of them have closed shells that are difficult to open has discouraged the consumer. The American orchardist must be supplied with varieties that are large, and his crop, when harvested, must contain a high percentage of split nuts.

Splitting of the shell is apparently not a hereditary character; but according to many Persian growers, this tendency is associated with growth. When conditions are favorable for rapid growth of the seed or kernel, a greater percentage of splitting is noticed.

No final explanation has been reached, but various points may be noted. The pistache is dioecious; that is, the male, or staminate flowers, and the female, or pistillate flowers, are born on different trees. In Sicily it has been observed that drupes of *Pistacia vera* on trees planted nearest to the male, or staminate *P. terebinthus* trees had a tendency to open their valves at the top, owing to the large size of the seed within, suggesting the influence of pollination. When not pollinated, the shells develop and to all appearance are normal except that they are empty, no seed or kernel developing within. Investigations in the United States have shown that developing apple seeds favors the development of the fruit, the largest apples containing the greater number of well-developed seeds. The question of the right kind of pollenizer is apparently important. In Persia, where the fruit has been grown for centuries, there is still a great deal of confusion on this point, and in some orchards many of the trees bear a heavy crop of seedless shells.

Although during his studies in Persia the writer heard many conflicting opinions as to the best methods of orchard culture for pistache, it was interesting to note that in one or two cases, where the grower

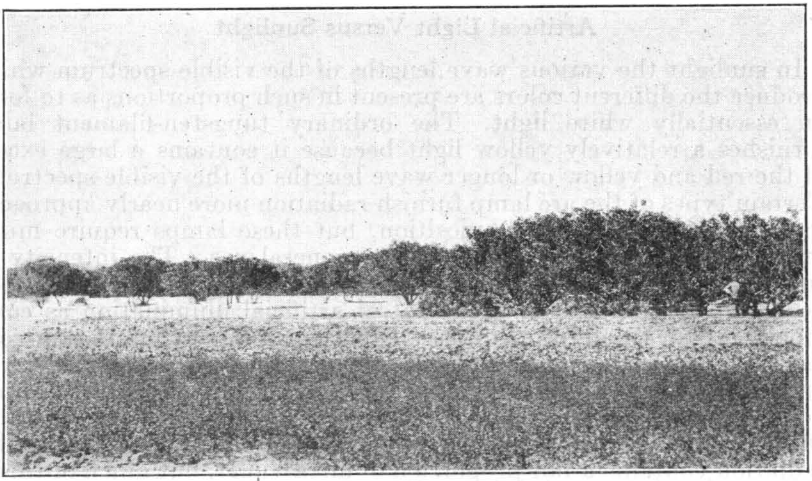


FIGURE 137.—Well-cared-for pistache orchard at Ardekan, Persia. Trees in the old orchard on the right are over 100 years old

was fertilizing, cultivating, and irrigating, the terminal growth was approximately five or six times as great, the percentage of split nuts was considerably higher, the crop was much larger, and the trees much healthier looking than in near-by orchards that received only average care. (Fig. 137.) Observations in Persia suggest that although the pistache will survive in some sections when given a minimum of care, it responds readily to good orchard management and that there is a correlation between tree growth and fruitfulness, just as there is in many other fruits.

Trials to date indicate that pistache trees will thrive in some sections of the United States, and when, after introduction and trial, it has been shown that with the better types of these nuts and good orchard management a product can be grown which appeals to the American consumer, there will be an opportunity for good fruit growers in these sections to develop the pistache industry.

W. E. WHITEHOUSE,
Horticulturist, Bureau of Plant Industry.

PLANT Growth by Artificial Light Has Possibilities Green plants owe their characteristic color to the presence in their tissues of the complex pigment known as chlorophyll. With the aid of this pigment the leaves and other green parts of the plant, by utilizing a portion of the energy received from sunlight, are able to abstract the minute quantities of carbon dioxide present in the air and from it build up starch, sugar, and other organic substances. It is hardly possible to overestimate the importance of this process of photosynthesis, for without it all forms of life would cease to exist. Likewise, formation of flower and fruit, including of course the seed, is not only of the greatest importance to the plant itself in assuring its perpetuation but also may furnish highly valuable elements of nutrition for other forms of life. In these reproduction processes of the plant, light again plays an important rôle. The kind and the amount of illumination also affect plant growth in various other ways.

Artificial Light Versus Sunlight

In sunlight the various wave lengths of the visible spectrum which produce the different colors are present in such proportions as to form an essentially white light. The ordinary tungsten-filament lamp furnishes a relatively yellow light because it contains a large excess of the red and yellow or longer wave lengths of the visible spectrum. Certain types of the arc lamp furnish radiation more nearly approaching that of sunlight in composition, but these lamps require much attention and are hardly suitable for general use. The intensity of sunlight is quite variable, of course, but as a rule the daily average is very high in comparison with that of artificial illumination as commonly used. In addition to the visible portion, solar radiation contains a large component of longer wave lengths, the so-called infra-red or heat rays. The radiant energy from the tungsten-filament lamp, however, contains less than 15 per cent of the visible wave lengths, the remainder being mostly infra-red radiation. At high altitudes solar radiation contains a fair proportion of ultra-violet, but much of this is lost in the atmosphere before the sunlight reaches sea level. The tungsten-filament lamp supplies only a small component of the ultra-violet wave lengths lying immediately above the upper end of the visible spectrum. The quartz mercury-vapor lamp radiation is rich in ultra-violet and in certain bands in the violet and blue-green regions, but is deficient in the red wave lengths. The use of this lamp is attended with some danger. A type of lamp combining the essential features of the tungsten-filament and the mercury-vapor lamps has recently come on the market.

Although it appears that no single portion of the visible spectrum is essential for the growth of plants, differences in composition of the light may considerably affect the character of the growth. The longer red and yellow wave lengths promote photosynthesis, but if present in excess, as in the tungsten lamp, they tend to cause undue elongation of the stem, at least in some plants. The shorter wave lengths of the blue and violet region favor a more stocky type of growth. In many plants, however, the color or spectral composition of the light does not seem to have very striking effects on flowering and fruiting if other conditions are favorable. Ultra-violet radiation seems not to be essential for normal plant growth and so far as now known appears to be harmful when used in sufficient dosage to produce pronounced effects.

Effect of Relative Length of Day and Night

It has recently come to be recognized that change in length of day with season and with latitude may have profound effects on the seasonal behavior of plants and on their natural distribution. The effects of day length on flowering and fruiting are particularly striking. In some plants flowering and fruiting are induced by exposure to relatively long days, but in another large group of plants this form of development is favored by short days, while a third group is able to flower and fruit under a wide range in day length. In general, plants that normally flower in late spring or in summer respond best to long days and are known as long-day plants. (Fig. 138.) Conversely, plants normally flowering in the fall or winter respond to short days and are spoken of as short-day plants. With conditions otherwise favorable, short-day plants may be forced out of season by artificially shortening the daylight period. Thus poinsettia will readily flower in midsummer if the early morning or late afternoon light is excluded so that the plant receives only about 10 hours of illumination daily. Similarly, by using electric light to prolong the daily light period to 15 hours or longer, coneflower may be made to flower in midwinter in the greenhouse. (Fig. 139.) Many long-day plants may be thus forced during the short days of winter with artificial light of low intensity if the plants also receive the benefit of good natural illumination.

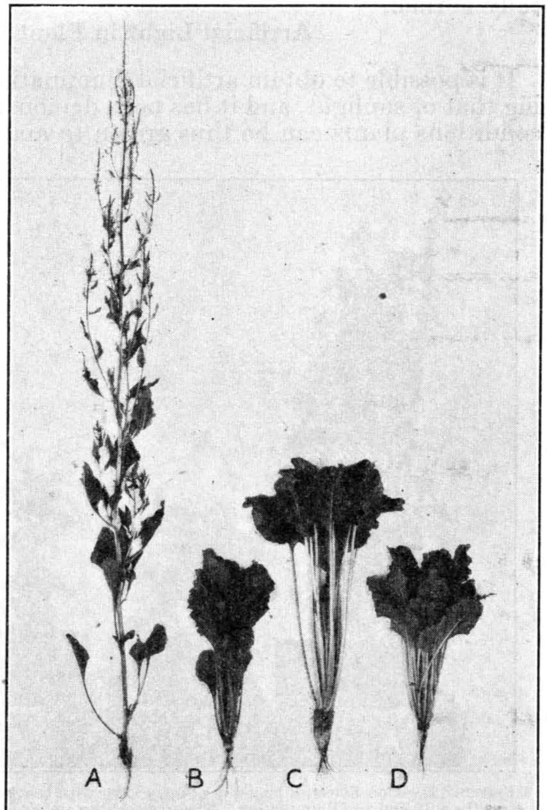


FIGURE 138.—Sugar beet, a long-day plant, grown in greenhouse. The treatments were: (A) Day artificially lengthened to 16 hours with electric light and cool temperature; (B) natural winter day and cool temperature; (C) artificially lengthened day and warm temperature; (D) natural winter day and warm temperature. The beet, usually biennial in habit, behaves as an annual when exposed to a very long day combined with a cool temperature

It is an interesting fact that reducing the daily illumination by darkening the plants for several hours in the middle of the day fails to induce flowering in short-day plants, and usually it also fails to retard flowering in the long-day type of plants. Moreover, by means of artificial light it has been found that short alternating periods of light and darkness ranging in length from six hours down to five seconds all affect long-day and short-day plants about the same as the midday darkening so far as concerns flowering and fruiting. However, as the alternations of light and darkness are progressively shortened the growth and general nutrition of the plant suffer to an increasing and surprising degree until the alternations have been reduced to about one minute. Curiously enough, as the alternations are further shortened the vigor and growth of the plant rapidly increase and with alternating periods of light and darkness of five seconds again become practically normal.

Artificial Light in Plant Culture

It is possible to obtain artificial illumination of intensities approaching that of sunlight, and it has been demonstrated that under suitable conditions plants can be thus grown to maturity with artificial light.

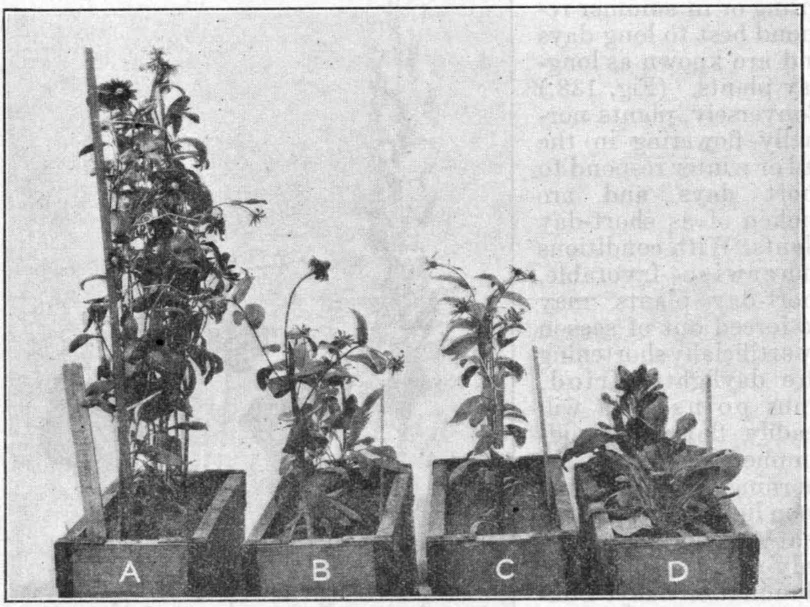


FIGURE 139.—Coneflower, a long-day plant, grown with continuous and intermittent electric light as the only source of illumination. The treatments were: (A) Continuous light; (B) 1-hour alternations of light and darkness; (C) 15-minute alternations; (D) 12-hour alternations. With 15 hours or more of uninterrupted light daily both the growth and flowering are normal; 12 hours of unbroken light give a stocky growth but delay flowering; while the very short light periods result in normal flowering but weak growth and symptoms of malnutrition

However, for reasons previously pointed out, such plants are not likely to be entirely normal in appearance, and from a practical standpoint the cost involved would be prohibitive. With further improvement in the efficiency of the electric light and in its composition, together with decreased cost of electric current, there may come a time when artificial light can be used to advantage in special cases for growing plants of relatively high value. There is at present special need of a type of lamp that will furnish illumination approximating sunlight in composition. By taking full advantage of sunlight there would seem to be possibilities in the practical use of artificial light to prolong the daily light period during the winter months for the purpose of forcing plants of the long-day type in the greenhouse. It is necessary, however, to give proper consideration to the specific requirements of the particular plant involved with respect to light, temperature, and other environmental factors.

W. W. Garner,
Principal Physiologist, Bureau of Plant Industry.

POISONOUS-PLANT Study on Livestock Ranges Involves Many Problems

The early explorers found immense droves of bison grazing the Great Plains and the Rocky Mountains. Deer, elk, and antelope were countless over the entire western ranges. Forage was abundant when cattle, horses, and sheep began to utilize the range. Stock raising proved so profitable, however, that the range was soon overstocked. It was so overgrazed in places that much of the natural forage was destroyed. Vigorous native or introduced plants of little or no forage value, and also poisonous plants, multiplied in great numbers on trails and ranges. Sometimes range land was put under the plow and later abandoned. As a result, poisonous plants, such as whorled milkweek and other native weeds, as well as foreign weeds, increased greatly. Animals were trailed, bedded, or grazed on such ranges, and often ate the harmful plants. Study of the poisonous plants by the botanist, the chemist, and the animal experimenter became necessary.

Many discoveries about poisonous plants are made by stockmen. The botanist first consults stockmen who are known to give constant attention to the animals on their ranges and who know the plants eaten and the results. The botanist with a general knowledge of plants, and a particular knowledge of poisonous plants, should be able to judge most situations quickly. However, knowledge of poisonous plants is not yet so extensive that he does not need all the help obtainable.

Difficulties in Poison-Plant Study

Moreover, the botanist can not often be present where animals are sick and dying from poisonous plants. Often he receives word from the range after the animals are dead and the evidence of what they have been eating is destroyed. Usually, when plans are made to observe animals on a suspected area, none of the animals are sick. Cattlemen and horsemen are more apt to find cattle or horses dead than sick on the range, since they have much territory to cover. Sheep, from the nature of their handling on the range in bands under the constant care of their herders, are more easily found and the conditions accompanying the poisoning studied. It is of importance to both stockman and student that the symptoms of plant poisoning be known, since distinct species of poisonous plants may and often do produce different results. Knowing the symptoms, one can often detect the plant causing them, and suggest the remedy.

Most of the exact knowledge of the action of poisonous plants on animals is gained at the experiment stations. An examination of the stomach contents of a poisoned animal may reveal the harmful plant. More frequently it does not, because digestion has destroyed the identity of the plant. The chemist usually sends stomach specimens to the botanist for identification before making his analysis.

The far Western States have numberless mountains, valleys, plains, and plateaus with a diversified flora. The botanist sometimes finds give proper consideration to the specific requirements of the particular plant involved with respect to light, temperature, and other environmental factors.

W. W. GARNER,
Principal Physiologist, Bureau of Plant Industry.

POISONOUS-PLANT Study on Livestock Ranges Involves Many Problems

The early explorers found immense droves of bison grazing the Great Plains and the Rocky Mountains. Deer, elk, and antelope were countless over the entire western ranges. Forage was abundant when cattle, horses, and sheep began to utilize the range. Stock raising proved so profitable, however, that the range was soon overstocked. It was so overgrazed in places that much of the natural forage was destroyed. Vigorous native or introduced plants of little or no forage value, and also poisonous plants, multiplied in great numbers on trails and ranges. Sometimes range land was put under the plow and later abandoned. As a result, poisonous plants, such as whorled milkweek and other native weeds, as well as foreign weeds, increased greatly. Animals were trailed, bedded, or grazed on such ranges, and often ate the harmful plants. Study of the poisonous plants by the botanist, the chemist, and the animal experimenter became necessary.

Many discoveries about poisonous plants are made by stockmen. The botanist first consults stockmen who are known to give constant attention to the animals on their ranges and who know the plants eaten and the results. The botanist with a general knowledge of plants, and a particular knowledge of poisonous plants, should be able to judge most situations quickly. However, knowledge of poisonous plants is not yet so extensive that he does not need all the help obtainable.

Difficulties in Poison-Plant Study

Moreover, the botanist can not often be present where animals are sick and dying from poisonous plants. Often he receives word from the range after the animals are dead and the evidence of what they have been eating is destroyed. Usually, when plans are made to observe animals on a suspected area, none of the animals are sick. Cattlemen and horsemen are more apt to find cattle or horses dead than sick on the range, since they have much territory to cover. Sheep, from the nature of their handling on the range in bands under the constant care of their herders, are more easily found and the conditions accompanying the poisoning studied. It is of importance to both stockman and student that the symptoms of plant poisoning be known, since distinct species of poisonous plants may and often do produce different results. Knowing the symptoms, one can often detect the plant causing them, and suggest the remedy.

Most of the exact knowledge of the action of poisonous plants on animals is gained at the experiment stations. An examination of the stomach contents of a poisoned animal may reveal the harmful plant. More frequently it does not, because digestion has destroyed the identity of the plant. The chemist usually sends stomach specimens to the botanist for identification before making his analysis.

The far Western States have numberless mountains, valleys, plains, and plateaus with a diversified flora. The botanist sometimes finds areas having plants radically different from those seen elsewhere. Occasionally the plants are nearly all new to the botanist. Although this adds interest to the work, it increases its difficulty. Until recently the West has not been well supplied with local botanies and floras. This has often obliged the botanist to make a more general botanical study of a region. To identify properly a single species, sometimes the entire group of many species has to be studied and described.

More than 100 Poisonous Plants Studied

Yet the knowledge of poisonous plants as related to livestock is increasing. For more than 25 years the Department of Agriculture has maintained field experiment stations in the West for studying the action of poisonous plants on livestock. Chemists in the department have worked on poisonous-plant problems for a longer period. The State experiment stations also study these problems. Department botanists have inspected the mountains of 13 of the far Western States. This inspection extends eastward to the Black Hills of South Dakota and the mountains of western Texas. It includes nearly 80 national forests and hundreds of stock ranches.

More than 100 poisonous plants have been investigated in the United States west of the Mississippi River. Many plants that were suspected of being poisonous have been tested and found harmless. Among these poisonous plants are 5 species of death camas, 13 larkspurs, 28 of the pea family, 3 parsnips, 6 laurels (heaths), 11 of the true milkweeds, 2 tobaccos, and perhaps a score of the composite family. The pea family, which contains so many valuable forage plants, also produces a large proportion of the poisonous plants. It is the locos, belonging to the pea family, that have been studied the longest. The locos cover more territory and cause more damage to livestock than any other group of plants. The larkspurs are the main source of poisoning to cattle in the mountain areas. Species of death camas poison more sheep in the foothills of the mountain ranges than any other closely related group of plants. The death of many sheep is due to the lupines. The milkweeds also cause heavy losses.

The inspection of a "poison range" is a very different matter now from what it was 20 years ago. In 1911 a botanist was sent to inspect poisonous ranges in the Lassen and Plumas National Forests in northern California. Both larkspur and waterhemlock (known locally as "poison parsnip" or "wild parsnip") were believed to be causing the trouble. Neither of these plants, however, was found in the numerous areas inspected. No knowledge was gained of the plants actually causing the trouble on these forest ranges.

Fourteen years later another inspection of the Lassen and Plumas Forests was made. A certain large fenced pasture in the Plumas Forest where cattle are ranged during June and July contained great patches of *Lupinus caudatus*. Cattle began to die here early in July when the lupine was making seed. The manager suspected the lupine, removed his cattle from the pasture, and placed them on a range free from lupine. The deaths ceased. Pods of this species and also of *L. laxiflorus* variety *silvicola* were collected and sent to the Salina Experiment Station of the Bureau of Animal Industry, where both were found to be poisonous to cattle. The sick animals developed symptoms somewhat similar to those of larkspur poisoning. On "poison parsnip" areas, Mexican whorled milkweed was plentiful. This plant was without much doubt responsible for the deaths which the stockmen had thought were caused by "wild parsnip."

Up to 1925, much feeding of other lupine species had been done without positive results, except in the case of the northwestern species, *Lupinus leucophyllus*, which had been proved to be poisonous to sheep. Evidence is accumulating that other lupine species of California, Oregon, and Washington are poisonous. Many such problems still need solution.

WILLARD W. EGGLESTON,
Assistant Botanist, Bureau of Plant Industry.

POP CORN Selecting for Added Popping Expansion Would Pay Large Growers

The value of pop corn as human food depends to a very large extent on its quality. One of the important factors in determining quality is popping expansion. This is measured commercially as the ratio of volume of the popped corn to that of the unpopped corn. For example, a sample with 20 volumes popping expansion is one in which 1 cupful of corn will pop out to 20 cupfuls. The satisfaction of the home consumer of pop corn and the profits of the vendor depend to a considerable extent on this popping expansion.

It has long been recognized that bulk samples of different varieties from different localities, and even from different individual growers in the same locality, will vary considerably in popping expansion. It is not so generally known, however, that within a variety grown under uniform conditions some ears will give markedly greater expansion on popping than will other ears of very similar external appearance. Repeated trials have shown that if a large number of ears from a uniform field are popped individually, by far the greater proportion will have a popping expansion similar to the average of the field, while a few will pop very poorly and a few will pop extremely well.

Some of the excellence of the few outstanding ears may be due to environmental advantages of the parent plants, but some undoubtedly is due also to inherited differences which can be passed along to future crops. Heritable variation is the basis of improvement by selection in plants and animals. The Bureau of Plant Industry of the United States Department of Agriculture, cooperating with the Kansas Agricultural Experiment Station, has demonstrated during the past seven years the feasibility of improving the popping expansion of a strain of pop corn by continuous selection of seed ears on the basis of individual popping tests. As a result of this investigation, an improved strain of yellow pearl pop corn, christened Sunburst, has been produced.

Figure 140 shows a comparison of the popping expansion of Sunburst and unselected Queen Golden, representative of the material from which Sunburst was selected, grown in the same field. The average popping expansion was raised considerably by selection, being 26.1 volumes for Sunburst and 19.3 volumes for Queen Golden. The ears of Sunburst also were less variable in popping expansion than Queen Golden. The occasional very poor ear frequently found in unselected sorts has been practically eliminated from Sunburst.

parsnip" areas, Mexican whorled milkweed was plentiful. This plant was without much doubt responsible for the deaths which the stockmen had thought were caused by "wild parsnip."

Up to 1925, much feeding of other lupine species had been done without positive results, except in the case of the northwestern species, *Lupinus leucophyllus*, which had been proved to be poisonous to sheep. Evidence is accumulating that other lupine species of California, Oregon, and Washington are poisonous. Many such problems still need solution.

WILLARD W. EGGLESTON,
Assistant Botanist, Bureau of Plant Industry.

POP CORN Selecting for Added Popping Expansion Would Pay Large Growers The value of pop corn as human food depends to a very large extent on its quality. One of the important factors in determining quality is popping expansion. This is measured commercially as the ratio of volume of the popped corn to that of the unpopped corn. For example, a sample with 20 volumes popping expansion is one in which 1 cupful of corn will pop out to 20 cupfuls. The satisfaction of the home consumer of pop corn and the profits of the vendor depend to a considerable extent on this popping expansion.

It has long been recognized that bulk samples of different varieties from different localities, and even from different individual growers in the same locality, will vary considerably in popping expansion. It is not so generally known, however, that within a variety grown under uniform conditions some ears will give markedly greater expansion on popping than will other ears of very similar external appearance. Repeated trials have shown that if a large number of ears from a uniform field are popped individually, by far the greater proportion will have a popping expansion similar to the average of the field, while a few will pop very poorly and a few will pop extremely well.

Some of the excellence of the few outstanding ears may be due to environmental advantages of the parent plants, but some undoubtedly is due also to inherited differences which can be passed along to future crops. Heritable variation is the basis of improvement by selection in plants and animals. The Bureau of Plant Industry of the United States Department of Agriculture, cooperating with the Kansas Agricultural Experiment Station, has demonstrated during the past seven years the feasibility of improving the popping expansion of a strain of pop corn by continuous selection of seed ears on the basis of individual popping tests. As a result of this investigation, an improved strain of yellow pearl pop corn, christened Sunburst, has been produced.

Figure 140 shows a comparison of the popping expansion of Sunburst and unselected Queen Golden, representative of the material from which Sunburst was selected, grown in the same field. The average popping expansion was raised considerably by selection, being 26.1 volumes for Sunburst and 19.3 volumes for Queen Golden. The ears of Sunburst also were less variable in popping expansion than Queen Golden. The occasional very poor ear frequently found in unselected sorts has been practically eliminated from Sunburst.

Testing Individual Ears

The method used to make the individual ear tests is simple. Certain details, however, must be strictly followed to obtain comparable results. The ears must all be of the same moisture content when popped. Uniformity may be attained by storing in a cool protected place and by not bringing the unpopped ears into a heated room until immediately before popping. In the northern portions of the country where corn does not reach good popping condition until spring, some artificial drying may be necessary to make satisfactory popping tests before planting time. The source of heat for popping must be constant, and distance from the heat source must be arranged so that all samples may be popped under uniform conditions. Two glass graduates, one small and one large, both calibrated in cubic centimeters, make convenient measures for determining expansion. (Fig. 140.) One man can test from 60 to 75 ears per day.

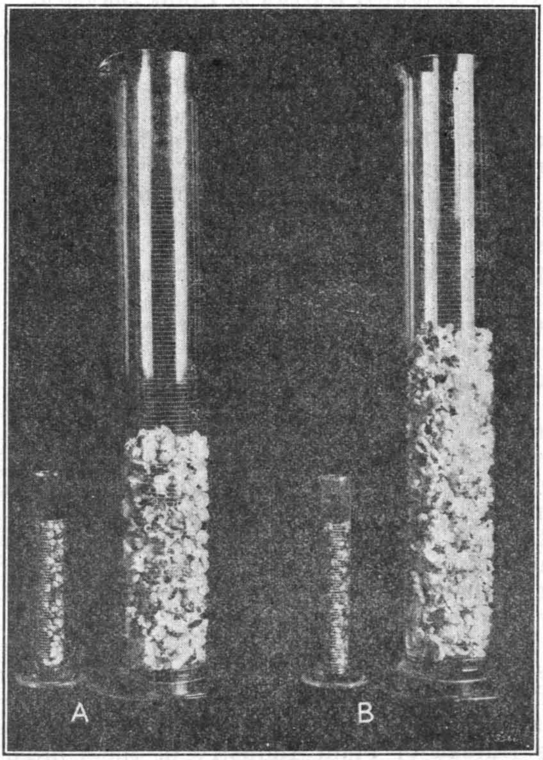


FIGURE 140.—The equipment used in measuring expansion. The two graduates (A) show the relative expansion of Queen Golden and the other two (B) of Sunburst pop corn

Both mass selection and ear-to-row methods have been used in selecting pop corn with almost equally favorable results. Mass selection is preferred because of its simplicity. In this method the remnants of all selected ears are bulked together for seed. The following fall, ears of the new crop are picked for testing from any portion of the field which is well isolated from other corn. As an indication of the amount of labor involved, something over 1,000 ears have been popped individually each winter in the mass-selection experiment previously noted, the best 5 to 10 per cent of these being saved for seed. Since less than half of each ear is needed for the popping test, a generous seed remnant is available for planting.

Ears vary not only in popping expansion but also in tenderness and flavor. Fortunately, there is a high correlation between tenderness and high popping expansion, so that in selecting for expansion one is likely to obtain ears of better than average tenderness. The best insurance is to taste each popped sample after measuring so that the occasional ear having a tough hull or woody texture may be discarded. Almost equally important with texture is flavor. Most people prefer a slightly sweetish corn with a pronounced, characteristic pop-corn taste. The product from some ears is woody and tasteless and from other ears is actually bitter. If there has been recent opportunity for crossing with dent corn, it is likely that some ears having a distinct field-corn flavor will be found. All ears with undesirable texture or flavor should be discarded, irrespective of popping volume.

This method of improvement can be utilized by the grower to improve his pop corn. The small grower who has no permanent demand for a quality product probably can not afford the time and effort, but the large grower can well afford to spend the necessary time during the winter to select some good ears for a seed plot. To an even greater extent, seed houses and companies that contract for large acreages of pop corn each year would find pop-corn improvement a paying investment. As the public becomes more discriminating the premium for high quality in pop corn should increase.

ARTHUR M. BRUNSON,
Agronomist, Bureau of Plant Industry.

POTASH Extraction from Domestic Sources Has Great Possibilities For years the potash situation in the United States has been highly unsatisfactory owing to our dependence on foreign sources and an ever increasing use of concentrated fertilizers, which require large quantities of high-grade potassium salts. In spite of the encouraging growth of the American potash industry, the yearly importation of potash still requires an expenditure of more than $23,000,000. Research on the further utilization of domestic sources of potash is being carried on by the Bureau of Chemistry and Soils and substantial progress has been made this last year. Particular stress is being laid on the leucitic rock of Wyoming, the alunite of Utah, the potash shales of Georgia, and the greensand of New Jersey.

Leucite

In Wyoming are found enormous deposits of leucite (Wyomingite), constituting potash reserves of immense size. In the same region are found plentiful supplies of high-grade phosphate rock, cheap fuels, and other raw materials representing an unusual combination of resources for fertilizer manufacture. This situation is of great interest and based on these conditions notable progress has been made in the development of chemical processes yielding products susceptible of widest distribution. With the idea of utilizing possible by-products the extraction of potash from leucite by oxides of nitrogen and various industrial acids is being studied. Another method of particular interest due to its simplicity is the volatilization of potash from leucite by smelting with special reagents and subsequent recovery of the potash in a concentrated form. Preliminary results show this method is feasible especially when carried out simultaneously with the volatilization of phosphoric acid. These materials can then be combined to form a highly concentrated fertilizer salt, potassium phosphate, which will greatly reduce distribution costs, thus opening up a much wider occasional ear having a tough hull or woody texture may be discarded. Almost equally important with texture is flavor. Most people prefer a slightly sweetish corn with a pronounced, characteristic pop-corn taste. The product from some ears is woody and tasteless and from other ears is actually bitter. If there has been recent opportunity for crossing with dent corn, it is likely that some ears having a distinct field-corn flavor will be found. All ears with undesirable texture or flavor should be discarded, irrespective of popping volume.

This method of improvement can be utilized by the grower to improve his pop corn. The small grower who has no permanent demand for a quality product probably can not afford the time and effort, but the large grower can well afford to spend the necessary time during the winter to select some good ears for a seed plot. To an even greater extent, seed houses and companies that contract for large acreages of pop corn each year would find pop-corn improvement a paying investment. As the public becomes more discriminating the premium for high quality in pop corn should increase.

ARTHUR M. BRUNSON,
Agronomist, Bureau of Plant Industry.

POTASH Extraction from Domestic Sources Has Great Possibilities For years the potash situation in the United States has been highly unsatisfactory owing to our dependence on foreign sources and an ever increasing use of concentrated fertilizers, which require large quantities of high-grade potassium salts. In spite of the encouraging growth of the American potash industry, the yearly importation of potash still requires an expenditure of more than $23,000,000. Research on the further utilization of domestic sources of potash is being carried on by the Bureau of Chemistry and Soils and substantial progress has been made this last year. Particular stress is being laid on the leucitic rock of Wyoming, the alunite of Utah, the potash shales of Georgia, and the greensand of New Jersey.

Leucite

In Wyoming are found enormous deposits of leucite (Wyomingite), constituting potash reserves of immense size. In the same region are found plentiful supplies of high-grade phosphate rock, cheap fuels, and other raw materials representing an unusual combination of resources for fertilizer manufacture. This situation is of great interest and based on these conditions notable progress has been made in the development of chemical processes yielding products susceptible of widest distribution. With the idea of utilizing possible by-products the extraction of potash from leucite by oxides of nitrogen and various industrial acids is being studied. Another method of particular interest due to its simplicity is the volatilization of potash from leucite by smelting with special reagents and subsequent recovery of the potash in a concentrated form. Preliminary results show this method is feasible especially when carried out simultaneously with the volatilization of phosphoric acid. These materials can then be combined to form a highly concentrated fertilizer salt, potassium phosphate, which will greatly reduce distribution costs, thus opening up a much wider market for fertilizers manufactured in this section. With these new advantages and, in addition, an abundant supply of cheap fuel an industrial chemical development is very probable in which the Middle West would be supplied with a totally adequate and accessible supply of fertilizer ingredients.

Alunite

The Middle West is well supplied with another mineral, alunite, which has a promising future as a raw material for potash and alumina manufacture. Up to the present the processes employed have not been economical because of the inadequacy of the alumina recovery and because the portion recovered has been in too impure a form to enable it to enter the select market. To eliminate silica, one of the most objectionable impurities, a process is proposed in which alunite is heated with hydrofluoric acid, whereby the silica is volatilized. Further work is in progress on the elimination of iron as well as the improvement of methods with a view of simplifying plant equipment and reducing losses. Such improvements will make possible the use of lower grade alunite than has been used in past operations with a view to increasing the latent potash resources of this raw material.

Polyhalite

At the request of the Bureau of Mines work has been carried out and completed on the ammonium carbonate—ammonia extraction of polyhalite, a Texas saline mineral. The results clearly indicate the commercial possibility of such a procedure with the almost complete separation of the potash, as sulphate, from both the associated calcium and magnesium compounds. At the same time a further economy is obtained through the formation of ammonium sulphate from the sulphuric acid of the polyhalite and the ammonia in the leaching solution. The formation of these two concentrated fertilizer salts greatly reduces the cost of shipping the finished product to the remote fertilizer markets.

Greensand and Georgia Shales

In addition to these raw materials great interest is attached to both the potash-bearing greensands of New Jersey and the shales of Georgia because of their proximity to the great fertilizer markets of the East and Southeast. Being comparable to the Wyoming leucites these materials are being studied along analogous lines. However, from an economical view each raw material is an individual problem and must be studied as such. In the case of greensand, which may be considered a low-grade iron ore, smelting processes lend themselves advantageously to the volatilization of the potash and the recovery of pig iron as a by-product. Perfection of such a procedure will be applicable to the recovery of the potash which is now volatilized and lost in the iron industry. Other commercial chemicals are recovered as by-products in the manufacture of potash by acid-extraction methods, especially glaucosil, an active silica, for which there is a great number of uses.

J. RICHARD ADAMS,
Associate Chemist, Bureau of Chemistry and Soils.

POULTRY in Commercial Flocks Increasing in Relative Importance

Poultry keeping is an ancient calling, the beginnings of which antedate history. The imagination pictures children and tender-hearted women of primitive races keeping young or wounded birds for pets, and men with less unselfish concern keeping captured live birds as a reserve food supply. The Romans raised geese and the Greeks captured wild ducks to establish duckeries in the early history of those peoples. The poultry industry in China is very old, tradition pointing to beginnings as early as 1400 B. C. References to the lordly sport of cockfighting are incorporated in the code of the great Indian lawgiver, Manu, dating back probably a thousand years before the Christian Era. The early Hebrews had doves, which were used in sacrifice, and the Egyptians raised geese abundantly. In America the Maya Indians of Mexico and Central America were keeping large numbers of turkeys when Europeans reached this hemisphere.

The domestic breeds of chickens seem to be closely related to certain wild types of jungle birds in southeastern Asia. Chickens were introduced a few centuries before the Christian Era into western Asia and Europe from the farther east. According to Caesar they had already been introduced into Britain in 55 B. C.

The great diversity of types of chickens in different countries suggests the probability both of a varied origin and that man has from remote times tried to produce better types by mating superior birds. Practically no record remains of the efforts of the early breeders, even within comparatively recent historic times, but we have the results of their labors.

Chickens were brought to this country by the early colonists and became a feature of American country and small-town life. The abundance of game and of other meats, and the seasonal character of egg laying, interfered with the maximum usefulness of eggs as food. At the time of heavy spring layings, eggs were eaten very freely, with a relish induced by enforced abstinence during the period of scanty layings in the late fall and early winter. Attempts were made to preserve the surplus eggs by cold, or by dipping them in preparations designed to furnish a protective coating. These methods were only partially successful. Many eggs were lost and a large proportion of the preserved surplus had to be used in cooking and baking where their lack of freshness was not so evident, or else disposed of for other purposes, such as tanning.

Cold Storage Opens New Era

The development of cold storage opened the modern era for poultry. When it became possible to keep eggs from the spring surplus to the time of shortage in the fall and early winter and supply them to the market then comparatively fresh, consumption enormously increased.

The actual numbers of poultry in this country prior to 1880 are unknown. Beginning in that year the decennial census furnished reports of numbers. After adjustments for the differences in the time of year when the census was taken and for variations in the forms of questions used, the reports show for the most important class, chickens, approximately the following numbers:

Year	Number of chickens	Year	Number of chickens
Jan. 1, 1880	141, 000, 000	Jan. 1, 1910	322, 000, 000
Jan. 1, 1890	195, 000, 000	Jan. 1, 1920	360, 000, 000
Jan. 1, 1900	260, 000, 000	Jan. 1, 1925	409, 000, 000

Beginning with 1920, the United States Department of Agriculture has estimated comparative numbers of chickens on farms as of January 1, as follows:

Year	Number	Year	Number
1920	359, 537, 000	1926	424, 227, 000
1921	356, 168, 000	1927	448, 665, 000
1922	396, 507, 000	1928	463, 364, 000
1923	411, 469, 000	1929	444, 481, 000
1924	449, 188, 000	1930	469, 457, 000
1925 [a]	417, 755, 000		

The poultry industry has developed largely as a side line to farming and such it continues to be, in the main. With some protection and relatively little care, given mostly by women, poultry on farms are largely self-sustaining during a considerable part of the year. The birds gain much of their living by gleaning grain and seeds that would otherwise be lost, and from insects. But with the constantly growing demand for eggs, their production on a commercial scale has become increasingly important.

What proportion of the total number of chickens in the country is held in commercial flocks is unknown. But in 1925 flocks of 450 birds or over in two counties in California contained 36 per cent of the total number of chickens in the State. Somewhat similar conditions exist in sections of Washington, New York, New Jersey, and a number of other States. In the north-central group of States, however, which has about half of the chickens in the country, the proportion in commercial flocks has been insignificant. But during the last few years the increase in commercial flocks in these States seems to have been very rapid. The proportion of birds in commercial flocks, of from 400 to 999 birds, to the number in farm flocks of less than 400, as reported by about 20,000 crop correspondents, has been as follows: 1925, 9.86 per cent; 1926, 11.08 per cent; 1927, 12.78 per cent; 1928, 13.39 per cent; 1929, 14.7 per cent; 1930, 16.36 per cent.

The apparent increase has been to some extent due to the tendency of commercial producers to report to the department for their flocks in order that they may obtain the department's monthly reports in return. This has tended to increase the proportion of returns from large flocks; but even allowing for this, the figures indicate a marked increase in the relative importance of commercial flocks in egg production.

Estimates Based on Census Reports

Figures on the production of chickens were not collected by the Bureau of the Census until 1909 and the numbers reported to the enumerators for 1919 and 1924 are probably short of the true number. The numbers raised and the net production, after allowing for replacement of birds lost on the farm, have been estimated by this department for the last six years. The census figures and this department's estimates are given in Table 13.

[a] Including a conservative allowance for census omissions.

TABLE 13.—*Chickens raised in 1909, 1919, and 1924–1929 and net production 1924–1929*

Year	Report of Census	Estimates of Department of Agriculture	
	Number raised	Number raised	Number raised, less mature birds lost, or net production
1909	460,611,000		
1919	473,201,000		
1924 [1]	545,848,000	600,768,000	546,869,000
1925		622,321,000	572,193,000
1926		657,788,000	606,885,000
1927		691,680,000	637,837,000
1928		634,260,000	578,656,000
1929		697,548,000	644,210,000

[1] Estimate allows for understatements to enumerators.

Mortality of Chickens

The annual mortality from disease, vermin, accidents, exposure, etc., is, according to the judgment of crop correspondents for their localities, about 10 per cent of the grown chickens on hand January 1, and about 26 per cent of the chickens hatched during the current season. The mortality in different sections seems to be quite uniform, the percentages for the different geographic grand divisions being as follows, for mature and young birds, respectively: North Atlantic, 8.8 and 21.3; North Central, 9.7 and 26.7; South Atlantic, 9.6 and 25.5; South Central, 9.8 and 28.2; Western, 9.8 and 19.2; United States, 9.7 and 25.8.

Judging from the records available for commercial flocks, the mortality in these, in spite of the better care received, seems to be fully as great as among farm flocks. This fact is probably due to the greater liability of chickens to disease when large numbers are kept in restricted quarters; and sometimes to the breakdown of layers from intensive feeding for heavy egg production.

Cycle in Poultry Numbers

For the different classes of livestock there are fairly definite cycles of years of increase and decrease in numbers varying with the time required for the animal to mature and with the time required for producers to adjust their plans and operations to an increase or decrease in production. The length of the cycle of increase and decrease in numbers of poultry seems to be similar to the cycle for swine; in both cases numbers can be rapidly increased by heavy breeding or decreased by early and heavy marketing, within a single season. Beginning with 1920 the department's estimates show a peak in numbers of chickens held on farms on January 1 in 1924 and again in 1928. On January 1, 1929 and 1930, numbers showed renewed increase, and heavy early hatchings in 1930 pointed to further increase on January 1, 1931. The exceptional conditions and low prices of 1930 however led to a rapid disappearance of chickens by sale and by farm consumption, and resulted in a small decrease in numbers for January 1, 1931. The high points of the cycle evidently tend to recur every three or four years, with a more or less sharp recession in numbers the following year and a renewed trend of increase continued through two or three years to the next peak. While it is possible greatly to increase or decrease the number of chickens in a single year, the decision of the producers as to extent of change is usually the outgrowth of the experience of the preceding two or three years, so that actual changes for the industry as a whole are less rapid than would be the case if all producers were inclined and able to readjust radically their plans each year.

The adjusted census figures on numbers per person, of chickens on hand and of eggs produced on farms in the United States, are as follows for the different census years: 1880, 2.82 chickens and 9.14 dozens of eggs; 1890, 3.10 and 13.02; 1900, 3.42 and 17.03; 1910, 3.50 and 18; 1920, 3.50 and 18.28; 1925, 3.56 and 19.63. These figures show the per capita supply of poultry products to have been increasing quite markedly up to 1900. Since that period increase in chickens per person has been rather slight and increase in the supply of eggs per person much less marked than previously, though still material.

The marked decrease observed over a period of years in the average quantity of meat consumed per person in the United States seems not to have taken place with chickens or eggs, particularly not with the latter. Possibly the loss, if any, by people turning from poultry products to vegetables may be offset by gains from those turning from meats to poultry and eggs.

Relative Numbers of Different Breeding

The heavy dual purpose types of chickens, such as the Plymouth Rock and Rhode Island Red, both of which were developed in this country, have been favored for farm flocks in most sections, while the commercial egg producers have used the small-bodied, heavy-laying types—mainly Leghorns. No definite figures on the proportion of the different kinds have been available until recently. In 1929 an inquiry to the crop correspondents of the Department of Agriculture developed the following information concerning the proportions of the leading types: 42 per cent of the birds of the country are of lightweight breeding; Leghorns alone are 35 per cent; approximately 42 per cent also are of heavyweight breeding, 17 per cent each being Plymouth Rocks and Rhode Island Reds, and 8 per cent of other heavyweight breeding; 16 per cent are of mixed breeding. The Pacific Coast States have the highest proportion of Leghorn breeding, 68 per cent; the Middle Atlantic States have 52 per cent. The lowest proportion of Leghorns, 26 per cent, is shown by the Southeastern States. Of the heavy breeds, the East North Central States show 22 per cent of Plymouth Rocks and the Southeastern States 21 per cent. The lowest proportion of Plymouth Rocks is in the Pacific Coast States which show only 7 per cent. The Rhode Island Reds constitute 50 per cent of the chickens of New England, 20 per cent in the Southeastern and Rocky Mountain States, and about 18 per cent in the West North Central and the South Central States. The Southern States show the highest proportion of mixed breeding, 22 per cent, other groups showing 15 per cent or less.

Commercial Hatching

Along with the increase in commercial production of eggs has been an even more rapid increase in commercial hatching of chicks. An inquiry to crop correspondents in 1929 showed the proportion of chickens hatched by different means as follows: Under hens, 42.9 per cent; in incubators on farm where raised, 24.2 per cent; custom hatched (for a fee, from eggs supplied by the grower), 9.6 per cent; bought as baby chicks, 23.4 per cent. The practice is quite different in the different geographical sections. In the South about two-thirds of the chicks are still hatched under hens, but in the Northeast only 26 per cent. In farm incubators, 31 per cent are hatched in the North Central States, and down to 13 per cent in the Southeast. Eleven per cent are custom hatched in the Northeast and North Central States and about 7 per cent elsewhere. Purchased baby chicks comprise 45 per cent in the Northeast, 41 per cent in the West, 25 per cent in the North Central group, 12 per cent in the Southeast and only 9 per cent in the South Central States.

Production of Eggs

The production of eggs in the United States as reported in the successive census returns since 1879 and as estimated by the Department of Agriculture since 1925 is shown below. The census figures for the last three census enumerations are adjusted by a judgment allowance to care for the evident understatement by producers due to changes in the time of the year when the enumerations were made.

TABLE 14.—*Production of eggs in stated years*

Year	United States census	Estimates, United States Department of Agriculture	Year	United States census	Estimates, United States Department of Agriculture
	Number	*Number*		*Number*	*Number*
1879	4,845,000,000		1925		28,504,000,000
1889	9,840,000,000		1926		30,555,000,000
1899	15,528,000,000		1927		32,000,000,000
1909	[1] 19,872,000,000		1928		32,120,000,000
1919	[1] 23,256,000,000		1929		31,741,000,000
1924	[1] 27,096,000,000				

[1] Adjusted.

Poultry and egg production on a commercial scale, with flocks of a thousand or more birds, requires a man's entire attention. Most of these poultrymen buy their feeds. The extent to which efficient management of large flocks compensates the poultryman for buying rather than raising feed, is one measure of the success of a commercial poultry producer. The financial success of egg production under efficient management on a commercial scale is demonstrated by the very evident, though as yet unmeasured, increase in this branch of the industry. Whether the exceptionally favorable conditions of certain localities for commercial egg production will lead to a still greater proportion of the eggs being produced in such sections is still to be seen. The very rapid increase during the last year or two of commercial poultry flocks in the North Central States and in portions of the South, as well as in some Rocky Mountain States, may, if continued, result in holding present proportions in the different geographic sections reasonably constant.

S. A. JONES,
*Senior Agricultural Statistician,
Bureau of Agricultural Economics.*

POULTRY Profits Are Largely Dependent on High Egg Production Variable factors affect the returns from a poultry enterprise. Among these are prices of feeds and poultry products, the size of the project, efficiency of management, diversification of the business, and productiveness of the stock. As the major portion of income is derived from eggs, with meat as a supplementary source of revenue, the importance of high egg yield is obvious. About 60 per cent of the total income from poultry products on the average farm is obtained from eggs, while 40 per cent comes from poultry meat. Farms in Missouri and Ohio, carrying general-purpose fowls, show 70 per cent of the receipts coming from the egg crop. Commercial poultry farms in New Jersey and California obtain an even larger percentage of income from eggs, totaling from 85 to 90 per cent.

Information from various sources on factors influencing poultry profits indicates that high average egg production is most important.

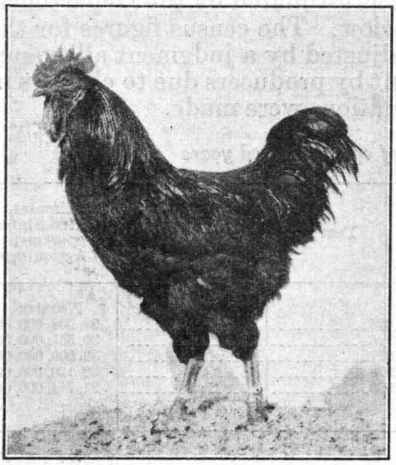


FIGURE 141.—A Rhode Island Red cockerel with high-class "relatives." His dam laid 248 eggs in one year. The average production of his 10 sisters ranged from 210 to 301 eggs, with an average of 244

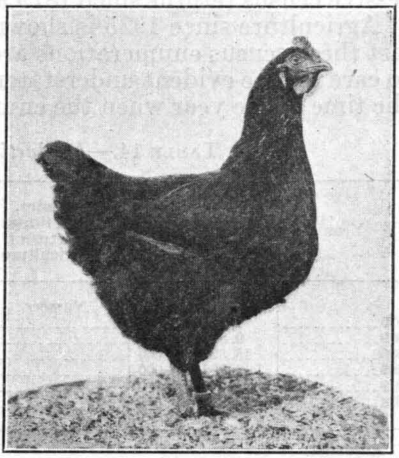


FIGURE 142.—This Rhode Island Red ranks high in both numbers of eggs and size of eggs. In one year she laid 274 eggs, averaging 27 ounces to the dozen

Studies at the Massachusetts Experiment Station showed that each additional dozen eggs per bird increased the labor income by 35 cents in 1926 and 1927. One dollar more per bird was made with flocks averaging 154 eggs than with flocks laying 120 eggs; also average egg production per bird was the most important factor influencing profits per bird. Figures from Ohio (1926) show that owners of flocks producing 180 or more eggs per year incurred expenses of $2.51 per bird more than owners of flocks of less than 100-egg production. But the high-producing group returned $4.83 more in cash receipts than the low-producing group. Statistical studies at the University of California indicated an increase of 153 per cent in net profits between two groups of layers, one producing 122 eggs per annum and the other 163 eggs. Such an increase is much greater in proportion than the 33.6 per cent in average number of eggs produced per hen. In other words, as production increases income over feed cost rises more rapidly.

Importance of Breeding Demonstrated

The average egg production of the flock can be increased by proper feeding, rigid culling, and good breeding. Direct evidence as to the importance of breeding is supplied from Cornell University in a comparison of results from their high and low line White Leghorns. The high-producing family averaged about 180 eggs, while the other averaged 120 eggs. A 5-year average value of eggs produced by the high line was 60 per cent greater than the low line and resulted in a much greater percentage of return over feed costs, approximating $2 per hen. The cost of feeding the high line was somewhat greater, but the difference was so slight that the increased production was obtained at relatively less cost per dozen. More recent results have made even a more favorable comparison.

Lateness of maturity seems to be characteristic of poor producers. Late-maturing birds are generally inferior to early-maturing birds. At the United States Animal Husbandry Experiment Farm, Beltsville, Md., in 1927–28, the average production of Leghorn pullets in early maturing families totaled 224 eggs for those beginning in September and 226 eggs for October pullets, compared with an average production of 86 eggs for pullets beginning to lay in January. Rhode Island Red pullets, beginning to lay in October and November, averaged 205 and 201 eggs, respectively, while the January pullets averaged 133 eggs. In 1928–29 Leghorn pullets starting to lay in September and October averaged 211 and 196 eggs, respectively, while the January pullets averaged 131 eggs. In 1928–29 the Rhode Island Reds beginning to lay in September and October averaged 212 and 209 eggs, respectively, while the January birds averaged 161 eggs.

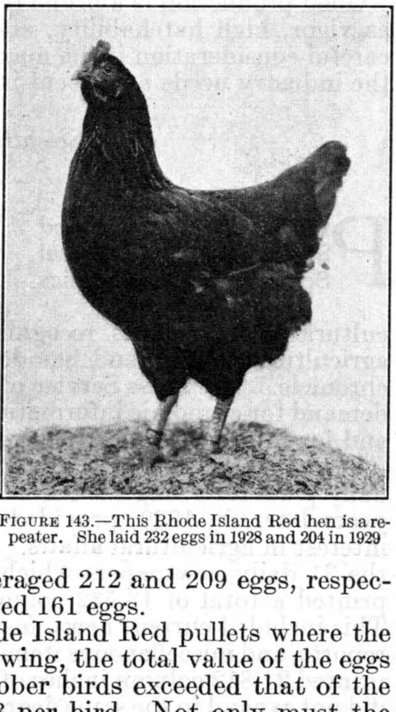


FIGURE 143.—This Rhode Island Red hen is a repeater. She laid 232 eggs in 1928 and 204 in 1929

Taking the last two groups of Rhode Island Red pullets where the January birds have made the best showing, the total value of the eggs produced by the early maturing October birds exceeded that of the later maturing group by about $2.28 per bird. Not only must the higher-producing group be given credit for greater value of their total production but also for greater value per dozen, as 22 per cent of the eggs were laid in October, November, and December. New York prices of "average extra near-by" eggs were 57 cents per dozen during these months as against 41 cents for the January-September period. Feed cost for the October pullets was only about 18 cents more per bird.

Method for Improving Production

Since increased production is the most practical way to greater profits the fundamental importance of improving egg-laying ability can readily be seen. The job of improving production quality can not be accomplished by hit-or-miss methods. Methodical year-round trap nesting and progeny testing are essential steps in breeding work. Study of trap-nest records discloses five essential factors in breeding for increased efficiency:

1. Early maturity.
2. Steady winter laying.
3. High rate or intensity of production.
4. Elimination of broodiness.
5. Persistency of production.

Only the larger producers of market eggs or those engaged in the production and sale of breeding stock may be in a position to trap nest. The average farmer or poultryman may find it more expedient and economical to purchase stock or eggs from reliable breeders. The important point is that bred-to-lay stock, whether purchased or produced at home, is essential for greatest opportunity for profit.

Good production is a prime requisite. Other desirable factors, such as vigor, high hatchability, and large egg size, should also receive careful consideration if the maximum profit is to be obtained. What the industry needs at present is not more poultry but better poultry.

JOSEPH P. QUINN,
Chief Scientific Aid, Bureau of Animal Industry.

PRESS Giving Increased Space to Agricultural Science and Economics Daily newspapers recently have devoted far more attention to news of agriculture than they formerly did. The press, confronted with an urgent agricultural problem, has recognized its responsibility in interpreting agricultural affairs, and has devoted more space to the agricultural chronicle. The Press Service of the department has had an increasing demand for economic information, for news of scientific developments, and for information on better methods of farming.

The Press Service, in comparing a representative sample of the daily press for a single week in 1919 and the corresponding period 10 years later, in 1929, provided statistical evidence of this increased interest in agricultural affairs. In the last seven days of June, 1919, the 31 daily newspapers which formed the basis for the comparison printed a total of 13,532 column inches of agricultural information. This included current news, feature articles, editorial opinion, market reports, and miscellaneous items. In the week in 1929 the same papers printed 21,812 column inches of similar material. The market reports did not expand to the same degree as other classifications, but increased 39 per cent in space occupied. The total of the other classifications increased 85 per cent, and the current news of agriculture in these dailies increased nearly 90 per cent.

One metropolitan newspaper in an eastern city—a paper which is generally regarded by newspapermen as one of the leaders in its field—showed a greater increase in its agricultural matter than any other paper surveyed. In 1919 the paper printed 231 column inches of agricultural matter, of which 147 inches were market reports. This was one of the smallest totals in the list. In 1929 the same daily printed 1,079 column inches or more than 4.5 times as much as in 1919 and stood near the head of the list. In the 1919 week it printed 84 inches of agricultural news. In the 1929 week this classification for the week be accomplished by hit-or-miss methods. Methodical year-round trap nesting and progeny testing are essential steps in breeding work. Study of trap-nest records discloses five essential factors in breeding for increased efficiency:

1. Early maturity.
2. Steady winter laying.
3. High rate or intensity of production.
4. Elimination of broodiness.
5. Persistency of production.

Only the larger producers of market eggs or those engaged in the production and sale of breeding stock may be in a position to trap nest. The average farmer or poultryman may find it more expedient and economical to purchase stock or eggs from reliable breeders. The important point is that bred-to-lay stock, whether purchased or produced at home, is essential for greatest opportunity for profit.

Good production is a prime requisite. Other desirable factors, such as vigor, high hatchability, and large egg size, should also receive careful consideration if the maximum profit is to be obtained. What the industry needs at present is not more poultry but better poultry.

JOSEPH P. QUINN,
Chief Scientific Aid, Bureau of Animal Industry.

PRESS Giving Increased Space to Agricultural Science and Economics Daily newspapers recently have devoted far more attention to news of agriculture than they formerly did. The press, confronted with an urgent agricultural problem, has recognized its responsibility in interpreting agricultural affairs, and has devoted more space to the agricultural chronicle. The Press Service of the department has had an increasing demand for economic information, for news of scientific developments, and for information on better methods of farming.

The Press Service, in comparing a representative sample of the daily press for a single week in 1919 and the corresponding period 10 years later, in 1929, provided statistical evidence of this increased interest in agricultural affairs. In the last seven days of June, 1919, the 31 daily newspapers which formed the basis for the comparison printed a total of 13,532 column inches of agricultural information. This included current news, feature articles, editorial opinion, market reports, and miscellaneous items. In the week in 1929 the same papers printed 21,812 column inches of similar material. The market reports did not expand to the same degree as other classifications, but increased 39 per cent in space occupied. The total of the other classifications increased 85 per cent, and the current news of agriculture in these dailies increased nearly 90 per cent.

One metropolitan newspaper in an eastern city—a paper which is generally regarded by newspapermen as one of the leaders in its field—showed a greater increase in its agricultural matter than any other paper surveyed. In 1919 the paper printed 231 column inches of agricultural matter, of which 147 inches were market reports. This was one of the smallest totals in the list. In 1929 the same daily printed 1,079 column inches or more than 4.5 times as much as in 1919 and stood near the head of the list. In the 1919 week it printed 84 inches of agricultural news. In the 1929 week this classification for the week showed a total of 626 column inches, about 7.5 times as much, or more than in any other paper in the selected group.

News of the activities of the United States Department of Agriculture or news traceable to the department as the source of information registered an increase of approximately 80 per cent. Of particular significance also was a comparative gain in the news traceable to the State colleges, experiment stations, and extension forces, which increased about 130 per cent. The comparative figures cover too brief a period to be conclusively representative. They indicate the trend, however, and confirm the observation and experience of the Press Service. They also indicate a deepening understanding by the press of the rôle which agriculture plays in the affairs of the nation.

PALMER SMITH,
Writer, Office of Information.

RANGE Surveys Help Livestock Industry and Conserve Forage Growth When the administration of the western national forests was undertaken by the Forest Service great numbers of cattle, sheep, and horses grazed unrestricted on these areas. In many cases the more desirable and accessible ranges had been seriously damaged and the forage depleted through overgrazing. The more inaccessible range on the other hand remained unused.

In order to manage these grazing lands properly, some method had to be devised to determine how much forage was available on the various areas, what plants furnished the most and best feed, how much forage a cow or a sheep required in a given time, and what forms of management were necessary to maintain the forage crop so that the greatest amount of beef or mutton could be turned off. To meet these needs the present method of conducting range surveys has gradually been developed by the Forest Service.

Large numbers of stockmen and ranchers are affected by the results of good or poor management of the ranges. Depleted areas not only fail to provide good feed for large numbers of stock, but the lack of sheltering, soil-binding plants allows the soil to wash away. The danger of floods is increased, and during the dry season springs and streams may dry up because the water runs off rapidly and is not stored in the ground. The object of a range survey is to collect the information needed to formulate plans for the best correlated use of grazing, watershed, and other resources.

Making a Range Survey

The work is usually done by crews of specially trained men. The range is mapped to show the location and acreages of the various types of forage, and the location of high ridges, canyons, watering places, and similar features of the range which influence grazing. The amount and kind of forage on all portions of the range are recorded. Each stockman operating on the area may then be allotted feed in proportion to the number of animals which he grazes and the stock can be distributed according to the amount of forage found on various parts of the range. (Fig. 144.)

Through pasture tests, as well as experiments on portions of the range itself, the amount of forage required for cattle or sheep is determined.

showed a total of 626 column inches, about 7.5 times as much, or more than in any other paper in the selected group.

News of the activities of the United States Department of Agriculture or news traceable to the department as the source of information registered an increase of approximately 80 per cent. Of particular significance also was a comparative gain in the news traceable to the State colleges, experiment stations, and extension forces, which increased about 130 per cent. The comparative figures cover too brief a period to be conclusively representative. They indicate the trend, however, and confirm the observation and experience of the Press Service. They also indicate a deepening understanding by the press of the rôle which agriculture plays in the affairs of the nation.

PALMER SMITH,
Writer, Office of Information.

RANGE Surveys Help Livestock Industry and Conserve Forage Growth When the administration of the western national forests was undertaken by the Forest Service great numbers of cattle, sheep, and horses grazed unrestricted on these areas. In many cases the more desirable and accessible ranges had been seriously damaged and the forage depleted through overgrazing. The more inaccessible range on the other hand remained unused.

In order to manage these grazing lands properly, some method had to be devised to determine how much forage was available on the various areas, what plants furnished the most and best feed, how much forage a cow or a sheep required in a given time, and what forms of management were necessary to maintain the forage crop so that the greatest amount of beef or mutton could be turned off. To meet these needs the present method of conducting range surveys has gradually been developed by the Forest Service.

Large numbers of stockmen and ranchers are affected by the results of good or poor management of the ranges. Depleted areas not only fail to provide good feed for large numbers of stock, but the lack of sheltering, soil-binding plants allows the soil to wash away. The danger of floods is increased, and during the dry season springs and streams may dry up because the water runs off rapidly and is not stored in the ground. The object of a range survey is to collect the information needed to formulate plans for the best correlated use of grazing, watershed, and other resources.

Making a Range Survey

The work is usually done by crews of specially trained men. The range is mapped to show the location and acreages of the various types of forage, and the location of high ridges, canyons, watering places, and similar features of the range which influence grazing. The amount and kind of forage on all portions of the range are recorded. Each stockman operating on the area may then be allotted feed in proportion to the number of animals which he grazes and the stock can be distributed according to the amount of forage found on various parts of the range. (Fig. 144.)

Through pasture tests, as well as experiments on portions of the range itself, the amount of forage required for cattle or sheep is determined.

The results may be applied to any similar range on which the amount of available feed is known. The numbers of stock or length of season may then be adjusted so that the range is used fully and properly.

Turning out stock too soon after growth first begins is responsible for much range deterioration. During the early spring plants are easily damaged by grazing, and if this practice is continued the valuable forage is eventually thinned out or destroyed. Range-survey methods are used to determine the dates when each portion of the range is ready for use during an average season, and the stock may then be placed on each unit when it is ready to be grazed. Frequently stock may be turned on one portion of the range early and other parts may be allowed to rest. The following year another area may be used first, so that each part of the range will have a complete rest during the principal growing period at least every few years.

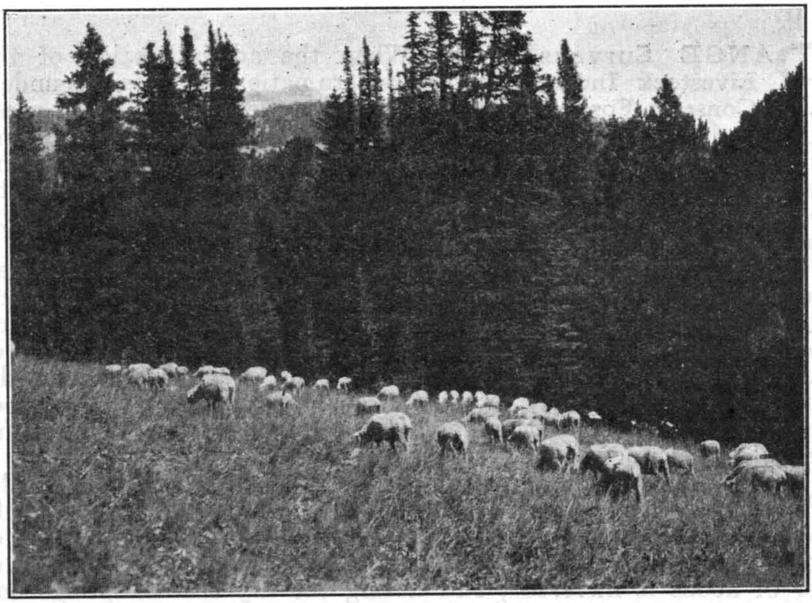


FIGURE 144.—Sheep grazing on the Jefferson National Forest, Mont.

Salting Aids Proper Distribution

After the various natural divisions of each range are determined and the amount of feed within each is known, it is possible to work out a plan of distribution so that all parts of the range may be grazed to the same degree. Such a plan is greatly aided by refinements in actual practices of handling stock. Well distributed salt will do much toward keeping cattle scattered over the area and also toward drawing them to those portions of the range where use is ordinarily light. The salt grounds are usually located on ridges and in parks away from water so that cattle will feed off these areas as well as graze the range between water and salt. Range damage due to stock congregating along creeks and springs is largely eliminated and frequently, with proper salting, the range is capable of carrying larger numbers of stock with less accompanying damage. By knowing the amount of available forage which each portion of the range supports, a definite plan can be drawn up showing how many cattle are to be located in each drainage or pocket and the needed amount and location of salt. (Fig. 145.)

On sheep range, the old method of trailing the band back to a central bed ground each night is detrimental to the sheep and very destructive to the range. The tepee system, as used on the national forests, provides for quiet open herding during the daytime, allowing the sheep to graze slowly outward and bed down where night overtakes them. The herder has a cook and supply camp centrally located on each range unit, but he moves his tepee and bed to the place where the sheep will be bedded for the night. This system of herding allows the sheep to graze progressively over the range, so that they are on fresh feed continuously. A range survey is necessary because the amount of forage in each area used from a central camp must be known in order that the

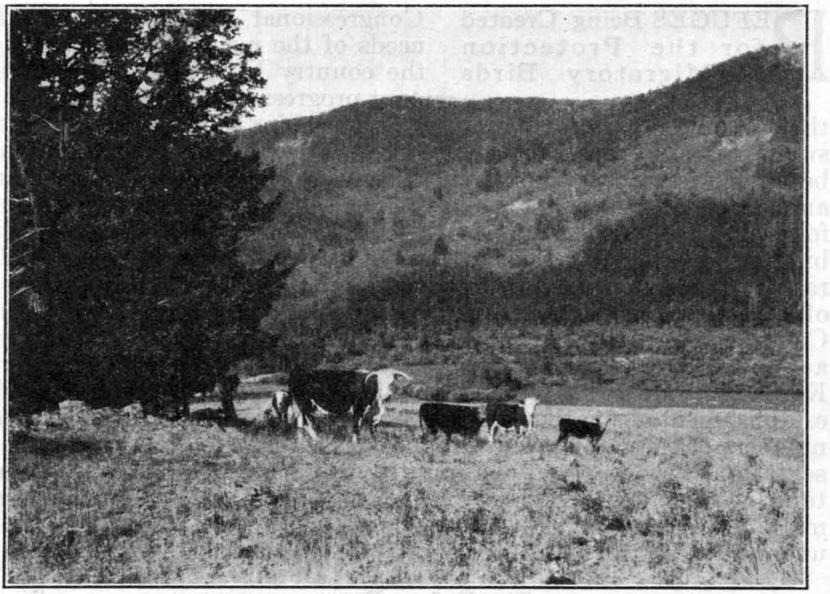


FIGURE 145.—Cattle using feed on ridges. Well distributed salt will do much toward drawing cattle to those portions of the range where use is ordinarily light

range can be evenly grazed. Otherwise, as frequently happens where the forage resources have not been estimated, some areas will be overgrazed and others not grazed at all or only lightly, because the herder has no guide to indicate how rapidly each area should be gone over.

Opening Areas Difficult of Access

Often through the construction of a few range improvements it is possible to open up inaccessible areas, to prevent too early use of the higher range, and to aid in the even distribution of stock so as to prevent local overgrazing. During the progress of a range survey a record is also kept of all needed improvements, such as development of springs, construction of stock trails and driveways, handling corrals, drift fences, and similar features that are necessary to good management. The boundaries of dangerous patches of poisonous plants are noted so that, where possible, eradication may be undertaken, or serious losses may be prevented by modifying the management plan of the range.

While much progress in range management has been made, many additional refinements are desirable. Overgrazed and damaged ranges must be allowed to recuperate so that they may contribute their full share toward meat production and watershed protection. The lightly grazed areas should be made accessible in order that the forage can be used. When all of the information obtained in range surveys is fully applied in the management of the ranges, they should yield their maximum benefits to the users and the surrounding communities.

H. E. Schwan,
Junior Range Examiner, Forest Service.

REFUGES Being Created for the Protection of Migratory Birds Congressional recognition of the needs of the migratory wild fowl of the country has resulted in important progress during the past year in the creation of a national system of refuges for the wild ducks, geese, swans, and other migrants that twice each year, spring and fall, pass between this country and Canada. Two refuges—one in Montana and the other in Oklahoma—have been set aside by Executive order, following investigations as to their suitability under the migratory bird conservation act of February 18, 1929; two others—one in Colorado and the other in South Carolina—are being acquired by purchase of necessary lands as authorized by the Migratory Bird Conservation Commission created by this act; and in the Seventy-first Congress authorization was granted for the acquisition of 20,000 acres in central Kansas for migratory-bird refuge purposes. These beginnings in the establishment of a nation-wide system of sanctuaries for the threatened numbers of migratory birds are most gratifying to the wild-life conservationists throughout the country, who have been active for years to bring this about. The placing of these areas under administration marks a further step in this country's efforts to carry out its obligations under the migratory bird treaty of 1916.

The Refuge Programs

The new conservation measure authorizes appropriations over a period of 10 years, aggregating about $8,000,000, for the establishment of migratory game bird refuges. The initial allotment, made available on July 1, 1929, set up $75,000, and this was used to explore and study regions recommended as suitable for reservation purposes. Two lines of investigation were at once instituted:

(1) Migratory-bird resources, existing and potential, were studied in 48 States, covering 189 units, with an aggregate area of about 3,700,000 acres. Of these 66 thus far have been found suitable as nesting, resting, and feeding grounds. (2) Within the acceptable units detailed examinations were made to determine accurately the types of land, ownership, the uses made of land and cover, and the character, extent, and value of existing improvements. At the end of the fiscal year 1930 valuation investigations had been completed on areas aggregating 1,225,000 acres in 24 States, and statistical data and maps compiled on 40 of the units under consideration.

so that, where possible, eradication may be undertaken, or serious losses may be prevented by modifying the management plan of the range.

While much progress in range management has been made, many additional refinements are desirable. Overgrazed and damaged ranges must be allowed to recuperate so that they may contribute their full share toward meat production and watershed protection. The lightly grazed areas should be made accessible in order that the forage can be used. When all of the information obtained in range surveys is fully applied in the management of the ranges, they should yield their maximum benefits to the users and the surrounding communities.

H. E. SCHWAN,
Junior Range Examiner, Forest Service.

REFUGES Being Created for the Protection of Migratory Birds Congressional recognition of the needs of the migratory wild fowl of the country has resulted in important progress during the past year in the creation of a national system of refuges for the wild ducks, geese, swans, and other migrants that twice each year, spring and fall, pass between this country and Canada. Two refuges—one in Montana and the other in Oklahoma—have been set aside by Executive order, following investigations as to their suitability under the migratory bird conservation act of February 18, 1929; two others—one in Colorado and the other in South Carolina—are being acquired by purchase of necessary lands as authorized by the Migratory Bird Conservation Commission created by this act; and in the Seventy-first Congress authorization was granted for the acquisition of 20,000 acres in central Kansas for migratory-bird refuge purposes. These beginnings in the establishment of a nation-wide system of sanctuaries for the threatened numbers of migratory birds are most gratifying to the wild-life conservationists throughout the country, who have been active for years to bring this about. The placing of these areas under administration marks a further step in this country's efforts to carry out its obligations under the migratory bird treaty of 1916.

The Refuge Programs

The new conservation measure authorizes appropriations over a period of 10 years, aggregating about $8,000,000, for the establishment of migratory game bird refuges. The initial allotment, made available on July 1, 1929, set up $75,000, and this was used to explore and study regions recommended as suitable for reservation purposes. Two lines of investigation were at once instituted:

(1) Migratory-bird resources, existing and potential, were studied in 48 States, covering 189 units, with an aggregate area of about 3,700,000 acres. Of these 66 thus far have been found suitable as nesting, resting, and feeding grounds. (2) Within the acceptable units detailed examinations were made to determine accurately the types of land, ownership, the uses made of land and cover, and the character, extent, and value of existing improvements. At the end of the fiscal year 1930 valuation investigations had been completed on areas aggregating 1,225,000 acres in 24 States, and statistical data and maps compiled on 40 of the units under consideration.

Information collected by the Bureau of Biological Survey during the past 45 years on the distribution and migration of waterfowl was available as a foundation on which to prosecute intensive field studies. At hand also was a vast store of data gathered by specialists who had visited a large number of areas known as favorite haunts of migratory birds. In addition, many recommendations regarding places deemed suitable by reason of waterfowl concentrations during migration were received by the Biological Survey from persons interested in wild-life conservation. Most of the information at hand regarding the numerous proposed refuge sites, however, was only general in character. It was necessary, therefore, to make more comprehensive studies of the places that seemed to meet sanctuary standards.

At the beginning of the fiscal year 1931, $200,000 became available under the act of February 18, 1929, for the further prosecution of refuge-land survey and acquisition work. Next year Congress is authorized by the same act to appropriate $600,000, and during the succeeding seven years $1,000,000 each year. Such a program will permit orderly progress in the acquisition of refuge areas and will facilitate the wise and economical expenditure of the funds provided.

Though the stage of actual purchase of areas recommended, examined, and approved has been reached, the work of examination of proposed refuge sites has not been completed. Field parties of the Biological Survey will investigate additional tracts of extensive lowlands of marsh and neighboring woodland that were formerly well suited as feeding and resting grounds for migratory birds but are now useless for the purpose by reason of drainage or evaporation, to determine whether they can be restored to their natural condition. It is planned to have the primary network of refuges consist of units of approximately 20,000 acres each, though areas suitable for the purpose up to 50,000 acres will be considered.

The Migratory Bird Conservation Commission, upon recommendation of the Secretary of Agriculture, and in conjunction with the appraisal and valuation data previously assembled, will pass upon the purchase of lands at prices quoted in options obtained from the owners by the Biological Survey.

Refuges Established by Executive Order

The first of the refuges established by Executive order as a result of investigations under the new act was the Benton Lake Bird Refuge, situated in Chouteau and Cascade Counties, Mont., which will contain in its entirety 26,669 acres, of which 12,389 acres are public lands. The President, by order of November 21, 1929, set aside these public lands and immediately thereafter they came under the jurisdiction of the Bureau of Biological Survey for administration. Large numbers of migratory game birds congregate at Benton Lake during their nesting and migration seasons, including many species of ducks and geese. Other migratory species that will find sanctuary on the area include some of the diving birds and several kinds of shore birds.

By Executive order of March 26, 1930, an area of 18,683 acres of public lands in Alfalfa County, Okla., was withdrawn for creating the Salt Plains Wild Life Refuge. The total area designated as suitable for the purpose contains 19,985 acres and comprises extensive flatlands that have been repeatedly submerged by flood waters from the Arkansas River. Many migratory birds common to the region, chiefly ducks and coots, will frequent the Salt Plains Refuge and nest there when it is fully developed. Shore birds, rails, bitterns, herons, gulls, and terns also appear on the marsh and water areas in the vicinity of the refuge.

Refuges To Be Acquired by Purchase

The Migratory Bird Conservation Commission in May, 1930, approved plans presented by the Biological Survey for the purchase of lands for two refuges under the migratory-bird conservation act. One is a 5,500-acre area in Alamosa County, Colo., embracing San Luis and Head Lakes, as well as numerous shallow sloughs, ponds, and lesser lakes. By reason of its situation in an otherwise arid region, this refuge will be of outstanding importance in the nation-wide network. Some of the migratory birds that are frequent or common breeders there are ducks, geese, coots, herons, grebes, soras, and several species of shore birds.

Negotiations were also concluded for the purchase of a 32,000-acre unit at Cape Romain, on the Atlantic seaboard in Charleston County, S. C. The State of South Carolina cooperated in the establishment of the refuge by enacting a law ceding to the United States jurisdiction over certain tidal lands falling within its boundaries. The Cape Romain unit is attractive to several species of ducks and is used as a nesting ground by various kinds of shore birds. Other birds seek this region in their migrations, while skimmers, terns, and herons are relatively abundant there.

Other Refuges for Migratory Birds

By an act of June 12, 1930, Congress authorized the Secretary of Agriculture to acquire 20,000 acres of land for a migratory-bird refuge in what is known as the Cheyenne Bottoms, in Barton County, Kans., the only extensive lake area in the State. The Biological Survey had previously made exhaustive investigations as to the suitability of the site for sanctuary purposes. Migratory waterfowl and shore birds in their semiannual flights frequent the Cheyenne Bottoms in immense numbers, and the area is the most suitable haven for them within hundreds of miles. Funds were made available to the Biological Survey in July, 1930, for initial steps toward the acquisition of the refuge.

For the Bear River Migratory-Bird Refuge in Utah, which was authorized by an act of April 23, 1928, 15,860 acres of land were purchased in the fiscal year 1930, and negotiations were concluded for the conveyance to the United States of 7,126 acres by exchange. The total land acres now under control within the Bear River Refuge is 56,486 acres.

Progress also continues in the acquisition of lands for the Upper Mississippi River Wild Life and Fish Refuge, created by an act of June 7, 1924, and at the close of the fiscal year 1930 the total area of land under control in the States of Iowa, Minnesota, Illinois, and Wisconsin amounted to 106,823 acres. The many sloughs, ponds, and lakes intermingled with the refuge lands contain an estimated area of 16,023 acres, making the total land and water area 122,846 acres, exclusive of approximately 70,000 acres in the main channel of the Mississippi River within the exterior limits of the refuge. About 20,000 acres of land are yet to be acquired.

The plan to establish refuges for our migratory birds calls for the active interest of lovers of wild life in all parts of the country and for their cooperation, individually or through their organizations, with the Bureau of Biological Survey.

RUDOLPH DIEFFENBACH,
Senior Land Valuation Engineer,
Bureau of Biological Survey.

REGIONAL Conferences Carry Outlook Facts Closer to Farm Needs

The development of the regional outlook conference in addition to the annual national conference held at Washington was the most significant progress made in 1930 in the work of bringing information on probable future markets to the attention of farmers.

Five such regional outlook conferences of groups of States were held during the year 1930 as follows: New England States, Boston, February 9–11; Appalachian States, Washington, D. C., September 18–28; Middle Western States, Ames, Iowa, September 25–27; Southern States, Atlanta, Ga., November 10–14; and Western States, Salt Lake City, Utah, December 15–17.

One of the problems in outlook work has been the difficulty of adapting the national outlook to local conditions in any given region. The practical use by an individual farmer of the facts supplied him is largely dependent upon the adjustments he can make in production. In many producing areas, natural, climatic, and geographic conditions are such that farmers have only a few, if any, optional lines of production. Statements regarding the best probable course for farmers of the country as a whole to follow in the production of a certain commodity may not be applicable to certain local areas because of the local conditions. In certain regions where climatic and rainfall conditions are such as to exclude the possibility of growing many crops except wheat, for example, the individual farmer is concerned with growing his wheat at the lowest possible cost and developing the most efficient possible unit of operation. In individual cases, this may mean an increase in acreage even in the face of probable low prices.

In the regional outlook conferences, States that have somewhat similar problems are grouped. Months previous to the conference, a program of procedure is formulated, and State and regional commodity committees are formed to assemble commodity facts from State sources. Committee members bring these data and facts to the regional conference. The national outlook is presented by the representatives of the Bureau of Agricultural Economics, and the national outlook is interpreted with the regional facts in mind.

Regional conferences usually last from three to four days, and emphasis is placed only upon the commodities which are of greatest importance in the region. The limited number of subjects considered allows time for a detailed discussion of each. Out of these discussions practical conclusions are drawn which are used as a basis of extension work.

Information is Localized

The principal benefit of the regional conferences is that they afford a means of localizing the reports by considering them at a time and

The plan to establish refuges for our migratory birds calls for the active interest of lovers of wild life in all parts of the country and for their cooperation, individually or through their organizations, with the Bureau of Biological Survey.

RUDOLPH DIEFFENBACH,
Senior Land Valuation Engineer,
Bureau of Biological Survey.

REGIONAL Conferences Carry Outlook Facts Closer to Farm Needs The development of the regional outlook conference in addition to the annual national conference held at Washington was the most significant progress made in 1930 in the work of bringing information on probable future markets to the attention of farmers.

Five such regional outlook conferences of groups of States were held during the year 1930 as follows: New England States, Boston, February 9–11; Appalachian States, Washington, D. C., September 18–28; Middle Western States, Ames, Iowa, September 25–27; Southern States, Atlanta, Ga., November 10–14; and Western States, Salt Lake City, Utah, December 15–17.

One of the problems in outlook work has been the difficulty of adapting the national outlook to local conditions in any given region. The practical use by an individual farmer of the facts supplied him is largely dependent upon the adjustments he can make in production. In many producing areas, natural, climatic, and geographic conditions are such that farmers have only a few, if any, optional lines of production. Statements regarding the best probable course for farmers of the country as a whole to follow in the production of a certain commodity may not be applicable to certain local areas because of the local conditions. In certain regions where climatic and rainfall conditions are such as to exclude the possibility of growing many crops except wheat, for example, the individual farmer is concerned with growing his wheat at the lowest possible cost and developing the most efficient possible unit of operation. In individual cases, this may mean an increase in acreage even in the face of probable low prices.

In the regional outlook conferences, States that have somewhat similar problems are grouped. Months previous to the conference, a program of procedure is formulated, and State and regional commodity committees are formed to assemble commodity facts from State sources. Committee members bring these data and facts to the regional conference. The national outlook is presented by the representatives of the Bureau of Agricultural Economics, and the national outlook is interpreted with the regional facts in mind.

Regional conferences usually last from three to four days, and emphasis is placed only upon the commodities which are of greatest importance in the region. The limited number of subjects considered allows time for a detailed discussion of each. Out of these discussions practical conclusions are drawn which are used as a basis of extension work.

Information is Localized

The principal benefit of the regional conferences is that they afford a means of localizing the reports by considering them at a time and place in the region which affords an opportunity for the maximum number of State workers to attend the meetings. They also encourage State workers to prepare local outlook information and use it in connection with the regional report. They enable the conference to devote more time to commodities of importance in the region and to omit discussions of unimportant subjects, thus conserving the time of all the workers.

The development of the regional conferences does not replace or restrict the annual national conference, since the latter is necessary to consider the world-wide and nation-wide aspects of the outlook. State workers wish to attend the national conference to make contacts with the sources of information in the Federal department; to meet workers from all other States; to inform themselves concerning many commodities which can not be considered at regional conferences, and to follow interregional adjustments more closely.

The development of regional outlook conferences is very timely in view of the readjustments that are becoming increasingly necessary in the farming systems of various regions as the result of nation-wide changes in economic conditions. The problem of the most profitable combinations of enterprises for farmers to follow is of major importance in many regions.

Outlook conferences in those regions supply facts and information that are of great benefit in attempting to solve these problems. A closer coordination of research and extension work is brought about. Research results are given the test of practicability, and an impetus is given to economic research along lines of greatest benefit to extension and experiment station workers and farmers.

A Guide in Planning Farm Work

Outlook reports are designed to furnish basic facts that will serve as a guide in farming operations. Greater success attends the management of a farm if such management is based upon probable future price conditions rather than upon current or past prices. Farmers always have expanded or contracted their farming operations in response to changing economic conditions, and they will continue to make such shifts. The primary purpose in outlook work is to furnish to farmers the facts, so that expansion or contraction can be effected at the right time.

One means of indicating the dollars-and-cents value of basing farm operations upon probable future market conditions is the setting up of a farm organization typical of a given area, showing probable receipts, expenses, and net income under each of several systems of management. Both the long-time and short-time outlook are considered in the set-up, and the relative advantages in probable income are shown. This method of presenting outlook material requires an intimate knowledge of local farming conditions; it brings to local farmers the local outlook adaptation in terms of actual farm operations which they can readily understand and use on their own farms.

THEW D. JOHNSON,
Agricultural Economist, Bureau of Agricultural Economics.

RETAIL Prices Follow Wholesale Prices But Change Later and Less Wholesale prices fell 15 per cent between July, 1929, and July, 1930. During the same period prices received by farmers fell more than 20 per cent. Farmers are wondering, therefore, whether retail prices for the commodities they buy can be expected to make similar declines. A study of the relationship of wholesale prices to prices paid by farmers for the goods they buy in other periods of rapidly changing prices should give some indication of how retail prices may be expected to react to the recent decline in wholesale prices.

Retail prices tend to follow changes in wholesale prices, but usually change later and to a somewhat smaller extent. The accompanying chart (fig. 146) of all commodity prices shows that, during the period of rapidly rising prices, 1915 to 1920, retail prices lagged behind wholesale prices and did not advance nearly so far. In the period of rapidly declining prices, 1920 to 1922, the same lag is noted in the decline of retail prices and the decline was not so great as in wholesale prices.

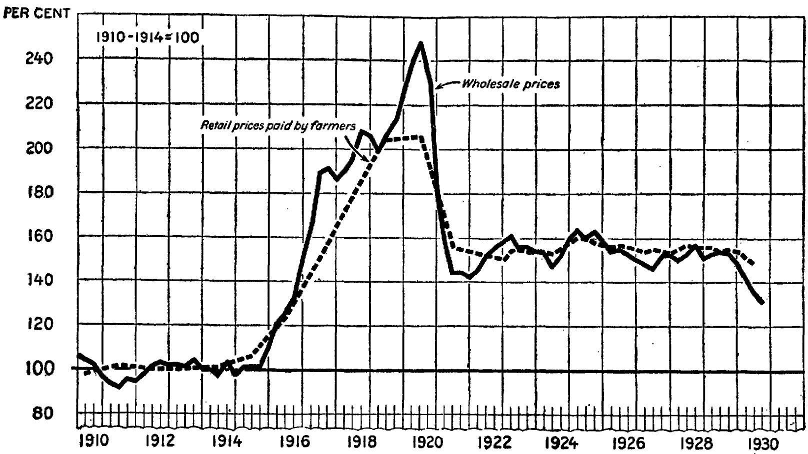


FIGURE 146.—Comparison of changes in wholesale and retail prices of all commodities, 1910–1929

During 1923 both series of prices reached a level about 56 per cent above pre-war and until last year tended to fluctuate near that level.

The general level of wholesale prices as shown in the accompanying chart is considerably influenced by prices of raw materials, such as steel, rubber, cotton, and wool. A decline in the prices of these raw materials frequently is not reflected in prices of the finished products until materials bought at the lower prices have been made into farm machinery, automobile tires, clothing, etc. Consequently, a part of the lag of retail prices behind wholesale prices is accounted for by the time consumed in converting raw materials into finished products. Since costs of manufacturing do not usually fluctuate so much as prices for raw products, prices for finished goods are more stable and cause less fluctuations in retail prices than in wholesale prices.

Wholesale Change Eventually Passed Along

Everyone hesitates to buy in a market where prices are continually changing. For this reason retailers like to keep their prices as steady as possible. In a period of rapidly changing prices they frequently

40442°—31——30

do not raise or lower their prices to customers until they are sure that the new level of prices will continue. To a certain extent retailers are justified in not lowering their prices when wholesale prices decline; if they did they would suffer a loss, as their stocks of goods on hand were often bought at the old price level. Costs for transportation, labor for assembling and distributing commodities, and rent for shop or storage space, which must be added to the wholesale prices, are all slowly adjusted to changes in the general price level. When the change in the level of wholesale prices is permanent, however, the retailer is soon forced to pass the change in wholesale prices on to the consumer. Therefore, if the lower level of wholesale prices continues, it is likely that a large part of the recent price decline will soon be reflected in prices farmers pay.

The time at which the lower levels of retail prices will be reached will vary considerably for different commodities. Retail prices for goods that require little or no processing and are held by the retailer a short time only may be expected to change very soon after a change

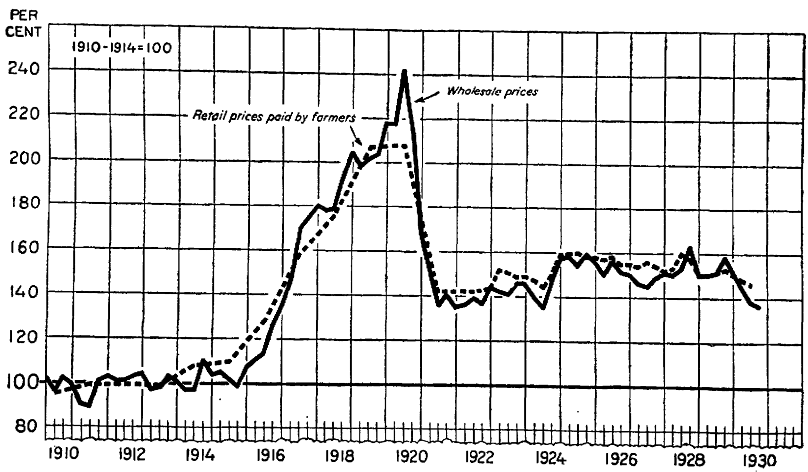


FIGURE 147.—Comparison of changes in wholesale and retail prices of food, 1910–1929

occurs in wholesale prices. Most foods, feeds, and fuels fall into this class of goods. Prices for commodities that farmers buy at only one time during the year, such as seeds and fertilizers, also respond quickly to changes in wholesale prices, as local dealers carry them for only a short period during the year. On the other hand, retail prices for commodities that require a great deal of processing and are held by dealers for some time respond very slowly to changes in wholesale prices and usually change less than wholesale prices because of the large amount of labor involved in manufacturing. A large part of farmers' purchases, such as farm machinery, building materials, clothing, and furniture, fall into this class and largely account for the lag of prices paid by farmers behind wholesale prices. The accompanying chart of food prices (fig. 147) shows how closely retail prices follow wholesale prices.

Different methods of retailing commodities also cause variations in the length of time between changes in retail prices and wholesale prices. Some commodities such as automobiles are sold to farmers at the factory or wholesale price plus the cost of freight and a fixed handling charge. For these commodities any change in the wholesale price is almost immediately reflected in the retail price. Other commodities such as lumber are bought in carload lots by the retailer and sold to the farmer in smaller lots over a period of time. Although wholesale prices may decline before the retailer has sold out his stock, he can not afford to lower prices until he receives a new order of goods at the lower price level.

Prices Fairly Stable from 1923 to 1929

From 1923 to 1929 there were no wide fluctuations in either wholesale or retail prices and there was little change in the important costs of distributing commodities. Therefore a comparison of retail and wholesale prices for the different groups of commodities during this period will show how much more closely the retail prices of some commodities tend to follow wholesale prices than others. The chart of food prices shows that from 1923 to 1929 every important change in the level of wholesale prices was almost immediately followed by a similar change in retail prices. Feed and fertilizer prices during this period also followed closely the changes in wholesale prices. The tendency of these commodities to respond to changes in wholesale prices can be shown by their price trends during the first part of the recent price decline. In June, 1930, the decline in prices was well under way and wholesale prices were 9 per cent below June, 1929. Retail food prices in June were 3.3 per cent lower than a year earlier, feed prices were 5.5 per cent lower and fertilizer prices were 4.5 per cent below the same time last year.

On the other hand, retail prices of several groups of commodities have shown little tendency to follow wholesale prices during the years 1923 to 1929. In 1929, wholesale prices of clothing were nearly 12 per cent lower than in 1923, while retail prices were the same as 1923. Building-material prices declined 11 per cent at wholesale markets, while retail prices advanced 2 per cent. Prices of farm machinery at wholesale markets in 1929 were 1 per cent higher than in 1923 and retail prices were 8 per cent higher. These comparisons show that the two series of prices for these commodities do not move closely together and that farmers have not received the benefits of declining wholesale prices. Up to June 15, 1930, clothing had made the greatest response to the recent decline in prices and prices were 4.5 per cent below a year earlier. Prices for building materials and machinery were about 2 per cent below a year before. The extent to which retail prices for these commodities will reflect the decline in the general price level is uncertain and unless the lower level of prices continues retail prices are not likely to decline so much as the general level of wholesale prices.

C. M. PURVES,
Agricultural Economist, Bureau of Agricultural Economics.

ROADSIDE Tree Planting Restores Beauty Impaired by Highway Construction With the increasing interest in the appearance of the roadsides, the laws governing the operations of the State highway departments are gradually being amended to authorize expenditures for roadside planting as well as road construction. The departments have always been cognizant of the economic as well as esthetic value of such plant-dling charge. For these commodities any change in the wholesale price is almost immediately reflected in the retail price. Other commodities such as lumber are bought in carload lots by the retailer and sold to the farmer in smaller lots over a period of time. Although wholesale prices may decline before the retailer has sold out his stock, he can not afford to lower prices until he receives a new order of goods at the lower price level.

Prices Fairly Stable from 1923 to 1929

From 1923 to 1929 there were no wide fluctuations in either wholesale or retail prices and there was little change in the important costs of distributing commodities. Therefore a comparison of retail and wholesale prices for the different groups of commodities during this period will show how much more closely the retail prices of some commodities tend to follow wholesale prices than others. The chart of food prices shows that from 1923 to 1929 every important change in the level of wholesale prices was almost immediately followed by a similar change in retail prices. Feed and fertilizer prices during this period also followed closely the changes in wholesale prices. The tendency of these commodities to respond to changes in wholesale prices can be shown by their price trends during the first part of the recent price decline. In June, 1930, the decline in prices was well under way and wholesale prices were 9 per cent below June, 1929. Retail food prices in June were 3.3 per cent lower than a year earlier, feed prices were 5.5 per cent lower and fertilizer prices were 4.5 per cent below the same time last year.

On the other hand, retail prices of several groups of commodities have shown little tendency to follow wholesale prices during the years 1923 to 1929. In 1929, wholesale prices of clothing were nearly 12 per cent lower than in 1923, while retail prices were the same as 1923. Building-material prices declined 11 per cent at wholesale markets, while retail prices advanced 2 per cent. Prices of farm machinery at wholesale markets in 1929 were 1 per cent higher than in 1923 and retail prices were 8 per cent higher. These comparisons show that the two series of prices for these commodities do not move closely together and that farmers have not received the benefits of declining wholesale prices. Up to June 15, 1930, clothing had made the greatest response to the recent decline in prices and prices were 4.5 per cent below a year earlier. Prices for building materials and machinery were about 2 per cent below a year before. The extent to which retail prices for these commodities will reflect the decline in the general price level is uncertain and unless the lower level of prices continues retail prices are not likely to decline so much as the general level of wholesale prices.

C. M. PURVES,
Agricultural Economist, Bureau of Agricultural Economics.

ROADSIDE Tree Planting Restores Beauty Impaired by Highway Construction With the increasing interest in the appearance of the roadsides, the laws governing the operations of the State highway departments are gradually being amended to authorize expenditures for roadside planting as well as road construction. The departments have always been cognizant of the economic as well as esthetic value of such planting, but the demand of automobile owners for highways of smooth, easy-riding, and dustless surfaces has engaged their whole attention and revenue. Improvement of highways has been the greatest need, and in most States the largest revenue it has been possible to collect has not been more than sufficient to satisfy the minimum requirements of the growing traffic.

With the completion of the most urgently needed roadway improvements, public attention is turning more and more toward the condition and appearance of the countryside. Motorists are demanding that the highways afford them recreation and beauty. State highway departments, so far as their laws permit, have cooperated with agencies interested in roadside restoration. For the lack of beauty along the highways is mainly the result of a failure to restore that which in the construction of the roads it has been necessary to destroy. Unquestionably, there has been some needless destruction of old trees which it will take many years to replace. But, a free use of the knife has been needed in the major operation which has been required to clear the way for the great and steadily mounting surge of motor vehicles that demanded freer passage over the main roads of the country. Widening, straightening, and reduction of the grades of the old roads have been necessary, and these operations have entailed much sacrifice of natural beauty and have left ragged scars upon the landscape. In carrying out the betterment of the road surfaces, the scars have not been obliterated.

Massachusetts Began in 1912

Massachusetts was perhaps the first State to realize the interdependence existing between roadside planting and road construction, when in 1921, it created an office in the State highway department and filled it with a man whose skill in landscape planting has made possible the accomplishment of large results at relatively small expenditure. The State had begun planting trees along its highways as early as 1912, but it was not until nine years later that the work was correlated with that of construction, and an office created for carrying it out.

Pennsylvania, another pioneer, authorized the planting of roadsides under the supervision of its State highway commissioner by amendments in 1921 and 1923 of its State highway act. This was followed in 1927 by the creation of a forestry unit as a branch of the department of highways to plant and care for roadside trees, shrubs, vines, and grasses. The department also cooperates with persons and organizations according to a definite policy.

Delaware has been planting trees and shrubs along its roads since 1920, with the result that probably 50 per cent of the entire State highway mileage is now improved with planting.

Connecticut organized a landscape division of its State highway department in 1927 and has since done some effective work. In the same year the highway commission of Michigan took over the task of beautifying the trunk-line roads of that State; and the Oklahoma Highway Department began similar work.

In 1928 Missouri employed a landscape architect to cooperate with interested organizations and individuals in roadside development; and California in the same year also employed a landscape planner and embarked on a limited program.

Wisconsin, the most recent addition to the group which has recognized the interdependence of planting with construction, authorized its State highway commission in 1929 to employ a director of regional planning, one of whose duties is to cooperate with and assist local planning agencies in roadside planting.

On the part of the Federal Government, Congress in 1928 recognized the planting of shade trees as a part of the improvement of the Federal-aid highway system and specifically authorized the expenditure of Federal funds for that purpose whenever such aid is requested by the State highway departments. The fact that no State has yet applied for aid is due to no lack of interest in roadside planting but rather to the fact that the States that are ready to start planting have no need to request financial assistance.

It was after the World War and following closely upon the signing of the armistice that the search of patriotic societies and local community organizations for a fitting means of commemorating the services of the men who fell in conflict led to the planting of bordering trees along short sections of roads in all parts of the country. Their efforts served as object lessons of what might be done at relatively small expense to relieve the prevalent barrenness of American roadsides.

Requires Careful Planning

Thus, tree planting became the means of roadside beautification upon which most of the aroused popular interest has been centered. It is also the activity that requires the most careful planning. In the absence of such planning, it is the activity which, more than all others needed for the restoration of the beauty of our roadsides, may be fraught with the greatest waste and futility.

Trees at full growth are among the most conspicuous objects in the landscape. When, therefore, as in every scheme of roadside development, the reason of their planting is the creation of beauty, there is need for care and thought to make sure that in kind and position they will harmonize with their surroundings.

Trees attain maturity slowly and while young require a good deal of care and protection, the amount depending upon their hardiness and adjustment to their surroundings. Their successful use in roadside development demands effective provision for their maintenance as well as for the planting, and calls for the selection of only the hardier varieties of indigenous growth.

As a full grown tree represents a considerable investment of care, money, and time, its destruction constitutes a distinct loss, which should be avoided whenever possible by forethought in planting beyond the limits of probable subsequent road widening and relocation.

Through failure to take account of some or all of these facts, much praiseworthy effort of patriotic and civic groups has been misdirected. Trees have been planted within existing narrow right of ways so close to the present roadways that they must certainly be uprooted to make way for necessary future surface widening. Exotic varieties and tender young indigenous trees have been set out and left to struggle through to a doubtful maturity without the least provision for their care and protection.

Row planting, which characterizes most of the voluntary effort of civic groups, is a form of treatment that should be used sparingly in rural surroundings. It may be employed with good effect on an occasional straight stretch of country highway traversing level or slightly rolling, cultivated and relatively treeless farm land, under which conditions the trimness of the regular alignment and spacing of the trees may add the final touch to an ordered countryside. But even in such surroundings, with overuse, it may easily become monotonous.

On a road that lies alternately in cut and fill, so that adjacent ground varies from levels well above to others well below the roadway, such mathematical precision of placement is almost impossible, and if it is somehow arranged, is extremely unnatural.

Approximation to Natural Conditions Desirable

While tree planting is of great importance in roadside development, the most successful scheme of beautification of a rural road is generally that which restores the roadside as nearly as possible to the undisturbed natural condition in which it existed before it was slashed and scarred by the hurried work of the road maker. While tree planting is necessary to repair much of the destruction that has been permitted in the past, of equal importance is the sodding of the road shoulders and the mantling of banks and side slopes with grasses, vines, and wild flowers to hide the scars of construction and to restore the natural beauty of the countryside. They are equally desirable as measures for the protection and maintenance of the road structure. Sodding of shoulders and planting of side slopes with vines or small shrubs prevent soil erosion. Judicious planting of hedges, shrubs, bushes, and other low growth lends additional charm to the roadside picture and is of value to song birds and other wild life. In northern latitudes, such planting must be properly placed to aid in the prevention of road-clogging snowdrifts, otherwise it will prove harmful.

The removal of trees and underbrush to afford distant views from mountainside roads and the opening of vistas toward rivers and lakes from roads paralleling their banks are desirable contributions to the pleasure of motoring. But they necessitate consideration of the probable halting of traffic and suitable provision for parking in the planning of the roadway.

In the construction of future roadways, it is highly important that there shall be a studied effort to preserve and enhance the natural beauty by intelligent clearing of the right of way, the preservation of desirable trees and natural growth, and the development of vistas of decorative value.

The interception and control of springs within the right of way are essential to the protection of the road. If their water is potable they may be developed at small expense into attractive drinking fountains for the comfort and convenience of travelers.

These are only a few examples of the interrelation of measures that may be adopted for the beautification and the planning and construction of the roads.

B. M. Joyce,
Assistant Editor, Bureau of Public Roads.

ROADS of Traffic-Bound Type Meet Needs of Some Sections at Low Cost

Traffic-bound and gravel roads which have been developed to meet the needs of the relatively light traffic on some of the main roads in sparsely settled sections of the West and on secondary roads in more densely populated sections are well adapted for use where it is desired to surface a farm road.

tions the trimness of the regular alignment and spacing of the trees may add the final touch to an ordered countryside. But even in such surroundings, with overuse, it may easily become monotonous.

On a road that lies alternately in cut and fill, so that adjacent ground varies from levels well above to others well below the roadway, such mathematical precision of placement is almost impossible, and if it is somehow arranged, is extremely unnatural.

Approximation to Natural Conditions Desirable

While tree planting is of great importance in roadside development, the most successful scheme of beautification of a rural road is generally that which restores the roadside as nearly as possible to the undisturbed natural condition in which it existed before it was slashed and scarred by the hurried work of the road maker. While tree planting is necessary to repair much of the destruction that has been permitted in the past, of equal importance is the sodding of the road shoulders and the mantling of banks and side slopes with grasses, vines, and wild flowers to hide the scars of construction and to restore the natural beauty of the countryside. They are equally desirable as measures for the protection and maintenance of the road structure. Sodding of shoulders and planting of side slopes with vines or small shrubs prevent soil erosion. Judicious planting of hedges, shrubs, bushes, and other low growth lends additional charm to the roadside picture and is of value to song birds and other wild life. In northern latitudes, such planting must be properly placed to aid in the prevention of road-clogging snowdrifts, otherwise it will prove harmful.

The removal of trees and underbrush to afford distant views from mountainside roads and the opening of vistas toward rivers and lakes from roads paralleling their banks are desirable contributions to the pleasure of motoring. But they necessitate consideration of the probable halting of traffic and suitable provision for parking in the planning of the roadway.

In the construction of future roadways, it is highly important that there shall be a studied effort to preserve and enhance the natural beauty by intelligent clearing of the right of way, the preservation of desirable trees and natural growth, and the development of vistas of decorative value.

The interception and control of springs within the right of way are essential to the protection of the road. If their water is potable they may be developed at small expense into attractive drinking fountains for the comfort and convenience of travelers.

These are only a few examples of the interrelation of measures that may be adopted for the beautification and the planning and construction of the roads.

B. M. Joyce,
Assistant Editor, Bureau of Public Roads.

ROADS of Traffic-Bound Type Meet Needs of Some Sections at Low Cost

Traffic-bound and gravel roads which have been developed to meet the needs of the relatively light traffic on some of the main roads in sparsely settled sections of the West and on secondary roads in more densely populated sections are well adapted for use where it is desired to surface a farm road.

The first step in building such a road is to grade the roadway to the proper width and crown with side ditches and culverts as needed.[10] Crushed rock, gravel, cinders, slag, chats, and shell may be used for this type of surfacing. Crushed limestone is particularly desirable because of its binding qualities and the small sized material can often be obtained as waste product from lime plants. Slag, chats, and cinders may be obtained from industrial plants and in many localities along the seacoast it is possible to obtain shell suitable for road material. The material from any of these sources should preferably be

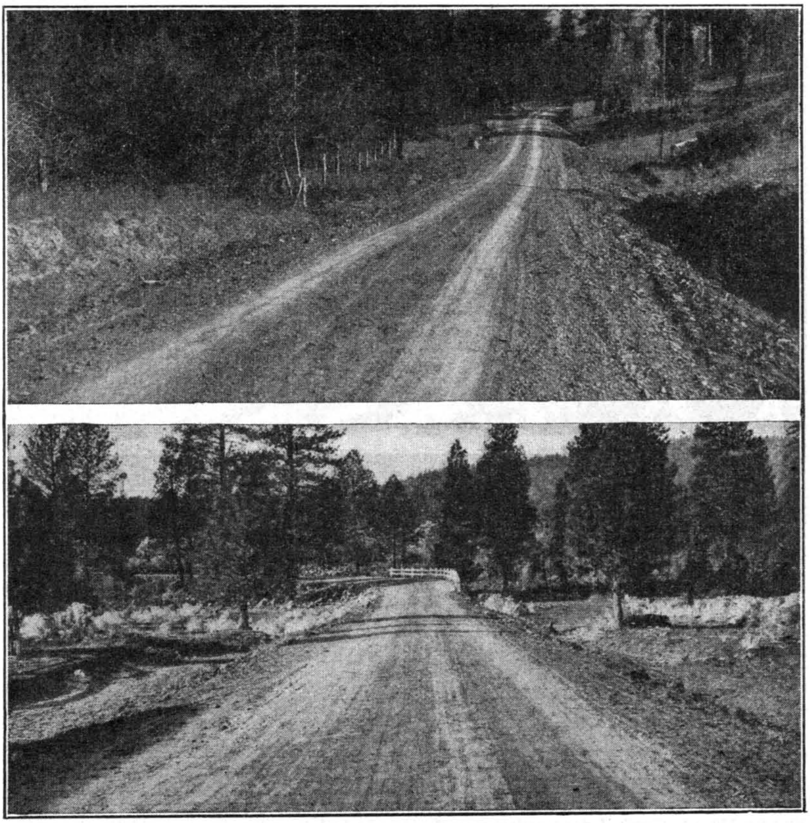


FIGURE 148.—Traffic-bound crushed stone roads showing the smooth surface which can be produced

of a size that will all pass a 1-inch ring and contain at least 80 per cent larger than ¼-inch size.

If gravel is used it will be best to be guided by local experience in selecting a material. Gravels varying greatly in composition have been successfully used. Unsatisfactory results are frequently due to use of material containing gravel particles of too large a size or an excess of clay in the mixture. For good construction the largest size of gravel should not exceed 1 inch. From 55 to 75 per cent of the

[10] Information on this subject will be found in the article Road Work on Farm Outlets Needs Skill and Right Equipment, on p. 528 of the Yearbook of Agriculture, 1928. This article has been reprinted as Yearbook Separate No. 1036, and can be supplied by the Bureau of Public Roads, U. S. Department of Agriculture, Washington, D. C.

material (by weight) should be larger than one-fourth of an inch in size. The greater the amount of small particles in the mixture the more clay will be required as a binder. Clay should not be in excess of 10 to 15 per cent of the mixture. Gravel from pits frequently has an excess of clay, while that from stream beds sometimes requires the addition of clay. (Fig. 148.)

In the traffic-bound macadam type of surfacing, the initial application of granular material is forced into the subgrade and acts as a subgrade stabilizer. For this reason it is sometimes economical to use inferior material for the first application and better material for the courses that will take the wear of traffic.

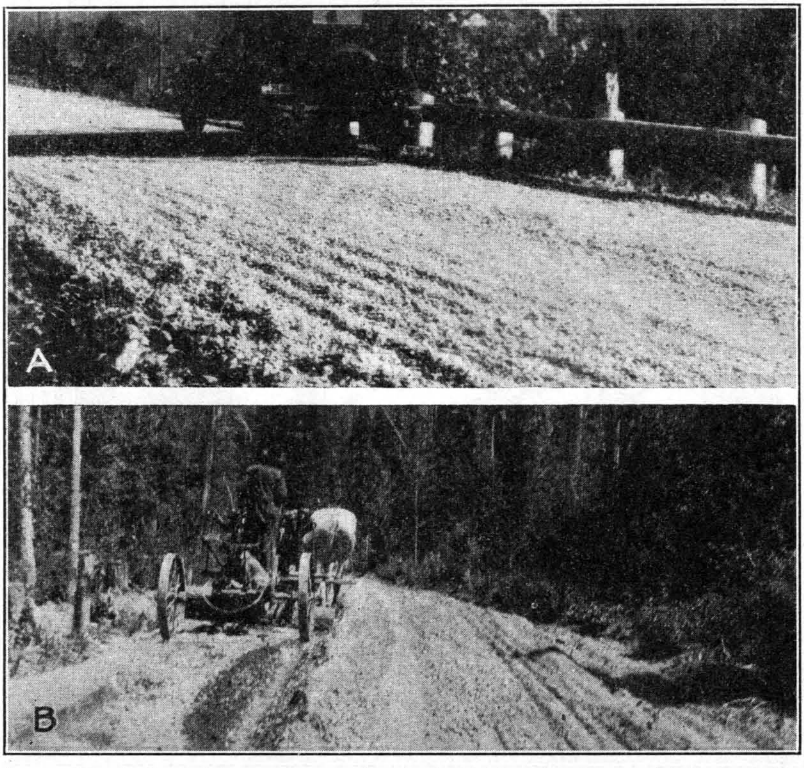


FIGURE 149.—A, Crushed stone surface recently placed which is undergoing consolidation by traffic Frequent dragging is required during this period. B, Spreading crushed stone

After the road has been graded and drained and somewhat compacted by traffic, the surfacing material is brought to the job and dumped in a windrow along one shoulder. Two windrows make passing of vehicles difficult and dangerous and also tend to hold water on the subgrade. Best results are obtained by blading light applications of the surfacing material over the subgrade but on farm roads where a blade grader is not available, the material may be spread by hand and the road drag used to even it up. The amount placed during this first application will depend on the condition of the subgrade. If the subgrade is moist it will be necessary to use considerably more than if it is dry. Ordinarily 1½ to 3 inches will be sufficient and it is important that too heavy an application be avoided because it will defeat the purpose intended, namely, compaction by traffic. If the material is placed in a thick course traffic will use the shoulder if it is possible, and even if traffic attempts to consolidate it, the material is scattered about and much of it is wasted. (Fig. 149.)

While the compacting process is going on, care should be taken that it is dragged often enough to keep the surface smooth and that the traffic is distributed over the surface so as to compact it uniformly. The small size of the particles permits this method to be used without serious inconvenience to traffic.

If the work is properly done the resulting surface will be quite smooth—decidedly more so than a rolled stone surface and can be kept in excellent condition by dragging.

Where a higher type of surface is desired it may be possible to arrange to have a surface treatment applied when such work is being done on public highways in the vicinity. There are a number of methods of applying surface treatment and a typical method will be briefly described.

The road surface must be properly shaped, well compacted, and cleaned of dust and loose material. From one-fourth to one-third gallon per square yard of priming material (tar or light asphaltic oil) is applied. Time is allowed for this material to penetrate the surface and then one-third to one-half gallon per square yard of binder (asphaltic oil or tar) is applied hot and immediately covered with crushed stone ranging in size from one-fourth to three-fourths of an inch and at a rate of 30 to 50 pounds per square yard. The surface is then rolled and is ready for traffic which completes the consolidation and smoothing of the surface. Rolling is sometimes omitted but this would not be desirable on a farm road with very light traffic unless the bituminous material is of the type mentioned below. It is necessary that the surface be worked and ironed out so as to form a mat within a few days after placing.

For farm roads where equipment for heating the asphalt and rolling is not available good results may be obtained by using cold tar or a cut-back asphalt instead of binder asphalt. If the cut-back asphalt is used a road drag should be operated while it is drying out.

In buying bituminous materials it will be best to obtain the advice of some one familiar with their use in road construction.

R. E. Royall, *Senior Highway Engineer*,
A. G. Bruce, *Senior Highway Engineer*,
Bureau of Public Roads.

SAWMILLS' Indirect Costs Often Ignored by Farmer Operators

Many farmers engaged in operating small sawmills in the hope of profitably employing, between crops, their teams, tractors, and trucks, often ignore some of the costs entering into the production of their product. Obvious direct costs, such as wages, supplies required each day, and even the costs of making roads and mill set-ups are usually considered. Less obvious costs, such as expenditures for depreciation, maintenance and repair of equipment, taxes, and interest on capital tied up in the business are usually ignored. Costs thus overlooked often run from around $2.40 to $3 a thousand feet, board measure, or between 10 and 20 per cent of the total production cost (stumpage included).

defeat the purpose intended, namely, compaction by traffic. If the material is placed in a thick course traffic will use the shoulder if it is possible, and even if traffic attempts to consolidate it, the material is scattered about and much of it is wasted. (Fig. 149.)

While the compacting process is going on, care should be taken that it is dragged often enough to keep the surface smooth and that the traffic is distributed over the surface so as to compact it uniformly. The small size of the particles permits this method to be used without serious inconvenience to traffic.

If the work is properly done the resulting surface will be quite smooth—decidedly more so than a rolled stone surface and can be kept in excellent condition by dragging.

Where a higher type of surface is desired it may be possible to arrange to have a surface treatment applied when such work is being done on public highways in the vicinity. There are a number of methods of applying surface treatment and a typical method will be briefly described.

The road surface must be properly shaped, well compacted, and cleaned of dust and loose material. From one-fourth to one-third gallon per square yard of priming material (tar or light asphaltic oil) is applied. Time is allowed for this material to penetrate the surface and then one-third to one-half gallon per square yard of binder (asphaltic oil or tar) is applied hot and immediately covered with crushed stone ranging in size from one-fourth to three-fourths of an inch and at a rate of 30 to 50 pounds per square yard. The surface is then rolled and is ready for traffic which completes the consolidation and smoothing of the surface. Rolling is sometimes omitted but this would not be desirable on a farm road with very light traffic unless the bituminous material is of the type mentioned below. It is necessary that the surface be worked and ironed out so as to form a mat within a few days after placing.

For farm roads where equipment for heating the asphalt and rolling is not available good results may be obtained by using cold tar or a cut-back asphalt instead of binder asphalt. If the cut-back asphalt is used a road drag should be operated while it is drying out.

In buying bituminous materials it will be best to obtain the advice of some one familiar with their use in road construction.

R. E. Royall, *Senior Highway Engineer*,
A. G. Bruce, *Senior Highway Engineer*,
Bureau of Public Roads.

SAWMILLS' Indirect Costs Often Ignored by Farmer Operators

Many farmers engaged in operating small sawmills in the hope of profitably employing, between crops, their teams, tractors, and trucks, often ignore some of the costs entering into the production of their product. Obvious direct costs, such as wages, supplies required each day, and even the costs of making roads and mill set-ups are usually considered. Less obvious costs, such as expenditures for depreciation, maintenance and repair of equipment, taxes, and interest on capital tied up in the business are usually ignored. Costs thus overlooked often run from around $2.40 to $3 a thousand feet, board measure, or between 10 and 20 per cent of the total production cost (stumpage included).

Taxes and the cost of keeping equipment in working order are overlooked largely because they occur with an irregularity requiring a systematic accounting habit in order to include them. Depreciation and interest on the capital tied up in the business are overlooked because the average operator does not have the basic information by which they can be reckoned.

Depreciation Charges

Depreciation is a charge to compensate for the decrease in value of equipment as a result of use, time, or the development of more efficient machines. The accepted practice is to charge off as a cost each year a portion of the total value of the equipment so that when discarded this total equals the decreased value of the equipment. Timber-appraisal experts and other authorities commonly discount the following percentages of the original purchase price for each year of service: Teams, 15 per cent; harness, 25 per cent; small tools, 100 per cent; trucks, 25 per cent; tractors, 20 per cent; logging wagons, 50 per cent; lumber-hauling wagons, 20 per cent; sawmill, 15 per cent.

Interest on capital is obviously a cost when the operator is running on borrowed capital since he must pay such interest. If the operator provides the capital, he ties up money which otherwise could be placed in interest-producing investments. An interest return of 5 per cent is therefore properly allowed on capital. To determine the extent of this cost, estimate the average amount of capital tied up. This cost should include the cost of the average amount of stumpage carried during the year; the cost, properly discounted for previous service, of the equipment used; and the cost of producing the average amount of stock on hand. In operations that market their product green from the saw, the capital investment can be kept relatively low. Where seasoning is required, the capital investment is large, and the interest cost correspondingly high.

TABLE 15.—*Costs frequently ignored in operating small sawmills*

Item	Cost per year	Cost per thousand board feet
Interest on capital invested ($18,600 at 5 per cent)	$930	$0.93
Maintenance of equipment (saw teeth, belts, boiler repairs, grease, etc.)	280	.28
Depreciation (total investment in equipment $7,100; average life of equipment estimated at 6.57 years)	1,080	1.08
Taxes (equipment and lumber)	100	.10
Total of items usually ignored	2,390	2.39

NOTE.—The capital required comprised the following: Woods (4 teams, 4 sets of harness, and small tools), $1,300; mill (sawmill and boiler), $2,800; lumber haul (a 2-ton motor truck, and 4 teams, 4 wagons, and 4 sets of harness), $3,000; making a total gross of $7,100 of which $3,540 was charged off as depreciation against previous operations, leaving a total net equipment investment of $3,560; stock (an average stock of 5 months' cut) carried in the yard on which stumpage, logging, sawing, and hauling to yard amounted to $20.13 per thousand board feet or $11,730, in addition an average of 2 months' cut had been sold but the bills were still uncollected and the hauling to railroad, loading, and selling of this lot had, at $5.40 per thousand board feet, amounted to $890; margin of safety (for slow sales, collections, and similar variations) on the average total investment of $16,186 at 15 per cent was $2,427. Hence, the total capital required was $18,600.

Computing Costs on Board Foot Basis

Since sales and costs of lumber are computed on the basis of a thousand board feet, the final step in allocating the costs of taxes, maintenance, depreciation, and interest is to total them and divide the total by the number of thousand board feet cut annually.

In farmer-operated mills some of the equipment is used at intervals for nonsawmill jobs and a fair apportionment of depreciation and interest costs against the sawmill operation is to proportion them on the basis of the fraction of the year they are available to this operation.

The accompanying tabulation (Table 15) from an Appalachian hardwood operation cutting about 1,000,000 board feet per year shows the nature and extent of costs that are frequently ignored.

C. J. TELFORD,
Small-Mill Specialist, Forest Service.

SAWMILLS Pay More for Logs That Are Correctly Bucked Sawmills large and small are depending increasingly upon logs from farmers and small timberland owners. A few facts on how to buck felled trees, or cut them into logs, so that they will bring the most money may therefore be helpful. Before making any cuts, the felled tree should be sized up and laid off tentatively to determine where the cuts should be made in order to get as much of the stem as possible into upper grades.

Trees should be bucked so that the clear lumber is kept within the same log as far as possible. Sixteen feet is the most desirable length from the milling standpoint. Oftentimes, however, a 16-foot butt log is clear for 14 feet and has 2 feet of knotty material on the end. It will be better to cut it to 14 feet and leave the knotty material in the next log.

Much waste also results if long logs are cut regardless of the crookedness of a tree. (Fig. 150, A.) Most grading rules allow a 4-inch deflection from a straight line in a 16-foot log. Sharp crooks should be cut out entirely. (Fig. 150, B.)

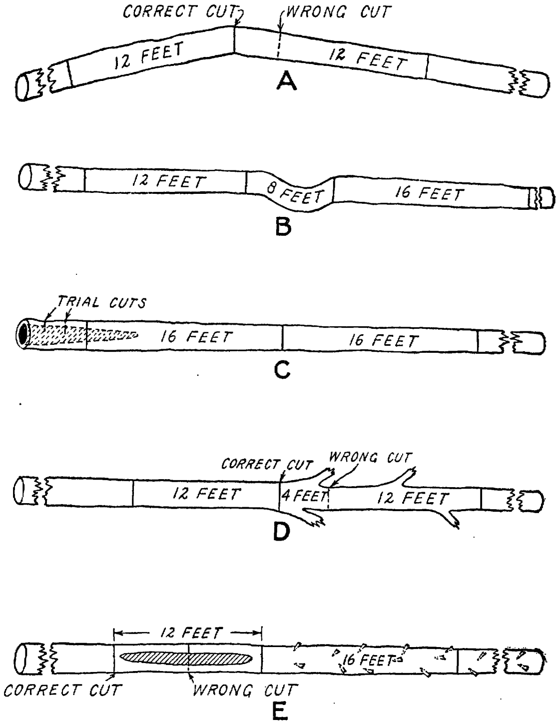


FIGURE 150.—A, Tree trunks with sweep should be cut where the sweep is greatest, even though some short logs may result; B, crooks should be eliminated; C, trial cuts should be made on rotten butts until enough sound material occurs to pay its way, the first log should be a long one; D, confine the clear material to the same log, in hardwoods the diameter below large branches is much larger than above them and the scale is consequently higher; E, rotten material, long cat faces, or other similar defects in softwoods should be confined to the same log

Making frequent trial cuts in defective butts or other sections where the extent of the defect is concealed, minimizes the chances of cutting out excessive sound material. (Fig. 150, C.) Most buyers, especially

In farmer-operated mills some of the equipment is used at intervals for nonsawmill jobs and a fair apportionment of depreciation and interest costs against the sawmill operation is to proportion them on the basis of the fraction of the year they are available to this operation.

The accompanying tabulation (Table 15) from an Appalachian hardwood operation cutting about 1,000,000 board feet per year shows the nature and extent of costs that are frequently ignored.

C. J. TELFORD,
Small-Mill Specialist, Forest Service.

SAWMILLS Pay More for Logs That Are Correctly Bucked Sawmills large and small are depending increasingly upon logs from farmers and small timberland owners. A few facts on how to buck felled trees, or cut them into logs, so that they will bring the most money may therefore be helpful. Before making any cuts, the felled tree should be sized up and laid off tentatively to determine where the cuts should be made in order to get as much of the stem as possible into upper grades.

Trees should be bucked so that the clear lumber is kept within the same log as far as possible. Sixteen feet is the most desirable length from the milling standpoint. Oftentimes, however, a 16-foot butt log is clear for 14 feet and has 2 feet of knotty material on the end. It will be better to cut it to 14 feet and leave the knotty material in the next log.

Much waste also results if long logs are cut regardless of the crookedness of a tree. (Fig. 150, A.) Most grading rules allow a 4-inch deflection from a straight line in a 16-foot log. Sharp crooks should be cut out entirely. (Fig. 150, B.)

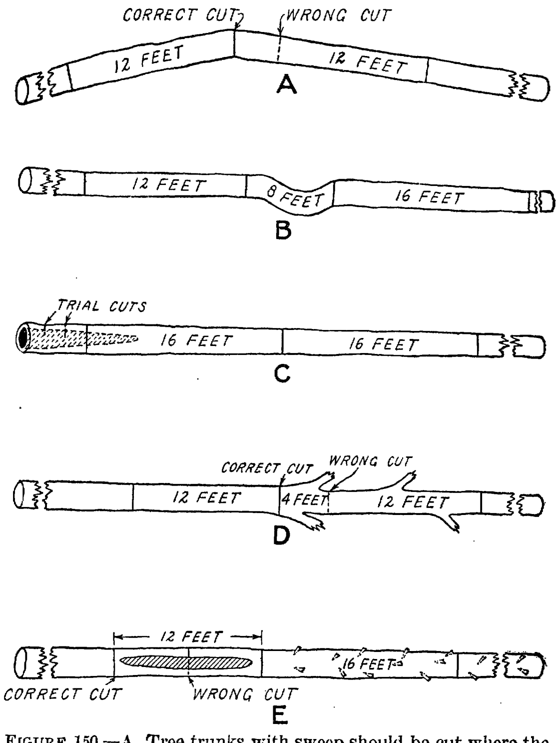


FIGURE 150.—A, Tree trunks with sweep should be cut where the sweep is greatest, even though some short logs may result; B, crooks should be eliminated; C, trial cuts should be made on rotten butts until enough sound material occurs to pay its way, the first log should be a long one; D, confine the clear material to the same log, in hardwoods the diameter below large branches is much larger than above them and the scale is consequently higher; E, rotten material, long cat faces, or other similar defects in softwoods should be confined to the same log

Making frequent trial cuts in defective butts or other sections where the extent of the defect is concealed, minimizes the chances of cutting out excessive sound material. (Fig. 150, C.) Most buyers, especially in the larger mills, encourage the butting of logs clear of all rot, which means better logs but more waste.

The value of the lumber from top, top knotty, and middle knotty logs is practically the same in logs 8 inches in diameter as in logs 20 inches in diameter. A large coarse-knotted log, however, costs considerably more to trim than one with small knots. Rotten material, long cat faces (fig. 150, D and E), or other similar defects in softwoods should be confined to the same log.

Freshly cut logs always bring a better price than weathered, stained, and dirty logs. Logs should be transported from the woods to the market as promptly as possible. When felling a tree, a low stump is important because high-quality material occurs in the lower part of the tree. Split logs, logs with splinters pulled from them, or logs with splinters hanging on the ends are never so desirable as logs without these defects.

JOHN B. CUNO,
Associate Wood Technologist, Forest Service.

SAWMILLS Profit by Closely Controlling Thickness of Boards

Farmer-operated sawmills often lose money by producing inaccurately cut lumber. The product brings less per thousand board feet and encounters stiffer sales resistance than that from the more accurate band mills. A less obvious loss is the excessive manufacturing waste that results from inaccurate cutting.

Recent studies by the Forest Products Laboratory indicate that the portable-mill operator, in sawing for thickness, cuts only about 20 per cent of the boards within one thirty-second of an inch of the thickness he sets for. The remaining 80 per cent vary in thickness from as much as eight thirty-seconds of an inch too thin to five thirty-seconds of an inch too thick. (Fig. 151, upper pile.) To counteract this tendency to cut too thin, the operator must set to cut most boards too thick. (Fig. 151, middle pile.) But in so doing each one thirty-second of an inch added reduces the possible total cut exactly as if the saw kerf were increased one thirty-second of an inch. A far better expedient is to minimize waste by keeping the equipment in good condition.

Causes of Inaccurate Cutting

The main causes for inaccurately cut lumber are: (1) Faulty condition of the saw, such as uneven filing of saw teeth, excessive or uneven swage, dull teeth on one side, unequal tension; (2) worn bearings in mandril, carriage wheels, and particularly in the setworks; (3) poor installation of carriage and saw, chips between log and headblock or on track; (4) careless setting, inadequate manipulation of dogs, miscalculation resulting in the last board cut from each log being either undersized or oversized; and (5) frozen timber, or other unusual stresses in wood.

After adjusting the saw, carriage, and track for the most accurate work possible, the output can be marketed as accurately cut lumber. In addition, waste in manufacture can now be reduced and yield increased by setting to cut all boards thinner. The number of thin rejects will not be increased thereby, because the effect of truing up in the larger mills, encourage the butting of logs clear of all rot, which means better logs but more waste.

The value of the lumber from top, top knotty, and middle knotty logs is practically the same in logs 8 inches in diameter as in logs 20 inches in diameter. A large coarse-knotted log, however, costs considerably more to trim than one with small knots. Rotten material, long cat faces (fig. 150, D and E), or other similar defects in softwoods should be confined to the same log.

Freshly cut logs always bring a better price than weathered, stained, and dirty logs. Logs should be transported from the woods to the market as promptly as possible. When felling a tree, a low stump is important because high-quality material occurs in the lower part of the tree. Split logs, logs with splinters pulled from them, or logs with splinters hanging on the ends are never so desirable as logs without these defects.

JOHN B. CUNO,
Associate Wood Technologist, Forest Service.

SAWMILLS Profit by Closely Controlling Thickness of Boards Farmer-operated sawmills often lose money by producing inaccurately cut lumber. The product brings less per thousand board feet and encounters stiffer sales resistance than that from the more accurate band mills. A less obvious loss is the excessive manufacturing waste that results from inaccurate cutting.

Recent studies by the Forest Products Laboratory indicate that the portable-mill operator, in sawing for thickness, cuts only about 20 per cent of the boards within one thirty-second of an inch of the thickness he sets for. The remaining 80 per cent vary in thickness from as much as eight thirty-seconds of an inch too thin to five thirty-seconds of an inch too thick. (Fig. 151, upper pile.) To counteract this tendency to cut too thin, the operator must set to cut most boards too thick. (Fig. 151, middle pile.) But in so doing each one thirty-second of an inch added reduces the possible total cut exactly as if the saw kerf were increased one thirty-second of an inch. A far better expedient is to minimize waste by keeping the equipment in good condition.

Causes of Inaccurate Cutting

The main causes for inaccurately cut lumber are: (1) Faulty condition of the saw, such as uneven filing of saw teeth, excessive or uneven swage, dull teeth on one side, unequal tension; (2) worn bearings in mandril, carriage wheels, and particularly in the setworks; (3) poor installation of carriage and saw, chips between log and headblock or on track; (4) careless setting, inadequate manipulation of dogs, miscalculation resulting in the last board cut from each log being either undersized or oversized; and (5) frozen timber, or other unusual stresses in wood.

After adjusting the saw, carriage, and track for the most accurate work possible, the output can be marketed as accurately cut lumber. In addition, waste in manufacture can now be reduced and yield increased by setting to cut all boards thinner. The number of thin rejects will not be increased thereby, because the effect of truing up equipment is to bunch boards closer to the intended one thirty-second of an inch group and thus to decrease the number of extremely thick and thin boards. (Fig. 151, middle pile.)

If twenty-eight thirty-seconds of an inch is taken as the thinnest dry lumber that qualifies, the set works can be moved either by one thirty-second of an inch intervals or, where the intervals are one sixteenth of an inch, by placing a one sixteenth of an inch leaf in the back stop, so that the entire cut is three thirty-seconds of an inch thinner. (Fig. 151, lower pile.) The consequent increase in yield is 4½ per cent. The ideal adjustment does not attempt to qualify every board but rather to set for thinner boards until a point is reached where the gain from increasing yields is balanced by the loss from thin rejects. This balance is reached when a 1½ per cent increase in rejects results from setting one thirty-second of an inch thinner. To determine this ideal adjustment for any mill, find what percentage of boards are too thin to qualify at the setting commonly used. Continue to set thinner by one thirty-second of an inch intervals until the number of thin boards increases by more than 1½ per cent over the previous setting. The ideal adjustment is one thirty-second of an inch thicker than this setting.

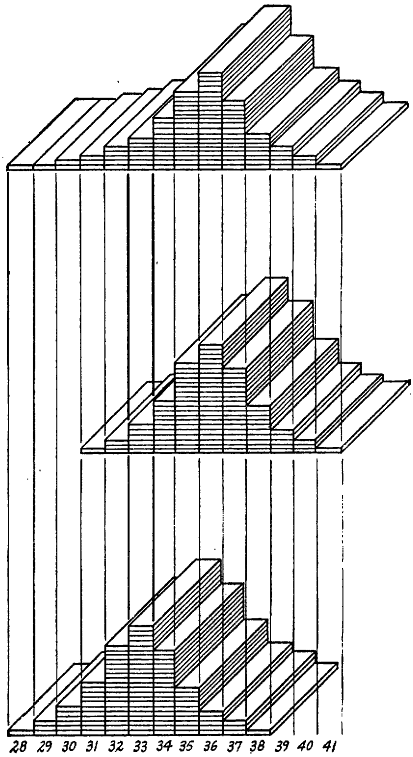


FIGURE 151.—Piles showing 100 boards sorted according to variations in cut. The top pile is typical of the farmer-operated mill. The middle pile shows the result of improved equipment; the cut is concentrated about the set of thirty-six thirty-seconds inches. The set can now be reduced to thirty-three thirty seconds, a far more economical cut, and still bring all boards within the original twenty-eight thirty-seconds inch qualification

Allowance Needed for Shrinkage

An allowance of one thirty-second of an inch must be made for shrinkage of inch softwood lumber from a green to a thoroughly air-dry condition. Moreover, most softwood grading rules admit 20 per cent twenty-eight thirty-seconds inch dry lumber; hence, the twenty-nine thirty-seconds inch green-lumber group is the thinnest to qualify. A mill cutting lumber as in the upper pile in Figure 151 should therefore set one thirty-second of an inch thinner, since the 1½ per cent increased yield is but partly offset by the 1 per cent increase in rejects. For a mill grouping its cut as in the lower pile in Figure 151, a one thirty-second of an inch thinner set, although gaining the 1½ per cent increased yield, results in an increase of 3 per cent in rejects.

The set-up for hardwood differs from this in that two thirty-seconds of an inch must be allowed for shrinkage (three thirty-seconds for beech and hickory), and the grading rule base is thirty-two thirty-seconds inch for rough dry lumber. Thus thirty-four thirty-seconds inches is the thinnest green board to qualify. A mill grouping its cut as in the upper pile in Figure 151 for hardwoods should set four places thicker, so that the 2 per cent shown in the thirty thirty-seconds inch group would be in the thirty-four thirty-seconds inches group.

C. J. Telford,
Small-Mill Specialist, Forest Service.

SCALES May Be Balanced and Be Very Sensitive and Yet Be Inaccurate While thousands of tons of farm produce are weighed every day on farm scales, two mistaken ideas about scales are widely prevalent. As a consequence incorrect weights are sometimes accepted. One of those ideas is that if a scale balances, or is made to balance properly, with the scale platform empty and with the poises set to read zero, the scale is accurate. This idea may be erroneous.

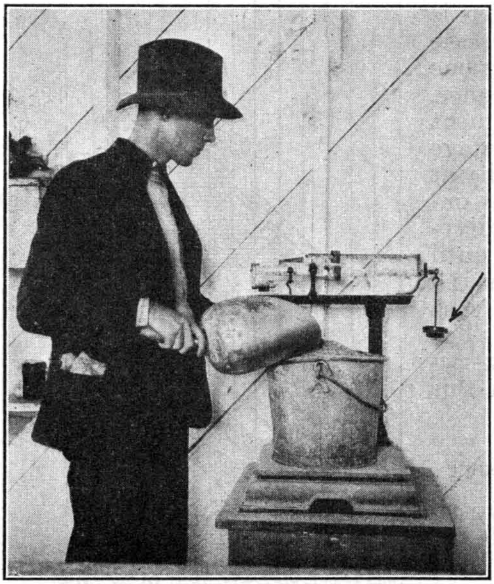


FIGURE 152.—A good scale that gave inaccurate weights. This bucket of feed normally weighing about 25 pounds registered 51 pounds. Investigation finally revealed that the ½-pound counterpoise weight (shown by arrow) had been borrowed from another scale having a different lever ratio

The fact that a scale balances correctly with the platform empty is no indication that the scale is accurate or that it does not possess serious defects. For instance, an accurate scale in good condition can be taken and the weight of both sliding and counterpoise weights can be reduced by half and the scale can be made to balance correctly with the platform empty. However, the weights obtained from the scale will be 100 per cent in error; a 100-pound load will be indicated as 200 pounds by the scale. Large errors of this character actually occur if counterpoise weights belonging to one scale are used on another scale designed for a different counterpoise ratio. (Fig. 152.)

Errors of similar character may arise from losing poise parts or from repairs made by persons who are not fully informed on scale construction and adjustment. For instance, if the set screw provided in some scales to clamp the poise to the beam in a desired position is removed through any cause, errors are produced in the weights obtained from the scale. The screw is a proper part of the weight of the poise in such a scale. In the foregoing case there will be nothing whatever in the action of the beam to indicate that incorrect weights are being obtained. Defects may exist also in the levers which may introduce errors in the weights and yet the beam can be balanced properly with no load on the scale.

seconds inch for rough dry lumber. Thus thirty-four thirty-seconds inches is the thinnest green board to qualify. A mill grouping its cut as in the upper pile in Figure 151 for hardwoods should set four places thicker, so that the 2 per cent shown in the thirty thirty-seconds inch group would be in the thirty-four thirty-seconds inches group.

C. J. TELFORD,
Small-Mill Specialist, Forest Service.

SCALES May Be Balanced and Be Very Sensitive and Yet Be Inaccurate

While thousands of tons of farm produce are weighed every day on farm scales, two mistaken ideas about scales are widely prevalent. As a consequence incorrect weights are sometimes accepted. One of those ideas is that if a scale balances, or is made to balance properly, with the scale platform empty and with the poises set to read zero, the scale is accurate. This idea may be erroneous.

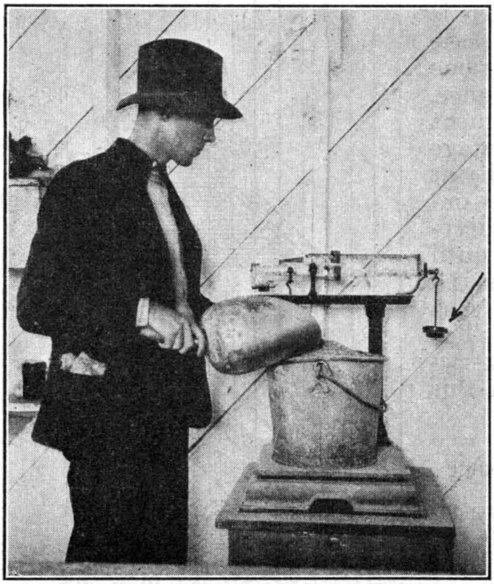


FIGURE 152.—A good scale that gave inaccurate weights. This bucket of feed normally weighing about 25 pounds registered 51 pounds. Investigation finally revealed that the ½-pound counterpoise weight (shown by arrow) had been borrowed from another scale having a different lever ratio

The fact that a scale balances correctly with the platform empty is no indication that the scale is accurate or that it does not possess serious defects. For instance, an accurate scale in good condition can be taken and the weight of both sliding and counterpoise weights can be reduced by half and the scale can be made to balance correctly with the platform empty. However, the weights obtained from the scale will be 100 per cent in error; a 100-pound load will be indicated as 200 pounds by the scale. Large errors of this character actually occur if counterpoise weights belonging to one scale are used on another scale designed for a different counterpoise ratio. (Fig. 152.)

Errors of similar character may arise from losing poise parts or from repairs made by persons who are not fully informed on scale construction and adjustment. For instance, if the set screw provided in some scales to clamp the poise to the beam in a desired position is removed through any cause, errors are produced in the weights obtained from the scale. The screw is a proper part of the weight of the poise in such a scale. In the foregoing case there will be nothing whatever in the action of the beam to indicate that incorrect weights are being obtained. Defects may exist also in the levers which may introduce errors in the weights and yet the beam can be balanced properly with no load on the scale.

If the scale does not balance properly with no load on the platform, the trouble may be serious or trivial. Sometimes shot may be lost from the shot cup or something may cause weight to be removed from or added to the scale platform and it may not be possible to bring the scale to balance with the balance ball provided for the purpose. In this case shot may be added or removed from the shot cup in the counterpoise hanger at the end of the beam until the scale can be balanced.

Generally, in adding or removing shot, it is best to place the balance ball in about the middle of its travel and bring the beam to balance with the platform empty, by the proper supply of shot. This gives the maximum leeway for moving the balance ball either way for taking care of the ordinary changes in the weight of the platform.

Sometimes, defects in a scale will be indicated by the balance of the empty scale. If, for no apparent reason, there is a rather sudden

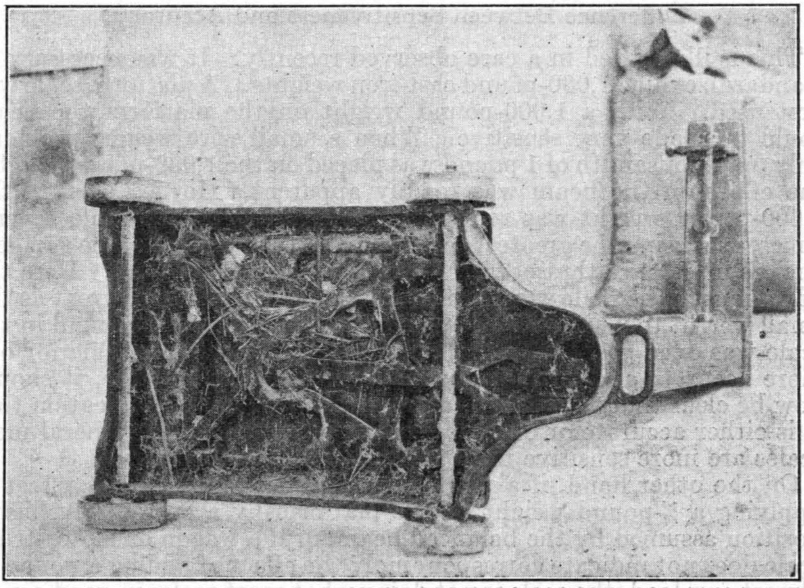


FIGURE 153.—One reason why scales go wrong. The accumulation of hay, straw, paper, string, and cob-webs, together with a mouse's nest between two levers of this scale, resulted in unreliable weights

change in the balance of the scale, investigate. Also be on the alert for slower changes. At the present time there are in scales probably thousands of nests of rats and mice which would have been discovered and cleaned out had each scale owner investigated why the scale had to have the balance adjusted or why the motion of the beam in weighing had changed from what it was at the previous weighing. (Fig. 153.)

Sensitiveness Unrelated to Accuracy

The second mistaken idea held by many scale users is that when a scale is very sensitive it is an accurate scale. Such is not necessarily the case. A scale may be very sensitive and readily show a pound applied on the scale platform and yet give weights in error by many pounds.

Consider the case previously used for illustration in which an accurate scale in good working order was used with another scale's counter-poises, of only half the proper weight. In such an instance the actual sensitiveness of the scale would not be changed. A pound weight on the scale platform would cause the same change in the balance position of the beam as before. Yet, the scale would give only half the proper weight.

It is easier to make a scale sensitive than it is to make it accurate and constant. To make a scale loaded with 10,000 pounds show the effects of adding a 1-pound weight to the 10,000 pounds already there is not difficult. But it is difficult, unusual, and expensive to get a scale which will weigh loads of about 10,000 pounds accurately to the nearest pound. Generally when a 10,000-pound load is removed and reapplied, even with the greatest care, differences of 2 or 3 pounds will appear in the indications for the weights obtained. The same relations substantially hold for smaller scales and smaller loads.

Difference Between Sensitiveness and Accuracy

This is illustrated in a case observed recently. It was necessary to standardize some 1,000-pound cast-iron weights. A platform scale was first used. With a 1,000-pound weight on the platform the beam could be made very sensitive. When a small wire weight weighing only one-thousandth of 1 pound was placed on the 1,000-pound weight, the effect on the beam was readily apparent. However, when the 1,000-pound weight was removed and replaced on the scale several times, exercising the greatest care not to disturb the scale, the smallest change in balance that occurred was a quarter of a pound. Here the variations in the scale were two hundred and fifty times as great as the small weight to which the scale was sensitive. The error found in the scale was even greater. It was necessary to reject this scale for one more accurate and constant but less sensitive. Therefore, it should now be clear that the fact a scale is sensitive is not an indication that it is either accurate or constant in its performance. In general most scales are more sensitive than they are accurate or constant.

On the other hand, if a platform scale does not show the effect of applying a ¼-pound weight on the platform by a perceptibly higher position assumed by the balanced beam, or if a wagon or motor-truck scale does not indicate correspondingly the effect of adding a pound to almost any load, the scale is not doing what most scales in good condition will do, and there is probably something wrong with it.

There is just one way to determine whether a scale is accurate and that is to test it thoroughly. This consists in using standard test weights and determining that the scale weighs correctly (1) at all loads it will be used to weigh and (2) in all positions of the weights on the scale platform in which the load is likely to be placed in the ordinary course of weighing.

C. A. Briggs,
Livestock Weight Supervisor, Bureau of Animal Industry.

SEED Treatment and Warm Soil Improve Stands of Sorghum

The securing of satisfactory and uniform stands is one of the chief difficulties in growing grain sorghums. The sorghums require relatively high temperatures for germination and early growth, and the seeds are easily rotted when planted in cold, wet soil. Varieties such as the feteritas, having soft poises, of only half the proper weight. In such an instance the actual sensitiveness of the scale would not be changed. A pound weight on the scale platform would cause the same change in the balance position of the beam as before. Yet, the scale would give only half the proper weight.

It is easier to make a scale sensitive than it is to make it accurate and constant. To make a scale loaded with 10,000 pounds show the effects of adding a 1-pound weight to the 10,000 pounds already there is not difficult. But it is difficult, unusual, and expensive to get a scale which will weigh loads of about 10,000 pounds accurately to the nearest pound. Generally when a 10,000-pound load is removed and reapplied, even with the greatest care, differences of 2 or 3 pounds will appear in the indications for the weights obtained. The same relations substantially hold for smaller scales and smaller loads.

Difference Between Sensitiveness and Accuracy

This is illustrated in a case observed recently. It was necessary to standardize some 1,000-pound cast-iron weights. A platform scale was first used. With a 1,000-pound weight on the platform the beam could be made very sensitive. When a small wire weight weighing only one-thousandth of 1 pound was placed on the 1,000-pound weight, the effect on the beam was readily apparent. However, when the 1,000-pound weight was removed and replaced on the scale several times, exercising the greatest care not to disturb the scale, the smallest change in balance that occurred was a quarter of a pound. Here the variations in the scale were two hundred and fifty times as great as the small weight to which the scale was sensitive. The error found in the scale was even greater. It was necessary to reject this scale for one more accurate and constant but less sensitive. Therefore, it should now be clear that the fact a scale is sensitive is not an indication that it is either accurate or constant in its performance. In general most scales are more sensitive than they are accurate or constant.

On the other hand, if a platform scale does not show the effect of applying a ¼-pound weight on the platform by a perceptibly higher position assumed by the balanced beam, or if a wagon or motor-truck scale does not indicate correspondingly the effect of adding a pound to almost any load, the scale is not doing what most scales in good condition will do, and there is probably something wrong with it.

There is just one way to determine whether a scale is accurate and that is to test it thoroughly. This consists in using standard test weights and determining that the scale weighs correctly (1) at all loads it will be used to weigh and (2) in all positions of the weights on the scale platform in which the load is likely to be placed in the ordinary course of weighing.

C. A. Briggs,
Livestock Weight Supervisor, Bureau of Animal Industry.

SEED Treatment and Warm Soil Improve Stands of Sorghum The securing of satisfactory and uniform stands is one of the chief difficulties in growing grain sorghums. The sorghums require relatively high temperatures for germination and early growth, and the seeds are easily rotted when planted in cold, wet soil. Varieties such as the feteritas, having soft starchy seed coats, are very susceptible to decay; milos and kafirs are somewhat less susceptible; while the sorgos (sweet sorghums) are the least likely to decay.

Seed treatment with copper carbonate or with one of several commercial organic mercury compounds often improves sorghum stands by largely preventing seed decay. Treatment is especially effective if the soil is cold or if soft-seeded varieties are planted. The stands of feterita obtained sometimes are more than doubled by seed treatment, although in warm soil the differences in stand are much less. These seed treatments also control kernel smut of sorghums. The varieties least susceptible to seed rotting often are most susceptible to smut, while some of the varieties that are most susceptible to rotting are rather resistant to smut. Consequently, it pays to treat all sorghum varieties as an insurance against losses from either seed rots or smut. The chemical dusts may be applied with a wheat-treating machine or by shaking the dust and seed together in a tight can or box. Three ounces of the dust per bushel of seed is sufficient. Since a bushel of grain-sorghum seed will plant from 10 to 40 acres, the cost and labor of treating enough seed for an acre are small items in comparison with the probable benefits.

Poor Germination Below 50° F.

Sorghums germinate very poorly, if at all, at temperatures lower than about 50° F. and usually germinate best at temperatures as high as 70° to 80°. During the spring the average temperature of the soil near the surface usually is slightly higher than the mean air temperature, but the soil at lower depths is cooler than the air. The soil will be sufficiently warm for sorghum planting if planting is delayed and proper preparation of the seed bed is practiced.

In an experiment at Hays, Kans., sorghums produced stands 50 to 100 per cent better when planted in May than when planted a month earlier. Several experiments in Oklahoma and Texas have shown similar increases in stand from delayed planting up until June, provided ample moisture was available at all plantings. Yields of grain sorghums usually are higher from planting after May 15 to June 1, if the soil is kept well tilled and free from weeds before planting, and where insects do not attack the late-planted crop.

Many farmers plant sorghums in the bottom of a lister furrow in cold soil which has not been worked previous to the planting operation, and poor stands frequently result. Experiments have shown that the stands obtained from lister planting usually are thinner than from surface planting unless the surface soil is too dry for germination. Better stands can be obtained by working the land well before planting. Additional tillage before planting also often reduces the number of cultivations necessary after planting. The land can be plowed and harrowed and the seed planted either with a surface planter or lister. The lister method of preparing the land and planting the seed is preferred by most farmers, largely because of the economy of labor and because it prevents soil blowing.

Lister Method of Planting

A lister method of planting grain sorghums, which nearly always results in excellent stands, has been developed in cooperative experiments at the Fort Hays (Kans.) Branch Experiment Station. The land is first listed in late fall or early spring. When weeds start to grow in the spring the lister furrows are "thrown in" with a "ridge buster." The seed is later planted in the old furrow with a lister planter or with a surface planter equipped with disk furrow openers. Only part of the loose soil is thrown out in the planting operation, and a layer of mellow, warm soil is left in the bottom of the furrow where the seeds are planted.

By proper attention to seed treatment, time of planting, and seedbed preparation, considerable loss from low yields due to poor stands or from the expense of replanting may be avoided. A loss of stand due to soil washing during heavy rains is difficult to prevent in lister-planted sorghums.

J. H. Martin,
Senior Agronomist, Bureau of Plant Industry.

SHEEP Grow Better on Alfalfa Than Timothy Hay, Experiments Show Much has been said relative to the feeding value of timothy and alfalfa hays for sheep in New England, since timothy hay is abundant and cheap there, whereas alfalfa hay is rather expensive and not always available. That alfalfa can be grown successfully in the New England States and is not so uncertain a crop as it was once thought to be is accepted more fully each year.

To obtain information on the value of these hays for sheep, the Bureau of Animal Industry conducted a feeding trial at its experiment farm near Middlebury, Vt., during the winter of 1929–30. Twenty-eight grade ewe lambs were divided equally into two uniform lots, each lot consisting of six grade Southdowns and eight grade Shropshires. These lambs were the product of a grading-up experiment in which, at the beginning, crossbred Lincoln-Rambouillet ewes of the western type were bred to purebred Southdown and Shropshire rams. Their selected ewe offspring were mated with Southdown and Shropshire rams, respectively, for several generations. The ewe lambs used in the feeding trial here described were of the third and fourth top crosses.

Lot 1 received home-grown timothy hay, corn silage, and a grain mixture composed of 4 parts cracked corn, 4 parts oats, 2 parts bran, and 1 part linseed meal, by weight. Lot 2 received home-grown alfalfa hay and the same weight and quality of corn silage and grain mixture as were fed to lot 1. The only appreciable variation in the two rations was the kind of hay. The quantities of feed consumed by each lot were practically equal. Each sheep received daily 0.5 pound of the standard grain mixture, 1.5 pounds of corn silage, and 2 pounds of hay, lot 1 receiving timothy and lot 2 alfalfa. The timothy hay was typical of normal timothy hay—that is, it was made when rather mature—and the alfalfa hay was also typical for New England. (Table 16.)

Weekly weights were taken of individual sheep in each lot throughout the experiment. The trend of the average weights of the sheep, by breeds, is shown in Table 16.

From the figures in Table 16 it is apparent that gains were greater and more consistent in the alfalfa-fed lots. Average weights, however, may not be conclusive evidence of a larger body growth, so, after these ments at the Fort Hays (Kans.) Branch Experiment Station. The land is first listed in late fall or early spring. When weeds start to grow in the spring the lister furrows are "thrown in" with a "ridge buster." The seed is later planted in the old furrow with a lister planter or with a surface planter equipped with disk furrow openers. Only part of the loose soil is thrown out in the planting operation, and a layer of mellow, warm soil is left in the bottom of the furrow where the seeds are planted.

By proper attention to seed treatment, time of planting, and seedbed preparation, considerable loss from low yields due to poor stands or from the expense of replanting may be avoided. A loss of stand due to soil washing during heavy rains is difficult to prevent in lister-planted sorghums.

J. H. Martin,
Senior Agronomist, Bureau of Plant Industry.

SHEEP Grow Better on Alfalfa Than Timothy Hay, Experiments Show

Much has been said relative to the feeding value of timothy and alfalfa hays for sheep in New England, since timothy hay is abundant and cheap there, whereas alfalfa hay is rather expensive and not always available. That alfalfa can be grown successfully in the New England States and is not so uncertain a crop as it was once thought to be is accepted more fully each year.

To obtain information on the value of these hays for sheep, the Bureau of Animal Industry conducted a feeding trial at its experiment farm near Middlebury, Vt., during the winter of 1929–30. Twenty-eight grade ewe lambs were divided equally into two uniform lots, each lot consisting of six grade Southdowns and eight grade Shropshires. These lambs were the product of a grading-up experiment in which, at the beginning, crossbred Lincoln-Rambouillet ewes of the western type were bred to purebred Southdown and Shropshire rams. Their selected ewe offspring were mated with Southdown and Shropshire rams, respectively, for several generations. The ewe lambs used in the feeding trial here described were of the third and fourth top crosses.

Lot 1 received home-grown timothy hay, corn silage, and a grain mixture composed of 4 parts cracked corn, 4 parts oats, 2 parts bran, and 1 part linseed meal, by weight. Lot 2 received home-grown alfalfa hay and the same weight and quality of corn silage and grain mixture as were fed to lot 1. The only appreciable variation in the two rations was the kind of hay. The quantities of feed consumed by each lot were practically equal. Each sheep received daily 0.5 pound of the standard grain mixture, 1.5 pounds of corn silage, and 2 pounds of hay, lot 1 receiving timothy and lot 2 alfalfa. The timothy hay was typical of normal timothy hay—that is, it was made when rather mature—and the alfalfa hay was also typical for New England. (Table 16.)

Weekly weights were taken of individual sheep in each lot throughout the experiment. The trend of the average weights of the sheep, by breeds, is shown in Table 16.

From the figures in Table 16 it is apparent that gains were greater and more consistent in the alfalfa-fed lots. Average weights, however, may not be conclusive evidence of a larger body growth, so, after these sheep were sheared on April 22, 1930, they were measured for width, depth, height, belly circumference, and length from nose to tail. That the alfalfa-fed sheep were larger than the timothy-fed sheep is evident from Table 17.

TABLE 16.—*Average weight of Southdown and Shropsnire sheep receiving timothy and alfalfa hay, respectively, in their rations*

Breed	Kind of hay (2 pounds daily)	Weight of sheep on —						
		Nov. 27	Dec. 25	Jan. 22	Feb. 19	Mar. 19	Apr. 16	May 7
		Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Southdown	Timothy	71.0	70.8	75.5	75.6	74.8	78.8	[1] 74.0
	Alfalfa	70.5	71.5	75.8	78.5	79.5	83.8	[1] 80.5
Shropshire	Timothy	71.9	72.4	74.6	73.6	76.1	79.2	[1] 74.9
	Alfalfa	71.6	72.6	77.4	79.6	83.9	88.7	[1] 88.6

[1] Weights after shearing.

TABLE 17.—*Average body measurements after shearing of Southdown and Shropshire sheep receiving timothy and alfalfa hay, respectively, in their rations*

Breed	Kind of hay (2 pounds daily)	Body measurements				
		Width	Depth	Height	Belly circumference	Length from nose to tail
		Inches	*Inches*	*Inches*	*Inches*	*Inches*
Southdown	Timothy	7.8	9.4	20.7	32.2	41.9
	Alfalfa	8.0	9.7	21.4	34.7	41.5
Shropshire	Timothy	7.4	9.9	21.7	33.1	42.7
	Alfalfa	8.1	10.1	22.6	35.7	43.6

On the basis of average prices of these hays for the United States, at the time these sheep were fed, the alfalfa hay cost 48 cents per ewe more than the timothy hay for the 161-day winter-feeding period. The benefits of the increased thrift, size, and substance from the alfalfa hay in this experiment suggest the desirability of feeding good alfalfa hay as compared with normal, rather mature timothy hay for young breeding ewes.

STANLEY L. SMITH,
Junior Animal Husbandman, Bureau of Animal Industry.

SMALL-SCALE Farming Is Widespread in U. S., Census Figures Show Sixty per cent of the farm population of the United States were, in 1925, living on farms whose size was less than 100 acres. About 40 per cent were then living on farms of less than 50 acres. Fifteen per cent were living on farms of less than 20 acres. Broadly speaking, a farm in the United States of less than 20 acres is by common consent a small farm. Nor will many persons object to calling a farm of less than 50 acres a small farm. The people on such farms now number 10,000,000. These small farms are not all divided-up acreages of large cotton and tobacco holdings, as is occasionally hinted. In the region of the East North Central States, which includes Ohio, Indiana, Illinois, Michigan, and sheep were sheared on April 22, 1930, they were measured for width, depth, height, belly circumference, and length from nose to tail. That the alfalfa-fed sheep were larger than the timothy-fed sheep is evident from Table 17.

TABLE 16.—*Average weight of Southdown and Shropsnire sheep receiving timothy and alfalfa hay, respectively, in their rations*

Breed	Kind of hay (2 pounds daily)	Weight of sheep on —						
		Nov. 27	Dec. 25	Jan. 22	Feb. 19	Mar. 19	Apr. 16	May 7
		Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Southdown	Timothy	71.0	70.8	75.5	75.6	74.8	78.8	[1] 74.0
	Alfalfa	70.5	71.5	75.8	78.5	79.5	83.8	[1] 80.5
Shropshire	Timothy	71.9	72.4	74.6	73.6	76.1	79.2	[1] 74.9
	Alfalfa	71.6	72.6	77.4	79.6	83.9	88.7	[1] 88.6

[1] Weights after shearing.

TABLE 17.—*Average body measurements after shearing of Southdown and Shropshire sheep receiving timothy and alfalfa hay, respectively, in their rations*

Breed	Kind of hay (2 pounds daily)	Body measurements				
		Width	Depth	Height	Belly circumference	Length from nose to tail
		Inches	*Inches*	*Inches*	*Inches*	*Inches*
Southdown	Timothy	7.8	9.4	20.7	32.2	41.9
	Alfalfa	8.0	9.7	21.4	34.7	41.5
Shropshire	Timothy	7.4	9.9	21.7	33.1	42.7
	Alfalfa	8.1	10.1	22.6	35.7	43.6

On the basis of average prices of these hays for the United States, at the time these sheep were fed, the alfalfa hay cost 48 cents per ewe more than the timothy hay for the 161-day winter-feeding period. The benefits of the increased thrift, size, and substance from the alfalfa hay in this experiment suggest the desirability of feeding good alfalfa hay as compared with normal, rather mature timothy hay for young breeding ewes.

STANLEY L. SMITH,
Junior Animal Husbandman, Bureau of Animal Industry.

SMALL-SCALE Farming Is Widespread in U. S., Census Figures Show Sixty per cent of the farm population of the United States were, in 1925, living on farms whose size was less than 100 acres. About 40 per cent were then living on farms of less than 50 acres. Fifteen per cent were living on farms of less than 20 acres. Broadly speaking, a farm in the United States of less than 20 acres is by common consent a small farm. Nor will many persons object to calling a farm of less than 50 acres a small farm. The people on such farms now number 10,000,000. These small farms are not all divided-up acreages of large cotton and tobacco holdings, as is occasionally hinted. In the region of the East North Central States, which includes Ohio, Indiana, Illinois, Michigan, and

Wisconsin, 24 per cent of the farms are under 50 acres; in Ohio, 30 per cent; in Illinois, 20 per cent. In the West North Central States—the Dakotas, Nebraska, Kansas, Minnesota, Iowa, Missouri—the States of supposedly large-sized farms, 15 per cent are small farms. Even in Iowa 16 per cent of all farms contain less than 50 acres each.

What is the situation of small-scale farmers? Who are they and why are they in small-scale farming? There are two quite legitimate uses, usually, of every farm in the United States—one is affording the opportunity to grow a product of value; the other is affording a good place to live. The most desirable farm from the production standpoint may not satisfy the ideal of a desirable place to live; and the most desirable land on which to live may not come up to the standard of a desirable farm for production. A small farm as a living place, however, may be on a par with a large farm. In fact, the small farm as a habitation is quite likely to overtop the small farm as an instrument of production (except where a small farm of good land is so intensively organized that it amounts to a highly capitalized business; and this type of farm is not being considered in this article), and one must be prepared to concede to the small farm preeminent value as a good place to live.

Three Groups of Small Farmers

Studies during the past year indicate that there are three main classes of persons living on small farms in the United States. The first class is made up of those who would rather own a small farm, if possible, than rent a larger farm.

The second class is composed of men who, whether they own or rent, feel at home with a small type of job, and are ill at ease with a large job.

The third class includes men who appreciate the small farm first of all as a place to live. These men reckon the small farm as equivalent for living purposes to a farm of large size. This type of farmer thinks first of his family, its security, space for restless, growing children, without large expense or great responsibility to produce.

Uniform neglect to establish a public policy for small farms and small farmers lends color to the idea that small farms are generally overlooked in public thought, or to the idea that small farms stand in the way of agricultural progress, and are being left to the fate of ruthless attrition, in the expectation of their eventual disappearance.

It is generally conceded that small farms can not be operated to advantage along the same lines of farm practice as large farms. Small operations in mercantile business are totally different from large operations in business. Yet there are thousands and thousands of legitimate small businesses. Small factories are run on a different system from large factories. Yet out of 200,000 factories in the United States, there are 80,000 factories employing between 6 and 50 operatives only and 90,000 employing less than 6 operatives.

Denmark's Small Farms

Why should we think that the small farm, just because it is not adapted to the mechanical technic of operations employed on a large farm, can not be operated advantageously on principles specially adapted to small-scale farming? In 1928, Denmark had 206,000 farms of which 109,000, or over 50 per cent, were in small holdings ranging from 1¼ to 25 acres; 69,000 holdings were farms with a range of from 25 to 75 acres. The Danes long ago set up and perfected a special production and marketing program for their small holders which has justified their existence alongside of the large farmers.

Let us suppose, however, that this special technic for the operation of small farms in the United States is not immediately forthcoming. Even then, the case against the small farm is feeble until it is shown that small-scale farming dooms the future personality and career of the children of the small farmer, or is incompatible with proper living standards. Europe has always owed a debt to its mountaineers. The highlands of Scotland, the mountains of Switzerland, the rugged slopes of Norway—all the abode of small farmers—have been and still are famous for their people. The 40 per cent of our farm population who live on small farms deserve, as a matter of fair play, serious investigation into ways of improving their production and their level of living.

C. J. Galpin,
Principal Agricultural Economist,
Bureau of Agricultural Economics.

SOIL Erosion Is Often Caused by Burrowing Rodents A casual observer may wonder why a mountain stream, rushing and tumbling out of wooded hills, has such clear sparkling water, when the same stream, after winding its devious course through miles of lowlands, bordered with stock ranges or farms, becomes murky and muddy in appearance. The answer is to be found in conditions caused by erosion, the results of which may well alarm any one who will study them carefully. The headwaters of many streams, even though they flow at a rate that would quickly cut unprotected soil, carry only a light quantity of silt, because the upper watersheds are frequently well protected with a heavy vegetative cover, and, also, because the beds of the headwater channel ways are often stony and resistant to abrasion. Along the lower levels, cultivated fields, open to the effects of washing rains and cutting winds, supply ample eroded material to roil the waters as they flow through the wider valleys and eventually to the ocean.

The quantity of silt carried by the streams of the country is appalling. Bennett and Chapline[11] estimate that not less than 126,000,000,000 pounds of plant food material is removed by erosion from the fields and pastures of the United States every year. Not only are valuable plant foods thus removed, but much of the soil itself. This accounts for the yearly increasing silt deposits in the lower Mississippi Valley, with attendant difficulties in holding this treacherous stream within the bounds of man-made levees.

The removal of vegetative cover not only exposes the soil to the washing and eroding effects of rain, but is a large factor in the primary cause of the increased frequency and volume of floods. Trees, undergrowth, and grass form a surface matting of leaves and decaying vegetation that acts as a sponge in absorbing rain and as a screen to keep open the pores of the soil—the natural channel ways through which

[11] Bennett, H. H., and Chapline, W. R. Soil erosion a national menace. U. S. Dept. Agr. Circ. 33, 36 p., illus. 1928.

ranging from $1\frac{1}{4}$ to 25 acres; 69,000 holdings were farms with a range of from 25 to 75 acres. The Danes long ago set up and perfected a special production and marketing program for their small holders which has justified their existence alongside of the large farmers.

Let us suppose, however, that this special technic for the operation of small farms in the United States is not immediately forthcoming. Even then, the case against the small farm is feeble until it is shown that small-scale farming dooms the future personality and career of the children of the small farmer, or is incompatible with proper living standards. Europe has always owed a debt to its mountaineers. The highlands of Scotland, the mountains of Switzerland, the rugged slopes of Norway—all the abode of small farmers—have been and still are famous for their people. The 40 per cent of our farm population who live on small farms deserve, as a matter of fair play, serious investigation into ways of improving their production and their level of living.

C. J. GALPIN,
Principal Agricultural Economist,
Bureau of Agricultural Economics.

SOIL Erosion Is Often Caused by Burrowing Rodents A casual observer may wonder why a mountain stream, rushing and tumbling out of wooded hills, has such clear sparkling water, when the same stream, after winding its devious course through miles of lowlands, bordered with stock ranges or farms, becomes murky and muddy in appearance. The answer is to be found in conditions caused by erosion, the results of which may well alarm any one who will study them carefully. The headwaters of many streams, even though they flow at a rate that would quickly cut unprotected soil, carry only a light quantity of silt, because the upper watersheds are frequently well protected with a heavy vegetative cover, and, also, because the beds of the headwater channel ways are often stony and resistant to abrasion. Along the lower levels, cultivated fields, open to the effects of washing rains and cutting winds, supply ample eroded material to roil the waters as they flow through the wider valleys and eventually to the ocean.

The quantity of silt carried by the streams of the country is appalling. Bennett and Chapline [11] estimate that not less than 126,000,000,000 pounds of plant food material is removed by erosion from the fields and pastures of the United States every year. Not only are valuable plant foods thus removed, but much of the soil itself. This accounts for the yearly increasing silt deposits in the lower Mississippi Valley, with attendant difficulties in holding this treacherous stream within the bounds of man-made levees.

The removal of vegetative cover not only exposes the soil to the washing and eroding effects of rain, but is a large factor in the primary cause of the increased frequency and volume of floods. Trees, undergrowth, and grass form a surface matting of leaves and decaying vegetation that acts as a sponge in absorbing rain and as a screen to keep open the pores of the soil—the natural channel ways through which

---

[11] BENNETT, H. H., and CHAPLINE, W. R. SOIL EROSION A NATIONAL MENACE. U. S. Dept. Agr. Circ. 33, 36 p., illus. 1928.

percolating water passes. With the removal of such cover and the clogging of the soil openings with silt descending in muddied erosional water, the rain water rushes from the barren hillsides without check and results in serious floods in the valleys below.

Rodents on Western Ranges

Among the causes of erosion, the Bureau of Biological Survey finds that the part played by rodents is by no means inconsequential. Prairie dogs, ground squirrels, and pocket gophers infest western range and farming lands literally by the millions. W. P. Taylor,[12] in a recent rodent survey, found one rodent to each 1,088 square feet on the Santa Rita Range Reserve near Continental, Ariz. He estimates that there are 2,000,000 rodents on this 50,000-acre reserve.

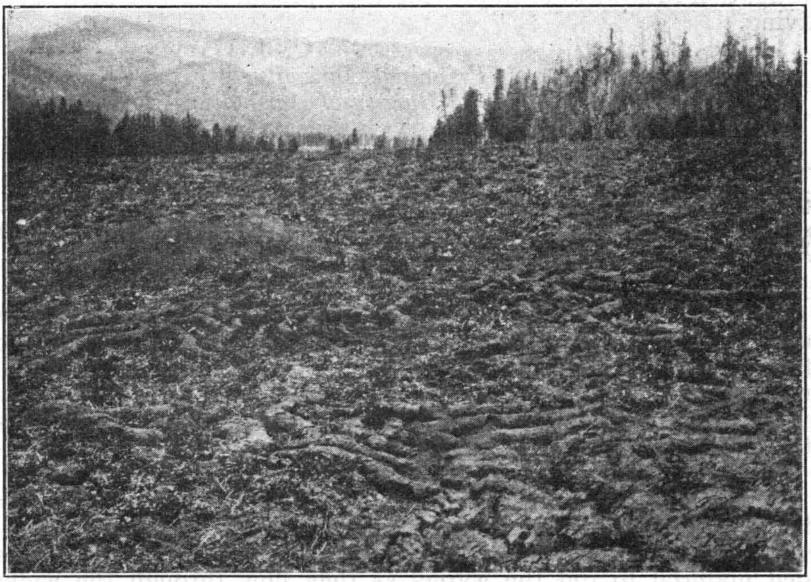


FIGURE 154.—Winter workings of pocket gophers in a mountain park of western Colorado. Such excavations, made under the snow, are definite means of starting erosion

Prairie dogs build their characteristic large mounds in inverted-funnel shape to prevent rain water draining into the underground burrows. As a means of protection against natural enemies, as well as for food, they keep all grass cropped close within a radius of 15 or more feet of the burrows. Not only is the grass cut short, but the roots are dug out. Thousands of acres of valuable western range land have thus been denuded by the ravages of this crop pest, and many cases of erosion, resulting directly from the removal of the grass cover and the building of mounds by prairie dogs, have been noted.

Perhaps the worst rodent pests, from the standpoint of causing erosion, are the pocket gophers, which are found in great numbers in all the Western States. These small, underground rodents burrow with apparently untiring efforts. In summer they throw the dirt re-

[12] TAYLOR, WALTER P. METHODS OF DETERMINING RODENT PRESSURE ON THE RANGE. Ecology 11 (3): 523-542, July, 1930.

moved by their burrowing activities to the surface of the ground, piling it up in mounds. When the snow comes in fall, and before it has melted away in spring, pocket gophers push the surplus dirt out of their underground workings in the form of long, chainlike ridges, or miniature dikes, as illustrated in Figure 154. With the melting of the snow, these earthworks form guide channels for water, and thus aid in starting definite erosion scars. Later, when sheep and cattle enter the mountain areas, the trampling stock break through into the shallow runways, creating more passageways to carry off the rains and melting snows. In many areas, following the destruction of forage and the removal of much of the surface soil in this combination of trampling by livestock and washing by rains, weeds and ofttimes poisonous plants gain a foothold. This creates a very serious range condition. (Fig.155.)

FIGURE 155.—An acre of alfalfa land, valued at $400, ruined by erosion resulting from pocket-gopher activities

Damage to Irrigation Works

In irrigation districts many instances of breaks in ditches and in reservoir dikes are directly traceable to burrowing by ground squirrels, pocket gophers, or prairie dogs. A small hole in the bank of an irrigation ditch carrying a heavy load of water soon plays havoc, in many places cutting great gullies. Not only is erosion damage great, but the loss in water, badly needed to produce crops, frequently amounts to thousands of dollars before the break can be repaired. Such a case occurred in Idaho, when a pocket gopher burrowed through an irrigation canal that carried 18,000 inches of water for the irrigation of 30,000 acres. Repairs to the break cost $5,000 and before the ditch could be put in serviceable condition the drought resulted in the loss of 25 per cent of the crops. Figure 156 illustrates the havoc a rodent burrow can cause in an irrigation district.

Prompt and effective measures of checking the destructive effects of erosion should be applied as soon as its beginnings become apparent, if wasteful loss of soil is to be prevented. A large part of the present erosion problem would be solved if effective rodent-control methods could be put into practice on many of the western mountain range areas and farming districts. The Bureau of Biological Survey is aiding in the organization of such control units in all the Western

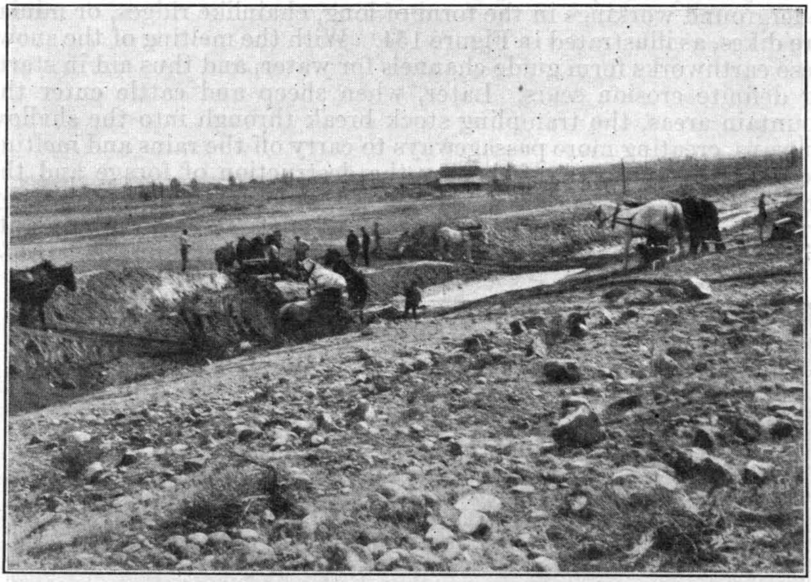


FIGURE 156.—Expensive break in irrigation ditch near Kennewick, Wash., caused by water finding its way through burrows made by pocket gophers

States, which will, in time, assist greatly in preventing further loss of soil through erosion caused by rodents.

ALBERT M. DAY,
Biologist, Bureau of Biological Survey.

SPRAY Residue Removal by Latest Methods Is an Economic Benefit The removal of arsenical spray residue from apples and pears is an almost universal practice in the Pacific Northwest. With more stringent regulatory measures being enforced, spray-residue removal has become necessary and is being adopted more and more in other sections of the country. Prolonged dry weather such as prevailed during 1930 over large areas of the Eastern States made it necessary for many growers to face this problem for the first time in areas where it had not been anticipated that the difficulty would be encountered.

Combination of lead arsenate with oil sprays generally makes fruit cleaning more difficult than when lead arsenate is applied alone. However, when these combination sprays are prepared with oils of a viscosity of 75 Saybolt or less, with relatively high volatility, and when properly applied, difficulty of cleaning is not materially increased.

Such combination sprays should be used immediately after mixing, in order to avoid separation and resulting heavy oil-covered blotches of residue on the fruit. Late applications of combined lead-arsenate oil sprays should be avoided.

The sooner fruit is cleaned after harvest the more easily the cleaning can be accomplished and with less risk of damage. If cleaning and areas and farming districts. The Bureau of Biological Survey is aiding in the organization of such control units in all the Western

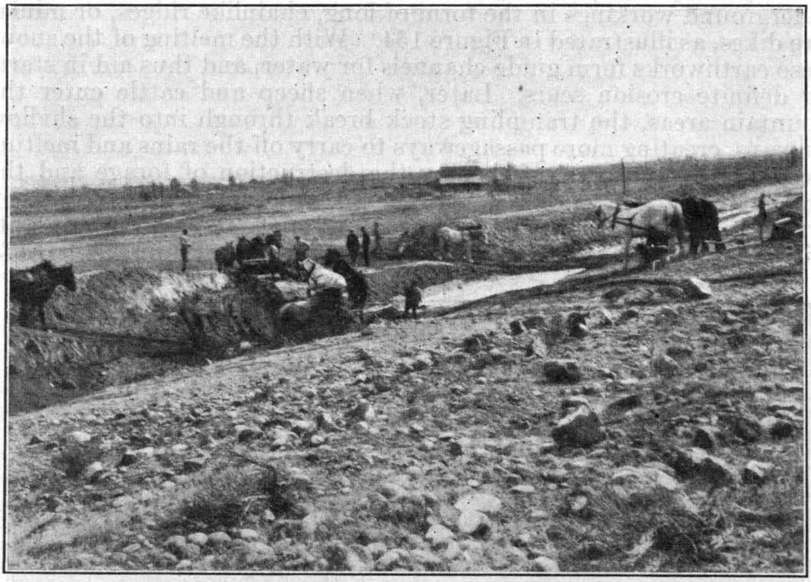


FIGURE 156.—Expensive break in irrigation ditch near Kennewick, Wash., caused by water finding its way through burrows made by pocket gophers

States, which will, in time, assist greatly in preventing further loss of soil through erosion caused by rodents.

ALBERT M. DAY,
Biologist, Bureau of Biological Survey.

SPRAY Residue Removal by Latest Methods Is an Economic Benefit The removal of arsenical spray residue from apples and pears is an almost universal practice in the Pacific Northwest. With more stringent regulatory measures being enforced, spray-residue removal has become necessary and is being adopted more and more in other sections of the country. Prolonged dry weather such as prevailed during 1930 over large areas of the Eastern States made it necessary for many growers to face this problem for the first time in areas where it had not been anticipated that the difficulty would be encountered.

Combination of lead arsenate with oil sprays generally makes fruit cleaning more difficult than when lead arsenate is applied alone. However, when these combination sprays are prepared with oils of a viscosity of 75 Saybolt or less, with relatively high volatility, and when properly applied, difficulty of cleaning is not materially increased.

Such combination sprays should be used immediately after mixing, in order to avoid separation and resulting heavy oil-covered blotches of residue on the fruit. Late applications of combined lead-arsenate oil sprays should be avoided.

The sooner fruit is cleaned after harvest the more easily the cleaning can be accomplished and with less risk of damage. If cleaning and packing are unavoidably delayed the fruit should be held in the coolest storage available.

Dry cleaning is not generally satisfactory for removing excessive arsenical spray residue. Moreover, when the elements of cost, relative efficiency, safe handling of fruit, and capacity are considered, washing methods are invariably more economical and satisfactory.

To be commercially practicable, washing equipment should clean fruit satisfactorily without the necessity for frequent repairs and adjustment, and with a minimum of rough handling and mechanical or chemical damage to the fruit. Several types and sizes of satisfactory washing equipment are on the market, and it is also possible to construct satisfactory homemade devices. (Fig. 157.)

Washing methods employing hydrochloric acid are by far the most frequently used, although alkaline materials may also be employed. The latter are gelnerally efficient, but because of the solvent effect of alkalies upon the waxy coating of the fruit their use must be supervised rather closely, particularly the rinsing phase. Washing methods that require submersing the fruit more than a few inches below the surface of the liquid should be avoided, especially if the varieties to be washed have open calyx tubes, in order to avoid possible penetration of the washing solution into the core region with consequent injury and possible decay.

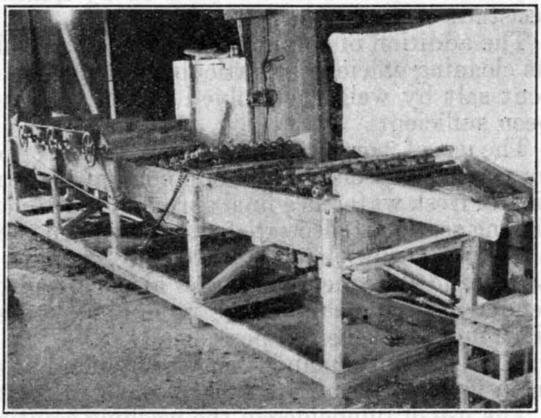


FIGURE 157.—Homemade washer of paddle type for removal of spray residue from apples and pears

Simple Dipping Relatively Inefficient

One of the primary requisites of any washer is that it shall move as large a quantity of fresh solvent over the fruit per unit of time as is mechanically economical. Simple dipping methods are therefore at a disadvantage in fruit cleaning unless the washing solution is agitated.

The satisfactory washing of apples and pears generally requires an acid concentration of at least 1 gallon to 100 gallons of water. The commercial grade of hydrochloric or muriatic acid is used.

Increasing the acid concentration to 4 gallons to 100 gallons of water gives significant increase in cleaning efficiency, but beyond this does not generally justify the added cost, and the higher concentrations put a greater burden on the rinsing section, as well as increase the danger of injury to the fruit from acid burning and from soluble arsenic, which may result on poorly rinsed fruit.

The acid concentration should be determined frequently. Simple and inexpensive apparatus is available for this purpose. Notes should be kept of the acid strength and temperature, of the chemical analyses made on the fruit, and of any other significant information, for reference in future operations.

The time required to remove spray residue depends upon a number of factors, such as the variety and maturity of the fruit, the amount of residue present, the strength and temperature of the acid solution, and the method of application. Generally, with flotation washers, an exposure of the fruit to the cleaning solution for 3 to 5 minutes is sufficient. When a dipping method is used, in which there is not much agitation of the solvent, an exposure of 5 minutes is generally required. Where the solution is pumped or thrown over the fruit an exposure of from 2 to 4 minutes is usually sufficient. With commercial washing machines 20 to 40 seconds generally suffice.

By raising the temperature of the cleaning solution to 80° F. and preferably to 95° or 100°, increased efficiency may be obtained. Warming the acid generally can be done best by some form of low-pressure steam coils placed in the tank or by heating directly in corrosion-resistant coils.

The addition of common salt to the acid solution will often enhance its cleaning efficiency, particularly if the solvent is warmed. One per cent salt by weight dissolved in the washing solution has generally been sufficient.

The use of 2 or 3 gallons of fresh water per bushel of fruit is desirable for rinsing. Recirculation of a portion of the rinse water and the addition of fresh water as a final spray or flood over the fruit as it leaves the rinsing section is also satisfactory. When there is a great shortage, all of the water may be circulated and 2 pounds of lime to 100 gallons of water added to neutralize the acid carried over on the fruit and to render insoluble the arsenic remaining. In such cases, however, the rinse must be renewed periodically.

The acid solution and rinse tanks should be emptied and flushed with fresh water after about 1,000 bushels of fruit have been cleaned.

The use of fungicides in the washing solution or rinse water has not given any practical benefit in reducing the danger of decay in the fruit. This danger is not great, however, if the washing is done with proper equipment and under reasonably sanitary conditions.

Injury From Faulty Washing

Faulty washing practices sometimes cause certain types of injury: (1) Arsenical injury, which occurs as depressed dark brown or black spots, sometimes extending into the flesh and usually found in the calyx end of the fruit; (2) hydrochloric acid injury, which is light brown or tan in color and may occur on any portion of the fruit; (3) chemical injury at the core, due to penetration of cleaning solution through open calyx tubes; and (4) mechanical injury due to defects in the equipment and rough handling. The remedies for these troubles have already been suggested in this discussion.

Reasonable drying of the fruit facilitates packing, but when it is well rinsed no storage troubles have resulted from the packing of wet fruit. Drying by air blasts, which sweep the water off the fruit, or by different types of cloth-drying apparatus are more satisfactory than by brush driers. The cloths on the rollers of wiping equipment, designed primarily for dry cleaning, will also serve the purpose, but must be frequently renewed if they are to function satisfactorily.

Commercial experience with properly washed fruit indicates that it keeps as well as unwashed fruit, that better grading and sorting result, that the final appearance of the fruit is much more attractive, and that it commands a higher price. Fruit cleaning, therefore, is a distinct benefit, particularly in sections where considerable spraying with arsenicals is necessary.

H. C. Diehl,
Physiologist, Bureau of Plant Industry.

STANDARD Specifications for Household Buying Are Being Developed

At the present time many farm products are graded for sale according to standards set up by the Bureau of Agricultural Economics. Manufacturers have for a long time been writing accurate descriptions for the raw materials and partly finished goods they buy. The Bureau of Standards of the Department of Commerce has worked with industrial and commercial agencies in setting up specifications that have limited the production of various articles to a given number of sizes and thereby cut down manufacturing costs. The Federal and State Governments have worked out specifications for purchases for various Government institutions. The housewife is beginning to ask why she can not buy in accordance with specifications that are guaranteed by the manufacturers.

The Bureau of Home Economics and the American Home Economics Association received so many requests for information on the subject of standard specifications for household goods that they cooperated during the past year in the compilation and publication of the booklet called "Household Purchasing: Suggestions for Club Programs." This booklet outlines the material available for club programs on difficulties the consumer meets in the present market, food standards and grades, food containers, weights and measures, quality standards and grades for foods, buying textiles and clothing, household equipment, and what the Government can do to help the consumer. The programs are now in use by a number of extension clubs.

In this attempt to bring together information as to the standard specifications which are now in definite, usable form for the housewife, several points came to light.

Some of the grades used in sorting agricultural products for the market can profitably be used by the housewife in her purchasing, provided definite information is furnished her as to what these grades mean. In some cities beef officially stamped with the official grade name can be bought in the retail shops. In some parts of the country poultry, eggs, and butter are now being sold to consumers labeled according to the Government grades. Large numbers of turkeys have been graded for the consumer, each bird being labeled with its Government grade mark. The standards for canned foods developed in the Bureau of Agricultural Economics under the warehouse act have been used in certain States as a basis for selling canned goods.

Definitions Under Food and Drugs Act

Under the food and drugs act, definitions and standards for a large number of food products have been promulgated by the department. These are designed (1) to fix the identity of the articles, and (2) to insure that they be of sound and merchantable quality. The specifications are of such a nature that any departure of an article above the maximum or below the minimum limits prescribed is evidence that the article is either impure or abnormal. Recently the food and drugs act has been amended to authorize the Secretary of Agriculture to promulit commands a higher price. Fruit cleaning, therefore, is a distinct benefit, particularly in sections where considerable spraying with arsenicals is necessary.

H. C. Diehl,
Physiologist, Bureau of Plant Industry.

STANDARD Specifications for Household Buying Are Being Developed At the present time many farm products are graded for sale according to standards set up by the Bureau of Agricultural Economics. Manufacturers have for a long time been writing accurate descriptions for the raw materials and partly finished goods they buy. The Bureau of Standards of the Department of Commerce has worked with industrial and commercial agencies in setting up specifications that have limited the production of various articles to a given number of sizes and thereby cut down manufacturing costs. The Federal and State Governments have worked out specifications for purchases for various Government institutions. The housewife is beginning to ask why she can not buy in accordance with specifications that are guaranteed by the manufacturers.

The Bureau of Home Economics and the American Home Economics Association received so many requests for information on the subject of standard specifications for household goods that they cooperated during the past year in the compilation and publication of the booklet called "Household Purchasing: Suggestions for Club Programs." This booklet outlines the material available for club programs on difficulties the consumer meets in the present market, food standards and grades, food containers, weights and measures, quality standards and grades for foods, buying textiles and clothing, household equipment, and what the Government can do to help the consumer. The programs are now in use by a number of extension clubs.

In this attempt to bring together information as to the standard specifications which are now in definite, usable form for the housewife, several points came to light.

Some of the grades used in sorting agricultural products for the market can profitably be used by the housewife in her purchasing, provided definite information is furnished her as to what these grades mean. In some cities beef officially stamped with the official grade name can be bought in the retail shops. In some parts of the country poultry, eggs, and butter are now being sold to consumers labeled according to the Government grades. Large numbers of turkeys have been graded for the consumer, each bird being labeled with its Government grade mark. The standards for canned foods developed in the Bureau of Agricultural Economics under the warehouse act have been used in certain States as a basis for selling canned goods.

Definitions Under Food and Drugs Act

Under the food and drugs act, definitions and standards for a large number of food products have been promulgated by the department. These are designed (1) to fix the identity of the articles, and (2) to insure that they be of sound and merchantable quality. The specifications are of such a nature that any departure of an article above the maximum or below the minimum limits prescribed is evidence that the article is either impure or abnormal. Recently the food and drugs act has been amended to authorize the Secretary of Agriculture to promulgate standards of quality, condition, and fill of container for canned foods. The same amendment authorizes the Secretary to prescribe a statement which will appear in a plain and conspicuous manner on the labels of all canned foods which do not meet the standard and which will clearly indicate that they fall below such standard. This amendment in no sense authorizes the distribution of adulterated or misbranded canned foods. As heretofore, these are banned under the terms of the food and drugs act. It does, however, divide legal canned foods, into two classes: (1) A class of a quality which entitles it to be known as "standard," and (2) a class which is in some respects inferior and, therefore, must be labelled "substandard."

The imposition of the substandard labelling requirement is important from the housewife's standpoint because it is a precaution to save the pocketbook. The housewife with a limited budget who feels that she can not afford to purchase canned foods of standard quality but does desire to obtain canned articles of satisfactory nutritive value, can satisfy her desires by selecting those canned products which bear the substandard label, with full assurance that they are legal and wholesome, even if not so palatable or of such satisfactory appearance as the standard article. On the other hand, if it is her desire to avoid the lower grades of canned foods, she may assure herself of the character of the product she buys by refusing to accept an article bearing a substandard label.

Some of the specifications used by Government and State agencies for institutional purchases may also be used by the housewife. Most of these, however, need to be set up in terms which will help to indicate their use to her. This involves considerable study. A discussion of the development of standard specifications for textiles appears elsewhere in this Yearbook.

Specifications for Refrigerators

When she buys household equipment, the housewife frequently spends a considerable sum of money for a single article. In making such a purchase she wants the best possible information, and she frequently asks the Bureau of Home Economics for assistance in learning what she needs to know. A beginning has been made in the setting up of standard specifications for household refrigerators. The refrigerator, like many other pieces of household equipment, does not carry its value on its face. It has taken some three years of work by manufacturers, ice distributors, and refrigerator users to determine how ice-cooled refrigerators should be labelled so that the housewife will know what she is getting. There may be in one row refrigerators varying in price from $25 to $200 with little difference in outside appearance. It is important that in deciding what to purchase the housewife should have some other basis of judgment. The salesman may tell her much about insulation and probable length of life. She would be much more secure in her purchase if each manufacturer were to place on his ice box such a statement as the following with pounds and cubic feet definitely stated.

> Ice capacity ---------- pounds; ---------- cubic feet of usable space. Guaranteed temperatures. Milk compartment not over 45° F. Food compartment average temperature not over 50° (under standard test conditions, outside temperature not exceeding 80°, with daily ice consumption under standard test conditions of ---------- pounds).

Such information would enable the housewife to select the ice box best adapted to her needs. In conferences among manufacturers, distributors, and users of refrigerators agreement has been reached as to part, although not all, of this label. It is an indication of the type of specification which the housewife wants and which the best manufacturers are coming to see they must furnish in some form and stand behind if they are to protect their goods on the market.

As time goes on it will be possible to develop similar labels suitable for other pieces of household equipment which will be of material help in solving the purchasing problems of the housewife.

FAITH M. WILLIAMS,
Senior Economist, Bureau of Home Economics.

STEM-RUST Hazard Is Reduced by Using the Proper Fertilizers The problem of building up soil fertility without increasing losses from stem rust of cereals must be considered from the standpoint of both soil type and climate. A few general rules, however, for the use of fertilizers may be noted.

Excessive amounts of nitrogen fertilizers should always be avoided in regions where epidemics of stem rust are likely to occur. It is a mistake to add nitrogenous fertilizers to the heavy loams of southeastern Minnesota in order to increase the yields of wheat. Most of the wheatlands of that area are fairly well supplied with nitrogen, and nitrogenous fertilizers are apt to be more harmful than beneficial, since excessive nitrogen is conducive to stem rust. With excess nitrogen the wheat grows luxuriantly and tillers profusely. The straw is weak and the plants lodge easily. Shading, incident to dense growth and lodging, checks evaporation, and the dew remains longer than on the normal plants. The rust spores require the presence of this moisture to germinate, and the longer the moisture remains on the surface of the wheat plant the greater the opportunity for the rust germ tubes to enter the wheat. If the rust organism does not enter before the plants dry, it shrivels and dies.

Nitrogenous fertilizers also delay maturity. Ripening may be delayed from four days to as much as two weeks. Stem rust does not infect wheat after it ripens. Prolonging the growing period of the wheat increases the length of time during which the stem rust may attack. Severe rust attacks also usually occur toward the end of the growing season, and a few days' delay in maturity may permit a severe attack, while earlier wheats may escape.

Phosphate and potash fertilizers are not so conducive to stem-rust development as are nitrogenous fertilizers. Wheat straw seldom lodges when phosphates or potash only are used. The wheat may grow vigorously but will not produce such a rank vegetation. Tillering is not so profuse, the number of culms is less, vegetation is more open, and aeration is better. Dews and rains evaporate more quickly than in more rank stands, and the rust has less time to accomplish infection.

Phosphate and Potash Hasten Ripening

Phosphate and potash fertilizers also tend to hasten ripening. At University Farm, St. Paul, Minn., in 1927, plants fertilized with phosphates ripened 3 or 4 days earlier than plants without fertilizers, Such information would enable the housewife to select the ice box best adapted to her needs. In conferences among manufacturers, distributors, and users of refrigerators agreement has been reached as to part, although not all, of this label. It is an indication of the type of specification which the housewife wants and which the best manufacturers are coming to see they must furnish in some form and stand behind if they are to protect their goods on the market.

As time goes on it will be possible to develop similar labels suitable for other pieces of household equipment which will be of material help in solving the purchasing problems of the housewife.

FAITH M. WILLIAMS,
Senior Economist, Bureau of Home Economics.

STEM-RUST Hazard Is Reduced by Using the Proper Fertilizers

The problem of building up soil fertility without increasing losses from stem rust of cereals must be considered from the standpoint of both soil type and climate. A few general rules, however, for the use of fertilizers may be noted.

Excessive amounts of nitrogen fertilizers should always be avoided in regions where epidemics of stem rust are likely to occur. It is a mistake to add nitrogenous fertilizers to the heavy loams of southeastern Minnesota in order to increase the yields of wheat. Most of the wheatlands of that area are fairly well supplied with nitrogen, and nitrogenous fertilizers are apt to be more harmful than beneficial, since excessive nitrogen is conducive to stem rust. With excess nitrogen the wheat grows luxuriantly and tillers profusely. The straw is weak and the plants lodge easily. Shading, incident to dense growth and lodging, checks evaporation, and the dew remains longer than on the normal plants. The rust spores require the presence of this moisture to germinate, and the longer the moisture remains on the surface of the wheat plant the greater the opportunity for the rust germ tubes to enter the wheat. If the rust organism does not enter before the plants dry, it shrivels and dies.

Nitrogenous fertilizers also delay maturity. Ripening may be delayed from four days to as much as two weeks. Stem rust does not infect wheat after it ripens. Prolonging the growing period of the wheat increases the length of time during which the stem rust may attack. Severe rust attacks also usually occur toward the end of the growing season, and a few days' delay in maturity may permit a severe attack, while earlier wheats may escape.

Phosphate and potash fertilizers are not so conducive to stem-rust development as are nitrogenous fertilizers. Wheat straw seldom lodges when phosphates or potash only are used. The wheat may grow vigorously but will not produce such a rank vegetation. Tillering is not so profuse, the number of culms is less, vegetation is more open, and aeration is better. Dews and rains evaporate more quickly than in more rank stands, and the rust has less time to accomplish infection.

Phosphate and Potash Hasten Ripening

Phosphate and potash fertilizers also tend to hasten ripening. At University Farm, St. Paul, Minn., in 1927, plants fertilized with phosphates ripened 3 or 4 days earlier than plants without fertilizers, and about 8 to 10 days earlier than plants fertilized with nitrates. In years when stem rust is epidemic, early ripening plays an important part in avoiding loss. The use of fertilizers that hasten maturity may protect the crop and result in better yields than where no fertilizer is supplied or where nitrogen is used.

The real test of fertilizer value is crop yield and quality. Where stem-rust epidemics occur, a well-balanced fertilization will improve yield, and quality also in so far as it aids in avoiding rust. On light sandy soils nitrogen may be beneficial, but on heavy loams both yield and quality may be actually decreased if nitrogen fertilizers are applied. Under rust-epidemic conditions phosphate and potash fertilizers can well be used on all soils that are benefited by them.

HELEN HART,
Agent, Bureau of Plant Industry.

STRAWBERRY Weevil May Be Controlled by Using Sulphur and Arsenate The strawberry weevil, *Anthonomus signatus* Say, a native pest of cultivated strawberries, is an ever-present factor in the production of this crop in the eastern half of the United States. Serious outbreaks of this weevil have occurred periodically in the Eastern States during the last 50 years, particularly on the coastal plain from North Carolina northward.

The strawberry weevil is about one-tenth of an inch long and approximately half as wide, with a curved snout similar to that of the boll weevil. The color varies from almost black to a dull reddish brown, with a dark spot on each wing cover. The injury to the strawberry crop is caused by the weevil cutting the blossom stem during the process of egg laying. The female weevil deposits the egg in the bud and then cuts the bud stem a short distance below the bud. Oftentimes the buds are severed, from the stem, but usually the stem is cut so as to leave the bud attached to it by a tiny thread; however, it eventually falls to the ground. The egg hatches in the severed bud and the larva or grub feeds therein until it reaches maturity, finally emerging as a weevil.

The economic importance of this insect can not be judged wholly by the percentage of the crop it destroys, but must be based on the reduction in returns received for the crop. For instance, in the North Carolina area the early strawberries sell for more than three times the price of those marketed three weeks later in the season, and it so happens that the buds producing these early berries are the ones most heavily attacked by the weevil.

The presence of the weevil in the strawberry fields in early spring may be detected by the small circular feeding holes in the petals of the open flowers in the rows near the edges of the field, particularly those rows which are adjacent to accumulations of dead vegetation, as it is such locations that harbor the greatest number of weevils during the winter season. A few days later the presence of the weevil may be manifested by a scarcity of open blossoms and a close examination will show buds severed from the stems. The small size of the weevil together with its habit of dropping to the ground when disturbed prevents its general detection by the casual observer. Very often the and about 8 to 10 days earlier than plants fertilized with nitrates. In years when stem rust is epidemic, early ripening plays an important part in avoiding loss. The use of fertilizers that hasten maturity may protect the crop and result in better yields than where no fertilizer is supplied or where nitrogen is used.

The real test of fertilizer value is crop yield and quality. Where stem-rust epidemics occur, a well-balanced fertilization will improve yield, and quality also in so far as it aids in avoiding rust. On light sandy soils nitrogen may be beneficial, but on heavy loams both yield and quality may be actually decreased if nitrogen fertilizers are applied. Under rust-epidemic conditions phosphate and potash fertilizers can well be used on all soils that are benefited by them.

HELEN HART,
Agent, Bureau of Plant Industry.

STRAWBERRY Weevil May Be Controlled by Using Sulphur and Arsenate The strawberry weevil, *Anthonomus signatus* Say, a native pest of cultivated strawberries, is an ever-present factor in the production of this crop in the eastern half of the United States. Serious outbreaks of this weevil have occurred periodically in the Eastern States during the last 50 years, particularly on the coastal plain from North Carolina northward.

The strawberry weevil is about one-tenth of an inch long and approximately half as wide, with a curved snout similar to that of the boll weevil. The color varies from almost black to a dull reddish brown, with a dark spot on each wing cover. The injury to the strawberry crop is caused by the weevil cutting the blossom stem during the process of egg laying. The female weevil deposits the egg in the bud and then cuts the bud stem a short distance below the bud. Oftentimes the buds are severed, from the stem, but usually the stem is cut so as to leave the bud attached to it by a tiny thread; however, it eventually falls to the ground. The egg hatches in the severed bud and the larva or grub feeds therein until it reaches maturity, finally emerging as a weevil.

The economic importance of this insect can not be judged wholly by the percentage of the crop it destroys, but must be based on the reduction in returns received for the crop. For instance, in the North Carolina area the early strawberries sell for more than three times the price of those marketed three weeks later in the season, and it so happens that the buds producing these early berries are the ones most heavily attacked by the weevil.

The presence of the weevil in the strawberry fields in early spring may be detected by the small circular feeding holes in the petals of the open flowers in the rows near the edges of the field, particularly those rows which are adjacent to accumulations of dead vegetation, as it is such locations that harbor the greatest number of weevils during the winter season. A few days later the presence of the weevil may be manifested by a scarcity of open blossoms and a close examination will show buds severed from the stems. The small size of the weevil together with its habit of dropping to the ground when disturbed prevents its general detection by the casual observer. Very often the destruction of buds escapes notice and at harvest time the shortage of the crop is attributed to some unknown cause.

In the North Carolina strawberry-growing area this weevil starts laying its eggs about the second week in March, continuing until the latter part of May, and reaching the peak of egg deposition about April 10. The weevils which develop from these eggs may be found active from early in May to the middle of June, feeding in the flowers of various kinds of wild shrubs. After a period of activity of about 10 days they become sluggish and inactive, seek coverage about the edges of the field in woodlands and uncultivated areas, and do not become active again until the following spring. Observations have shown that an average of over 90 per cent of the hibernating weevils pass the winter within 100 feet of the strawberry fields, particularly if suitable coverage is available.

Sulphur-Calcium Arsenate Mixture

The strawberry weevil may be effectively controlled by dusting with a sulphur-calcium arsenate mixture. This mixture is prepared by mixing 15 pounds of calcium arsenate with 85 pounds of sulphur. However, for the treatments to be effective they must be made early and be frequent enough to protect the buds as they develop. A close watch should be kept for the first sign of the presence of the weevils in the strawberry field. As soon as any evidence of the weevil is found, either from its feeding marks upon the petals of the strawberry blossoms, or cut buds, or by observation of the weevil itself, the first treatment should be applied. A thin coating of the dust should cover the developing fruit buds. The rate of application of the material per acre will depend somewhat upon the width of the rows of the growing plants, but should not exceed 35 to 40 pounds per acre for one application. Ordinarily two applications at 10-day intervals will be sufficient to protect the early fruit buds. The last application of the dust should be made not later than three weeks before the fruit begins to ripen. Any standard blower-type dust gun operated by hand or by horsepower may be used in making the dust applications.

Since the weevil hibernates about the edges of the field, usually in uncultivated or cut-over areas along the edges of the field, it is a good practice to clean up such areas during the dormant period.

W. A. Thomas,
Assistant Entomologist, Bureau of Entomology.

SUGAR-BEET Curly Top's Spread Aided by Vast Increase in Host Weeds With the coming of agriculture in the semiarid areas of western North America certain weeds were introduced from other countries, and the human activities favoring the increase and spread of these and some of the native plants are the principal factors in the bringing of the insect vector of sugar-beet curly top, the sugar-beet leaf hopper, *Eutettix tenellus* (Baker), up to its place of objectional prominence. The beet leaf hopper occurs mainly in the semiarid areas of western North America. It appears to be native to this continent and prior to the advent of civilized men on the western coast was probably a destruction of buds escapes notice and at harvest time the shortage of the crop is attributed to some unknown cause.

In the North Carolina strawberry-growing area this weevil starts laying its eggs about the second week in March, continuing until the latter part of May, and reaching the peak of egg deposition about April 10. The weevils which develop from these eggs may be found active from early in May to the middle of June, feeding in the flowers of various kinds of wild shrubs. After a period of activity of about 10 days they become sluggish and inactive, seek coverage about the edges of the field in woodlands and uncultivated areas, and do not become active again until the following spring. Observations have shown that an average of over 90 per cent of the hibernating weevils pass the winter within 100 feet of the strawberry fields, particularly if suitable coverage is available.

Sulphur-Calcium Arsenate Mixture

The strawberry weevil may be effectively controlled by dusting with a sulphur-calcium arsenate mixture. This mixture is prepared by mixing 15 pounds of calcium arsenate with 85 pounds of sulphur. However, for the treatments to be effective they must be made early and be frequent enough to protect the buds as they develop. A close watch should be kept for the first sign of the presence of the weevils in the strawberry field. As soon as any evidence of the weevil is found, either from its feeding marks upon the petals of the strawberry blossoms, or cut buds, or by observation of the weevil itself, the first treatment should be applied. A thin coating of the dust should cover the developing fruit buds. The rate of application of the material per acre will depend somewhat upon the width of the rows of the growing plants, but should not exceed 35 to 40 pounds per acre for one application. Ordinarily two applications at 10-day intervals will be sufficient to protect the early fruit buds. The last application of the dust should be made not later than three weeks before the fruit begins to ripen. Any standard blower-type dust gun operated by hand or by horsepower may be used in making the dust applications.

Since the weevil hibernates about the edges of the field, usually in uncultivated or cut-over areas along the edges of the field, it is a good practice to clean up such areas during the dormant period.

W. A. Thomas,
Assistant Entomologist, Bureau of Entomology.

SUGAR-BEET Curly Top's Spread Aided by Vast Increase in Host Weeds

With the coming of agriculture in the semiarid areas of western North America certain weeds were introduced from other countries, and the human activities favoring the increase and spread of these and some of the native plants are the principal factors in the bringing of the insect vector of sugar-beet curly top, the sugar-beet leaf hopper, *Eutettix tenellus* (Baker), up to its place of objectional prominence. The beet leaf hopper occurs mainly in the semiarid areas of western North America. It appears to be native to this continent and prior to the advent of civilized men on the western coast was probably a relatively inconspicuous member of the fauna. The reason for this is that under the system of natural equilibrium which existed earlier the plants affording favorable food for the leaf hopper were so limited in quantity that the population of the insect was restricted. With the vast increase in weeds which are favorable host plants the population of the insect has increased enormously.

The great economic importance of this leaf hopper is due to the fact that it is the only agent known to transmit the virus disease of sugar beets known as curly top. This disease is a limiting factor in sugar-beet growing in infested areas and also causes serious damage to the tomato crop as well as some injury to beans and certain other crops.

The annual sequences of plants which serve to support and breed the leaf hopper are not the same in all infested areas. In Washington, Oregon, Idaho, and parts of Utah, for example, tumbling mustard (*Norta altissima*) and tansy mustard (*Sophia sophia* and *S. filipes*) are the more important hosts of early spring. Following these, Russian thistle (*Salsola pestifer*) plays an important rôle as a host plant for the remainder of the season. In the principal breeding areas of California, by contrast, the important range plant filaree (*Erodium cicutarium*), which appears after the first fall rains, harbors the insect over winter and into the spring. When the filaree dries up the leaf hoppers move to other annuals, of which probably the most important are bract scale (*Atriplex bracteosa*) and silver scale (*A. argentea expansa*).

Movement from Early Maturing Hosts

In all infested areas there occurs this extensive movement of the insects from the early maturing host plants to those which continue to live in a green and somewhat succulent state through the long summer drought period. At the time of this movement sugar beets as well as tomatoes and beans which are within the range of the movement are likely to become infested and epidemics of curly top initiated. These crops are not necessary, however, in the propagation of the insect, as is shown by the fact that it occurs in great numbers in areas where none of these crops are grown and only the weeds are available as favorable hosts plants.

That these weeds often occupy large areas of land and thereby cause such regions to serve as breeding grounds for the leaf hopper is due largely, as mentioned above, to disturbances by man of the natural equilibrium. Some typical activities which have had this result may be mentioned. Excessive grazing of ranges, for instance, has damaged or destroyed the native vegetation which had successfully occupied the land and resisted the intrusion of weeds. As a result of this mismanagement of the ranges, the weeds such as those mentioned as favorable host plants for the leaf hopper form one of the stages in the return to equilibrium. Moreover, continued overgrazing, a practice already condemned because of the resulting deterioration of both soil and range resources, prolongs the weed stage in the succession. Another unfortunate procedure which will eventually become less troublesome is the abandonment of land after a temporary period of tillage. The situation will be improved in this respect when the agriculture of more of the infested areas has passed through the pioneering stage. Abandoned lands resulting largely from unsuccessful attempts at dry farming or from an inadequate or unsatisfactory supply of irrigation water form vast areas which thus pass through the weed stage and as such function as breeding grounds for the leaf hopper. All lands cleared or lands where the native vegetation is damaged or destroyed are promptly occupied by weeds such as those mentioned as hosts of the leaf hopper. This is particularly true, in some sections, of roadsides or railroad right of ways which are repeatedly cleared or burned over. It is to be hoped that a better way of handling such areas as these will eventually be adopted. Also a better appreciation of the value of range lands will result in progress in the direction of a conserving management such as is now generally followed in the handling of forest lands.

The Search for Preventive Measures

The Department of Agriculture is studying the curly-top problem from various viewpoints in the hope of discovering preventive measures. As the factors influencing the size of the leaf-hopper population are important, study is being made of the conditions which control the objectionable weed stages in the succession, with the hope that methods may be discovered whereby the return to the native plant cover, which consists largely of nonhost plants, can be hastened. Attention is also being given to the prevention of burning the annual grass (*Bromus tectorum*), which now covers large areas where the original stand of sagebrush has been destroyed. Considerable tracts in these areas have stands of the grass dense enough to reduce greatly or almost eliminate the objectionable weed hosts. This plant also has some forage value in the early spring months and is worth maintaining on that account. Consideration is also being given to the possibility of introducing suitable grasses from other countries. These, if successful, would improve the value of the ranges and help to keep the objectionable weeds in check.

EUBANKS CARSNER, *Senior Pathologist,*
R. L. PIEMEISEL, *Physiologist,*
Bureau of Plant Industry.

SUGAR-BEET Strains Resistant to Leaf Spot and Curly Top The development of the sugar beet of today from the types of beet which, more than a century ago, were being cultivated for feeding cattle is a fascinating story of the application of the scientific method to the benefit of agriculture. The percentage of sugar has been more than doubled, the purity with respect to sucrose greatly increased, and the yielding capacity increased.

The sugar beet is normally a cross-pollinated plant, and the set of seed from a completely isolated mother beet is small. Isolation is difficult because the sugar beet crosses readily with the garden beet, the mangel wurzel, and Swiss chard. The early experience of plant breeders led them to abandon almost entirely inbreeding methods and to concentrate attention upon mass selection.

The practices generally followed in commercial sugar-beet breeding consist of a selection test and then a recombination of the selected "families." Mother beets are selected on the basis of weight, richness in sugar, etc., and these are isolated more or less for the production of seed lots. The roots obtained as progenies from these seed lots are subjected to analysis, and the progenies that most nearly come up to the standard set are chosen as basic material. These roots, which function as breeding grounds for the leaf hopper. All lands cleared or lands where the native vegetation is damaged or destroyed are promptly occupied by weeds such as those mentioned as hosts of the leaf hopper. This is particularly true, in some sections, of roadsides or railroad right of ways which are repeatedly cleared or burned over. It is to be hoped that a better way of handling such areas as these will eventually be adopted. Also a better appreciation of the value of range lands will result in progress in the direction of a conserving management such as is now generally followed in the handling of forest lands.

The Search for Preventive Measures

The Department of Agriculture is studying the curly-top problem from various viewpoints in the hope of discovering preventive measures. As the factors influencing the size of the leaf-hopper population are important, study is being made of the conditions which control the objectionable weed stages in the succession, with the hope that methods may be discovered whereby the return to the native plant cover, which consists largely of nonhost plants, can be hastened. Attention is also being given to the prevention of burning the annual grass (*Bromus tectorum*), which now covers large areas where the original stand of sagebrush has been destroyed. Considerable tracts in these areas have stands of the grass dense enough to reduce greatly or almost eliminate the objectionable weed hosts. This plant also has some forage value in the early spring months and is worth maintaining on that account. Consideration is also being given to the possibility of introducing suitable grasses from other countries. These, if successful, would improve the value of the ranges and help to keep the objectionable weeds in check.

EUBANKS CARSNER, *Senior Pathologist,*
R. L. PIEMEISEL, *Physiologist,*
Bureau of Plant Industry.

SUGAR-BEET Strains Resistant to Leaf Spot and Curly Top

The development of the sugar beet of today from the types of beet which, more than a century ago, were being cultivated for feeding cattle is a fascinating story of the application of the scientific method to the benefit of agriculture. The percentage of sugar has been more than doubled, the purity with respect to sucrose greatly increased, and the yielding capacity increased.

The sugar beet is normally a cross-pollinated plant, and the set of seed from a completely isolated mother beet is small. Isolation is difficult because the sugar beet crosses readily with the garden beet, the mangel wurzel, and Swiss chard. The early experience of plant breeders led them to abandon almost entirely inbreeding methods and to concentrate attention upon mass selection.

The practices generally followed in commercial sugar-beet breeding consist of a selection test and then a recombination of the selected "families." Mother beets are selected on the basis of weight, richness in sugar, etc., and these are isolated more or less for the production of seed lots. The roots obtained as progenies from these seed lots are subjected to analysis, and the progenies that most nearly come up to the standard set are chosen as basic material. These roots, which

40442°—31——32

have thus given evidence of superiority over the general run, are commonly grouped with other roots from different mothers to form an elite stock. This elite stock is then increased for commercial use by two, three, or even more field increases, with occasionally some selection and with more or less testing of the yielding capacities. These mass-selection methods, patiently and painstakingly carried on, have been effective in providing seed stocks which have given satisfactory performance under normal conditions. The selections have been based largely upon the weight of the individual or weight per plot, the percentage of sucrose as revealed by the polariscope, and the apparent purity with respect to sucrose.

Research in Seed Improvement

The United States Department of Agriculture has sought to develop by scientific research a basis for sugar-beet seed improvement which would furnish varieties or strains of sugar beet adapted to definite local needs, and to produce strains resistant to diseases that are now threatening the very existence of the industry. This has involved investigation of the principles underlying the genetics of the sugar beet and the testing in strategically located areas of all commercial brands of sugar-beet seed to determine whether there are selections whose superiority would merit consideration as basic stock for seed increase. Tests of many years at Rocky Ford, Colo., where leaf spot is often present in epidemic form, and at State College, N. Mex., under severe curly-top conditions, have shown that, contrary to occasional claims made by overzealous agents, no commercial variety now available has such a degree of superiority over another in resistance to either leaf spot or curly top as to warrant its selection. Individual plants here and there in practically all of these commercial strains, however, have shown such resistance as to make them stand out from their diseased neighbors, and such resistant individuals have been selected and used as progenitors of inbred lines. Other selections have been used in group plantings to furnish seed for subsequent comparative tests against commercial lines of beets. Work with the progenies from inbred lines selected for disease resistance is as yet incomplete, and report on this phase must be deferred.

Results from the group plantings are significant. A number of individual sugar beets that were outstanding in size and in sugar percentage, as well as showing evidence of leaf-spot resistance, were selected in 1927 from a field where leaf spot was doing excessive damage. These beets were of satisfactory size and superior sugar content, and a group planting was made. The seed obtained has been outstanding in leaf-spot resistance and has produced a better yield of beets and a higher sugar percentage than the commercial lot from which it was isolated. By a single selection, results immediately detectable in the progeny were obtained.

Selection of Resistant Individuals

Similar selections of curly-top-resistant individuals have been made from fields where curly top was doing nearly its maximum damage. The progenies from such selections have produced more than three times the yield of the commercial variety under curly-top conditions, but are not as yet enough freed from the susceptible types to be commercially usable under severe conditions. At State College, N. Mex., in 1929, a selection was made for curly-top resistance from a commercial brand and compared with the original material with the results shown in Table 18. It seems certainly feasible to continue the sorting process to eliminate the susceptible types.

TABLE 18.—*Results of one season's rigid selection of sugar beets for curly-top resistance*

[Commercial brand Pioneer (check) contrasted with selections from it. State College, N. Mex., 1929. Results given as averages of three plantings]

Stock used	Relative susceptibility [1] (average)	Initial stand (average)	Final stand	Average yield computed on acre basis	Average weight of beet harvested
				Pounds	*Pound*
Selection	2.9	103	87	12,037	0.91
Check	4.5	93	67	2,786	0.21

[1] Relative curly-top susceptibility obtained from individual plant readings on a scale based on relative damage by curly top, in which 0 and 1 indicate immunity and high resistance, respectively, and 5 and 6 indicate high susceptibility.

Recognizing the natural limitations presented by present-day sugar-beet material, which probably traces back to one or a few sources, attempt was made to widen the range of available characters by hybridizing the sugar beet with the wild sugar beet, *Beta maritima*, from which the sugar beet is believed to have been derived. Collections of wild beet seed were made in Europe, where *B. maritima* is indigenous, and these collections have been tested under leaf-spot and curly-top conditions. No wild beet immune to leaf spot was found, but certain collections have given individuals with a sugar percentage equal to that of the sugar beet and more resistant to leaf spot than any sugar beet yet found. The wild beet hybridizes readily with the sugar beet, and individuals have been obtained with high resistance and with marked improvement in top and root characters over the wild progenitor.

Highly Resistant Wild Beets

Similar tests under severe curly-top conditions have shown that there exist, among the numerous collections of wild beets, forms which, while maintaining the capacity for sugar production, are so nearly immune to curly top as to make even recognition of the presence of disease on these forms very difficult. These highly resistant individuals have been crossed with high-grade nonresistant commercial beets, and the hybrid material has been tested. The results of one such test are given in Table 19 and are shown graphically in Figure 158.

TABLE 19.—*Comparison of yields of a sugar beet and Beta maritima cross with those obtained from a standard commercial sugar beet*

[Average of two plantings. State College, N. Mex., 1929]

Stock used	Relative curly-top susceptibility [1]	Initial stand	Final stand	Yield computed on acre basis	Average weight of beet based on initial stand
				Pounds	*Pounds*
Wild cross	2.0	99	89	25,556	1.73
Commercial (check)	4.4	100	61	3,331	0.21

[1] Relative curly-top susceptibility obtained from individual plant readings on a scale based on relative damage by curly top in which 0 and 1 indicate immunity and high resistance, respectively, and 5 and 6 indicate high susceptibility.

The hybrid material contained a composite of true sugar beets, of true wild, and of hybrid material. The hybrid material was extremely promising in showing almost immediate response in two directions, namely, (1) in resistance to curly top due to factors obtained from the wild parent, and (2) improvement over the wild type, as a result of the genetic factors from the cultivated parent. In view of work carried on abroad where the wild forms have been crossed with cultivated beets, it is believed that beets of satisfactory type may be obtained from this cross, and it certainly seems that the highly desired resistance can be retained if the breeding work is continued with constant exposure to curly top.

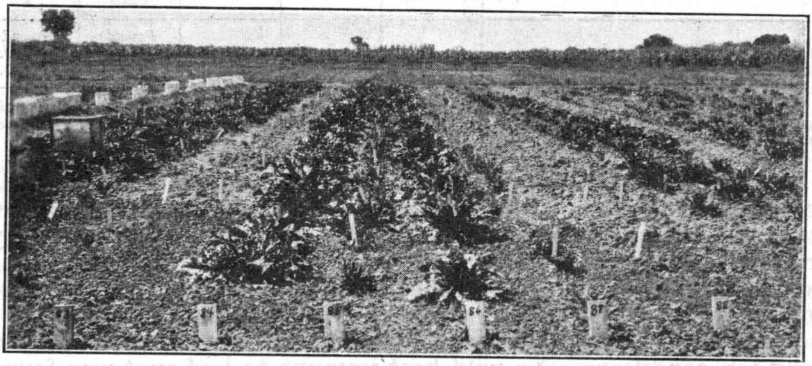


FIGURE 158.—Sugar beet tests under curly-top epidemic conditions at State College, N. Mex. Rows 84, 85, and 86 are hybrids of sugar beets and *Beta maritima*. Rows 81 and 87 are a commercial variety. (July 17, 1929)

The situation, therefore, with respect to improvement of the quality of sugar-beet seed for American use is very promising. By utilizing mass selection the advance in quality already made may be maintained while at the same time the desired resistance in seed stocks is developed. The recent demonstration of economical seed production in the United States from plants overwintered in the field in areas of mild climate will doubtless have important relation in this new development. Further, pure lines for amelioration of beet stocks by purposeful crossing are now being developed, and this basic breeding material gives promise of providing the ultimate solution for the serious beet diseases.

G. H. COONS, *Principal Pathologist*,
DEWEY STEWART, *Associate Pathologist*,
H. A. ELCOCK, *Assistant Pathologist*,
Bureau of Plant Industry.

SWEETCLOVER, Though a Fertilizer Crop, May Itself Need Fertilizer The use of fertilizer on a crop like sweetclover, which is grown primarily for improving the soil, seems at first very much like the proverbially useless task of carrying coals to Newcastle. Why, we ask, improve the soil for a crop that is supposed to be doing that of itself?

The answer lies in the fact that even a soil-improving crop makes a better growth if there is plenty of food material available for its use. Since the object of growing a soil-improving crop is to obtain the largest quantity of green material possible for plowing under, the use

The hybrid material contained a composite of true sugar beets, of true wild, and of hybrid material. The hybrid material was extremely promising in showing almost immediate response in two directions, namely, (1) in resistance to curly top due to factors obtained from the wild parent, and (2) improvement over the wild type, as a result of the genetic factors from the cultivated parent. In view of work carried on abroad where the wild forms have been crossed with cultivated beets, it is believed that beets of satisfactory type may be obtained from this cross, and it certainly seems that the highly desired resistance can be retained if the breeding work is continued with constant exposure to curly top.

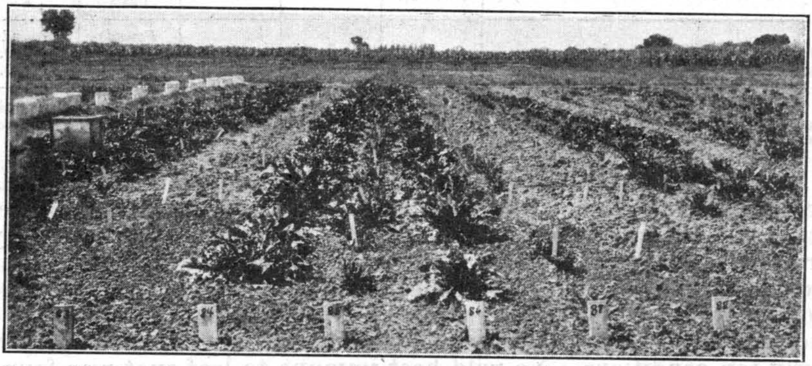


FIGURE 158.—Sugar beet tests under curly-top epidemic conditions at State College, N. Mex. Rows 84, 85, and 86 are hybrids of sugar beets and *Beta maritima*. Rows 81 and 87 are a commercial variety. (July 17, 1929)

The situation, therefore, with respect to improvement of the quality of sugar-beet seed for American use is very promising. By utilizing mass selection the advance in quality already made may be maintained while at the same time the desired resistance in seed stocks is developed. The recent demonstration of economical seed production in the United States from plants overwintered in the field in areas of mild climate will doubtless have important relation in this new development. Further, pure lines for amelioration of beet stocks by purposeful crossing are now being developed, and this basic breeding material gives promise of providing the ultimate solution for the serious beet diseases.

G. H. COONS, *Principal Pathologist,*
DEWEY STEWART, *Associate Pathologist,*
H. A. ELCOCK, *Assistant Pathologist,*
Bureau of Plant Industry.

SWEETCLOVER, Though a Fertilizer Crop, May Itself Need Fertilizer

The use of fertilizer on a crop like sweetclover, which is grown primarily for improving the soil, seems at first very much like the proverbially useless task of carrying coals to Newcastle. Why, we ask, improve the soil for a crop that is supposed to be doing that of itself?

The answer lies in the fact that even a soil-improving crop makes a better growth if there is plenty of food material available for its use. Since the object of growing a soil-improving crop is to obtain the largest quantity of green material possible for plowing under, the use of a reasonable quantity of fertilizer often pays. However, discretion is needed in the choice of fertilizers, for some pay better than others.

The most expensive fertilizers are those that carry nitrogen. Since sweetclover, like all legumes, obtains most of its nitrogen from the air, there usually is no necessity of adding nitrogen to the soil in the form of fertilizer. However, there are times when a small quantity of a quick-acting nitrogenous fertilizer like nitrate of soda or ammonium sulphate is helpful. When seeding has been delayed until May 1 or later, 50 pounds per acre of one of these stimulating chemicals causes the young sweetclover to make rapid growth and helps it to overcome the handicap of late sowing. Such an application may well result in the production of an additional 2 tons per acre of green manure the following year. Similarly, when sweetclover is seeded in corn at the last cultivation, as is sometimes done, a small application of immediately available nitrogen gives the plant a quick start and may enable it to succeed in spite of dry weather. Nitrogenous fertilizers used on sweetclover at other times are likely to be wasted.

Phosphorus, the second most important element in commercial fertilizers, is sometimes, though by no means always, beneficial to sweetclover. One of the principal advantages of sweetclover as a green-manure crop is its ability to assimilate crude forms of soil phosphorus which plants like wheat and corn can not utilize. The sweetclover plant takes up these crude phosphorus compounds, changes them to a more usable form, and stores them in its tissues. When the sweetclover is plowed under these altered phosphorus compounds are returned to the soil, where they have the same effect on the succeeding crop as an application of a phosphorus fertilizer.

In some soils, however, even the crude forms of phosphorus are lacking. Then an application of 300 pounds of phosphate fertilizer per acre is necessary before sweetclover will grow. The exact locations of these phosphorus-deficient soils are not yet known, but if all other methods of obtaining a stand of sweetclover fail, phosphorus deficiency may be suspected and a generous trial application made of a phosphorus fertilizer.

Sweetclover seems unable to utilize soil phosphates of any kind if the soil is acid or "sour." Soil acidity may be corrected by applying lime. Possibly one of the principal reasons for the remarkable effect of lime on sweetclover is its influence in making the soil phosphates available. On soils which are only moderately acid, good sweetclover often may be grown by the use of a phosphate fertilizer having a strongly alkaline reaction. Such a fertilizer is basic slag. In tests in North Carolina and elsewhere, 500 pounds of basic slag per acre sometimes has produced as good sweetclover as a ton or more of limestone. The exact limitations of the basic slag method of growing sweetclover have not been determined, but the process is at least very interesting. Phosphates in the form of superphosphate (acid phosphate) are of little use on acid soils, but when combined with lime, especially on soils in which both the elements are lacking, frequently give excellent results. Most county agents and State agricultural experiment stations are prepared to test the lime and phosphorus content of soils.

Few instances have been noted in which sweetclover has suffered for lack of potassium in the soil. Possibly on sandy soils an application of potash fertilizer would be of benefit, but such instances, so far as known, are rare.

L. W. KEPHART,
Senior Agronomist, Bureau of Plant Industry.

SWINE If Inbred Give Birth to Small Litters of Pigs Lacking Vigor Inbreeding never has met with widespread favor among swine breeders. The few who have been fortunate enough to succeed, when practicing it, naturally are enthusiastic; but the many who have failed are equally disappointed. The effect of inbreeding on swine has been, therefore, a debated question. Recently, however, experimental evidence has thrown considerable light upon the situation.

An experiment begun in 1923 by the Bureau of Animal Industry has furnished data showing that persistent close inbreeding of swine offers little likelihood of success to commercial pork producers. The plan of the experiment was to develop several distinct inbred strains in the Poland China, Tamworth, and Chester White breeds by brother-sister matings, generation after generation, as long as breeding animals were available. After several generations of such breeding the procedure involved crossing the inbred strains within breeds as well as among the three breeds.

More than 700 inbred pigs have been farrowed with widely varying results in type, color, size of litter, per cent raised to weaning, and growth. For example, the size of litter varied more in the Poland Chinas than in either the Tamworths or the Chester Whites, although this is not considered a breed characteristic. In general, the inbred stock of all the breeds, in all generations, had smaller litters than the noninbred stock. In per cent of pigs raised to weaning, at 70 days of age, great variation also was found. The lowest percentage was 26.6 in the second-generation Poland China inbreds; the highest was 81 per cent in the first-generation Chester Whites, which was considerably higher than for any of the noninbred groups used for comparison. In gains in weight to weaning age, the inbreds of all the breeds averaged less than the noninbreds, although this was not true of all individuals. Table 20 shows the results of inbreeding, in terms of number of pounds of pigs per sow raised to weaning age, for the three breeds.

TABLE 20.—*Number of pounds of pigs raised, per sow, to weaning age (70 days) in the different generations of inbreeding*

Generation of inbreeding	Poland China	Tamworth	Chester White
	Pounds	*Pounds*	*Pounds*
First	97.5	140.0	151.3
Second	32.7	84.7	120.7
Third	(1)	76.3	140.3
Fourth	(1)	76.3	(1)

[1] No progeny.

The combination of small litters, high mortality, and low gains in weight to weaning age exhausted the Poland China lines in the second generation. Only about one pig per sow was raised to weaning, thus making it impossible to obtain enough breeding stock for further study. The foundation stock apparently carried many hidden weaknesses which were brought to light by the close breeding. In the Tamworth and the Chester White breeds the results were somewhat similar. Of three separate strains of Tamworths and two of Chester Whites, only one in each breed survived more than one generation of brother-sister mating. The inbred Chester White pigs were superior to the inbred strains of the other two breeds in number of pounds of pigs raised per sow to weaning and showed less decrease as the number of generations of inbreeding increased. In pork production, this strain excelled all others used in the experiment. The present Chester White strain, which is in the third generation of inbreeding, is of a different type from that of the foundation animals. The bodies are longer and the hams are plumper although there is a tendency to lack depth of body. In the feed lot some of these pigs made very economical gains and produced very desirable carcasses.

Frequent Color Variations Found

Abnormal pigs have been rare among the inbred lots and the percentage of pigs born dead has been no higher than for the noninbred lots. Frequent color variations are found in the inbreds. One of these, a dilute black or sepia in the Poland Chinas, appears to be due to the segregation of a single recessive color factor. Among the Tamworths, the appearance of large black spots has been fairly common. Among the Chester White inbreds light reds, red with black and white, and black-spotted whites have appeared. Most of these color variations are in one line, which had to be discarded later because of high mortality and low fertility. All such variations are probably a result of the segregation of recessive factors which have been hidden by dominant characters until segregated and made manifest by a system of close breeding.

Persistent close breeding offers little chance of success to the commercial pork producer. Inbred pigs will make less average gain and show higher average mortality than noninbreds. It appears, however, that in some strains close breeding can be practiced without very serious consequences and, of course, in these strains inbreeding tends to conserve the good qualities of the stock. There is no means of determining which strains will succeed and which will degenerate when inbred except by trial. This has been shown, by the present experiment, to be an expensive and slow procedure.

In the hands of the experimentalist or research worker, swine inbreeding offers an almost unexplored field for study and much good probably will come from such studies continued over a long period of time. The isolation of pure strains by inbreeding should make possible a more thorough study than has heretofore been possible of inheritance in swine. But at the present stage of knowledge on this subject it seems inadvisable for the producer of pork to attempt the widespread use of inbreeding.

H. C. McPhee,
Senior Animal Husbandman, Bureau of Animal Industry.

SWINE Kidney Worm Causes Loss to Southern Producers from Condemned Carcasses The swine kidney worm, known to scientists as *Stephanurus dentatus*, causes a heavy loss to the meat industry and southern swine raisers. In some localities in the South the loss from this parasite averages about 27 cents per hog slaughtered, according to an investigation made by department veterinarians and investigators. This loss results from the trimming of infested carcasses and from condemnations of livers and other organs damaged by the parasite.

to the inbred strains of the other two breeds in number of pounds of pigs raised per sow to weaning and showed less decrease as the number of generations of inbreeding increased. In pork production, this strain excelled all others used in the experiment. The present Chester White strain, which is in the third generation of inbreeding, is of a different type from that of the foundation animals. The bodies are longer and the hams are plumper although there is a tendency to lack depth of body. In the feed lot some of these pigs made very economical gains and produced very desirable carcasses.

Frequent Color Variations Found

Abnormal pigs have been rare among the inbred lots and the percentage of pigs born dead has been no higher than for the noninbred lots. Frequent color variations are found in the inbreds. One of these, a dilute black or sepia in the Poland Chinas, appears to be due to the segregation of a single recessive color factor. Among the Tamworths, the appearance of large black spots has been fairly common. Among the Chester White inbreds light reds, red with black and white, and black-spotted whites have appeared. Most of these color variations are in one line, which had to be discarded later because of high mortality and low fertility. All such variations are probably a result of the segregation of recessive factors which have been hidden by dominant characters until segregated and made manifest by a system of close breeding.

Persistent close breeding offers little chance of success to the commercial pork producer. Inbred pigs will make less average gain and show higher average mortality than noninbreds. It appears, however, that in some strains close breeding can be practiced without very serious consequences and, of course, in these strains inbreeding tends to conserve the good qualities of the stock. There is no means of determining which strains will succeed and which will degenerate when inbred except by trial. This has been shown, by the present experiment, to be an expensive and slow procedure.

In the hands of the experimentalist or research worker, swine inbreeding offers an almost unexplored field for study and much good probably will come from such studies continued over a long period of time. The isolation of pure strains by inbreeding should make possible a more thorough study than has heretofore been possible of inheritance in swine. But at the present stage of knowledge on this subject it seems inadvisable for the producer of pork to attempt the widespread use of inbreeding.

H. C. McPhee,

Senior Animal Husbandman, Bureau of Animal Industry.

SWINE Kidney Worm Causes Loss to Southern Producers from Condemned Carcasses The swine kidney worm, known to scientists as *Stephanurus dentatus*, causes a heavy loss to the meat industry and southern swine raisers. In some localities in the South the loss from this parasite averages about 27 cents per hog slaughtered, according to an investigation made by department veterinarians and investigators. This loss results from the trimming of infested carcasses and from condemnations of livers and other organs damaged by the parasite.

The fact that about 10,000,000 hogs raised in the Southern States are slaughtered annually in Government-inspected abattoirs alone, is evidence that the losses in this section from the kidney worm can not be disregarded. The total slaughter of hogs affected by kidney worms is, of course, considerably more. By interfering with the orderly functions of the organs which it invades, this parasite causes further loss by arresting the normal growth and development of swine. Briefly, it is one of the most injurious pests confronting the swine grower in the South and one which he must combat in order to make swine raising profitable.

The first recorded discovery of the kidney worm was made in a Brazilian peccary, an animal resembling the pig. The worm is largely confined to tropical and subtropical countries. Until very recently it was not found in Europe, and its present known distribution on that continent is limited to southern Spain, where it is still a scientific curiosity rather than a parasite causing serious harm. In the United States it occurs chiefly in the South.

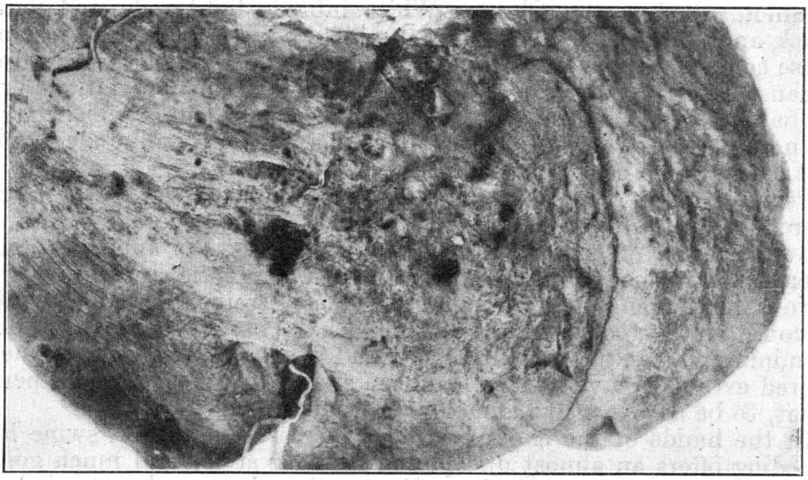


FIGURE 159.—One lobe of a pig's liver showing injuries produced by kidney worms. The dark areas are the lesions produced by the worms

Injures Organs and Retards Growth

A hog carcass and its organs which are heavily infested with kidney worms present anything but a pleasing appearance. The liver, if its injuries have healed, is badly scarred, the lesions appearing as hard, grayish areas of varying sizes and shapes. Unhealed or incompletely healed liver injuries are far more unsightly than are the healed lesions. The latter usually no longer contain worms, whereas the former (fig. 159) are soft and contain creamy pus and live, dead, or degenerated worms. In addition to containing lesions, the entire liver may be covered with a fibrinous deposit and may adhere rather firmly to the stomach and diaphragm. Similar lesions are not uncommonly found in the lungs. The lesions in and near the liver, in the fat around the kidneys, in the kidneys themselves, and in other abdominal organs usually contain an abundance of kidney worms, some loosely attached to the tissues with which they are in contact and others firmly embedded in tough cysts, or sacs. Even the body muscles are not safe from the attacks of kidney worms, for these parasites can and do penetrate the rather resistant muscle tissue in the region of the kidneys. Sometimes the worms even penetrate the spinal canal, in which case they may produce a partial paralysis.

Where meat is inspected, scarred or infested livers must be trimmed to remove the tough, fibrous substance of which the scar is composed, and if the scars or infested areas are excessive the entire liver is condemned. This applies also to the fat and muscle tissue.

Investigations have shown, moreover, that heavy infestations of pigs with kidney worms retard their growth, as shown in Figure 160. These pigs, all of the same litter, were about 2 months old when the photograph was taken and were still with the sow. Pigs A, C, and F were free from kidney-worm infestation, whereas pigs B, D, and E, when about 1 week old, were infected experimentally with kidney-worm larvae. The pigs were of strikingly uniform size when farrowed, with the exception of pig C, which was born a runt. This pig, however, was bigger and heavier when about 2 months old than were the three worm-infested pigs.

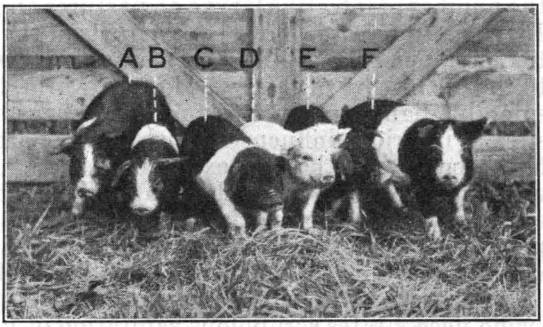


FIGURE 160.—Litter of pigs about 2 months old. Pigs B, D, and E were infected with kidney worms when about a week old; pigs A, C, and F remained uninfested. Pig C was born a runt. Note differences in size between infested and noninfested pigs

Passes Through Body of Animal

Unless the farmer knows something concerning the mode of life of the kidney worm, the manner of its propagation, and the ability of its eggs and free-living larvae to maintain themselves in hog lots and on hog pastures under various conditions, he can do comparatively little to overcome this parasite, since there is no known drug which will destroy it once it has invaded the body of the animal.

During warm weather and when moisture is abundant, the microscopic kidney-worm eggs, which are eliminated from infested hogs with the urine, develop on the ground in a day or so; the larvae which hatch from the eggs continue to develop on the soil and on pastures, and under favorable conditions they reach the infective stage in about four days. The infective larvae are about one-fiftieth of an inch long. Hog lots and pastures on which kidney-worm infested hogs are kept may be teeming with these larvae. Some are swallowed with the feed and water; others penetrate the broken skin through wounds and places on the body where the skin is merely rubbed off. Once they are inside the body of a pig they make their way to the liver, and in this organ they develop slowly, increase in size gradually, and at the same time work their way through the liver substance until they reach the capsule of the liver. Many of the worms remain in this organ and in its blood vessels until they die and degenerate; others break through the liver capsule, however, and thus get into the abdominal cavity where they wander freely for a time over the surfaces of the abdominal organs. Some of these worms may become inclosed in a cyst, or sac, in the tissues adjacent to the liver or other abdominal organs. Others penetrate the kidney fat, perforate the uterer, and discharge their eggs, which pass out with the urine. These are the ones which complete the cycle of development of the kidney worm in the body of a pig. The process is a slow one and may take six months or longer.

Control Measures Necessary

The most hopeful outlook for the control of these parasites is to keep the number of infective larvae on pastures and in lots as low as possible. Investigations carried out by scientists of the Bureau of Animal Industry have not only established many of the essential facts with regard to the life history of the swine kidney worm, but have also thrown considerable light on the reactions of the eggs and larvae of these parasites to injurious influences to which they are naturally subjected. It has been shown that on experimental pastures and plots which are well drained, exposed to the sun, and free from trash and litter, the eggs and larvae are relatively short-lived, whereas on poorly drained plots and pastures which are shaded and in which trash and litter abound, the larvae find more favorable conditions for existence.

It is evident, therefore, that control of kidney-worm infestation in swine necessitates scrupulous sanitation of hog lots and pastures, and for arrangements of a sort which will expose the eggs and larvae to the sun, prevent the accumulation of litter on pastures and on lots, and afford good drainage. The swine-sanitation system, which was developed by the bureau as a control measure for the large intestinal roundworm, also controls kidney-worm infestation to some extent, but not sufficiently, in most cases, to prevent some heavy losses. Other precautions are necessary, but what they are and how they can be practically applied still remain to be determined for the most part. The following recommendation is made, however, with the assurance that it will prove beneficial: Pigs should be weaned as early as possible and moved to a clean pasture in order to shorten, as much as possible, their period of exposure to infective kidney-worm larvae.

Since the kidney worm develops rather slowly in the body of pigs, infested swine are not likely to discharge kidney-worm eggs before they are at least 6 months old, and therfore will not contaminate their pastures with eggs before they reach that age. If pigs are raised under the swine-sanitation system and fed properly, most of them will be ready for market before they begin to discharge many kidney-worm eggs. The sources from which pigs acquire kidney worms are the larvae which develop from eggs discharged by infested sows. If the period of exposure to this source of infestation is reduced to the minimum consistent with good husbandry and if this precaution is coupled with scrupulous sanitary provisions as outlined above, considerable progress will be made in the control of this worm plague.

BENJAMIN SCHWARTZ,
Senior Zoologist, Bureau of Animal Industry

SWINE-SANITATION Plan Results in More and Better Pigs per Sow The continued losses sustained by swine raisers on account of various diseases and conditions, other than hog cholera, have developed a demand for information on effective control measures. The preventive serum treatment, as insurance against cholera, is widely known and used, but swine owners are not so familiar with means for reducing certain other sources of loss.

One of the diseases which stands out prominently is necrotic enteritis, characterized by inflammation of the intestines. This malady is definitely on the increase in many sections of the country. Parasites, both internal and external, also take a heavy toll, though not so much in actual death losses as in retarded growth and reduced vigor. Many pigs also are lost at farrowing time from a variety of causes.

Accepting the challenge of this array of losses, representatives of the Bureau of Animal Industry inaugurated and are now conducting a campaign against them in connection with hog-cholera-control work. The campaign centers chiefly in inducing farmers to keep their hog lots sanitary by following definite recommendations. In many instances these efforts have resulted in a decided increase in the number of pigs saved during the spring farrowing season, the production of a better quality of pigs, and more rapid growth, enabling farmers to market a 200-pound hog at about 6 months of age instead of at 8 or 9 months, as usually happened when no attention was given to sanitary precautions.

In localities where strict sanitary measures have been used necrotic enteritis and internal parasites have practically disappeared, and herds of strong, thrifty shotes, free of runts, may be seen on the farms where the sanitary program was carried out. The program consists essentially in washing sows thoroughly before farrowing, having them farrow in clean quarters, and keeping the young pigs on clean pastures until at least 4 months old. Details of the methods are described in department literature which is furnished on request. In an area where more than 7,000 pigs were grown under the swine-sanitation plan during the spring and summer of 1930, not a single call for assistance came to the bureau veterinarians; whereas in sections where no attention was given to sanitary precautions calls were continually coming for aid in combating necrotic enteritis, intestinal parasites, lung worms, and post-vaccination troubles, which are almost invariably due to some of these conditions.

Conditions that Prevent Normal Growth

It is inconceivable that an animal which is forced to exist under insanitary conditions and becomes diseased can thrive and grow normally. Neither can one expect normal growth from a pig heavily infested with parasites, either internal or external, that sap its strength and reduce its power to assimilate its food. When these simple facts are brought to the attention of a swine grower in language that he understands, and by post-mortem demonstrations (fig. 161), he is quick to realize that the adoption of reasonable sanitary precautions means the difference between health and disease and that that difference is the difference between profit and loss, success and failure. The measure of success achieved depends, to a large extent, on the effort put forth by the herd owner in following the swine-sanitation program. To follow the plan in any of its essential features produces

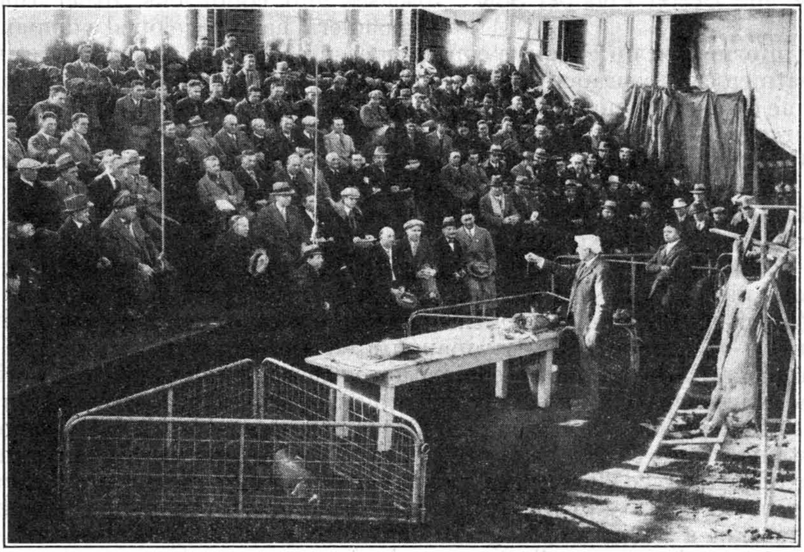


FIGURE 161.—Observing the results of a post-mortem examination at a swine-sanitation meeting

beneficial results, but one should not expect to obtain the best results through only half-hearted methods.

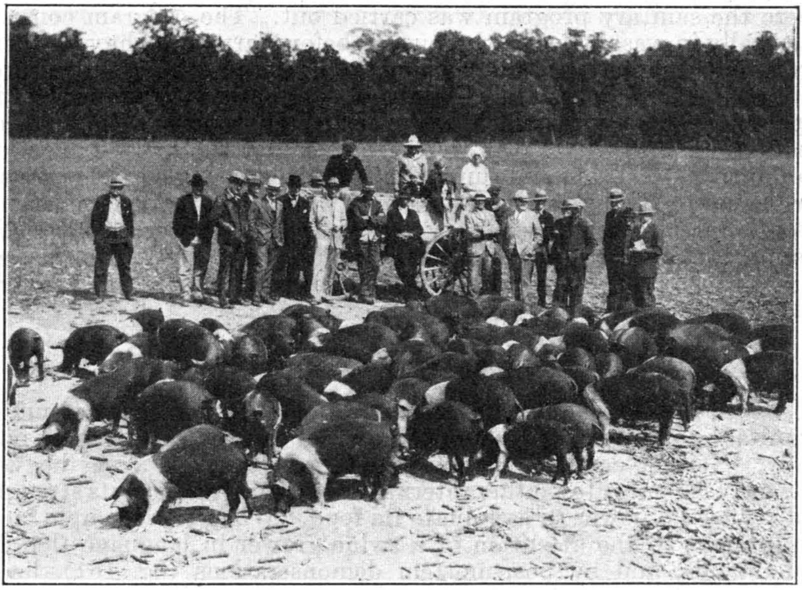


FIGURE 162.—Pigs raised under the sanitation system. Of 95 farrowed, 90 were raised to market weight

Under ordinary farm conditions, with pigs grown under insanitary surroundings, only about 50 in every 100 farrowed are marketed.

Swine sanitation increases the number of pigs reaching the market by about 50 per cent. About 75 in every 100 farrowed are raised successfully. Those lost fall victims to accident and other causes outside the saving influence of the system. By following swine sanitation a farmer can raise more pigs with a given number of sows or he can raise as many and also better pigs with fewer sows. In either case he can obtain a greater financial return for feed consumed.

The following typical experiences illustrate the kind of results obtained. In the fall of 1928 a swine owner in Indiana had 12 sows that farrowed 117 pigs in an old hog lot. Parasitic worms, necrotic enteritis, and other causes reduced the number until he had only 35 left for market the following spring. He also paid out about $200 for stock powders and tonics to save the pigs, but he lost them anyway. At a sanitation-campaign meeting he signed up as a demonstrator. He kept the same 12 sows and in the spring of 1929 they farrowed 95 pigs. Under sanitary handling and good feeding and housing, 90 of the 95 pigs were raised to market weights. "These pigs were not sick a minute," he said, "and I didn't spend a cent for anything but feed." A portion of his herd is shown in Figure 162.

Another swine grower who adopted the sanitation system because of the large proportion of runty pigs in his herd stated after using the new method two years, "My pigs are ready for market from six weeks to two months earlier."

One of the most interesting experiences was that of a 16-year-old 4-H club boy who entered a litter of 12 pigs in a ton-litter contest. The litter weighed 2,752 pounds when the pigs were 180 days old. They returned $199.25 over feed cost. When asked how he made his litter weigh so much at so low a cost, he said: "I merely followed instructions on swine sanitation to the letter."

J. E. GIBSON,
Senior Veterinarian, Bureau of Animal Industry.

TAX Research Outlined to Discover Means of Reducing Farm Levies

Continued enlargement of the farmers' tax bill is creating a widespread movement not only for stemming the tide toward future increases, but also for actual reduction. Resolutions on the subject are being passed with renewed vigor by leading farm organizations and the issue will almost certainly absorb an important part of the time of a majority of State legislatures. Between 1924 and 1929 farm real estate taxes per acre for the United States as a whole increased 7 per cent, while farm real estate values per acre declined 11 per cent. The result is that the "true" tax rate—the ratio of taxes to full value as distinguished from assessed value—increased almost 20 per cent. Stated differently, farm real estate taxes per $100 of full value increased from $1.22 in 1924 to $1.46 in 1929. (Table 21.) Results of the department's research and of studies by experiment stations and other agencies support the conclusion that farm tax revision is desirable from the standpoint of reasonable public policy.[13]

---

[13] COOMBS, WHITNEY. TAXATION OF FARM PROPERTY. See especially U. S. Dept. Agr. Tech. Bul. 172, 75 p. 1930.

Swine sanitation increases the number of pigs reaching the market by about 50 per cent. About 75 in every 100 farrowed are raised successfully. Those lost fall victims to accident and other causes outside the saving influence of the system. By following swine sanitation a farmer can raise more pigs with a given number of sows or he can raise as many and also better pigs with fewer sows. In either case he can obtain a greater financial return for feed consumed.

The following typical experiences illustrate the kind of results obtained. In the fall of 1928 a swine owner in Indiana had 12 sows that farrowed 117 pigs in an old hog lot. Parasitic worms, necrotic enteritis, and other causes reduced the number until he had only 35 left for market the following spring. He also paid out about $200 for stock powders and tonics to save the pigs, but he lost them anyway. At a sanitation-campaign meeting he signed up as a demonstrator. He kept the same 12 sows and in the spring of 1929 they farrowed 95 pigs. Under sanitary handling and good feeding and housing, 90 of the 95 pigs were raised to market weights. "These pigs were not sick a minute," he said, "and I didn't spend a cent for anything but feed." A portion of his herd is shown in Figure 162.

Another swine grower who adopted the sanitation system because of the large proportion of runty pigs in his herd stated after using the new method two years, "My pigs are ready for market from six weeks to two months earlier."

One of the most interesting experiences was that of a 16-year-old 4-H club boy who entered a litter of 12 pigs in a ton-litter contest. The litter weighed 2,752 pounds when the pigs were 180 days old. They returned $199.25 over feed cost. When asked how he made his litter weigh so much at so low a cost, he said: "I merely followed instructions on swine sanitation to the letter."

J. E. Gibson,
Senior Veterinarian, Bureau of Animal Industry.

TAX Research Outlined to Discover Means of Reducing Farm Levies

Continued enlargement of the farmers' tax bill is creating a widespread movement not only for stemming the tide toward future increases, but also for actual reduction. Resolutions on the subject are being passed with renewed vigor by leading farm organizations and the issue will almost certainly absorb an important part of the time of a majority of State legislatures. Between 1924 and 1929 farm real estate taxes per acre for the United States as a whole increased 7 per cent, while farm real estate values per acre declined 11 per cent. The result is that the "true" tax rate—the ratio of taxes to full value as distinguished from assessed value—increased almost 20 per cent. Stated differently, farm real estate taxes per $100 of full value increased from $1.22 in 1924 to $1.46 in 1929. (Table 21.) Results of the department's research and of studies by experiment stations and other agencies support the conclusion that farm tax revision is desirable from the standpoint of reasonable public policy.[13]

---

[13] Coombs, Whitney. TAXATION OF FARM PROPERTY. See especially U. S. Dept. Agr. Tech. Bul. 172, 75 p. 1930.

TABLE 21.—*"True" tax rate on farm real estate; Average for the United States and by geographic divisions for years indicated* [1]

Geographic division	1924	1925	1926	1927	1928	1929
New England	1.70	1.73	1.79	1.87	1.90	1.96
Middle Atlantic	1.56	1.61	1.63	1.68	1.70	1.72
East North Central	1.46	1.51	1.60	1.74	1.80	1.82
West North Central	1.03	1.07	1.11	1.20	1.24	1.26
South Atlantic	.98	1.03	1.10	1.21	1.25	1.29
East South Central	1.21	1.24	1.28	1.33	1.39	1.44
West South Central	1.06	1.00	.98	1.08	1.12	1.17
Mountain	1.35	1.46	1.47	1.54	1.55	1.61
Pacific	1.10	1.12	1.15	1.20	1.24	1.24
United States	1.22	1.26	1.31	1.37	1.43	1.46

[1] The term "true" tax rate as used here means the ratio of property taxes to true value, as distinguished from assessed value of farm real estate. The 1924 ratio is based on figures for farm taxes and farm real estate values as shown in the 1925 Census of Agriculture. Using this ratio as the base, those for other years were computed from trends of farm taxes reported regularly in the Agricultural Situation and trends of farm real estate values as reported in The Farm Real Estate Situation 1928–29, U. S. Dept. Agr. Cir. 101, by E. H. Wiecking.

Reasonable public tax policy is that policy which seeks to collect necessary public revenue with the least undesirable effects upon production, conservation, and land utilization, and with fairness to taxpayers. Hence the reasonableness of the present policy depends upon the answers to the following questions: Is the present high level of governmental expenditures necessary? What are the undesirable effects of the present tax system upon production, conservation, and land utilization? Is the apportionment of the cost of government among taxpayers fair?

Possibilities of Reduction

A proposal for farm-tax reduction might begin with the fundamental question of whether or not the level of all taxes—not merely farm taxes—is too high. This is simply another way of asking whether or not the general level of governmental expenditures is too high. It is evident that governmental expenditures can be reduced only by either reducing the services of government or getting the same services for less money. What are the possible economies that may result from consolidation and thorough modernization of the machinery of local government? This is an age of mergers and consolidations. Local governmental units and machinery, however, have remained relatively fixed, while the changes in production, marketing, and distribution have been revolutionary. Many of the forms, units, and methods of local rural government that served the purposes of our grandfathers may be antiquated now. Where the maintenance of unnecessary counties, townships, school districts, or other governmental units results in unnecessary tax burdens or impairs the services of government, every effort should be made to eliminate the unnecessary units. The opportunities for farm-tax reduction along this line will vary in different parts of the country and will depend upon local conditions, but they need to be called to public attention by thorough-going research. Such studies are contemplated in the research program of the Bureau of Agricultural Economics.

A prospective scarcity of timber supplies was the primary consideration that led the Congress to finance liberally an investigation now under way, one of the purposes of which is "to disclose the present methods and practices in the taxation of timber and forest-growing land and their actual effects upon the use of land for the growth of timber." An investigation no more difficult to make might attempt to disclose the present methods and practices in the taxation of farm property and their actual effects upon farm production, farm abandonment, and the value and utilization of farm land. Both types of studies relate to the economic effects of taxes as levied under the system in vogue in this country.

The issue in both cases is a question of the degree of conflict between the tax policy and other public policies. In both cases the questions are difficult to answer because of the difficulty of isolating the influence of taxes from other concurrent influences. And, after all, from the standpoint of an immediate program of action, the question is not only whether the tax was an influence, but also whether it was a limiting factor. Where farm prices, for example, have dropped to such low levels that the abolition of all taxes would have no appreciable effect upon land utilization and farm abandonment, taxes can not be considered the limiting factor. A tax that actually causes deficit or surplus output, or results in improper land use, is likely also to be an unfair tax. But a tax may be grossly unfair without having any of these effects. Unlike forest-tax investigations, farm-tax investigations have never been authorized because of any suspected causal relationship between methods of farm taxation and a prospective abundance or scarcity of food and fiber.

A Question of Fairness

The movement for farm-tax revision rests largely on considerations of fairness. Much has been written in recent years about the unfairness of the general property tax system. In practice there is no such tax system. What is called a "general" property tax is virtually a real-estate tax. The overwhelming predominance of real estate in the local tax base during a period of unparalleled increases in governmental expenditures is the starting point in any attempt to define the "unfairness" of the present system. The farmer's property is largely real estate and his taxes are largely local. But there is a trend toward the substitution of income, gasoline, and other taxes for the property levy for State purposes. Also, the States are gradually assuming an increasing share of financial responsibility for the support of certain functions, especially roads and schools, formerly regarded as strictly local in character. These developments will proceed further, and are undoubtedly elements of sound public policy. Are they proceeding rapidly enough?

The increasing share of the total tax burden assumed by nonfarming groups has generally not taken place at a sufficiently rapid rate actually to reduce farm taxes. It is often asserted that broadening the tax base for the support of schools and roads will simply mean more taxes for city people—not less for farmers. More frequently, it is contended that the adoption of an income tax will be "just another tax"—not farm-tax reduction. If the adoption of these measures is either preventing farm taxes from rising to otherwise higher levels, or making available to farmers desirable governmental services they otherwise would not have received, nonfarming groups are at least assuming an increasing share of the total tax burden, both absolutely and relatively. The advocates of a new tax are not fully answered by those who call the tax "just another tax." The real issue is whether the increased expenditure contemplated as a result of the new tax is wise or unwise.

New taxes are not easily adopted; and it is much easier to add a new tax than to substitute one for a portion of the property taxes. The gasoline tax was adopted only partially as a substitute for taxes real-estate owners would otherwise have paid. The people wanted expensive highways, and the real-estate owners would not and probably could not have supplied the needed funds. The gasoline tax is generally regarded as fair, but it grew partly out of the resistance of real-estate owners to higher property taxes for roads. Hence a conception of fairness without the power to make it effective is impotent.

Danger of Creating New Inequalities

Any effort at farm-tax revision should carefully avoid creating new inequalities more serious than those it seeks to eliminate. It should have due regard for the kinds of taxes already employed by the Federal Government as well as by the States. It should also take into account the inequality of tax payments as between various nonfarming groups. Many people believe that if real-estate taxes were levied on the basis of rental rather than selling value, a substantial portion of the taxes now paid by farmers would be paid by owners of urban real estate. Would such a change in the property tax actually lower farm taxes appreciably? Would it be fair to owners of urban real estate? What is European experience with this form of property taxation? Is the proposal fundamental or illusory? The bureau's projected research includes studies designed to throw light on these questions.

Excepting the possibility of far-reaching changes in governmental expenditures and in the revenue system, farmers will continue to pay relatively high taxes. The movement for retrenchment in the matter of public expenditures may be a factor favoring lower taxes; but the relatively high price level prevailing when the bulk of the public debt was contracted, the tendency of public expenditures to increase, and sheer inertia all point in the opposite direction. Furthermore, any significant farm-tax reduction will need to be accompanied by some provision to prevent the tax from rising quickly to its former level.

BUSHROD W. ALLIN,
Agricultural Economist, Bureau of Agricultural Economics.

TERRACE Failures Often Result from Errors in Planning and Building

Properly planned, well-constructed, and carefully maintained terrace systems have demonstrated the merits of terracing and the benefits to be derived therefrom in practically all sections of the country where this method is practiced. It is not uncommon, however, to hear the practice of terracing severely condemned by men who have tried it on their farms. An examination of the terraces on these farms almost invariably reveals that the causes for the terrace failures were due to the terraces being poorly planned, improperly laid out, inadequately constructed, or carelessly maintained.

One of the outstanding causes for terrace failures (fig. 163) is the failure to prevent water from draining on to a terraced field from those who call the tax "just another tax." The real issue is whether the increased expenditure contemplated as a result of the new tax is wise or unwise.

New taxes are not easily adopted; and it is much easier to add a new tax than to substitute one for a portion of the property taxes. The gasoline tax was adopted only partially as a substitute for taxes real-estate owners would otherwise have paid. The people wanted expensive highways, and the real-estate owners would not and probably could not have supplied the needed funds. The gasoline tax is generally regarded as fair, but it grew partly out of the resistance of real-estate owners to higher property taxes for roads. Hence a conception of fairness without the power to make it effective is impotent.

Danger of Creating New Inequalities

Any effort at farm-tax revision should carefully avoid creating new inequalities more serious than those it seeks to eliminate. It should have due regard for the kinds of taxes already employed by the Federal Government as well as by the States. It should also take into account the inequality of tax payments as between various nonfarming groups. Many people believe that if real-estate taxes were levied on the basis of rental rather than selling value, a substantial portion of the taxes now paid by farmers would be paid by owners of urban real estate. Would such a change in the property tax actually lower farm taxes appreciably? Would it be fair to owners of urban real estate? What is European experience with this form of property taxation? Is the proposal fundamental or illusory? The bureau's projected research includes studies designed to throw light on these questions.

Excepting the possibility of far-reaching changes in governmental expenditures and in the revenue system, farmers will continue to pay relatively high taxes. The movement for retrenchment in the matter of public expenditures may be a factor favoring lower taxes; but the relatively high price level prevailing when the bulk of the public debt was contracted, the tendency of public expenditures to increase, and sheer inertia all point in the opposite direction. Furthermore, any significant farm-tax reduction will need to be accompanied by some provision to prevent the tax from rising quickly to its former level.

Bushrod W. Allin,
Agricultural Economist, Bureau of Agricultural Economics.

TERRACE Failures Often Result from Errors in Planning and Building

Properly planned, well-constructed, and carefully maintained terrace systems have demonstrated the merits of terracing and the benefits to be derived therefrom in practically all sections of the country where this method is practiced. It is not uncommon, however, to hear the practice of terracing severely condemned by men who have tried it on their farms. An examination of the terraces on these farms almost invariably reveals that the causes for the terrace failures were due to the terraces being poorly planned, improperly laid out, inadequately constructed, or carelessly maintained.

One of the outstanding causes for terrace failures (fig. 163) is the failure to prevent water from draining on to a terraced field from higher and adjoining unterraced land. This unterraced land may consist of timber, pasture, orchard, or other land on the same farm that is not regarded by the owner as needing terraces, or it may be an adjoining field owned by a neighbor who is not interested in terracing. If for some reason it is not possible to have this outside area terraced, then the water draining from it should be intercepted before it reaches the lower terraced field and diverted into a natural drainage course by means of a properly located drainage ditch of adequate capacity.

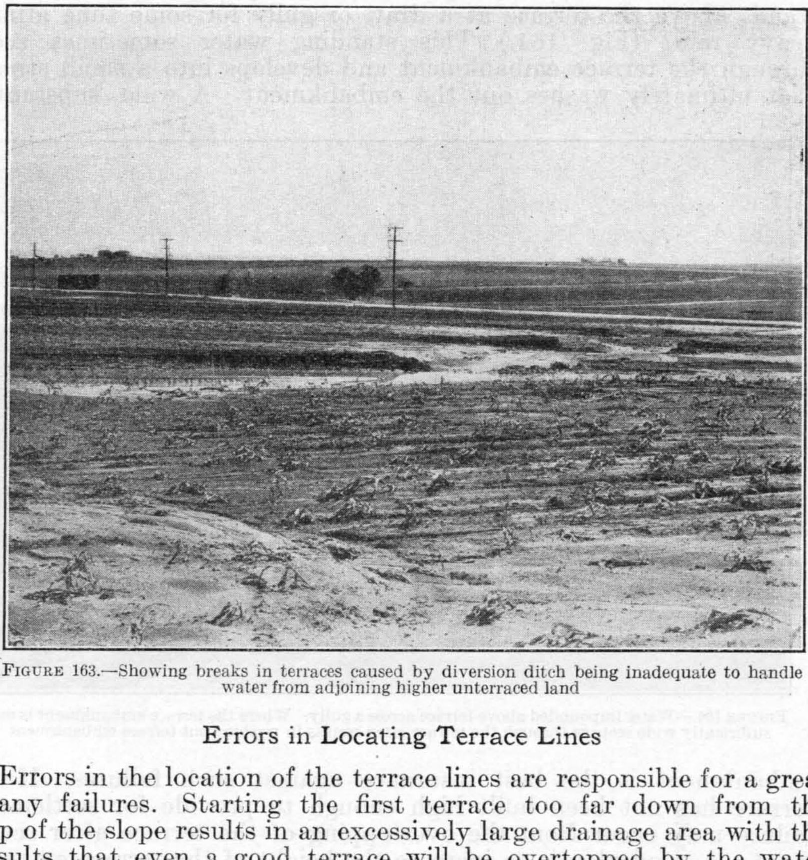


FIGURE 163.—Showing breaks in terraces caused by diversion ditch being inadequate to handle water from adjoining higher unterraced land

Errors in Locating Terrace Lines

Errors in the location of the terrace lines are responsible for a great many failures. Starting the first terrace too far down from the top of the slope results in an excessively large drainage area with the results that even a good terrace will be overtopped by the water draining from the large area above. Spacing terraces too far apart also has the same effect. Errors in laying out terraces may be due to carelessness or incompetency on the part of the instrument man or rodman. Points on the terrace line that are located too high may cause a damming of water and result in the accumulated water overtopping the terrace. If points are located too low on the terrace line the top of the terrace is usually built too low and washouts are of common occurrence at such points. The abrupt change from a steep to a flat grade along a terrace channel often causes an accumulation of water that overflows and breaks the terrace.

Even though a terrace is laid out properly this is no insurance against the possibility of its failure if it is not properly constructed. Faulty construction may consist of building the terrace to insufficient height, of building embankments too narrow, or of not making allowance for the settlement of the embankment across gullies. After a terrace is built the top should be checked with the leveling instrument to detect any low places and these low places should be built to the proper height with the scraper or other suitable implement. Terrace failures often occur at crossings of draws or gullies where the embankment is not built wide enough or sufficiently high. Water usually stands above the terrace at a draw or gully for some time after a heavy rain. (Fig. 164.) This standing water sometimes seeps through the terrace embankment and develops into a small stream that ultimately washes out the embankment. A wide, substantial

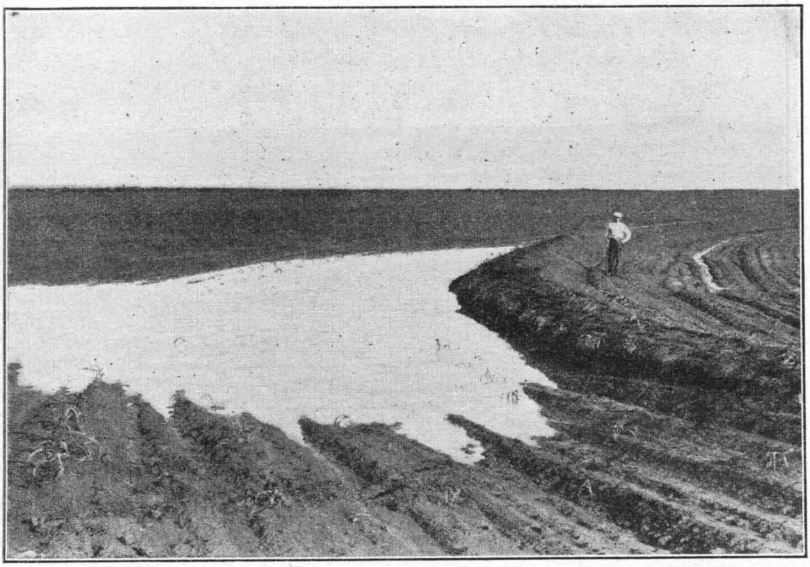


FIGURE 164.—Water impounded above terrace across a gully. Where the terrace embankment is not sufficiently wide seepage through the terrace often results in washing out terrace embankment

embankment is the best insurance against such failures. If the terrace has not been built high enough to provide for settlement, failure may occur from the overtopping of the terrace after settlement. A good plan is to increase the height of the terrace embankment at least 25 per cent at gullies and depressions to allow for settlement and then to check the height of the embankment occasionally as an insurance against an undue amount of settlement.

Other Causes of Failure

Other causes for failures of terraces are neglect or careless maintenance. Many farmers seem to think that after a terrace is once constructed it requires no more attention and often condemn the practice of terracing because of failures due solely to lack of maintenance. Careful maintenance is as essential to the proper functioning of a terrace as are adjustments and repairs to the satisfactory operation of

FIGURE 165.—Showing the cutting away of terrace embankment by erosion at bend

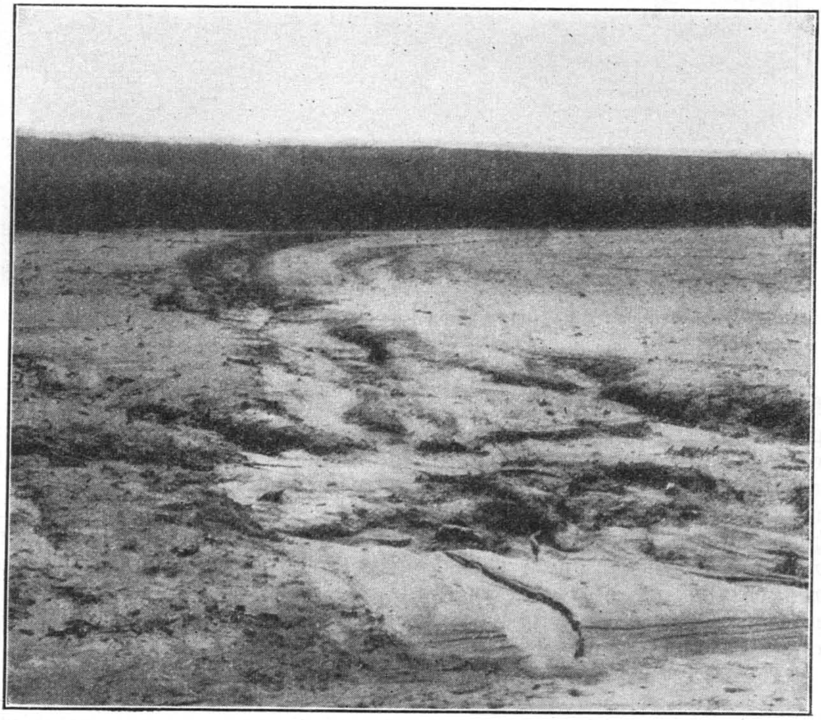


FIGURE 166.—Erosion of a gully between terraces due to concentration of water in furrow left below upper terrace and later breaking over at a low point in furrow

an automobile. Total disregard of maintenance in either case invariably produces disastrous results.

Where systematic maintenance is practiced not much work is required each year to keep the terraces built to the required height and width with a plow or by making a few rounds with a terracing implement. Where erosion of terrace embankments occurs at sharp bends due to the cutting action of the water as shown in Figure 165 it should be prevented by the seeding of the embankment to grass. The formation of gullies on the land between terraces, as shown in Figure 166, can often be stopped by preventing the concentration of water immediately below a terrace in furrows left after construction. This form of erosion between terraces is often the cause of the filling of the channel with soil during a single rain, resulting in the overtopping and breaking of the terrace. Figure 167 shows a view of a terrace channel partly filled with soil washed from the slope between the terraces.

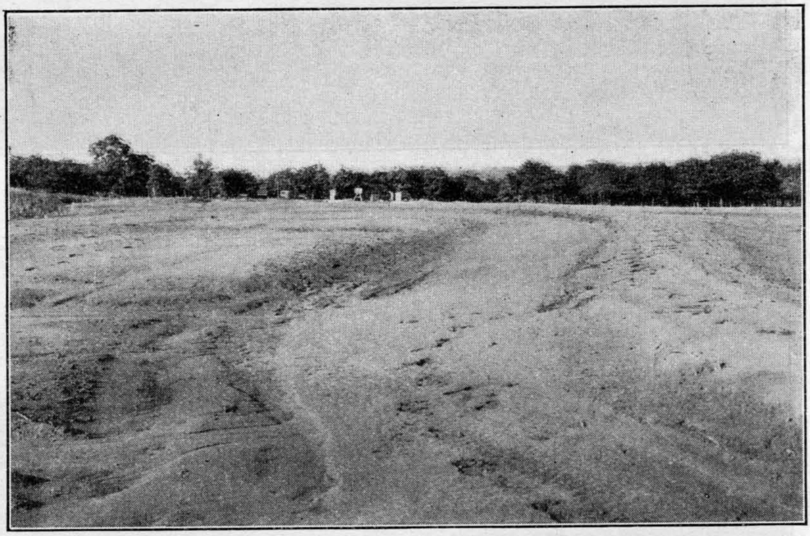


FIGURE 167.—Showing filling of terrace channel caused by erosion in draw between terraces. This draw should be seeded to grass

Where the water concentrates in a natural depression it may be found necessary, if marked erosion persists, to seed the depression to grass. Burrowing animals, large cracks that develop during dry periods, and low places in the top of the terrace caused by dragging farm machinery across are often causes of serious breaks that could be avoided by periodical examinations and a small amount of work to repair the damage. The gradual filling of a terrace channel from the movement of soil down the slope between terraces will eventually reduce the size of the terrace channel. This can be prevented by annual maintenance consisting of moving this filled-in soil from the channel to the terrace embankment.

C. E. RAMSER,
Senior Drainage Engineer, Bureau of Public Roads.

TEXTILE Buying for the Home Would Be Aided by System of Labeling

No home maker can be considered wholly successful to-day unless she is a wise and discriminating buyer. Her ability to bake good bread and sew a fine seam may still be desirable accomplishments, but in many homes both the bread and the seam are likely to be purchased ready made. Her problem is to select the best product obtainable for the money she has to spend. This is no easy matter, especially when she is trying to buy satisfactory clothing and other textile materials.

The extension service of the United States Department of Agriculture and the home-economics teachers of the country have attempted for many years to furnish so-called household tests by which the home maker could judge quality in textiles. She has been told to moisten a small spot of the material in order to discover whether it is linen or cotton, to burn a few yarns so as to determine how much wool it contains and to do many similar things which are supposed to tell her just what she is buying.

At best these methods are makeshifts. At one time they may have had some value, but that time has largely passed. To-day the cotton and linen or the cotton and wool are likely to be so mixed in the same yarn that the amount of each can only be determined by a textile specialist with laboratory facilities. New fabric finishes are being developed and applied to all kinds of materials so that their quality is not easily recognized. More confusing still is the fact that the market is flooded with so many similar materials, differing in price but so nearly identical in appearance that the ordinary household buyer can not make an intelligent choice between them. The result is that the home maker with even the best intentions and training is forced to buy largely by guess.

Retail-Store Buyers Handicapped Too

This is also true of most buyers for retail stores. Unless they have laboratories at their disposal, a facility now available to only a very small percentage, they are at as great a loss as are the women. In fact, in the majority of cases they have less knowledge of the subject than the college or extension trained home maker and in addition do not have the opportunity of watching the performance of the merchandise under actual wearing conditions.

The Bureau of Home Economics has recognized the difficulty for some time and has become interested in the possibility of setting up specifications for the more staple materials so that the home maker can select the one best suited to her purpose, within the price range she is able to pay. Grading systems involving quality specifications are used by producers and distributors of some commodities, such as meats, poultry, fruits, and vegetables. Standards for grade and staple of raw cotton have been set up by the department and are serving a useful purpose in the trade. In fact, most wholesale buying is done to-day on the basis of some kind of grades or specifications. These are chiefly the result of demand on the part of the buyers and are based on studies which have shown the type of specifications that would best describe each particular commodity. Much of this has been done by the Department of Agriculture. The Bureau of Home Economics is suggesting not only that these grades be brought into use in the retail market so that the consumer can benefit directly by them, but also that appropriate grades and standards be extended to other household commodities, such as textiles.

The question naturally arises as to what textile specifications would be most useful to the mass of consumers. In many cases this can not be answered until studies are made to determine the particular fabric characteristics of vital importance from the consumer's viewpoint. Often this will involve fundamental research as to the effect of differences in construction upon the usefulness of the fabric. A large gap now exists between the technical information in regard to fabric manufacture and the practical information of value in everyday living. This will have to be bridged before any real help can be given the household buyer. It is this type of research upon which the Bureau of Home Economics is making a beginning. For example, a study has been completed of the kinds of wear shown by bed sheets when used under hotel conditions and an investigation is now under way in cooperation with the Bureau of Agricultural Economics on the relative wearing qualities of sheets made with different grades of cotton of the same staple length.

Helpful Construction Details

There are, however, many construction details now in general use among manufacturers which would be helpful to consumers even if they would not completely solve the difficulty. From the manufacturer's point of view, this would involve printing the information on a label on the fabric. On the part of the consumer it would in some cases involve learning the meaning of a few simple terms now used chiefly by textile experts.

For instance, sheeting manufacturers specify the weight per square yard of the sheeting. This tells the total weight of fiber and finishing material and is often useful in comparing sheets of different prices. Sizing is the term used for the starch and other finishing material present in cotton fabrics. A small amount must be put on the warp yarns of every fabric so that they will not break when chaffed during the weaving process. Additional sizing is added to the finished fabric to make it appear smooth and attractive to the buyer. In extreme cases such large amounts may be used as to make the sheet or other fabric appear heavier and firmer than it is and the purchaser is misled. When the sheet is washed most of this finishing material is removed and the excessively sized fabric shows up as it really is, a very coarse, loosely woven piece of material. It would be a relatively simple and very valuable practice to tell on a label the percentage of sizing in sheets and other fabrics in which this is important. "Pure finish" is a term sometimes used to indicate that a minimum amount of sizing has been used.

The yarn count gives the number of the yarn and shows whether fine or coarse yarns have been used. The number of twists per inch in the yarn gives a numerical measure of whether it is very loosely or very tightly twisted. This is important because a yarn may be so loosely twisted that it pulls apart easily and does not wear. The number of threads per inch warp-wise and filling-wise is a measure of how closely woven the material is.

Breaking-Strength Test

Of course durability is one of the qualities chiefly desired in many fabrics and unfortunately there is as yet no standard method of determining this quickly. The nearest approach to such a test is the breaking strength of the material, often spoken of as the tensile strength. Although this is not necessarily an accurate measure of wearing quality, it is often some indication.

While in general, thread count, yarn count, twist count, weight per square yard, and tensile strength tell most of the construction story concerning a fabric, some of these items are more important in particular cases and often additional information is needed. Take the case of blankets. These items are all important in determining quality in these articles, but information about weight and tensile strength are especially useful. Two all-wool blankets may be the same size and of very similar construction but differ markedly in the amount of wool contained in each. This, of course, influences the heat-retaining properties and is of great significance when the matter of getting one's money's worth is considered. The tensile strength tells how strong the material is. In the case of blankets containing both cotton and wool, the percentage of each fiber present is of great importance to the purchaser. Under the present merchandising practice a mixed blanket is at best labeled "part wool" and this may mean anything from 95 per cent wool to one wool yarn in the selvage. The percentage could be easily designated on a label and the buyer thus told exactly what she is buying.

But certainly heat conductivity is the most important property of blankets. They are supposedly bought to keep people warm. Two things enter this property. One is how readily heat will be conducted away from a warm body through the blanket when the air outside is still. The other is how much will be lost if it is used where there is a draft or when a breeze is blowing, as is so often the case in outdoor sleeping. A blanket may be very warm in still air but so permeable to breezes that it is not warm under other conditions. "Air permeability" and "heat conductivity" of fabrics are common terms with textile specialists and methods of determining these qualities are well worked out. A purchaser who could, by looking at the labels, compare the kind of fiber, the tensile strength, the weight, air permeability, and heat conductivity of two blankets of equal size would have a logical basis for selection.

Necessity for Labeling

In fact every commodity could and should be labeled with such factual information. It would require no more ink or paper than is now used up in "sales-pressure" superlatives that really tell the purchaser nothing. Wouldn't it be fine if window shades carried labels that told what kind of fabric they were made of and their actual resistance to cracking? No vague, general claims, but statements as to exactly what kind of cleaning they will withstand and how many times a piece can be folded back and forth without cracking. That would give a real basis for choosing one rather than another. Towels could certainly be selected better if their construction details were given on the label and if such physical properties as the amount of water they would absorb and their tensile strength were emphasized rather than their glossy hems and other more superficial beauties.

Buying by specification would not mean that every purchaser would be able to buy the best on the market. Pocketbooks all have limits. But it would mean that every purchaser would know exactly what she is buying and could more wisely decide what is the best selection for her, taking all things into consideration.

RUTH O'BRIEN,
Chief, Division of Textiles and Clothing,
Bureau of Home Economics.

TICKS Are Carriers of Diseases of Man and of the Higher Animals In nature's complex many creatures of insignificant appearance and far down the scale of organic development play rôles of vast importance to the higher animals and man. This is preeminently true of certain species of ticks. Their influence is not benevolent or helpful in any sense of the word, but vicious and deadly, for they carry within their small bodies, and are capable of transmitting, some of the most dangerous diseases of which we have knowledge.

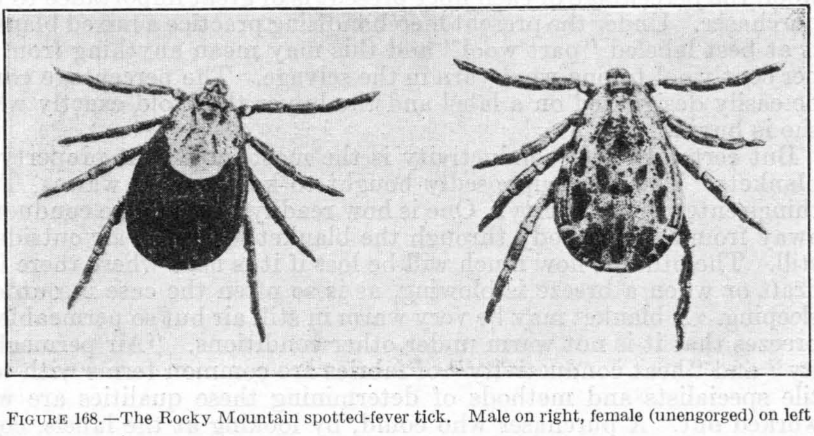


FIGURE 168.—The Rocky Mountain spotted-fever tick. Male on right, female (unengorged) on left

The discovery by Smith and Kilborne of the Bureau of Animal Industry, in 1890, of the rôle that the cattle tick plays in the transmission of splenetic fever of cattle, was one of the earliest and most important findings in medical entomology. Since that time a large number of diseases in various parts of the world have been shown to be carried wholly or largely by ticks. (Fig. 168.)

In addition to the blood diseases which ticks carry, the irritation caused by their bites is a source of great discomfort, especially in the warmer parts of the world, and furthermore, local persistent infections frequently result from tick attack. Again, a grave form of ascending paralysis may be caused by the attachment of ticks, especially at the base of the skull. This form of paralysis does not appear to be caused by a germ but more likely by some secretion of the tick, as the removal of the parasite usually results in prompt recovery.

In the United States, Rocky Mountain spotted fever is the most dangerous and widespread disease of man for which ticks are responsible. This disease occurs in the northern Rocky Mountain and the

Buying by specification would not mean that every purchaser would be able to buy the best on the market. Pocketbooks all have limits. But it would mean that every purchaser would know exactly what she is buying and could more wisely decide what is the best selection for her, taking all things into consideration.

RUTH O'BRIEN,
Chief, Division of Textiles and Clothing,
Bureau of Home Economics.

TICKS Are Carriers of Diseases of Man and of the Higher Animals In nature's complex many creatures of insignificant appearance and far down the scale of organic development play rôles of vast importance to the higher animals and man. This is preeminently true of certain species of ticks. Their influence is not benevolent or helpful in any sense of the word, but vicious and deadly, for they carry within their small bodies, and are capable of transmitting, some of the most dangerous diseases of which we have knowledge.

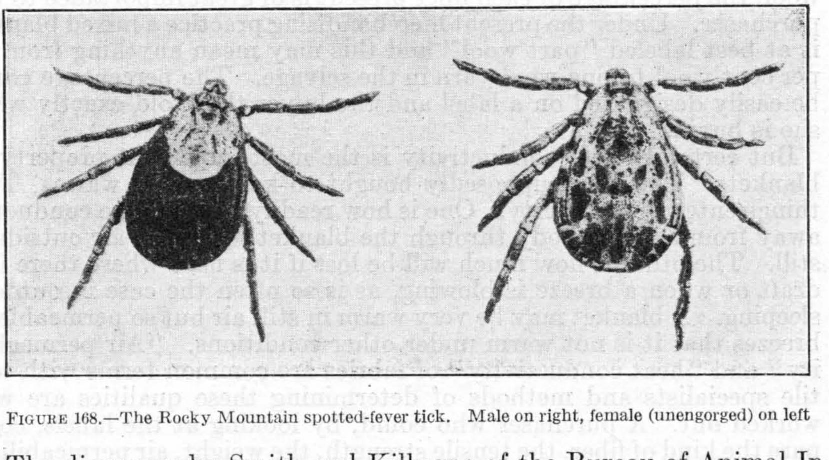


FIGURE 168.—The Rocky Mountain spotted-fever tick. Male on right, female (unengorged) on left

The discovery by Smith and Kilborne of the Bureau of Animal Industry, in 1890, of the rôle that the cattle tick plays in the transmission of splenetic fever of cattle, was one of the earliest and most important findings in medical entomology. Since that time a large number of diseases in various parts of the world have been shown to be carried wholly or largely by ticks. (Fig. 168.)

In addition to the blood diseases which ticks carry, the irritation caused by their bites is a source of great discomfort, especially in the warmer parts of the world, and furthermore, local persistent infections frequently result from tick attack. Again, a grave form of ascending paralysis may be caused by the attachment of ticks, especially at the base of the skull. This form of paralysis does not appear to be caused by a germ but more likely by some secretion of the tick, as the removal of the parasite usually results in prompt recovery.

In the United States, Rocky Mountain spotted fever is the most dangerous and widespread disease of man for which ticks are responsible. This disease occurs in the northern Rocky Mountain and the intermountain sections. Several hundred cases and several deaths occur each year. The species concerned is the common wood tick of that area, and the attachment of an infected tick for a few hours is sufficient to give rise to the disease. The development of a preventive serum by the Public Health Service, the reduction of the tick population by destroying the small wild animals upon which the young ticks feed, and the treatment of cattle, horses, and dogs to destroy the adult ticks are doing much to reduce the fear of this malady.

Tularemia Carried By Ticks

Tularemia, or rabbit fever, which has been much discussed in recent years, has been shown by R. R. Parker of the Public Health Service to be carried, at least in part, by ticks. Several cases of this disease in man have developed as a result of tick bite. Several kinds of ticks

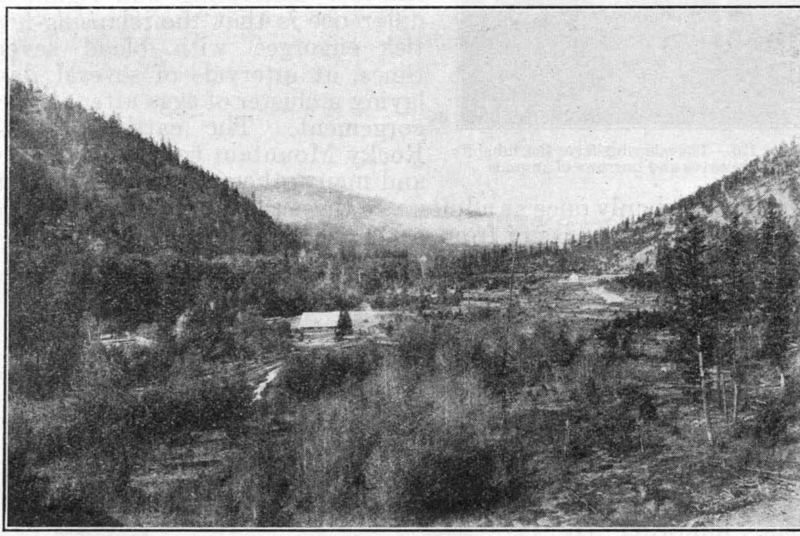


FIGURE 169.—In beautiful mountain valleys sometimes lurks a hidden menace—the Rocky Mountain spotted-fever tick

appear to play an important part in the spread of this disease among wild birds and animals, and from these hosts to man. It has been shown by Doctor Parker that this disease is transmitted hereditarily from the mother tick through the egg to the offspring. (Fig. 169.)

Wood ticks are suspected by some of being transmitters of endemic typhus of man, which is rather prevalent, especially in the Southeastern States where wood ticks are normally abundant.

Certain febrile diseases of man, known as relapsing fevers, are carried by insects and ticks. This group of diseases has been met with rarely in this country, but recently a number of cases have been diagnosed by Burford Weller and G. M. Graham, of Austin, Tex., in people who were bitten by ticks in caves which were being explored. This is the first proved instance in the United States of the transmission of relapsing fever to man by ticks. (Fig. 170.)

The occurrence in America of these and perhaps other diseases of man and of certain maladies of domestic animals makes detailed studies of the tick carriers very necessary. The distribution of the various ticks must be known, as also their local habitats, the hosts upon which they feed, how long they live, and their many peculiarities of life. In these respects ticks differ widely. Some, such as the relapsing-fever tick, will feed on almost any mammal or bird, and the period required for engorgement with blood is very short. On the other hand, the cattle tick will develop only on a limited number of species of animals, and it remains on the host for the entire period of its development, which requires from 20 to 60 days. Another interesting and significant difference is that the relapsing-fever tick engorges with blood several times, at intervals of several days, laying a cluster of eggs after each engorgement. The cattle tick, the Rocky Mountain spotted-fever tick, and many others attach to a host and fill with blood only once as adults. In these cases the female dies soon after depositing a mass of from 2,000 to 10,000 eggs. (Fig. 171.)

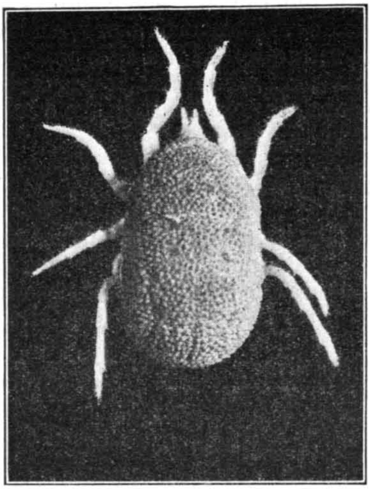


FIGURE 170.—The relapsing-fever tick inhabits certain caves and burrows of animals

All ticks, male and female, pass through several stages, viz, the egg, the larva or seed tick, the nymph, and the adult. However, the habits of the ticks with reference to feeding and development vary greatly. Some ticks, following engorgement in the different stages, drop off the host animal to shed their skins, and, consequently, must find a new host upon which to feed after each molt; other ticks lessen these hazards of life by remaining on the host while they molt and do not leave from the time they first attach as seed ticks until they become fully engorged adults. Most ticks are long-lived. Many live for several months as unfed seed ticks, nymphs, or adults, and some may survive for two or three years without food.

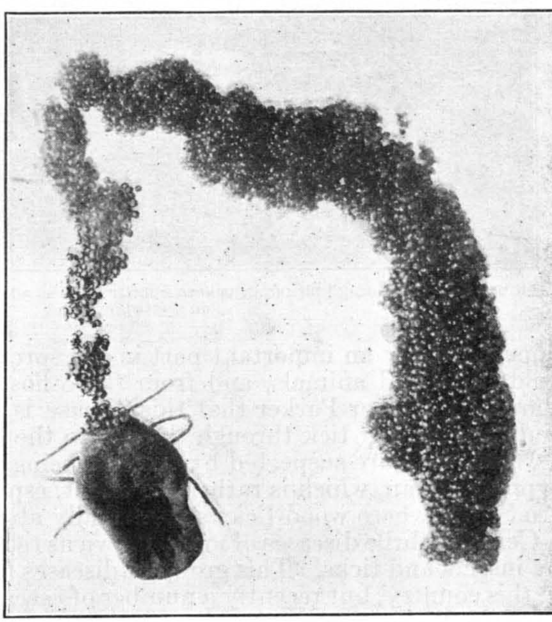


FIGURE 171.—A mass of from 4,000 to 7,000 eggs is laid by the female Rocky Mountain spotted-fever tick, after which she shrivels and dies

Tick Control Problems

These diverse habits make it impossible to apply the same control practices against different kinds of ticks, and make the control of some much more difficult than that of others. This fact indicates, too, the impracticability of attempting eradication of certain species, while in the case of others it may be perfectly feasible, as has been demonstrated with the cattle tick.

Where a tick is the principal carrier of a given disease, the importance of developing successful methods for its control is obvious. Often this is the most logical if not the only method of coping with the disease. The importance of certain ticks as annoyers of man, livestock, and poultry may well warrant the expenditure of much money and effort in control, even though no disease is carried by them.

Control methods must be based on an accurate knowledge of the life history and habits of the particular tick concerned. Since many of the ticks that carry diseases of man live at one time or another on domestic animals, the application of insecticides to these animals when they become infested at once suggests itself. The destruction of those rodents and other animals on which ticks feed is another line of attack. Most "wood ticks" are favored by the presence of brush, which not only gives them protected places in which to hide but also encourages wild animal hosts. Hence the recommendation to clear up cut-over areas and undergrowth. The protection of individuals from tick attack in areas where these parasites are numerous is not easy. The wearing of close-fitting clothing and the application to the outer garments of repellent substances, such as creosote dip or kerosene, will give a measure of protection. In areas where ticks are known to harbor disease, the examination of the body at frequent intervals and removal of all ticks present is advisable. The use of parasitic insects which destroy the ticks is receiving some attention, and this may be found to be a method which will aid in the fight against certain of these dangerous pests.

F. C. Bishopp,
Principal Entomologist, Bureau of Entomology.

TIMBER Owners in the Southwest Find Sale for Converter Poles

Owners of timber in the Southwest have had opened for them an outlet for timber products of sizes and species not heretofore readily marketed in the region. The product, known as converter poles, is used rather extensively by the copper-smelting companies in Arizona and New Mexico. Converter poles are from 25 to 30 feet long with a minimum top diameter of 4 inches and a maximum butt diameter of 12 inches; 8-inch butt diameters are preferred. Some smelters in the Southwest accept smaller poles. The size of the poles depends upon the machinery for handling them. The poles are cut full length in the woods and loaded on cars green for shipment to the smelters. Aspen, pine, or other coniferous species and occasionally oak are used.

In the casting of copper for electrolyte refining the molten copper is treated by what is known as poling. As a final step in removing impurities, green poles are placed in the oxidized metal and as they are consumed release reducing gases which change the oxidity of the copper back to the metallic form.

Tick Control Problems

These diverse habits make it impossible to apply the same control practices against different kinds of ticks, and make the control of some much more difficult than that of others. This fact indicates, too, the impracticability of attempting eradication of certain species, while in the case of others it may be perfectly feasible, as has been demonstrated with the cattle tick.

Where a tick is the principal carrier of a given disease, the importance of developing successful methods for its control is obvious. Often this is the most logical if not the only method of coping with the disease. The importance of certain ticks as annoyers of man, livestock, and poultry may well warrant the expenditure of much money and effort in control, even though no disease is carried by them.

Control methods must be based on an accurate knowledge of the life history and habits of the particular tick concerned. Since many of the ticks that carry diseases of man live at one time or another on domestic animals, the application of insecticides to these animals when they become infested at once suggests itself. The destruction of those rodents and other animals on which ticks feed is another line of attack. Most "wood ticks" are favored by the presence of brush, which not only gives them protected places in which to hide but also encourages wild animal hosts. Hence the recommendation to clear up cut-over areas and undergrowth. The protection of individuals from tick attack in areas where these parasites are numerous is not easy. The wearing of close-fitting clothing and the application to the outer garments of repellent substances, such as creosote dip or kerosene, will give a measure of protection. In areas where ticks are known to harbor disease, the examination of the body at frequent intervals and removal of all ticks present is advisable. The use of parasitic insects which destroy the ticks is receiving some attention, and this may be found to be a method which will aid in the fight against certain of these dangerous pests.

F. C. Bishopp,
Principal Entomologist, Bureau of Entomology.

TIMBER Owners in the Southwest Find Sale for Converter Poles Owners of timber in the Southwest have had opened for them an outlet for timber products of sizes and species not heretofore readily marketed in the region. The product, known as converter poles, is used rather extensively by the copper-smelting companies in Arizona and New Mexico. Converter poles are from 25 to 30 feet long with a minimum top diameter of 4 inches and a maximum butt diameter of 12 inches; 8-inch butt diameters are preferred. Some smelters in the Southwest accept smaller poles. The size of the poles depends upon the machinery for handling them. The poles are cut full length in the woods and loaded on cars green for shipment to the smelters. Aspen, pine, or other coniferous species and occasionally oak are used.

In the casting of copper for electrolyte refining the molten copper is treated by what is known as poling. As a final step in removing impurities, green poles are placed in the oxidized metal and as they are consumed release reducing gases which change the oxidity of the copper back to the metallic form.

Aspen, the species most commonly used, is usually the first tree crop that comes in at the higher elevations following fires, and its lighter foliage permits the conifers to reseed and reproduce on the burned area. Aspen also sprouts readily, so that poles can be cut from old burns that have restocked to coniferous stands or from stands of aspen which will then reproduce a new crop by sprouting. Pine poles can be obtained from thinnings, and the suppressed and defective trees removed, leaving the young stands in better silvicultural condition.

QUINCY RANDLES,
Assistant Regional Forester, Forest Service.

TOBACCO Graders Trained to Apply New System of Clearly Defined Grades Men are now being taught to grade tobacco in a new way. Instead of following the old methods that have been in vogue since early colonial days, the Department of Agriculture is training its graders to work with a definite system of clearly defined grades. The men to be trained have so far been drawn chiefly from two commercial sources—buyers who have been employed by tobacco firms or who have operated as independent speculators.

Each independent buying firm, whether manufacturer or dealer, has always had a more or less stable system of private grades, but there is no definite correlation between the grades of the various manufacturers and dealers. The manufacturers' grades are built around their private blends and the grades of the larger dealers usually reflect the blends of the domestic or foreign manufacturers for whom they buy.

Manufacturers and dealers avoid following a definite system of grades to keep others from knowing their grades and to safeguard private blends. Private blends are established by careful experiment with different types and qualities of tobacco, and the several qualities of each type used in a blend are then set up as the grades for that blend. These grades are usually designated by letters or numbers or by a combination of letters and numbers. For instance, a new grade may take the initials of one of the company's directors or a certain letter in the name of the blend may be selected. Although the grade is kept as constant as possible, sometimes the grade symbol is changed to keep competitive buyers from learning the grades. Apparently there is no written description, of any private grade, and a word picture of a private grade has heretofore been considered not only impracticable but undesirable.

The large manufacturer ordinarily buys from 20 to 40 grades for his private blends; no manufacturer covers the entire range of the market, but some of the larger dealers who have orders from several domestic and foreign manufacturers cover the full range of the market on which they operate. Usually the buyers of commercial concerns are the graders. The buyer examines the tobacco for which he is negotiating and determines the grade or grades it will make in his private system. This, in turn, fixes the price he is able to pay for the lot.

The Commercial Grading School

Each firm requires a large number of men to receive, handle, work, pack, and condition the tobacco after it has been graded and bought. This series of operations constitutes the commercial grading school for

Aspen, the species most commonly used, is usually the first tree crop that comes in at the higher elevations following fires, and its lighter foliage permits the conifers to reseed and reproduce on the burned area. Aspen also sprouts readily, so that poles can be cut from old burns that have restocked to coniferous stands or from stands of aspen which will then reproduce a new crop by sprouting. Pine poles can be obtained from thinnings, and the suppressed and defective trees removed, leaving the young stands in better silvicultural condition.

QUINCY RANDLES,
Assistant Regional Forester, Forest Service.

TOBACCO Graders Trained to Apply New System of Clearly Defined Grades Men are now being taught to grade tobacco in a new way. Instead of following the old methods that have been in vogue since early colonial days, the Department of Agriculture is training its graders to work with a definite system of clearly defined grades. The men to be trained have so far been drawn chiefly from two commercial sources—buyers who have been employed by tobacco firms or who have operated as independent speculators.

Each independent buying firm, whether manufacturer or dealer, has always had a more or less stable system of private grades, but there is no definite correlation between the grades of the various manufacturers and dealers. The manufacturers' grades are built around their private blends and the grades of the larger dealers usually reflect the blends of the domestic or foreign manufacturers for whom they buy.

Manufacturers and dealers avoid following a definite system of grades to keep others from knowing their grades and to safeguard private blends. Private blends are established by careful experiment with different types and qualities of tobacco, and the several qualities of each type used in a blend are then set up as the grades for that blend. These grades are usually designated by letters or numbers or by a combination of letters and numbers. For instance, a new grade may take the initials of one of the company's directors or a certain letter in the name of the blend may be selected. Although the grade is kept as constant as possible, sometimes the grade symbol is changed to keep competitive buyers from learning the grades. Apparently there is no written description, of any private grade, and a word picture of a private grade has heretofore been considered not only impracticable but undesirable.

The large manufacturer ordinarily buys from 20 to 40 grades for his private blends; no manufacturer covers the entire range of the market, but some of the larger dealers who have orders from several domestic and foreign manufacturers cover the full range of the market on which they operate. Usually the buyers of commercial concerns are the graders. The buyer examines the tobacco for which he is negotiating and determines the grade or grades it will make in his private system. This, in turn, fixes the price he is able to pay for the lot.

The Commercial Grading School

Each firm requires a large number of men to receive, handle, work, pack, and condition the tobacco after it has been graded and bought. This series of operations constitutes the commercial grading school for its young men. They are employed as receiving clerks, warehouse managers, and in other capacities in which they come into daily contact with the firm's purchases. It becomes an important part of each such employee's duty to acquire a knowledge of grades and to keep a careful watch for any irregularities in the grades as the tobacco passes through his hands.

A receiving clerk or warehouse manager is not ordinarily authorized to change the grade assigned by the buyer, but it is his duty to set aside doubtful lots to be reviewed by the buyers. This gives him an opportunity to observe the grading of the buyer, and to check his judgment with the buyer's on doubtful lots. In such cases the buyer usually explains his reason for placing each lot in a certain grade. Gradually these young men acquire sufficient knowledge to qualify them as substitute buyers on small stations. Later, if they develop sufficient skill they may be assigned to a small market or made an assistant buyer on a large market.

FIGURE 172.—Studying tobacco grades at a grading school held at the North Carolina State College in cooperation with the Department of Agriculture

Another kind of so-called training school is composed of a large number of young men who are unable to obtain positions with the companies. They follow the tobacco markets throughout the season studying tobacco and speculating on a number of lots, buying from the producers and reselling to manufacturers or large dealers. Ordinarily, these small speculators have no system of grades of their own, but they learn all they can about the grades and special quality preferences of the well-organized companies, so that they can resell to them. It is is difficult to learn the companies' private grades, but in the course of years, by careful observation and study, they can become familiar with them and develop a high degree of skill in judging the different qualities, colors, and lengths of the tobacco.

Contrasted with the private grades of the trade, the department has established for the leading types a uniform system of grades worked out on a definite plan and has formulated a written description of each grade. Since these standardized grades are intended to serve all interests who may care to use them, including producers, dealers, and manufacturers, they are not based upon the blends of any company, but upon four definite grade factors—group, quality, color, and length. The same system is used for each of the 26 important types produced in the United States, and a uniform symbol is used to designate each corresponding grade factor in all types.

Full Range of Characteristics Covered

The standardized grades cover the full range of quality, color, and length in each type, whereas the private grades of a manufacturer cover only such quality, colors, and length as are called for by his particular blends. There are from 50 to 75 standardized grades in each type; they divide the tobacco into uniform steps, from the highest to the lowest quality, from the lightest to the darkest color, and from the longest to the shortest lengths.

When inaugurating the Federal-State tobacco grading service, in 1929, the department required a number of graders. Men drawn from commercial sources, who were already good judges of tobacco, were employed and trained to grade according to Government standards. Each new grader was given a grade book with a list of the grades for the type he was to grade. This book gave a full explanation of the standard grading system, clear definitions of all indefinite tobacco terms, certain grading rules, and a complete description of each grade. It was demonstrated that, with sufficient background of experience, a person with the aid of a grade book and a few representative tobacco samples, in a very short time can familiarize himself with the standardized grades and can proceed to grade tobacco according to Government standards.

Plans are now being developed to establish tobacco grading schools in cooperation with some of the leading agricultural colleges. Three short courses of this nature have been held with encouraging results. (Fig. 172.)

FRANK B. WILKINSON,
Marketing Specialist, Bureau of Agricultural Economics.

TOBACCO Plants Spaced Close Yield More and Better Flue-Cured Leaf

The increasing demand for flue-cured tobacco during the past decade has been for the cigarette leaf or cutter grade, which is bright lemon to orange in color and is thinner than the wrapper. In order to produce a leaf of such characteristics it was found necessary to plant more tobacco on the land. A thinner leaf with brighter color can be produced by topping (pinching out the bud) higher or spacing the plants closer in the row. The former method did not prove to be as satisfactory as the close spacing, as the result was so often adversely affected by unfavorable seasons. During a period of eight years the closer spacing with only a few exceptions produced a larger yield of tobacco with a larger percentage of cigarette leaf and a greater total acre value than the ordinary distance of planting. By close spacing of

Contrasted with the private grades of the trade, the department has established for the leading types a uniform system of grades worked out on a definite plan and has formulated a written description of each grade. Since these standardized grades are intended to serve all interests who may care to use them, including producers, dealers, and manufacturers, they are not based upon the blends of any company, but upon four definite grade factors—group, quality, color, and length. The same system is used for each of the 26 important types produced in the United States, and a uniform symbol is used to designate each corresponding grade factor in all types.

Full Range of Characteristics Covered

The standardized grades cover the full range of quality, color, and length in each type, whereas the private grades of a manufacturer cover only such quality, colors, and length as are called for by his particular blends. There are from 50 to 75 standardized grades in each type; they divide the tobacco into uniform steps, from the highest to the lowest quality, from the lightest to the darkest color, and from the longest to the shortest lengths.

When inaugurating the Federal-State tobacco grading service, in 1929, the department required a number of graders. Men drawn from commercial sources, who were already good judges of tobacco, were employed and trained to grade according to Government standards. Each new grader was given a grade book with a list of the grades for the type he was to grade. This book gave a full explanation of the standard grading system, clear definitions of all indefinite tobacco terms, certain grading rules, and a complete description of each grade. It was demonstrated that, with sufficient background of experience, a person with the aid of a grade book and a few representative tobacco samples, in a very short time can familiarize himself with the standardized grades and can proceed to grade tobacco according to Government standards.

Plans are now being developed to establish tobacco grading schools in cooperation with some of the leading agricultural colleges. Three short courses of this nature have been held with encouraging results. (Fig. 172.)

FRANK B. WILKINSON,
Marketing Specialist, Bureau of Agricultural Economics.

TOBACCO Plants Spaced Close Yield More and Better Flue-Cured Leaf

The increasing demand for flue-cured tobacco during the past decade has been for the cigarette leaf or cutter grade, which is bright lemon to orange in color and is thinner than the wrapper. In order to produce a leaf of such characteristics it was found necessary to plant more tobacco on the land. A thinner leaf with brighter color can be produced by topping (pinching out the bud) higher or spacing the plants closer in the row. The former method did not prove to be as satisfactory as the close spacing, as the result was so often adversely affected by unfavorable seasons. During a period of eight years the closer spacing with only a few exceptions produced a larger yield of tobacco with a larger percentage of cigarette leaf and a greater total acre value than the ordinary distance of planting. By close spacing of the plants in the row a heavier application of fertilizer produced larger yield and net value of crop per acre and thus accentuated the gain over the usual methods.

With an application of 1,100 pounds per acre of a fertilizer mixture containing 5 per cent ammonia, 8 per cent phosphoric acid, and 10 per cent potash, tobacco planted 36 inches apart in rows 3 feet and 9 inches wide had an average value for eight years of $168.50 per acre. When the plants were spaced 30, 24, and 18 inches apart, respectively, the corresponding values of the crop were $187.50, $198.30, and $239.80. Where only 500 and 800 pounds per acre of the same fertilizer mixture were used the differences in favor of close spacing were not so great, being $22.70 and $37.20 per acre, respectively. These differences, however, were more than enough to pay for the total fertilizer cost.

In addition to the increased yield and value obtained by close spacing of tobacco, some of the common leaf-spot diseases are more easily controlled by close spacing than when the plants are spaced farther apart. It is easy to conclude, therefore, that liberal fertilization combined with close spacing in the flue-cured tobacco belt will produce a leaf of better quality and one that is in greater demand at the present time.

E. G. Moss,
Senior Agronomist, Bureau of Plant Industry.

TOMATO Ripening After Frost Requires Proper Handling and Storage

The ripening of tomatoes on a commercial scale after frost has killed the vines is a subject of considerable interest in many parts of the country. It is a more or less common custom for home growers and market gardeners to gather a limited quantity of green tomatoes after the first killing frost and to store them after a fashion under chaff in a mow or shed, or uncovered in a basement. To some extent these methods suffice to supply a certain quantity of ripe tomatoes after frost, but usually they result in considerable loss from decay and much of the fruit that ripens is of poor color and quality.

Proper handling and storage methods are necessary if attractive tomatoes of good quality are to be had. The local gardener who attempts to supply ripe tomatoes for the market after frost has killed the vines, and who wishes to compete in any degree with the shipped tomatoes that are usually commencing to come on the market at this time, must display an equally attractive product.

Investigations to determine the best conditions for the ripening of locally grown green tomatoes have been carried on for several years by the United States Department of Agriculture.

Tomatoes from plants that have passed their period of maximum productivity and are more or less spent are inclined to be soft and watery and will not ripen or keep as well as the firmer-fleshed fruits from plants in full vigor. Therefore to ripen marketable quantities of high-class tomatoes after frost it is advisable to set the plants in the field late enough so that they will come into full bearing at about the average time of the first frost. In the vicinity of Washington, D. C., where the experiments were carried on, the plants were set in the field the plants in the row a heavier application of fertilizer produced larger yield and net value of crop per acre and thus accentuated the gain over the usual methods.

With an application of 1,100 pounds per acre of a fertilizer mixture containing 5 per cent ammonia, 8 per cent phosphoric acid, and 10 per cent potash, tobacco planted 36 inches apart in rows 3 feet and 9 inches wide had an average value for eight years of $168.50 per acre. When the plants were spaced 30, 24, and 18 inches apart, respectively, the corresponding values of the crop were $187.50, $198.30, and $239.80. Where only 500 and 800 pounds per acre of the same fertilizer mixture were used the differences in favor of close spacing were not so great, being $22.70 and $37.20 per acre, respectively. These differences, however, were more than enough to pay for the total fertilizer cost.

In addition to the increased yield and value obtained by close spacing of tobacco, some of the common leaf-spot diseases are more easily controlled by close spacing than when the plants are spaced farther apart. It is easy to conclude, therefore, that liberal fertilization combined with close spacing in the flue-cured tobacco belt will produce a leaf of better quality and one that is in greater demand at the present time.

E. G. Moss,
Senior Agronomist, Bureau of Plant Industry.

TOMATO Ripening After Frost Requires Proper Handling and Storage

The ripening of tomatoes on a commercial scale after frost has killed the vines is a subject of considerable interest in many parts of the country. It is a more or less common custom for home growers and market gardeners to gather a limited quantity of green tomatoes after the first killing frost and to store them after a fashion under chaff in a mow or shed, or uncovered in a basement. To some extent these methods suffice to supply a certain quantity of ripe tomatoes after frost, but usually they result in considerable loss from decay and much of the fruit that ripens is of poor color and quality.

Proper handling and storage methods are necessary if attractive tomatoes of good quality are to be had. The local gardener who attempts to supply ripe tomatoes for the market after frost has killed the vines, and who wishes to compete in any degree with the shipped tomatoes that are usually commencing to come on the market at this time, must display an equally attractive product.

Investigations to determine the best conditions for the ripening of locally grown green tomatoes have been carried on for several years by the United States Department of Agriculture.

Tomatoes from plants that have passed their period of maximum productivity and are more or less spent are inclined to be soft and watery and will not ripen or keep as well as the firmer-fleshed fruits from plants in full vigor. Therefore to ripen marketable quantities of high-class tomatoes after frost it is advisable to set the plants in the field late enough so that they will come into full bearing at about the average time of the first frost. In the vicinity of Washington, D. C., where the experiments were carried on, the plants were set in the field the first or second week in July. The plants were at their best and were loaded with a good crop of mature and almost mature green and some ripe fruit by the middle of October, when the first frost can be expected. However, the writer does not wish to discourage the utilization of all available tomatoes of good quality left in the field even if they do represent the leavings of a midseason crop. These can be ripened and good use made of them.

It is doubtful whether tomatoes should be left on the plants after the first frost, even though part of the leaves are still uninjured. There is some indication that fruit so left loses its keeping quality. Furthermore, there is danger of a second and heavier frost following soon which may seriously injure the fruit.

Necessary Conditions for Ripening

For ripening purposes, only sound tomatoes that are mature or nearly so should be selected. These should be carefully handled to avoid bruising or other mechanical injury. Tomatoes in the proper stage for ripening can be sorted out by selecting only those showing a yellowish-white color or whitening about the blossom ends or sides, in contrast to the immature ones of solid dark green. The size of tomatoes is not necessarily an indication of maturity; medium-sized specimens may be more mature and may color up sooner than certain large ones.

When rapid ripening is desired a temperature around 70° F. with a relative humidity of 75 to 80 per cent is best. Although tomatoes will ripen rather rapidly at this temperature, or even a few degrees higher, they quickly break down after ripening. Moderately rapid ripening with a comparatively slow development of decay may be secured at a temperature of 60°.

Rapid ripening is not always desirable. Where a large quantity of tomatoes is to be ripened and marketed, a part should be held back and the rate of ripening adjusted so as to prolong the marketing period. The results of the investigations by the department show that a temperature of 55° F. is about the lowest at which satisfactory ripening will take place. Tomatoes held at this temperature will ripen slowly but with good color and quality and will keep in good sound condition longer than at temperatures above or below this point.

Cellars as Ripening Places

Usually a well-ventilated cellar, provided it is not damp, makes a good ripening or storage space, because the temperature is uniform and the humidity sufficiently high to prevent undue shriveling or wilting. The usual type of outside shed has a fluctuating temperature, being probably too cold at night and too warm on many days. Often such buildings can be remodeled so as to make a tight double-walled structure in which the desired temperature and humidity can be maintained. Shelves can be provided, although shallow trays on which to ripen the fruit are preferable. The tray should be supported in tiers a few inches apart on racks from which they can be readily removed independently for convenience in grading out the ripe or decayed fruits. The trays should be deep enough to hold only one layer of fruit and not too large when loaded for one person to carry. The ripening room should be kept dark so that the tomatoes will ripen more uniformly.

Good ventilation should be provided. Too high a humidity should be avoided, as this will promote undue decay.

An ideal arrangement for the ripening of tomatoes would be to have two rooms, one to be kept uniformly cool but not lower than 55° F. and the other at about 70°. The cool room would be considered a storage space from which tomatoes could be transferred to the warm room for rapid ripening in quantities as needed. With such an arrangement it should be possible to extend the marketing season a month or six weeks after frost.

Grading and Packing Important

At about the time frost has destroyed most of the local field crop, shipped tomatoes, carefully and attractively wrapped and packed, begin to appear on the market. To compete with these the local grower should uniformly grade his stock as to quality and size and pack it carefully in 4-quart baskets, rather than offer ungraded stock in hampers or other unsuitable containers. A very attractive pack can be made by wrapping alternate tomatoes with green tissue paper.

R. C. Wright,
Physiologist, Bureau of Plant Industry.

TREES of Four Kinds Are Becoming Important in Planting on Farms

Two kinds of pines and two of hardwoods are assuming an important rôle in our forest tree planting. They are red pine, slash pine, black locust, and black walnut. Red, or Norway pine (fig. 173), is a member

FIGURE 173.—Red, or Norway pine, important in forest planting in the Northeastern and Lake States

of the yellow-pine group. It ranks as one of the most popular pines for forest planting from Maine to Minnesota and south to the Mason

Good ventilation should be provided. Too high a humidity should be avoided, as this will promote undue decay.

An ideal arrangement for the ripening of tomatoes would be to have two rooms, one to be kept uniformly cool but not lower than 55° F. and the other at about 70°. The cool room would be considered a storage space from which tomatoes could be transferred to the warm room for rapid ripening in quantities as needed. With such an arrangement it should be possible to extend the marketing season a month or six weeks after frost.

Grading and Packing Important

At about the time frost has destroyed most of the local field crop, shipped tomatoes, carefully and attractively wrapped and packed, begin to appear on the market. To compete with these the local grower should uniformly grade his stock as to quality and size and pack it carefully in 4-quart baskets, rather than offer ungraded stock in hampers or other unsuitable containers. A very attractive pack can be made by wrapping alternate tomatoes with green tissue paper.

R. C. Wright,
Physiologist, Bureau of Plant Industry.

TREES of Four Kinds Are Becoming Important in Planting on Farms

Two kinds of pines and two of hardwoods are assuming an important rôle in our forest tree planting. They are red pine, slash pine, black locust, and black walnut. Red, or Norway pine (fig. 173), is a member

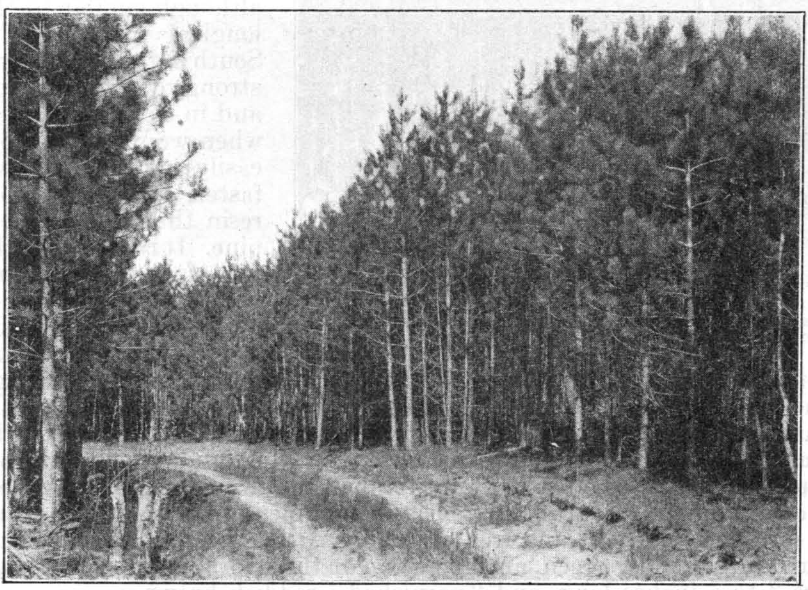


FIGURE 173.—Red, or Norway pine, important in forest planting in the Northeastern and Lake States

of the yellow-pine group. It ranks as one of the most popular pines for forest planting from Maine to Minnesota and south to the Mason and Dixon's line. In the same region the white pine is extensively planted. The trunks of red pine trees growing in close stands become smooth and relatively free of limbs. The growth is comparatively rapid and the wood is of good quality with a wide range of uses. Red pine's home range is about the same as that of eastern white pine, except that it does not extend south in the Appalachians. It enjoys a freedom from blister rust, an enemy of white pine, but is subject to the white-pine weevil.

FIGURE 174.—Slash pine is our most vigorous growing pine. Its home is the coastal plain in the Southeastern States where it is being extensively planted

The red pine may be distinguished by its short, rather thick needle leaves, two in a bundle, its small cones with very small seeds, the orange and red tinged branchlets, the straightness of the trunk, and the sturdy appearance of the tree. The name "Norway" pine is unfortunate since it suggests the country of Norway as its original home, whereas the name came from the town of Norway, Me.

Slash pine (fig. 174), although similar to the longleaf pine of the South in the hard, heavy, strong yellow-pine wood and in the flow of resin when wounded, is more easily propagated, grows faster, and yields more resin than the longleaf pine. It ranks, up to the age of about 20 years, as the fastest growing of all our native pines. Its geographic range extends over much of the coastal plain from South Carolina through the lower parts of Georgia, Florida, Alabama, Mississippi, and southeastern Louisiana. Within this range and a little farther north the slash pine is being extensively planted for the production of timber and resin. The wood is used for lumber, pulpwood, crossties, veneer blocks, and the tree trunks extensively for poles and piling. The trunk is unusually straight and free of branches; the needles or leaves are long, bright shiny green, and grow two or three in a bundle; the cones are 3 to 5 inches long, and "varnished" reddish brown.

In southern Georgia many farmers and larger timberland owners are planting areas of fire-devastated and worn-out cotton lands with 1-season-old slash pine seedlings, either dug up in the woods or, more generally, grown in private or State-managed nurseries. The same is true on a smaller scale in South Carolina and Florida. Probably the most extensive pine planting by a lumber company in the United States is that of the Great Southern Lumber Co. of Bogalusa, La. Of a total of about 30,000 acres of young planted forest, over 20,000 acres are slash pines.

At 5 years of age slash pines are commonly from 5 to 10 feet in height, at 15 years the stand is usually in good condition for turpentining and may be "worked" almost continuously thereafter for periods up to 40 years of age. Considering the abundance and relative cheapness of lands in portions of the South, and the rapidity of growth of slash pine and the products it yields, growing it as a crop is regarded as most profitable.

FIGURE 175.—Black locust combines several outstanding qualities for forest planting on farms. Before planting it, however, the landowner should seek the advice of the local forestry agencies, as in some localities an insect pest is serious

Black locust (fig. 175) has been widely distributed by man because of its high intrinsic value. It is favorably regarded in most sections, but unfavorably in some. Its good points are the cheapness and ease of propagation, rapid growth, ability to grow on well-drained banks, hillsides, and eroded lands, and the high value of the wood for stakes, posts, and poles. Black locust wood used in the ground lasts from 15 to 40 years. No other wood except osage-orange lasts longer in the ground without preservative treatment, and few trees grow faster or mature earlier than black locust. In some regions like the brown loams of the Mississippi Valley black-locust stands are mature in 15 years, and elsewhere in not over 20 years.

Small trees dug up in locust thickets or grown from seed are easily set out. The trees grow from 1 to 3 feet a year, and do well on many kinds of soil, although they do not thrive on very sandy or poorly drained sites. As the root system spreads rapidly just beneath the surface, the tree is of value as a soil binder. No tree in the United States ranks so high as black locust for planting to prevent or check erosion.

The chief drawback to successful growing of black locust is the locust borer, an insect which almost everywhere is doing some damage to the tree trunks. In some regions it is so serious as to make the locust growing impracticable. This appears to be the case in much of Ohio and Indiana and portions of West Virginia and northern Kentucky along the Ohio River. In poor soil where growth is slow, the borer may seriously injure or even destroy plantations, but in favorable regions of growth the damage is not so severe.

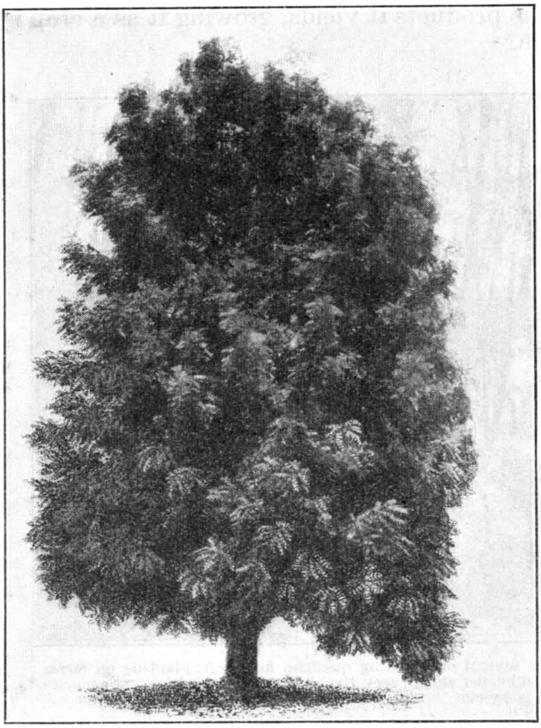


FIGURE 176.—The tree aristocrat, the black walnut, is recommended for planting singly or widely spaced in small groups about the farm

Favorable regions for planting and growing black locust as a crop are found from central New York south through Maryland and the upland hilly or piedmont section and the Appalachian Mountain region to middle Georgia and Alabama, and generally throughout the central Mississippi Valley region. Particularly favorable are limestone soils and others that are nonacid in character. In Idaho and other parts of the western United States the growing of black locust under irrigation is eminently successful and profitable.

Before attempting to establish a plantation, except on a small experimental scale, the landowner would do well to consult the State forester, the extension forester located at the State college of agriculture, the local agricultural county agent, or the Forest Service of the United States Department of Agriculture.

Black walnut (fig. 176), a native American tree, has many and varied uses, ranging all the way from the finest cabinets and furniture to gunstocks and gimlet handles. If a farmer wants wood for a special gate lock or other use where the weather must have little effect upon it he may well select black walnut. The nuts of this dual-purpose tree bring good prices in an increasing market.

Young trees may be started by planting the nuts 2 inches deep in the ground where squirrels or hogs can not dig them up, or by planting year-old nursery-grown seedlings. A few hundred seedlings can be grown in the garden, and set out successfully the next spring.

Black walnut should not be planted closely to form a stand—it does not grow that way in nature—but rather it should be planted as individual trees about the farm, always, however, in good soil. Planting black walnut in small patches in corners or along fence rows, or in stony but good soil, should be a good investment. Often in such out-of-the-way places inferior kinds of trees are now growing. For example, sycamores are trees of low value that might well be replaced by black walnut.

A deep, good soil, well supplied with moisture and well drained, is required for growing walnut successfully. Limestone soils are very favorable, as well as deep rich alluvial soils along streams not subject to heavy overflow.

On many farms active effort should be made to restock them with black walnut, as this choice forest tree is easy to grow and profitable to handle.

W. R. Mattoon,
Extension Forester, Forest Service.

TUBERCULOSIS of Cattle Practically Eradicated from State of Michigan

When the nation-wide bovine-tuberculosis-eradication project was launched in 1917, supporters had no tangible basis for their predictions of success. The project at that time was but a plan on paper. Yet this plan had received much serious thought by veterinary officials and representatives of the livestock industry. Now that this disease has been brought under complete control in three States—North Carolina, Maine, and Michigan—and under partial control in more than a thousand counties elsewhere, a successful termination of the project can not be questioned. The conduct of the work in Michigan illustrates some of the problems that are encountered in such an undertaking, as well as the manner in which they are met.

Testing Individual Herds Was First Step

When the eradication campaign started in 1917 it was found that Michigan, like nearly all other States, had no suitable laws for carrying out a project of this nature. Nearly four years were required to obtain necessary legislation. During that time State and Federal officials cooperated with owners of purebred herds, under what was known as the accredited-herd plan. This was a method of freeing individual herds from tuberculosis, on a voluntary basis.

This procedure led to benefits that stimulated a demand for accreditation work on a large scale. In 1920 accredited-herd owners in Livingston County requested the board of supervisors to appropriate funds for a cooperative arrangement with the State and Federal Governments in a county-wide campaign against bovine tuberculosis. When put into effect, this county-area plan was so favorably accepted that before the end of 1921 eight counties had appropriated funds and work was under way in seven of the counties. Within eight years every county board of supervisors in the State had made similar appropriations for participation in county-wide testing.

Black walnut should not be planted closely to form a stand—it does not grow that way in nature—but rather it should be planted as individual trees about the farm, always, however, in good soil. Planting black walnut in small patches in corners or along fence rows, or in stony but good soil, should be a good investment. Often in such out-of-the-way places inferior kinds of trees are now growing. For example, sycamores are trees of low value that might well be replaced by black walnut.

A deep, good soil, well supplied with moisture and well drained, is required for growing walnut successfully. Limestone soils are very favorable, as well as deep rich alluvial soils along streams not subject to heavy overflow.

On many farms active effort should be made to restock them with black walnut, as this choice forest tree is easy to grow and profitable to handle.

W. R. MATTOON,
Extension Forester, Forest Service.

TUBERCULOSIS of Cattle Practically Eradicated from State of Michigan When the nation-wide bovine-tuberculosis-eradication project was launched in 1917, supporters had no tangible basis for their predictions of success. The project at that time was but a plan on paper. Yet this plan had received much serious thought by veterinary officials and representatives of the livestock industry. Now that this disease has been brought under complete control in three States—North Carolina, Maine, and Michigan—and under partial control in more than a thousand counties elsewhere, a successful termination of the project can not be questioned. The conduct of the work in Michigan illustrates some of the problems that are encountered in such an undertaking, as well as the manner in which they are met.

Testing Individual Herds Was First Step

When the eradication campaign started in 1917 it was found that Michigan, like nearly all other States, had no suitable laws for carrying out a project of this nature. Nearly four years were required to obtain necessary legislation. During that time State and Federal officials cooperated with owners of purebred herds, under what was known as the accredited-herd plan. This was a method of freeing individual herds from tuberculosis, on a voluntary basis.

This procedure led to benefits that stimulated a demand for accreditation work on a large scale. In 1920 accredited-herd owners in Livingston County requested the board of supervisors to appropriate funds for a cooperative arrangement with the State and Federal Governments in a county-wide campaign against bovine tuberculosis. When put into effect, this county-area plan was so favorably accepted that before the end of 1921 eight counties had appropriated funds and work was under way in seven of the counties. Within eight years every county board of supervisors in the State had made similar appropriations for participation in county-wide testing.

Procedure for County-Wide Testing

Before the county-area plan was put into effect, officials in charge agreed that cooperation be confined to State, Federal, and county authorities, excluding any outside organizations. It was agreed also that no support be solicited by either State or Federal officials and that the plan be placed before no board of supervisors except upon invitation from that board. These arrangements proved to be wise. When pressure was brought upon any board of supervisors to make an appropriation, it came from the taxpayers in that county.

The county-area plan was brought before the State legislature, and resulted finally in a State law which empowered any board of supervisors to make county appropriations for cooperating with the Federal Government in the eradication of tuberculosis. The law also made it compulsory for every herd owner in a county where the project had been adopted to have his herd tuberculin tested. However, no owner was compelled to accept State and Federal supervision but

FIGURE 177.—A tuberculosis-free herd, one of approximately 150,000 that were tested during the state-wide campaign in Michigan

could employ an accredited veterinarian to apply the test, if he so desired. Though having legal features, the entire plan, as carried out, was essentially one of voluntary cooperation between the Federal, State, and county Governments and herd owners. Cases in which owners did not desire to cooperate voluntarily were left to State authorities for law enforcement, an arrangement which did not directly involve the cooperating organization.

At the beginning of the campaign the State had a cattle population of over 1,500,000 head distributed among more than 150,000 farms. (Fig. 177.) A careful estimate showed an average of about 4 per cent infection. The "drive" plan of operating appeared to be the most efficient and economical and was therefore followed throughout the campaign.

Hillsdale County, the second to make appropriations for the work, was chosen as the area in which to make the first drive. An aggressive campaign was begun October 24, 1921 with 33 veterinarians, 15 of whom were Federal veterinarians sent in from other States, not only to assist in the actual work but also to study the methods and observe the results. The entire county was covered in 12 days, 95 per cent of the herd owners voluntarily cooperating.

Test Reveals Many Generalized Cases

It took nine years and four months to reduce the percentage of bovine tuberculosis infection from approximately 4 per cent to less than one-half of 1 per cent, which is the requirement for accreditation. In carrying out this work the tuberculin test was applied 3,236,376 times and 58,324 reactors were removed.

Several interesting points were noted during the campaign. One was that countries having the heaviest infection were accredited with the smallest number of county-wide tests. Macomb County, for instance, with the highest degree of infection, 14.4 per cent, was accredited after two complete tuberculin tests of all the cattle. Ontonagon, an upper peninsula county, having only 1.2 per cent of tuberculosis on the first test, required three complete tests to reach the point of accreditation. This is explained by the manner of handling the cattle in the different localities. In Macomb County the cattle owners were largely in the dairy business and the herds were kept on individual farms, making control methods comparatively easy. In Ontonagon County the conditions were reversed. The cattle were owned by miners and were kept mostly in community herds, which made it difficult to control the spread of infection.

The general impression that a large percentage of extensively diseased cattle do not react to the tuberculin test was disproved in the Macomb County work where the post-mortem reports showed that of the 4,063 reactors, 547 were generalized cases. Furthermore, 509 of the 547, or 93 per cent, reacted to the first test, leaving but 38 head to be found by subsequent testing.

There is ample evidence to support the belief that bovine tuberculosis, once eradicated, can be kept suppressed. In Michigan 42 counties have been retested three years from the date of first accreditation. All of these counties have been reaccredited, showing that the disease has been kept from reappearing. Furthermore, in the last two years 23,266 cattle from various parts of Michigan were tuberculin tested to meet the requirements for shipment to other States. Of this large number only 10 were reactors, representing 0.04 per cent of infection.

The result of the Michigan campaign should be sufficient to convince the most skeptical person that bovine tuberculosis can eventually be entirely eradicated.

THEODORE S. RICH,
Senior Veterinarian, Bureau of Animal Industry.

TURKEY Grading by U. S. Grades Extended to Many Country Points Government grading of turkeys was confined practically to terminal markets until the holiday season of 1929–30. But as receivers, favorable to Government grading, insisted that the place to do the grading is at the shipping point where the turkeys are packed, and as requests for grading were received from many of the State departments of agriculture, State agricultural colleges, turkey pools, and the results. The entire county was covered in 12 days, 95 per cent of the herd owners voluntarily cooperating.

Test Reveals Many Generalized Cases

It took nine years and four months to reduce the percentage of bovine tuberculosis infection from approximately 4 per cent to less than one-half of 1 per cent, which is the requirement for accreditation. In carrying out this work the tuberculin test was applied 3,236,376 times and 58,324 reactors were removed.

Several interesting points were noted during the campaign. One was that countries having the heaviest infection were accredited with the smallest number of county-wide tests. Macomb County, for instance, with the highest degree of infection, 14.4 per cent, was accredited after two complete tuberculin tests of all the cattle. Ontonagon, an upper peninsula county, having only 1.2 per cent of tuberculosis on the first test, required three complete tests to reach the point of accreditation. This is explained by the manner of handling the cattle in the different localities. In Macomb County the cattle owners were largely in the dairy business and the herds were kept on individual farms, making control methods comparatively easy. In Ontonagon County the conditions were reversed. The cattle were owned by miners and were kept mostly in community herds, which made it difficult to control the spread of infection.

The general impression that a large percentage of extensively diseased cattle do not react to the tuberculin test was disproved in the Macomb County work where the post-mortem reports showed that of the 4,063 reactors, 547 were generalized cases. Furthermore, 509 of the 547, or 93 per cent, reacted to the first test, leaving but 38 head to be found by subsequent testing.

There is ample evidence to support the belief that bovine tuberculosis, once eradicated, can be kept suppressed. In Michigan 42 counties have been retested three years from the date of first accreditation. All of these counties have been reaccredited, showing that the disease has been kept from reappearing. Furthermore, in the last two years 23,266 cattle from various parts of Michigan were tuberculin tested to meet the requirements for shipment to other States. Of this large number only 10 were reactors, representing 0.04 per cent of infection.

The result of the Michigan campaign should be sufficient to convince the most skeptical person that bovine tuberculosis can eventually be entirely eradicated.

THEODORE S. RICH,
Senior Veterinarian, Bureau of Animal Industry.

TURKEY Grading by U. S. Grades Extended to Many Country Points Government grading of turkeys was confined practically to terminal markets until the holiday season of 1929–30. But as receivers, favorable to Government grading, insisted that the place to do the grading is at the shipping point where the turkeys are packed, and as requests for grading were received from many of the State departments of agriculture, State agricultural colleges, turkey pools, and associations, the Bureau of Agricultural Economics extended its grading service to the country points.

Before the grading work was started it was decided to hold a turkey-grading school at a convenient central point where instructions could be given in the interpretation, application, and use of the Government grades for turkeys to all who cared to attend. As the requests for the grading work came chiefly from the Northwestern States the first school was held at Salt Lake City in October, 1929. Representatives from 10 States attended. Of a total attendance of 125 persons, 86 registered for examination.

In response to an urgent demand for more aid, 14 schools were later held in California, Oregon, Wyoming, Colorado, Nevada, and Minnesota. In addition, certain State colleges and State agricultural workers held local schools in their States. The attendance at all these schools is estimated at 2,500 persons.

FIGURE 178.—Packing Government-graded turkeys at a country-receiving station

At each school some time was devoted to the problems of producers because in the Pacific Northwest States the producers do the dressing. Demonstrations included the grading of live turkeys, the methods of ascertaining whether a turkey is ready for market, and desirable methods of sticking, bleeding, and picking. Precooling and packing also received attention. In fact, the whole series of operations that occur from the time the turkey leaves the roost until it is packed and loaded into the car on its way to market were covered.

Six Hundred Students Take Examination

More than 600 students took the examinations for grading that were given at the various Federal schools; 286 of these were licensed as Federal-State turkey graders, and 32 were licensed as supervising graders. (Fig. 178.)

During the 1929–30 holiday season, including the Thanksgiving and Christmas markets, the graded turkeys, at shipping points and markets combined, totaled nearly 8,000,000 pounds. Much of this work was done through Federal-State cooperative grading services. The turkeys were classed as young turkeys, old turkeys, hens, and toms, and there were four grades of each class—U. S. Prime, U. S. Choice, U. S. Medium, and U. S. Common. Less than half of the total number of pounds graded were of U. S. Prime.

Of the 400 cars graded, only one car was subjected to regrading, and in that case the original grading was sustained except on a small part of the car. In general, satisfaction was expressed by producers, packers, and receivers.

The fees charged for the grading work, which accrue to the State cooperating agency and to the United States Treasury, amounted to $4,071.26, or less than one-half of a cent a bird.

Requests received for the grading services for the 1930–31 turkey crop indicated that there will be considerable expansion of the bureau's turkey-grading program; in fact, the indications are that Government grading of turkeys will eventually become an important factor in the marketing of the country's turkey crop.

THOMAS W. HEITZ,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

TURKEY Raising Is Being Stabilized by Modern Methods

Turkey raising, an industry which a few years ago had been almost wiped out in the Eastern and Middle Western States by the ravages of the blackhead disease, appears to be staging a comeback. This is not because of the discovery of anything unusual or actually new in turkey management but is mainly the result of modern methods of sanitation.

Turkeys raised in accordance with the new system obtain their feed only from clean, waste-proof feeders, never from the ground. They drink only from clean dishes. In order that they may obtain water only from this source, puddles are not allowed to stand in the yard. Yards are kept clean by graveling them, using them in rotation, moving buildings to a clean location from time to time, disposing of manure properly, and keeping chickens and turkeys separate. The young turkeys are raised on land that has not been used by poultry of any kind for at least one year. Modern methods of sanitation, therefore, may be summed up in these words: Clean feed, clean water, and clean environment.

Any system of feeding that has been found to be successful with chickens gives promise of being satisfactory with turkeys, though there is some evidence that turkeys require a more careful compounding of rations for maximum growth, low mortality, and straight breastbones. Their basic ration is usually a dry mash. During the first two months of the poult's life the composition and physical character of this mash are especially important. A mash very finely ground or one that contains much coarse material, such as oat hulls, is unsatisfactory. The mash usually is supplemented by milk, grit, and green feed, and by cod-liver oil in the absence of abundant direct sunlight. Six or eight weeks before marketing, the turkeys are given liberal feedings of scratch grain containing a large percentage of corn.

was done through Federal-State cooperative grading services. The turkeys were classed as young turkeys, old turkeys, hens, and toms, and there were four grades of each class—U. S. Prime, U. S. Choice, U. S. Medium, and U. S. Common. Less than half of the total number of pounds graded were of U. S. Prime.

Of the 400 cars graded, only one car was subjected to regrading, and in that case the original grading was sustained except on a small part of the car. In general, satisfaction was expressed by producers, packers, and receivers.

The fees charged for the grading work, which accrue to the State cooperating agency and to the United States Treasury, amounted to $4,071.26, or less than one-half of a cent a bird.

Requests received for the grading services for the 1930–31 turkey crop indicated that there will be considerable expansion of the bureau's turkey-grading program; in fact, the indications are that Government grading of turkeys will eventually become an important factor in the marketing of the country's turkey crop.

THOMAS W. HEITZ,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

TURKEY Raising Is Being Stabilized by Modern Methods

Turkey raising, an industry which a few years ago had been almost wiped out in the Eastern and Middle Western States by the ravages of the blackhead disease, appears to be staging a comeback. This is not because of the discovery of anything unusual or actually new in turkey management but is mainly the result of modern methods of sanitation.

Turkeys raised in accordance with the new system obtain their feed only from clean, waste-proof feeders, never from the ground. They drink only from clean dishes. In order that they may obtain water only from this source, puddles are not allowed to stand in the yard. Yards are kept clean by graveling them, using them in rotation, moving buildings to a clean location from time to time, disposing of manure properly, and keeping chickens and turkeys separate. The young turkeys are raised on land that has not been used by poultry of any kind for at least one year. Modern methods of sanitation, therefore, may be summed up in these words: Clean feed, clean water, and clean environment.

Any system of feeding that has been found to be successful with chickens gives promise of being satisfactory with turkeys, though there is some evidence that turkeys require a more careful compounding of rations for maximum growth, low mortality, and straight breastbones. Their basic ration is usually a dry mash. During the first two months of the poult's life the composition and physical character of this mash are especially important. A mash very finely ground or one that contains much coarse material, such as oat hulls, is unsatisfactory. The mash usually is supplemented by milk, grit, and green feed, and by cod-liver oil in the absence of abundant direct sunlight. Six or eight weeks before marketing, the turkeys are given liberal feedings of scratch grain containing a large percentage of corn.

TABLE 22.—*Average weights of male and female large-type Bronze turkeys raised at the United States Range Livestock Experiment Station, Miles City, Mont., 1929*

Age (weeks)	Average weight of 161 males	Average weight of 172 females	Age (weeks)	Average weight of 161 males	Average weight of 172 females
	Pounds	*Pounds*		*Pounds*	*Pounds*
4	0.71	0.61	16	9.56	6.99
8	2.58	2.04	20	13.90	9.59
12	5.48	4.16	24	17.96	11.48

Other factors essential to successful turkey raising are plenty of heat for the baby turkeys with temperatures beginning at 95° F. in the brooder and 80° in the room, the elimination of corners in the brooders where the poults can pile up, and protection from enemies such as coyotes and dogs. The turkeys usually are kept within a fenced inclosure, although some poultry men allow their turkeys to range at will. Turkeys develop well in confinement, at all ages, but must not be overcrowded at any age. It is difficult to rear the young birds successfully in groups of more than 150. Turkeys are naturally quiet and easily handled. If given the opportunity, they will range far and wide, but if they are confined to a limited range they appear to be contented as long as they are well fed.

FIGURE 179.—Bronze turkeys at the United States Range Livestock Experiment Station, Miles City, Mont.

Turkeys Are Economical Feeders

Turkeys are economical feeders and fast growers. Growth-rate and feed-consumption data are available for several hundred birds grown in 1929 at the United States Range Livestock Experiment Station, Miles City, Mont. That year 3.1 pounds of dry mash and 1.34 pounds of scratch grain were required, on the average, to produce 1 pound of live turkey for market at the age of about 25 weeks. An average young turkey tom weighing 18 pounds, therefore, required about 80 pounds of these feeds, and a young turkey hen weighing 11½ pounds required 51 pounds. Table 22 shows the average weights of males and females of large-type Bronze turkeys at the station mentioned. (Fig. 179.)

The last few years have brought great advances in the science of poultry husbandry. Blackhead, formerly the chief limiting factor in turkey production, is being controlled to a large extent, as described, by sanitation. Some of the most important problems that face the turkey grower at present are the elimination of crooked breastbones, feeding methods that will promote growth and reduce mortality in large flocks, greater hatchability of eggs, successful methods of artificial incubation, progressive methods of breeding, and more effective control of diseases.

S. J. MARSDEN,
Associate Poultry Husbandman,
Bureau of Animal Industry.

TYPES of Farming on Larger Farms Shown by a Special Survey

Advantages and disadvantages of the large farm have been the subject of much discussion during the past few years. Some people have advocated the application of "big business" methods to farming, whereas others have expressed serious doubts as to the desirability of the decrease in the number of family sized farms which would probably accompany any marked increase in the operation of farms as large business enterprises.

It is common knowledge that there are a number of well-organized farms that should be classed as large businesses, but there is little information as to the number and size of units included in the class. One measure of size is area of land in the farm. This measure alone, of course, will not give a complete picture, but since it has been used as a basis of classification in the census reports on agriculture beginning in 1880, there is an opportunity to note the changes in the number of farms in the different size classes.

The group 1,000 acres or more in size is of especial interest because it includes many large-scale businesses and because the total area of land in farms of that size increased from 1920 to 1925, while every other size group decreased in total area. The total area in farms 1,000 acres or more in size was approximately 2,000,000 acres greater in 1925 than in 1920, although the number was 4,000 less. During the 25-year period 1900 to 1925 there was an increase of approximately 12,500 farms 1,000 acres or more in size in the West North Central, Mountain, and Pacific Coast States, and only an increase of 3,500 for the remainder of the country.

TABLE 23.—*Farms 1,000 acres or more in size and all other farms, number and total acres, 1900–1925*

Year	Farms of 1,000 acres or more		Farms of less than 1,000 acres	
	Number	*Acres*	*Number*	*Acres*
1900	47, 276	200, 324, 045	5, 692, 381	640, 877, 501
1910	50, 135	167, 082, 047	6, 311, 367	711, 716, 278
1920	67, 405	220, 635, 519	6, 380, 938	735, 248, 196
1925	63, 328	222, 548, 890	6, 308, 312	701, 770, 463

young turkey tom weighing 18 pounds, therefore, required about 80 pounds of these feeds, and a young turkey hen weighing 11½ pounds required 51 pounds. Table 22 shows the average weights of males and females of large-type Bronze turkeys at the station mentioned. (Fig. 179.)

The last few years have brought great advances in the science of poultry husbandry. Blackhead, formerly the chief limiting factor in turkey production, is being controlled to a large extent, as described, by sanitation. Some of the most important problems that face the turkey grower at present are the elimination of crooked breastbones, feeding methods that will promote growth and reduce mortality in large flocks, greater hatchability of eggs, successful methods of artificial incubation, progressive methods of breeding, and more effective control of diseases.

S. J. Marsden,
Associate Poultry Husbandman,
Bureau of Animal Industry.

TYPES of Farming on Larger Farms Shown by a Special Survey Advantages and disadvantages of the large farm have been the subject of much discussion during the past few years. Some people have advocated the application of "big business" methods to farming, whereas others have expressed serious doubts as to the desirability of the decrease in the number of family sized farms which would probably accompany any marked increase in the operation of farms as large business enterprises.

It is common knowledge that there are a number of well-organized farms that should be classed as large businesses, but there is little information as to the number and size of units included in the class. One measure of size is area of land in the farm. This measure alone, of course, will not give a complete picture, but since it has been used as a basis of classification in the census reports on agriculture beginning in 1880, there is an opportunity to note the changes in the number of farms in the different size classes.

The group 1,000 acres or more in size is of especial interest because it includes many large-scale businesses and because the total area of land in farms of that size increased from 1920 to 1925, while every other size group decreased in total area. The total area in farms 1,000 acres or more in size was approximately 2,000,000 acres greater in 1925 than in 1920, although the number was 4,000 less. During the 25-year period 1900 to 1925 there was an increase of approximately 12,500 farms 1,000 acres or more in size in the West North Central, Mountain, and Pacific Coast States, and only an increase of 3,500 for the remainder of the country.

Table 23.—*Farms 1,000 acres or more in size and all other farms, number and total acres, 1900–1925*

Year	Farms of 1,000 acres or more		Farms of less than 1,000 acres	
	Number	*Acres*	*Number*	*Acres*
1900	47, 276	200, 324, 045	5, 692, 381	640, 877, 501
1910	50, 135	167, 082, 047	6, 311, 367	711, 716, 278
1920	67, 405	220, 635, 519	6, 380, 938	735, 248, 196
1925	63, 328	222, 548, 890	6, 308, 312	701, 770, 463

The fact that many of these farms of 1,000 acres or more are large businesses is shown by the average value of real estate per farm, which was $49,020 in 1925, while for the next lower group (500 to 999 acres in size) the average real estate value was only $23,120.

Kinds of Farming on Large Farms

What kind of farming is done on large farms? To answer this question in part, a special study was made of 55,000 of the 63,328 farms of 1,000 acres or more enumerated by the 1925 Census of Agriculture. States [14] having large numbers of plantations were not included in the study because of the fact that each cropper or tenant was considered to be operating a separate farm. If all plantations had been included, the total number of large farms would have been greater.

TABLE 24.—*Farms 1,000 acres or more in size, classified according to type of farming*[1]

Type of farming	Number of farms	Type of farming	Number of farms
Cattle, including dairying	22,677	Wheat [2]	11,791
Sheep	5,312	Miscellaneous, fruits, vegetables, sugar beets, etc.	727
Cattle and sheep	2,378		
General	12,721		
Cotton	2,231		57,837

[1] Eight Southeastern States omitted.
[2] Includes 500 farms upon which small grains other than wheat are principal products.

Half Were Livestock Farms

About one-half of the farms studied were classified as livestock farms. Cattle production, including dairying, accounted for almost 23,000 farms, sheep for 5,000, and those about evenly balanced as to cattle and sheep for 2,000 more. The livestock industry is also important on many of the 13,000 general farms.

Of the 11,000 farms that are devoted principally to wheat production, 9,500 are in the group 1,000 to 2,000 acres in size and another 1,000 in the 2,000 to 3,000 acre group. There were some 600 farms classed as grain farms, including barley, oats, and wheat in various combinations. There were no farms classified as corn farms. Small grain, principally wheat, is much more likely than other crops to be found on large farms.

In the group of 5,000 acres or more the number of general farms is small, only 4 per cent of the 7,000 included in the special tabulation, while in the group 1,000 to 5,000 acres in size about 25 per cent of the farms were general farms upon which no one product was outstanding.

Of the 3,163 farms 10,000 acres or more in size, all except 132 are devoted to some form of livestock production.

Farms were classified as to the principal source of income in 1900, at which time approximately 57 per cent of the group 1,000 acres or more in size were livestock farms. In 1925 the tabulation shows a little over 52 per cent mainly devoted to livestock production.

Grain farms in both 1900 and 1925 were approximately 20 per cent of all farms 1,000 acres or more in size.

O. M. JOHNSON,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

[14] North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Arkansas omitted.

VAT Dyes Play Big Part in Broadening Cotton Goods Market

In order to appreciate better the rôle that vat dyes have played in bringing cotton goods into fashion and popularity, it is necessary to examine the characteristics of such dyestuffs. Vat dyes as a class are the fastest and most complex of synthetic colors. They are not attacked by weak acids, and alkalies, and only faintly by bleach or perspiration. In fact, they are so stable and resistant that their general use on a large scale awaited only the development of convenient and economical means of applying them to the yarn or cloth.

Unlike most other types of dyes, vat colors as a class possess excellent fastness to light and severe washing. In fact these dyestuffs depend on an oxidizing atmosphere to bring out their color and brightness to the fullest extent.

In order to apply these dyes they must be in solution. At first a hydrosulphite vat was used, hence the name vat dyes. Hydrosulphite is a very strong reducing compound which converts the dyestuff to what is known as a soluble leuco compound. Oftentimes these leuco compounds possess no color, but when material impregnated with the leuco compound is exposed to the air, an oxidation process sets in and the original insoluble dyestuff is regenerated. More recently other compounds have been discovered which make it possible to apply vat colors directly on the cloth by a printing process. Indeed, the procedure is very similar to the printing of the colored supplements of the Sunday papers. The dyeing process is of course distinctly more complicated and must be subjected to a very refined control in order that the printed vat colors may be developed to their maximum fastness and brightness.

Printing Methods for Applying Colors

The utilization of printing methods for applying vat colors on lustrous cotton goods has made possible the manufacture of fabrics which are at once serviceable and attractive. Even the casual male observer has discerned the colorful house dresses which adorn milady in her daily tasks. This vogue for fast-colored cotton materials has been chiefly responsible for the tremendous growth in the production of vat dyes, which growth not only reflects the appreciation of color, but reveals the innate desire to combine the esthetic with the practical.

The combination of permanent colors of many hues on a lustrous cotton will always be in demand. The printing of artistic and novel designs makes possible dyed creations which are destined to remain popular and continue in fashion.

The cotton grower must realize that the popularity of cotton depends on a number of factors. To obtain the best results in the printing of cotton fabrics with vat dyes it is necessary that the raw cotton going into the cloth be uniformly bright and lustrous. By mechanical and chemical processes nature's product will then be improved so that the dyer may apply his vat colors to the best advantage.

P. H. Groggins,
Senior Chemist, Bureau of Chemistry and Soils.

VEGETABLE Weevil, a New Invader, Spreading in South and California In the spring of 1922 the vegetable weevil, *Listroderes obliquus* Gyll., a pest known to attack a considerable variety of vegetable crops, was found in Stone County, Miss. This constituted the first record of the occurrence of this weevil in the United States. For several years after its discovery it was injurious only locally, but is now known to be distributed over 55 counties in Mississippi, 40 parishes in Louisiana, 19 counties in Alabama, and 3 counties in Florida, ranging from Beauregard Parish in Louisiana on the west, northward to Yalobusha and Monroe Counties in Mississippi, and eastward to Coffee and Geneva Counties in Alabama and Holmes County in Florida. In 1926 it was discovered in the vicinity of San Jose, Calif. During the past season in the Gulf States, dispersal northward was retarded by the severe winter of 1929–30, although the spread to the east and west has maintained a normal rate.

The vegetable weevil is a small, grayish-brown snout beetle, about one-third of an inch long, and when newly emerged it bears a gray V-shaped mark on the wing covers. The beetle gradually darkens and the V-mark merges with the surrounding color, so in older individuals it may be entirely lacking.

While the adult beetles feed on the host plants, the most serious injury is done by the larvae, which, like the adults, feed principally at night. The larvae or grubs are about one-half inch in length when full grown, and pale to dark green in color. They feed principally on the leaves, spending the day down in the crowns of the plants and dropping to the ground if disturbed. As indicating their probable origin in the Southern Hemisphere, the adult vegetable weevils become active and begin to deposit eggs in the fall, the larvae live and feed throughout the winter and early spring, and the resting period occurs during the summer. The eggs are laid on the leaves and stems and in the crowns of the host plant, and pupation takes place in the soil, usually at depths of from one-half to 4 inches, although during dry weather the larvae may penetrate to a depth of 9 inches before pupating. There is a single generation annually, although, since the adults continue to deposit eggs throughout the winter, partially grown larvae may be found in late spring, and all are not mature before June. The time required for the completion of the various stages varies greatly with the temperature conditions encountered. The male is unknown, although many individuals have been examined as to sex.

A Strong Flier at Times

When the weevil was first discovered in this country it was believed to be distributed largely through traffic. It has since become evident that the species is a strong flier at times and hence can not be readily restrained. The long list of plants upon which it is able to subsist, including turnip, cabbage, collard, carrot, mustard, spinach, beet, chard, radish, potato, tomato, lettuce, onion, parsley, parsnip, chickweed, mallow, pigweed, dock, and milk thistle, will insure distribution as well as persistence of attack.

The vegetable weevil may be controlled by spraying or dusting with such standard stomach poisons as lead arsenate and calcium arsenate. Either of these may be expected to give satisfactory control of both adults and larvae.

When the crop attacked is one in which the leaves constitute the edible portion, the use of arsenicals becomes dangerous. Contact insecticides are not practical. It has been found that the adult weevils at the time of their emergence in May and June may be controlled by a poisoned bran mash such as is used for cutworm bait, flavored with cull vegetables and scattered along the rows. At best, however, this is only a supplementary remedy.

M. M. HIGH,
Associate Entomologist, Bureau of Entomology.

WALNUT Burl, a New Forest Product, Wanted for Cabinet Making In the Southwest, a new forest product is being sold from the national forests and from private lands. It has been found that some specimens of nogal (*Juglans rupestris major*) and little walnut (*J. rupestris*) have wood in burls at and below the root collar that is valuable for the production of fancy veneers for cabinet purposes. These trees occur along the banks of streams in the canyons of central and southern New Mexico and Arizona. They do not form continuous stands, but are found as single individuals or clumps of trees in favorable localities.

Not all trees form valuable burls, so that it is necessary for the burl hunter to visit each tree and at times dig down beside the trunk to determine if valuable wood is present. Burl is indicated by a distinct swelling of the tree; a chip on this swelling indicates the grain of the burl.

The weight of burls varies greatly; occasionally a good one weighs up to 2 tons. The average in this region would be 700 to 900 pounds. The cost of locating, preparing, and hauling this material to the railroad from the rather inaccessible locations where it is found is considerable.

Walnut trees occupy what would otherwise be waste land. They grow relatively fast. Why some trees have burl and others do not is unknown. It if were possible to grow trees with burl, a good business could be developed in growing these trees.

QUINCY RANDLES,
Assistant Regional Forester, Forest Service.

WATERMELONS Prove Valuable Source of Vitamins A and C According to Government reports, during the year 1929 some 67,000,000 watermelons were produced and presumably consumed in the United States. In this age when we are continually faced with the problem of evaluation of all kinds of foodstuffs it was only natural that a fruit as plentiful as the watermelon should become the subject of investigation. Seemingly, it had occurred to no one that such a watery fruit would possess any value other than cool refreshment on a hot summer's day. Vitamins have been shown in abundance in many fruits and vegetables possessing a high water content, but no similar study had been made of the watermelon. For this reason, the Bureau of Home Economics conducted a series of experiments to test its vitamin content.

When the crop attacked is one in which the leaves constitute the edible portion, the use of arsenicals becomes dangerous. Contact insecticides are not practical. It has been found that the adult weevils at the time of their emergence in May and June may be controlled by a poisoned bran mash such as is used for cutworm bait, flavored with cull vegetables and scattered along the rows. At best, however, this is only a supplementary remedy.

M. M. HIGH,
Associate Entomologist, Bureau of Entomology.

WALNUT Burl, a New Forest Product, Wanted for Cabinet Making In the Southwest, a new forest product is being sold from the national forests and from private lands. It has been found that some specimens of nogal (*Juglans rupestris major*) and little walnut (*J. rupestris*) have wood in burls at and below the root collar that is valuable for the production of fancy veneers for cabinet purposes. These trees occur along the banks of streams in the canyons of central and southern New Mexico and Arizona. They do not form continuous stands, but are found as single individuals or clumps of trees in favorable localities.

Not all trees form valuable burls, so that it is necessary for the burl hunter to visit each tree and at times dig down beside the trunk to determine if valuable wood is present. Burl is indicated by a distinct swelling of the tree; a chip on this swelling indicates the grain of the burl.

The weight of burls varies greatly; occasionally a good one weighs up to 2 tons. The average in this region would be 700 to 900 pounds. The cost of locating, preparing, and hauling this material to the railroad from the rather inaccessible locations where it is found is considerable.

Walnut trees occupy what would otherwise be waste land. They grow relatively fast. Why some trees have burl and others do not is unknown. It if were possible to grow trees with burl, a good business could be developed in growing these trees.

QUINCY RANDLES,
Assistant Regional Forester, Forest Service.

WATERMELONS Prove Valuable Source of Vitamins A and C According to Government reports, during the year 1929 some 67,000,000 watermelons were produced and presumably consumed in the United States. In this age when we are continually faced with the problem of evaluation of all kinds of foodstuffs it was only natural that a fruit as plentiful as the watermelon should become the subject of investigation. Seemingly, it had occurred to no one that such a watery fruit would possess any value other than cool refreshment on a hot summer's day. Vitamins have been shown in abundance in many fruits and vegetables possessing a high water content, but no similar study had been made of the watermelon. For this reason, the Bureau of Home Economics conducted a series of experiments to test its vitamin content.

When the crop attacked is one in which the leaves constitute the edible portion, the use of arsenicals becomes dangerous. Contact insecticides are not practical. It has been found that the adult weevils at the time of their emergence in May and June may be controlled by a poisoned bran mash such as is used for cutworm bait, flavored with cull vegetables and scattered along the rows. At best, however, this is only a supplementary remedy.

M. M. High,
Associate Entomologist, Bureau of Entomology.

WALNUT Burl, a New Forest Product, Wanted for Cabinet Making

In the Southwest, a new forest product is being sold from the national forests and from private lands. It has been found that some specimens of nogal (*Juglans rupestris major*) and little walnut (*J. rupestris*) have wood in burls at and below the root collar that is valuable for the production of fancy veneers for cabinet purposes. These trees occur along the banks of streams in the canyons of central and southern New Mexico and Arizona. They do not form continuous stands, but are found as single individuals or clumps of trees in favorable localities.

Not all trees form valuable burls, so that it is necessary for the burl hunter to visit each tree and at times dig down beside the trunk to determine if valuable wood is present. Burl is indicated by a distinct swelling of the tree; a chip on this swelling indicates the grain of the burl.

The weight of burls varies greatly; occasionally a good one weighs up to 2 tons. The average in this region would be 700 to 900 pounds. The cost of locating, preparing, and hauling this material to the railroad from the rather inaccessible locations where it is found is considerable.

Walnut trees occupy what would otherwise be waste land. They grow relatively fast. Why some trees have burl and others do not is unknown. It if were possible to grow trees with burl, a good business could be developed in growing these trees.

Quincy Randles,
Assistant Regional Forester, Forest Service.

WATERMELONS Prove Valuable Source of Vitamins A and C

According to Government reports, during the year 1929 some 67,000,000 watermelons were produced and presumably consumed in the United States. In this age when we are continually faced with the problem of evaluation of all kinds of foodstuffs it was only natural that a fruit as plentiful as the watermelon should become the subject of investigation. Seemingly, it had occurred to no one that such a watery fruit would possess any value other than cool refreshment on a hot summer's day. Vitamins have been shown in abundance in many fruits and vegetables possessing a high water content, but no similar study had been made of the watermelon. For this reason, the Bureau of Home Economics conducted a series of experiments to test its vitamin content.

It is possible to determine the relative amounts of the vitamins present in a foodstuff by feeding the food in question to laboratory animals such as the rat and the guinea pig, and observing the rate of growth made by these animals. The melons used were of the Tom Watson variety and they were fed so as to determine the vitamin A, B, C, and G content. Vitamin G is one of the newer vitamins, and is essential for normal growth. Some investigators consider this vitamin to be identical with the pellagra-preventing factor.

In making the tests 125 rats and about 24 guinea pigs were fed daily, weighed portions of watermelon. The experiments were carried on from July through October, until it was no longer possible to obtain fresh melons on the Washington market. Only the edible portion was given to the test animals although other experiments indicated that guinea pigs preferred the green rind to the red flesh. The speed with which the portions of melon were consumed, even when fed in rather large quantities, left no doubt as to the extent the animals relished this test food.

In the case of the vitamin A and C tests the animals grew well and appeared healthy. However, when the watermelon was fed as a source of vitamin B or G, growth was not very pronounced and the animals appeared subnormal. The final summary of the data showed watermelons to be a good source of vitamins A and C and to contain small but detectable amounts of vitamins B and G.

HAZEL E. MUNSELL,
Senior Nutrition Chemist, Bureau of Home Economics.

WHEATS from Many Countries Compared in Milling, Baking Tests

World production of wheat in 1928, excluding Russia and China, was 3,900,000,000 bushels. Grown as it is under a wide range of soil, climatic, and topographical conditions, this wheat necessarily varies considerably in its adaptability to milling and baking purposes.

Recognizing the need for information as to the milling and baking properties of the wheat grown throughout the world as essential to economical marketing and utilization of the wheat grown in the United States, studies were made to compare the milling and baking properties of the wheat grown in other parts of the world with that grown in the United States.

In the United States five commercial classes of wheat are recognized: The hard red winter wheats grown largely in the South Central States; the soft red winter wheats grown mostly in the more humid Central and Eastern States; the hard red spring wheats grown extensively in the North Central region; the durum (spring) wheats grown in practically the same region as the hard red spring wheats; and the white wheats, both spring and winter, grown largely in the Pacific Western States, although some are found in New York and Michigan.

From the study made, it was apparent that wheats of the world are of the common type (*Triticum vulgare*) with very minor acreages devoted to other types. Wheat similar in character to the hard red spring wheats produced in the United States is grown in Australia, Bulgaria, Canada, Czechoslovakia, England, Estonia, Germany, Hungary, India, Japan, Latvia, Manchuria, Norway, Russia, Sweden, Switzerland, the Netherlands, the Union of South Africa, and Uruguay. The greatest quantity of hard red spring wheat is produced in Canada, It is possible to determine the relative amounts of the vitamins present in a foodstuff by feeding the food in question to laboratory animals such as the rat and the guinea pig, and observing the rate of growth made by these animals. The melons used were of the Tom Watson variety and they were fed so as to determine the vitamin A, B, C, and G content. Vitamin G is one of the newer vitamins, and is essential for normal growth. Some investigators consider this vitamin to be identical with the pellagra-preventing factor.

In making the tests 125 rats and about 24 guinea pigs were fed daily, weighed portions of watermelon. The experiments were carried on from July through October, until it was no longer possible to obtain fresh melons on the Washington market. Only the edible portion was given to the test animals although other experiments indicated that guinea pigs preferred the green rind to the red flesh. The speed with which the portions of melon were consumed, even when fed in rather large quantities, left no doubt as to the extent the animals relished this test food.

In the case of the vitamin A and C tests the animals grew well and appeared healthy. However, when the watermelon was fed as a source of vitamin B or G, growth was not very pronounced and the animals appeared subnormal. The final summary of the data showed watermelons to be a good source of vitamins A and C and to contain small but detectable amounts of vitamins B and G.

HAZEL E. MUNSELL,
Senior Nutrition Chemist, Bureau of Home Economics.

WHEATS from Many Countries Compared in Milling, Baking Tests

World production of wheat in 1928, excluding Russia and China, was 3,900,000,000 bushels. Grown as it is under a wide range of soil, climatic, and topographical conditions, this wheat necessarily varies considerably in its adaptability to milling and baking purposes.

Recognizing the need for information as to the milling and baking properties of the wheat grown throughout the world as essential to economical marketing and utilization of the wheat grown in the United States, studies were made to compare the milling and baking properties of the wheat grown in other parts of the world with that grown in the United States.

In the United States five commercial classes of wheat are recognized: The hard red winter wheats grown largely in the South Central States; the soft red winter wheats grown mostly in the more humid Central and Eastern States; the hard red spring wheats grown extensively in the North Central region; the durum (spring) wheats grown in practically the same region as the hard red spring wheats; and the white wheats, both spring and winter, grown largely in the Pacific Western States, although some are found in New York and Michigan.

From the study made, it was apparent that wheats of the world are of the common type (*Triticum vulgare*) with very minor acreages devoted to other types. Wheat similar in character to the hard red spring wheats produced in the United States is grown in Australia, Bulgaria, Canada, Czechoslovakia, England, Estonia, Germany, Hungary, India, Japan, Latvia, Manchuria, Norway, Russia, Sweden, Switzerland, the Netherlands, the Union of South Africa, and Uruguay. The greatest quantity of hard red spring wheat is produced in Canada, with Russia and the United States ranking next in order. While hard red spring wheats are grown in Australia, England, India, Switzerland, the Netherlands, and Uruguay, their production is relatively unimportant.

Considerable acreages in Algeria, Bulgaria, Canada, Greece, Iraq, Italy, Morocco, Palestine, Russia, and Tunis are devoted to the production of durum wheat. Although durum wheat is raised in Argentina, Australia, India, Latvia, Rumania, Uruguay, and Yugoslavia, it is relatively unimportant.

Russia produces probably the greatest quantity of hard red winter wheat, with the United States and Argentina following in volume of production. Smaller quantities are also grown in Canada, Czechoslovakia, and Hungary, and negligible quantities in Australia, Bulgaria, and India.

Soft red winter wheats are grown in Argentina, Australia, Belgium, Bulgaria, Chile, Denmark, England, France, Germany, Hungary, India, Ireland, Italy, Japan, Latvia, Lithuania, Mexico, Portugal, Russia, Scotland, Spain, Sweden, Switzerland, the Netherlands, Union of South Africa, and the United States. They are outstandingly important commercially in Belgium, the lower Danube countries of Rumania, Yugoslavia, and Bulgaria, Denmark, England, France, Germany, Hungary, Ireland, Italy, Japan, Latvia, Portugal, Russia, Scotland, Spain, Switzerland, the Union of South Africa, and the United States.

Countries in which white wheat is of importance commercially are Australia, Belgium, China, Chile, Egypt, England, Estonia, India, Iraq, Japan, Lithuania, Mexico, Morocco, New Zealand, Poland, Scotland, Spain, the Netherlands, Union of South Africa, Tunis, and the United States. White wheat is also produced in small amounts in Algeria, Argentina, Bulgaria, Canada, Greece, Ireland, and Italy. The greatest production of white wheat is in India, with Australia second and the United States third. With the exception of Spain and China, for which statistics on class production are not available, all the other countries produce annually less than 25,000,000 bushels of white wheat.

Milling and Baking Factors

A study of the facts pertaining to milling and baking, compiled from the analysis of the world's wheat, shows that while milling quality, i. e., capability of producing a large quantity of high-grade flour from a minimum amount of wheat, is a factor in determining the relative standing of quality of wheat, it is the baking quality of the flours milled for light bread that sharply differentiates between the wheats.

Of the hard red spring wheats, the higher grades of Canadian wheat rank first in milling value. From a baking standpoint, however, the flours milled from the hard red spring wheats grown in the United States are equally as good. Russian spring wheats appear to be somewhat deficient in baking strength compared with those grown in North and South America.

Spring wheats grown in northern Europe, i. e., Norway, Sweden, Germany, Latvia, and Poland, while in most instances of good milling value, are somewhat deficient in baking strength. This is also true of the spring wheats grown in the Union of South Africa. Uruguay, on the other hand, produces spring wheat of very good baking strength.

Russia, Canada, and the United States produce the best quality of durum wheat. All other countries producing durum wheat, with but minor exceptions, have a product very noticeably deficient in baking strength.

From both a milling and a baking standpoint, the best quality of hard red winter wheat is produced in the United States. Hard red winter wheat grown in Argentina appears to be of lesser milling value than that grown in the United States. The baking quality of the flour milled from Argentine wheat, while not the equal of that milled from the hard red winter wheats of the United States, is fair. Flour milled from the Russian hard red winter wheats appears to be lacking in baking strength. The hard red winter wheats of Bulgaria and Hungary do not appear to be quite as strong as the Argentine wheats of similar classification.

Soft red winter wheats grown in the United States, while failing to meet the milling quality values of some of the wheats of the same class grown in other parts of the world, excelled in baking quality in every instance. Those produced in the United Kingdom, as well as in the greater part of continental Europe, are of average to above average milling quality, but are decidedly deficient in baking quality. Only in European Russia, Hungary and the lower Danube countries are soft red winter wheats to be found that have fair to average baking quality as well as average milling quality.

Quality of White Wheats

The milling quality of the white wheats grown in India, Australia, and the United States rank in the order named. From a baking standpoint, the flours milled from the white wheats produced in the United States and Australia are approximately of the same strength, while the baking strength of the flours milled from the white wheats of India is noticeably of lesser quality. Mexico, Russia, Poland, Chile, Morocco, and the Union of South Africa also produce white wheat of good baking strength. Those grown in all other parts of the world are much below average in this respect.

In the warm and dry areas of southern Europe and Asia and northern Africa, Poulard wheat (*Triticum turgidum*) is popular. Milling and baking tests made on this class of wheat on samples submitted from Egypt, Italy, Palestine, Portugal, and India gave results that were always below the average of any of the other classes of wheat studied.

D. A. Coleman,
Senior Marketing Specialist,
Bureau of Agricultural Economics.

WILD-FOWL Conservation Furthered by Regulation and Educational Methods

In one of the larger cities of Oklahoma last October, the guests at a "duck dinner," all of them prominent conservationists and sportsmen, ate heartily, conversed pleasantly the while on the relative gustatory merits of wild fowl, and yielded to the temptation to ask for second helpings. As one of the diners put it:

> After every plate had been cleaned and coffee had appeared, the stunning truth was told: the meat course of this "duck" dinner had been mud hen—nothing else, and the Department of Agriculture had been gloriously vindicated in its official announcement that the despised coot, properly prepared, is fit to eat.

minor exceptions, have a product very noticeably deficient in baking strength.

From both a milling and a baking standpoint, the best quality of hard red winter wheat is produced in the United States. Hard red winter wheat grown in Argentina appears to be of lesser milling value than that grown in the United States. The baking quality of the flour milled from Argentine wheat, while not the equal of that milled from the hard red winter wheats of the United States, is fair. Flour milled from the Russian hard red winter wheats appears to be lacking in baking strength. The hard red winter wheats of Bulgaria and Hungary do not appear to be quite as strong as the Argentine wheats of similar classification.

Soft red winter wheats grown in the United States, while failing to meet the milling quality values of some of the wheats of the same class grown in other parts of the world, excelled in baking quality in every instance. Those produced in the United Kingdom, as well as in the greater part of continental Europe, are of average to above average milling quality, but are decidedly deficient in baking quality. Only in European Russia, Hungary and the lower Danube countries are soft red winter wheats to be found that have fair to average baking quality as well as average milling quality.

Quality of White Wheats

The milling quality of the white wheats grown in India, Australia, and the United States rank in the order named. From a baking standpoint, the flours milled from the white wheats produced in the United States and Australia are approximately of the same strength, while the baking strength of the flours milled from the white wheats of India is noticeably of lesser quality. Mexico, Russia, Poland, Chile, Morocco, and the Union of South Africa also produce white wheat of good baking strength. Those grown in all other parts of the world are much below average in this respect.

In the warm and dry areas of southern Europe and Asia and northern Africa, Poulard wheat (*Triticum turgidum*) is popular. Milling and baking tests made on this class of wheat on samples submitted from Egypt, Italy, Palestine, Portugal, and India gave results that were always below the average of any of the other classes of wheat studied.

D. A. Coleman,
Senior Marketing Specialist,
Bureau of Agricultural Economics.

WILD-FOWL Conservation Furthered by Regulation and Educational Methods

In one of the larger cities of Oklahoma last October, the guests at a "duck dinner," all of them prominent conservationists and sportsmen, ate heartily, conversed pleasantly the while on the relative gustatory merits of wild fowl, and yielded to the temptation to ask for second helpings. As one of the diners put it:

> After every plate had been cleaned and coffee had appeared, the stunning truth was told: the meat course of this "duck" dinner had been mud hen—nothing else, and the Department of Agriculture had been gloriously vindicated in its official announcement that the despised coot, properly prepared, is fit to eat.

None of the guests had suspected that they were being experimented upon in the interests of science. When informed that they had been the victims of a "coot" dinner they decided that they were not victims at all, but converts to a delicious new viand.

Complaints from rice growers of the West that coots were damaging their fields had resulted in requests for permission to use extraordinary measures to reduce the numbers of these birds. Sportsmen also had charged that coots compete with wild ducks for food in some localities. Shooting coots out of season, removing protection entirely, and wholesale destroying by various methods, including poisoning, were suggested, many persons overlooking the fact that the coot is a game bird protected by the migratory-bird treaty, but that during open seasons it can be legitimately reduced in numbers by the hunters themselves. (Fig. 180.)

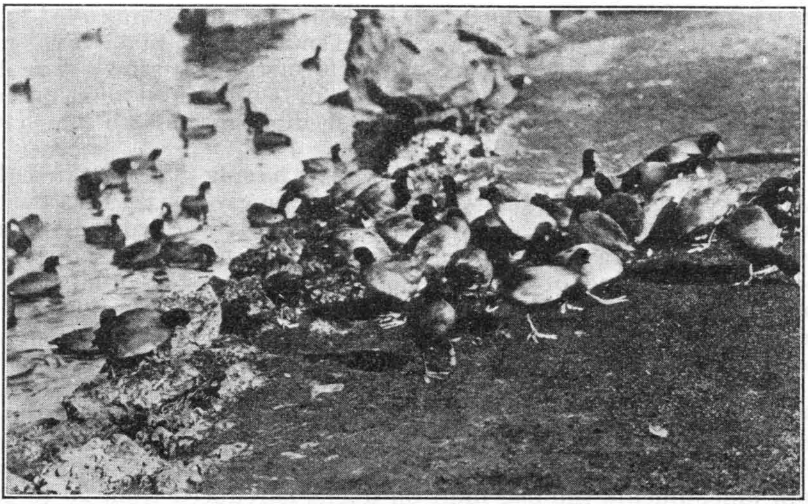


FIGURE 180.—Coots in Golden Gate Park, San Francisco, Calif. These birds are excellent eating, in spite of their name "mud hen." They are protected under the migratory-bird treaty act, and during the open season allowed for hunting, the bag limit is 25 a day

These grievances coming to the department led the Bureau of Biological Survey to issue a statement, showing that coots skinned and broiled are excellent eating, and that skinning is not difficult. It was pointed out also that in many localities where wild ducks are plentiful and are hunted by strangers, the lowly coot is prized for home consumption, and that visiting hunters with mistaken ideas on the edibility of game birds, and wanting only canvasbacks and the like, are precluded by their own prejudices from experiencing the delicious taste of coot. The coot was described as feeding more upon the green foliage of aquatic plants than do any of the wild ducks, and as consuming in addition such delicacies as the tubers of wildcelery and sago pondweed and the grain of wildrice; it was described as being in fact a cleaner feeder than many other birds prized as game. Sportsmen were urged to experiment and take the legal limit of coots a few times in the season, with the assurance that they would have something worth while from a gastronomic viewpoint, and at the same time would aid in reducing to proper proportions the numbers of this species, thus tending to eliminate complaints of damage. The experimental "duck" dinner in Oklahoma was one of the first to demonstrate that coot is as delectable as is claimed by the Biological Survey. The Federal open seasons on coots conform with those on ducks, geese, and brant for the various parts of the country, and the bag limit is 25 a day.

Methods of Conservation

Educational methods of conservation, including such experiments as the foregoing, which by encouraging the utilization of the abundant coot indirectly tend to spare some of the less numerous wild ducks, must naturally be supplemented by effective regulation, particularly in view of the increasingly adverse conditions confronting the wild fowl. Water regions frequented by the birds have been reduced by drought and drainage. The number of hunters is constantly on the increase. Modern transportation facilities, including improved highways, fast motor cars and boats, and even airplanes, make it easy for gunners to reach the regions where formerly waterfowl were unmolested. Furthermore the extension of agricultural development inevitably curtails the breeding and feeding grounds to which the birds have been accustomed to flock.

Recent studies by the Biological Survey having demonstrated that additional legal protection would have to be given wild fowl if they were to hold their own, all available safeguards were considered and recognized as three in number. Two of these could only be operative over a long period of years, namely, to increase the production of birds and to provide refuges for their use in resting and feeding during migration. The third, and the only one that would have immediately beneficial results, would be to restrict the annual kill by hunters.

Accordingly, at the end of December, 1929, the Bureau of Biological Survey recommended that a reduction be made in the bag limits allowed hunters, and the regulations were thereupon amended to take effect at the beginning of the fall hunting season of 1930. Under the new amendments the bag limit on ducks is reduced from 25 to 15 a day and on geese from 8 to 4 a day, and a possession limit of two days' bag is prescribed.

These changes may have little effect on the average hunter, but should lessen the aggregate kill on important winter concentration areas of the birds. In the event the measures already taken prove inadequate for the conservation of the wild fowl, the department is authorized to impose still further restraint upon hunting, possibly shortening the seasons, establishing rest days, restricting further the use of devices now allowed in taking the birds, and limiting the artificial methods employed to lure the birds within gunshot.

It is evident that if hunting as a sport is to continue, certain restrictions must be imposed on gunners. To effect the most satisfactory degree of conservation, the hunters should be good sportsmen and be willing to exercise personal restraint in shooting. Finally, conservationists generally must bring into play all possible educational measures, that the people of the country may be in possession of the facts on which conservation measures are based and in sympathy with efforts being made.

WILLIAM H. CHEESMAN,
Editor, Bureau of Biological Survey.

WILD-LIFE Protection Aided by Cooperation of U. S. Forest Service

Public interest in the country's wild life is growing with the recognition that in the present stage of our social, economic, and industrial development wild life can not shift for itself. The so-called balance of nature will no longer serve the needs of wild life. Public-resource aspects are receiving more and more thought.

Wild life, therefore, has become subject to human guidance and definite administration. There must be coordination of effort and meeting of minds, with emphasis on the premise that there is a definite, important, and permanent place in our American life and institutions for the wild-life resource. Conflicts in jurisdiction, where they tend to hinder progress, should give way to cooperation. Political considerations should have no place in the ultimate management of wild-life resources.

Any program of administration must consider and provide for the protection and development of existing wild life, the best methods of handling it, and the most efficient cooperation possible between Federal, State, and other agencies. Research is fundamental as in other forms of natural resource management. Its importance can not be overstressed in any practical development of wild-life programs.

Game Law Enforcement Necessary

Game laws, international, Federal, and State, constitute one of the important present factors in protection. Law enforcement must be stressed until public appreciation and cooperation, brought about through information and education, gradually reduce the necessity for special vigilance. The most important of Federal or international laws so far enacted are those to give effect to the migratory-bird treaty of August 16, 1916, between Great Britain and the United States. These laws, both of which are administered by the Bureau of Biological Survey, are the migratory-bird treaty act of 1918 and the migratory-bird conservation act of 1929. The former makes provision for hunting regulations and the latter provides for the establishment of refuges for waterfowl and other migratory game birds. Both Federal and State laws make provision for open and close seasons by species, for licenses, bag limits, interstate transportation, and for wild-life refuges. These laws become more specific as to species and localities as life history, distribution, economic status, and other studies are made and local conditions analyzed. (Fig. 181.)

The Forest Service personnel, through its opportunities for close observation and direct field contacts, and its interest in wild life as a forest resource, extends cooperation to States and other agencies in many ways. Forest officers hold appointments as nonsalaried wardens, record and report annually their first-hand observations, and make systematic and comprehensive game estimates. Progressive stock-taking is important and the information is widely used. Forest officers thus constitute a large auxiliary force of field men engaged in the study and protection of wild life. They are so recognized by the States and by the general public, and exert influence in building up respect for game laws and emphasizing the importance of wild life to the public. Some 30,000 hunting and fishing licenses were examined by forest officers in 1929. This activity is important in preventing possible game-law violations. In remote localities, where the public can not be satisfactorily served by other agencies, licenses are sold by the Forest Service for the States. Assistance is given in some localities in handling fur trapping on a sustained yield basis. Long-time fish-planting plans have been developed and assistance given

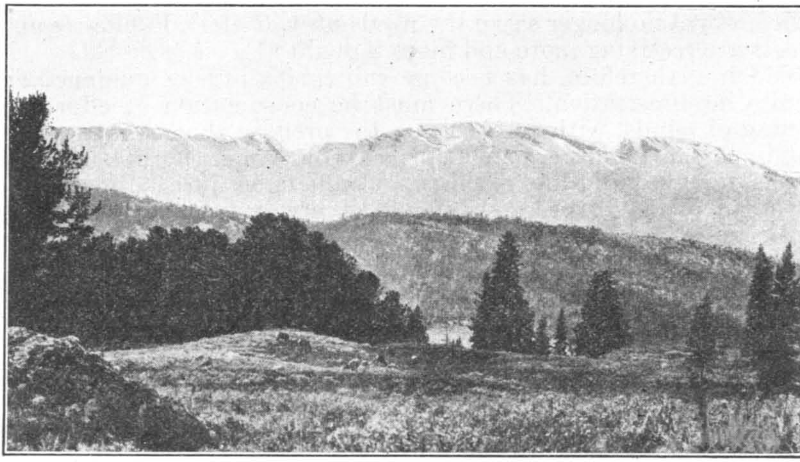


FIGURE 181.—Band of elk grazing on their native range, Wyoming National Forest, Wyo.

to State and Federal hatcheries in fish planting. Forest officers on the Colorado national forests planted 3,532,500 fish from Federal and State hatcheries in 1929.

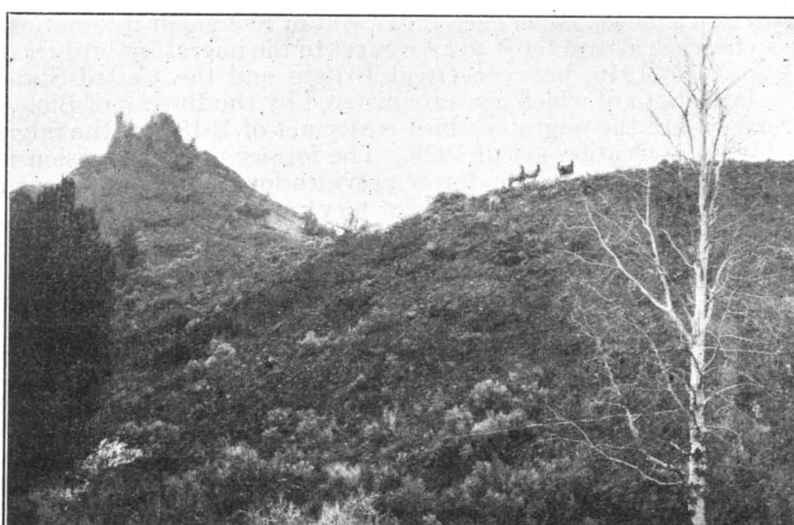


FIGURE 182.—Mountain sheep ranges, Shoshone National Forest, Wyo.

Wild-Life Sanctuaries Provided

State game refuges, totaling 19,652,580 acres, and Federal refuges, involving 1,386,955 acres, administered by the Forest Service, lie wholly within the national-forest boundaries. (Fig. 182.) In addition, 1,740,272 acreas at strategic places are under administrative restrictions for the protection of game. Such refuges provide special sanctuaries and protected breeding grounds. The national-forest areas furnish most of the remaining natural habitats of big-game animals in the western country during the summer months, though they comprise a comparatively small part of their winter range.

Satisfactory increases on the national forests are recorded in deer, elk, black and brown bears, beavers, and certain other fur bearers. Between the years 1924 and 1928, deer on the national forests showed an estimated increase of 25 per cent, elk about 69 per cent, and brown and black bears, 15 per cent. A considerable part of the elk increase has been due to transplants from surplus to depleted or "shot-out" areas. An important percentage of the present elk in Colorado, for instance, is the result of importations of 328 animals from 1913 to 1917, in which forest officers took an active part. Twenty-three hundred and eighty elk were estimated as a result of these plants at the close of 1928, and provision must now be made through hunting or other means to take care of the numbers represented by further natural increases.

Problems of Winter Range

Moose, mountain goats, and mountain sheep showed slight increases on the national forests in 1928 over 1924, but in the last two years there has been some falling off in the estimated number of mountain goats and a sharp decline in Colorado of mountain sheep. Special studies looking to the further protection and increase of mountain sheep are indicated.

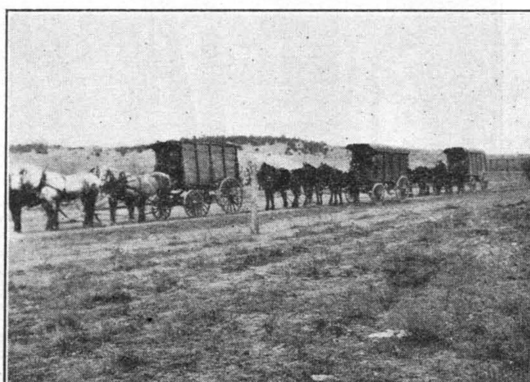


FIGURE 183.—Elk from Gardiner, Mont., being hauled from railroad station in ice wagons and transplanted on San Isabel National Forest, Colo., January 27, 1916

Protected winter ranges are of special importance to herbivorous game species, if material increases are to be expected. Such areas lie mostly outside the present national-forest boundaries. Most of the western country winter ranges are beginning to limit the numbers of forage-eating game animals that may be accommodated the yearlong. The balance between winter and summer ranges is becoming more and more a determining factor in the proper maintenance of big game. Summer capacities, except for local congested areas like the Kaibab National Forest in Arizona, will accommodate more than the present numbers without conflict with domestic livestock and other uses of the mountain pastures. Of first importance, therefore, is the segregation and protection of winter game ranges in proper locations to supplement present summer ranges. (Fig. 183.)

The Forest Service encourages the maintenance of proper feed and game balances by provisions for hunting the surplus or transplanting it to appropriate unstocked or understocked areas.

To achieve adequate protection of wild life and to provide for its maintenance and increase is a large task, because of the number of animals and vast areas of range involved. The responsibility for a constructive program must be shared alike by National, State, and other interested agencies.

JOHN H. HATTON,
Assistant Regional Forester, Forest Service.

WOODS on Farms Must Not Be Grazed If Good Timber Crop Is Wanted The farm woods, in order to serve in their highest capacity in supplying fuel wood, fence posts, and rough timbers for farm needs, should be given adequate protection. The use of the woodland as a dual-purpose area for timber production and grazing will prove a failure. With grazing animals excluded from the farm woods a first-class crop of timber may be developed which will well repay the owner.

FIGURE 184.—A grazed woods damaged by livestock. The soil is being packed and the roots trampled. No young seedling trees are coming in to renew the stand

Unrestricted grazing of farm woodlands in the hardwood regions of the Central and Eastern States has caused much damage to timber and soil. Comparatively little attention has been given to the effects of this practice, partly because of the almost unnoticeable damage to the woods over a short period of a year. Hence there is a tendency among woodland owners to consider the damage as a negligible factor. The cumulative effect, however, over a period of years is that the woods develop a degenerate condition. With continued pasturing there is a gradual changing over from the forest to open or prairie condition. In some cases this process brings poor land into pasture of low value. In other instances on good soils it causes the

To achieve adequate protection of wild life and to provide for its maintenance and increase is a large task, because of the number of animals and vast areas of range involved. The responsibility for a constructive program must be shared alike by National, State, and other interested agencies.

John H. Hatton,
Assistant Regional Forester, Forest Service.

WOODS on Farms Must Not Be Grazed If Good Timber Crop Is Wanted The farm woods, in order to serve in their highest capacity in supplying fuel wood, fence posts, and rough timbers for farm needs, should be given adequate protection. The use of the woodland as a dual-purpose area for timber production and grazing will prove a failure. With grazing animals excluded from the farm woods a first-class crop of timber may be developed which will well repay the owner.

FIGURE 184.—A grazed woods damaged by livestock. The soil is being packed and the roots trampled. No young seedling trees are coming in to renew the stand

Unrestricted grazing of farm woodlands in the hardwood regions of the Central and Eastern States has caused much damage to timber and soil. Comparatively little attention has been given to the effects of this practice, partly because of the almost unnoticeable damage to the woods over a short period of a year. Hence there is a tendency among woodland owners to consider the damage as a negligible factor. The cumulative effect, however, over a period of years is that the woods develop a degenerate condition. With continued pasturing there is a gradual changing over from the forest to open or prairie condition. In some cases this process brings poor land into pasture of low value. In other instances on good soils it causes the demolition of the farm woods even though they may be needed as a part of the farm and may be considered as an asset to the place.

Comparatively little attention has been given to this practice, but what has been done, together with extended observation, shows that farm woods grazed continually hold little promise for profitable timber growing. One of the most noticeable factors in a grazed woods is the absence of young seedling and sapling trees. There is little chance for the woodland to perpetuate itself with young trees, as they are either browsed off, defoliated, or trampled down. Studies conducted by the Forest Service show that some of the more valuable species of trees are palatable to livestock, especially when they are either seedlings or very young trees. Such trees as white ash, sugar maple, tulip poplar, elm, basswood, white oak, red oak, and shellbark

FIGURE 185.—A rapidly growing farm woods protected from grazing animals. Valuable young growth is filling in the openings

hickory appear to be relished under most conditions. With somewhat less frequency, the following species are browsed: Butternut, honey locust, black gum, black oak, shagbark hickory, scarlet oak, sycamore, and chestnut. In contrast to these species browsed under most conditions are a number of trees which are seldom eaten even during heavy grazing. Among these are blackjack oak, hawthorn, black cherry, dogwood, ironwood, red gum, pawpaw, and persimmon. Consequently grazing encourages the growth of the "weed trees" in the last group and leaves them to fill in the openings that should be occupied by the species in the former group that have a higher commercial value.

Soil Compacted by Trampling

Another damage resulting from grazing is the compacting of the soil by constant trampling of livestock in going through the woods. Forest soil in a natural state is loose and well covered with a leaf mold or mulch which is an essential factor for growth and for retaining moisture in the soil. When this covering is disturbed by trampling and the soil exposed through animals devouring a large portion of the young growth, the soil becomes sun-baked, packed, dry, and unfavorable to natural restocking. Constant trampling and rubbing exposes and injures tree roots, and allows them to dry out. This process is reflected in the poorer quality of timber and wood products and eventually brings on a weakened condition in the older trees, accompanied in some cases with stag-headedness and subsequent death. It is obvious that if grazing is permitted to the point of destruction of the young trees, with some loss among the larger ones, the resulting stand becomes unattractive from a timber buyer's point of view. A farm woods dwindling in timber value is a direct loss to the owner. Timber, like a corn or potato crop, needs some attention, and both are similar in that they need protection from livestock. In the case of timber the returns are deferred because of a longer period required to reach merchantable size, but if managed properly, the woods can be made to produce an income besides meeting, in a large measure, the timber requirements for home needs.

The exclusion of livestock by fencing off the farm woods is necessary for best timber production. If the woods are now a part of the pasture, a good plan for developing both phases would be to fence off the heavier timbered areas, leaving the lightly wooded portion in the pasture. This would provide shade and protection for livestock during the hot summer months and insure better and more profitable timber-growing conditions.

W. K. WILLIAMS,
Extension Forester, Office of Cooperative Extension Work.

WOOL Growth Increased by Supplemental Feeding of Sheep on the Range An experiment conducted for the last three years at the United States Sheep Experiment Station, Dubois, Idaho, has resulted in valuable information on the effects of supplemental feeding on the growth of wool. Two groups each consisting of 10 Corriedale ewes were selected, the ewes being as nearly uniform as possible in every respect. Extreme care was exercised in the selection of the ewes assigned to each group to be certain that they were strictly representative and to be assured that the results obtained would be reliable. The ewes were inspected individually in detail, and pedigrees were carefully studied to be certain that ewes in each group would be as much alike as possible in inheritance as well as in individual characteristics.

The ewes in one of these groups were handled under strictly range conditions and received only such feed and care as are ordinarily furnished to range ewes by practical wool growers. During periods of extreme cold they received a limited amount of concentrated feed to supplement range forage; and when the depth of the snow became too great to permit them to graze, they were fed slightly more than a maintenance ration of alfalfa hay. The ewes of the other group received additional feed from November 1 to March 15 and were purposely maintained in better condition during this period than the ewes which were handled entirely in accordance with common range practices. The procedure mentioned was carried out for three successive years.

ture in the soil. When this covering is disturbed by trampling and the soil exposed through animals devouring a large portion of the young growth, the soil becomes sun-baked, packed, dry, and unfavorable to natural restocking. Constant trampling and rubbing exposes and injures tree roots, and allows them to dry out. This process is reflected in the poorer quality of timber and wood products and eventually brings on a weakened condition in the older trees, accompanied in some cases with stag-headedness and subsequent death. It is obvious that if grazing is permitted to the point of destruction of the young trees, with some loss among the larger ones, the resulting stand becomes unattractive from a timber buyer's point of view. A farm woods dwindling in timber value is a direct loss to the owner. Timber, like a corn or potato crop, needs some attention, and both are similar in that they need protection from livestock. In the case of timber the returns are deferred because of a longer period required to reach merchantable size, but if managed properly, the woods can be made to produce an income besides meeting, in a large measure, the timber requirements for home needs.

The exclusion of livestock by fencing off the farm woods is necessary for best timber production. If the woods are now a part of the pasture, a good plan for developing both phases would be to fence off the heavier timbered areas, leaving the lightly wooded portion in the pasture. This would provide shade and protection for livestock during the hot summer months and insure better and more profitable timber-growing conditions.

W. K. Williams,
Extension Forester, Office of Cooperative Extension Work.

WOOL Growth Increased by Supplemental Feeding of Sheep on the Range

An experiment conducted for the last three years at the United States Sheep Experiment Station, Dubois, Idaho, has resulted in valuable information on the effects of supplemental feeding on the growth of wool. Two groups each consisting of 10 Corriedale ewes were selected, the ewes being as nearly uniform as possible in every respect. Extreme care was exercised in the selection of the ewes assigned to each group to be certain that they were strictly representative and to be assured that the results obtained would be reliable. The ewes were inspected individually in detail, and pedigrees were carefully studied to be certain that ewes in each group would be as much alike as possible in inheritance as well as in individual characteristics.

The ewes in one of these groups were handled under strictly range conditions and received only such feed and care as are ordinarily furnished to range ewes by practical wool growers. During periods of extreme cold they received a limited amount of concentrated feed to supplement range forage; and when the depth of the snow became too great to permit them to graze, they were fed slightly more than a maintenance ration of alfalfa hay. The ewes of the other group received additional feed from November 1 to March 15 and were purposely maintained in better condition during this period than the ewes which were handled entirely in accordance with common range practices. The procedure mentioned was carried out for three successive years.

Individual body weights were obtained for all the ewes at 56-day intervals. The ewes which received additional feed were about 7 per cent heavier on an average than the ewes which were handled under ordinary range conditions.

Measurements at 56-Day Intervals

Representative wool samples were taken for length measurements at 56-day intervals. These samples were obtained from every sheep in both groups on the same day. The technic and all the methods used were uniformly followed during the entire 3-year period. Although relatively small numbers of sheep were used in this test, the results are considered reasonably reliable owing to the very careful manner in which the work was performed.

The rate of wool growth was slower during the winter and early spring than in the summer when the sheep had access to abundant palatable and nutritious range forage in the mountains. Measurements of wool growth taken on both lots of ewes in September indicated that they had been producing wool at the rate of about one-half inch a month. In this 3-year experiment, the wool from the group of sheep which received additional feed in the winter was from 9 to 14 per cent longer during the periods of the least wool growth than was that of the other group.

These results indicate that the condition in which sheep are maintained has an important bearing on the rate of wool growth. The wool made its greatest growth during the summer months when these sheep had access to abundant feed and were gaining rapidly. The sheep which received additional feed during the winter were maintained in better condition and produced wool of greater length than the sheep handled under ordinary range conditions.

J. I. Hardy, *Senior Animal Fiber Technologist,*
W. A. Denecke, *Associate Animal Husbandman,*
Bureau of Animal Industry.

WOOL-PRICE Trend Reflects World-Wide Business Depression Wool producers of the United States have been confronted with falling prices for their product throughout most of the past two years. From the high point reached in the summer of 1928 domestic wool prices have fallen about 40 per cent. Present low wool prices constitute a very serious problem for wool growers. If sheep and wool prices are to remain low there are undoubtedly many producers who will want to go out of the wool-growing business. On the other hand, if it could be determined that wool prices would improve in the reasonably near future, many, who otherwise would become discouraged and liquidate while prices remain low, would manage to continue in the business. The key to the future trend of wool prices is to be seen in the fundamental conditions which brought about the low prices.

Conditions underlying the important trends in wool prices are world wide. The United States is now the second largest wool-producing country, but it produces considerably less than half as much wool as Australia, and only a little over one-tenth of the total world production. The United States consumes about one-fifth of the world's wool

Individual body weights were obtained for all the ewes at 56-day intervals. The ewes which received additional feed were about 7 per cent heavier on an average than the ewes which were handled under ordinary range conditions.

Measurements at 56-Day Intervals

Representative wool samples were taken for length measurements at 56-day intervals. These samples were obtained from every sheep in both groups on the same day. The technic and all the methods used were uniformly followed during the entire 3-year period. Although relatively small numbers of sheep were used in this test, the results are considered reasonably reliable owing to the very careful manner in which the work was performed.

The rate of wool growth was slower during the winter and early spring than in the summer when the sheep had access to abundant palatable and nutritious range forage in the mountains. Measurements of wool growth taken on both lots of ewes in September indicated that they had been producing wool at the rate of about one-half inch a month. In this 3-year experiment, the wool from the group of sheep which received additional feed in the winter was from 9 to 14 per cent longer during the periods of the least wool growth than was that of the other group.

These results indicate that the condition in which sheep are maintained has an important bearing on the rate of wool growth. The wool made its greatest growth during the summer months when these sheep had access to abundant feed and were gaining rapidly. The sheep which received additional feed during the winter were maintained in better condition and produced wool of greater length than the sheep handled under ordinary range conditions.

J. I. Hardy, *Senior Animal Fiber Technologist,*
W. A. Denecke, *Associate Animal Husbandman,*
Bureau of Animal Industry.

WOOL-PRICE Trend Reflects World-Wide Business Depression

Wool producers of the United States have been confronted with falling prices for their product throughout most of the past two years. From the high point reached in the summer of 1928 domestic wool prices have fallen about 40 per cent. Present low wool prices constitute a very serious problem for wool growers. If sheep and wool prices are to remain low there are undoubtedly many producers who will want to go out of the wool-growing business. On the other hand, if it could be determined that wool prices would improve in the reasonably near future, many, who otherwise would become discouraged and liquidate while prices remain low, would manage to continue in the business. The key to the future trend of wool prices is to be seen in the fundamental conditions which brought about the low prices.

Conditions underlying the important trends in wool prices are world wide. The United States is now the second largest wool-producing country, but it produces considerably less than half as much wool as Australia, and only a little over one-tenth of the total world production. The United States consumes about one-fifth of the world's wool clip. It is, therefore, one of several countries that greatly influences world wool supply, demand and price conditions, but that individually does not dominate the world wool situation. On the other hand, this country can, and does, separate itself to some extent from the world level of wool prices by a tariff on wool. The United States has never produced enough wool to satisfy its own consumption requirements. On the whole, this country consumes about twice as much wool as it produces. It is necessary, however, to distinguish between carpet wools, all of which are imported, and combing and clothing wools. This country produces slightly over three-fourths of the combing and clothing wools that it consumes. Domestic production more nearly satisfies the domestic requirements for fine than for medium grades of combing and clothing wools, but some fine wools as well as medium wools are imported. These import requirements serve to make the

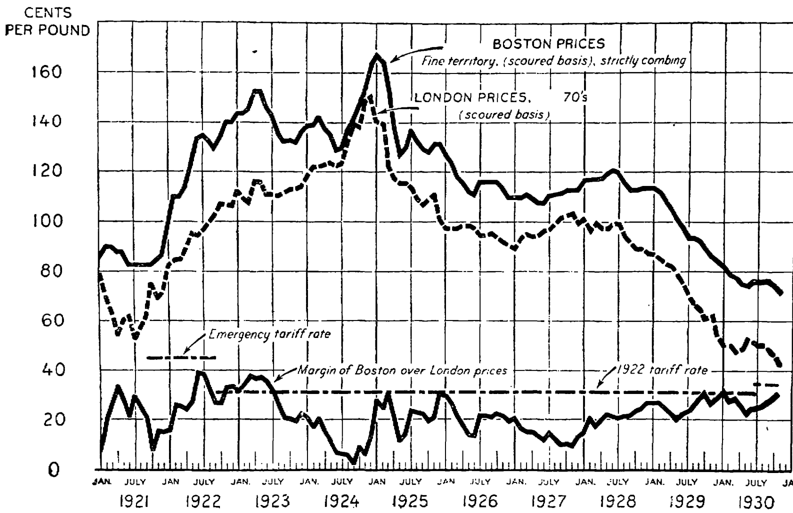


FIGURE 186.—Increased production caused world wool prices to trend downward for several years. In 1929 and 1930 a falling off in demand, due to the world business depression, caused further price declines. The major trends in wool prices in the United States are similar to those abroad, but the margin of domestic over foreign prices depends upon the supply of wool available in the United States and the strength of domestic demand. This country produces nearly all the fine wool it requires, so that prices on these grades follow very closely the trends abroad

tariff on wool effective. The tariff tends to hold domestic wool prices farther above foreign prices than they would be without the tariff. Differences between foreign and domestic wool prices are not uniform. They vary with the domestic supply and demand situations and the short-time trends of prices. At times domestic prices fall nearly to the world level, at other times they rise above the world level sufficiently to attract large imports. One effect of the tariff seems to be to retard the influence that changes in foreign prices have on domestic prices. Nevertheless, the major trends in both domestic and foreign wool prices are similar, although the domestic prices are higher.

Rapid Rise After Postwar Slump

Following the postwar deflation of 1920 and 1921 and its accompanying depression, wool prices rose rapidly and attained a high level in 1923. (Figs. 186 and 187.) Foreign prices continued gradually upward until the middle of 1924 and then rose sharply to a peak in the latter part of the year. Business conditions became unfavorable in the United States in 1924 and had an adverse effect on the demand for wool. This caused domestic prices to decline somewhat in the first part of the year and the sharp rise abroad the latter part of the year was only slowly reflected in the American market. As demand improved, however, the margin of domestic over foreign prices increased.

Wool prices were unusually high in 1923 and 1924, and, although they had a downward trend after 1924, they were still comparatively high through 1928. It was after 1928 that the purchasing power of wool became unusually low. The generally high level of prices from 1923 to 1928 caused production to increase. The wool clip of the United States rose from 222,000,000 pounds in 1922 to 304,000,000 pounds in 1928 and to 328,000,000 pounds in 1930. The total world production, excluding that of Russia and China, rose from 2,566,000,000 pounds in

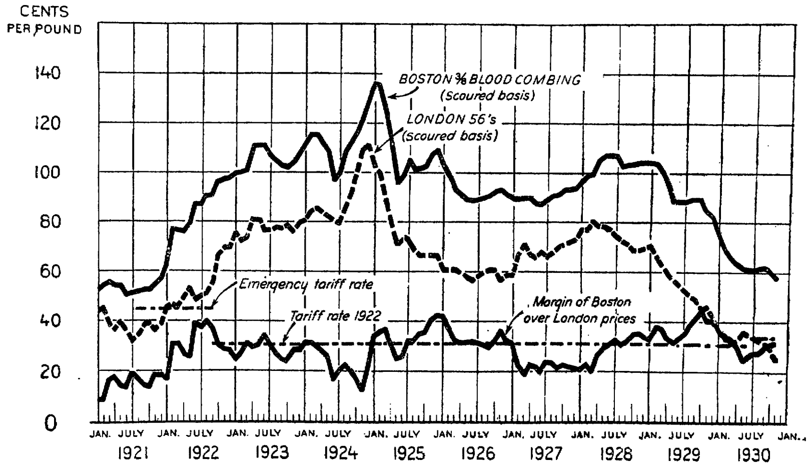


FIGURE 187.—Relatively small supplies of medium grades of wool caused prices on these grades to hold steady in the United States during most of 1929 despite declines abroad. Much of this firmness was subsequently lost. In the present depression, wool prices in the United States have been maintained at a wider margin above the world level than in previous periods of low consumer demand

1923 to the record of 3,232,000,000 pounds in 1928. Since 1928 world production has held at only a little below the record level. The trends of prices and production for the period since 1922 correspond to the trends for earlier periods of somewhat similar length. In the earlier periods, as in the present one, high prices first caused production to increase, then increased production caused prices to decline, and subsequently low prices checked the expansion in production. Finally, in the earlier periods, very low prices necessitated liquidations and restricted expenditures and made alternative enterprises relatively more profitable. As sheep numbers were reduced and the downward phase of the wool production cycle got under way, prices tended to improve gradually. So far in the present cycle, wool production has not been materially reduced, but there can be no doubt that present prices will cause producers in many parts of the world to liquidate their sheep enterprises, and practically all producers will be forced to restrict expenditures. Many producers will market breeding stock where they can do so at acceptable prices.

Influence of World Depression

The fall in wool prices that has taken place in the last two years was caused only in part by production. In large part it was caused by the world business depression and reduced consumer buying power and the accompanying decline in general commodity prices. A smaller world wool clip in 1927 and favorable demand conditions abroad had caused foreign prices to rise in 1927, but they started down early in 1928. In 1927 demand in the United States was rather weak and domestic prices were slow to reflect the rise abroad, but as domestic demand improved domestic prices strengthened. Except for a few short periods wool prices abroad have been falling steadily since the early part of 1928. Domestic prices fell more slowly and the margin of domestic over foreign prices became very wide. This wide margin reflected the strong demand in the United States until the fall of 1929 when the depression got under way in the United States. Supplies of medium wools in this country were short and prices on them were comparatively strong. With the development of the depression the American market weakened, and consumption and imports declined. It is worthy of note, however, that the margin of domestic over foreign prices has been maintained at as high a level as it has been despite severe depression in the United States and large supplies of the domestic clip coming rapidly on the market. In comparable earlier periods the margin was very small. Quite clearly this new development reflects the price stabilizing activities that have been conducted.

The first series of the 1931 London wool sales opened in January with further sharp declines in prices. Continued declines in general commodity price levels in important countries throughout 1930 reflected the generally unsatisfactory business conditions, and the declines in wool prices reflected the difficulty that world markets had in taking another large wool clip in the face of continued low consumer demand. With foreign wool prices materially lower than American prices, however, foreign producers who have costs at all comparable with those in the United States fare even worse than do American producers. In the past, low returns have ultimately brought a reduction in world sheep numbers. On the other hand, world business recovery, when it comes, can be expected to br ng a considerable improvement in the demand for wool.

Lawrence Myers,
*Senior Agricultural Economist,
Bureau of Agricultural Economics.*

DEPARTMENT PUBLICATIONS

List of new Farmers' Bulletins, Leaflets, Technical Bulletins, Circulars, Statistical Bulletins, Miscellaneous Publications, Reports, Soil Surveys, and other numbered and unnumbered publications issued from January 1, 1930, to December 31, 1930, classified by general subject matter.

[These different types of publications are indicated by the letters preceding each serial number]

Birds and Game:

- Laws and Regulations Relating to Game, Land Fur-Bearing Animals, and Birds in Alaska — Alaska G. C. Cir. 7
- Calculating Waterfowl Abundance on the Basis of Banding Returns — Cir. 118
- Propagation of Aquatic Game Birds — F. B. 1612
- Propagation of Upland Game Birds — F. B. 1613
- Game Laws for the Season 1930–31: A Summary of Federal, State and Provincial Statutes — F. B. 1647
- Directory of Officials and Organizations Concerned with the Protection of Birds and Game — M. P. 92

Clothing and Fabrics:

- Window Curtaining — F. B. 1633
- Ensembles for Sunny Days — Leaf. 63
- Bibliography on the Relation of Clothing to Health — M. P. 62
- An Annotated List of Literature References on Garment Sizes and Body Measurements — M. P. 78

Fires and Fire Protection:

- Fire Safeguards for the Farm — F. B. 1643
- Fires on Farms — Leaf. 44
- Glossary of Terms Used in Fire Control — M. P. 70
- The Determination of Hour Control for Adequate Fire Protection in the Major Cover Types of the California Pine Region — T. B. 209

Food and Diet:

- Market Classes and Grades of Dressed Veal and Calf Carcasses — Cir. 103
- Development and Use of Baking Powder and Baking Chemicals — Cir. 138
- Rabbit Recipes — Leaf. 66
- Beef Grading and Stamping Service — Leaf. 67

Forestry and Lumbering:

- Forest Nursery and Planting Practice in the California Pine Region — Cir. 92
- Knotty Lumber for Boxes — Cir. 105
- Specific Gravity and Baumé Gravity Tables for Turpentine — Cir. 110
- Growing Trees for Forest Planting in Montana and Idaho — Cir. 120
- Rate of Growth of Second-Growth Southern Pines in Full Stands — Cir. 124
- Experiments in the Use of Fertilizers in Growing Forest Planting Material at the Savenac Nursery — Cir. 125
- Effectiveness of Moisture-Excluding Coatings on Wood — Cir. 128
- Utilization of Black Locust — Cir. 131
- Suggestions for the Management of Spruce Stands in the Northwest — Cir. 134
- Growing Black Locust Trees — F. B. 1628
- Small Trees Wasteful to Cut for Saw Timber — Leaf. 55
- Preventing Cracks in New Wood Floors — Leaf. 56
- Pulpwood Crops in the Northeast — Leaf. 57
- Making a Model to Show Forests Prevent Erosion — Leaf. 58
- Why Some Wood Surfaces Hold Paint Longer than Others — Leaf. 62
- Pocket Guide to Alaska Trees — M. P. 55
- Forest Plantations at Biltmore, N. C — M. P. 61
- How the National Forests of California Benefit the State — M. P. 82
- Profits from Farm Woods — M. P. 87
- Forest and Range Resources of Utah: Their Protection and Use — M. P. 90
- Properties of Western Hemlock and Their Relation to Uses of the Wood — T. B. 139
- Quaking Aspen: A Study in Applied Forest Pathology — T. B. 155
- Investigations in Weed Control by Zinc Sulphate and Other Chemicals at the Savenac Forest Nursery — T. B. 156
- Comparative Strength Properties of Woods Grown in the United States — T. B. 158
- Selective Logging in the Northern Hardwoods of the Lake States — T. B. 164
- The Kiln Drying of Southern Yellow Pine Lumber — T. B. 165
- Timber Growing and Logging Practice in the Northeast — T. B. 166
- Tests of Large Timber Columns and Presentation of the Forest Products Laboratory Column Formula — T. B. 167
- The Application of Silviculture in Controlling the Specific Gravity of Wood — T. B. 168
- Principles of Box and Crate Construction — T. B. 171
- The Air Seasoning of Wood — T. B. 174
- Clubroot of Crucifers — T. B. 181
- The Production, Extraction, and Germination of Lodgepole Pine Seed — T. B. 191
- The Yield of Douglas Fir in the Pacific Northwest — T. B. 201
- Timber Growing and Logging and Turpentining Practices in the Southern Pine Region — T. B. 204
- Gluing Wood in Aircraft Manufacture — T. B. 205
- Directory, Forest Service (April, 1930) — Unnumbered.

Fruit Crops:

- Subsoil an Important Factor in the Growth of Apple Trees in the Ozarks — Cir. 95
- The Wonderful Variety of Pomegranate: Composition, Commercial Maturity, and By-products — Cir. 98
- Citrus Culture in Porto Rico — Porto Rico Bul. 33
- Testing Phylloxera-Resistant Grape Stocks in the Vinifera Regions of the United States — T. B. 146
- The Frozen-Pack Method of Preserving Berries in the Pacific Northwest — T. B. 148
- Inheritance of Composition of Washington Navel Oranges of Various Strains Propagated as Bud Variants — T. B. 163
- Origin and Distribution of the Commercial Strawberry Crop — T. B. 180
- Experiments on the Processing and Storing of Deglet Noor Dates in California — T. B. 193
- The Canning Quality of Certain Commercially Important Eastern Peaches — T. B. 196

Fur Animals:		
The Normal Breeding Season and Gestation Period of Martens	Cir.	107
Fur Laws for the Season 1930–31	F. B.	1648
Hints on Wolf and Coyote Trapping	Leaf.	59
Outlines for Studies of Mammalian Life Histories	M. P.	86
Grain Crops:		
Relation of Dust Fungicides to Flow of Small Grains Through Drills and to Drill Injury	Cir.	119
Grain Drying at a Country Elevator	Cir.	127
Hardiness and Yield of Winter-Wheat Varieties	Cir.	141
Oats in the Western Half of the United States	F. B.	1611
Varieties of Hard Red Spring Wheat	F. B.	1621
Farm Bulk Storage for Small Grains	F. B.	1636
Fall-Sown Oat Production	F. B.	1640
Flaxseed Production by Power Farming Methods in the Northern Great Plains	F. B.	1650
The World Wheat Outlook, 1930, and Facts That Farmers Should Consider	M. P.	95
Corn Statistics, Year Ended December 31, 1928, with Comparable Data for Earlier Years	S. B.	28
Statistics of Oats, Barley, and Grain Sorghums, Year Ended December 31, 1928, with Comparable Data for Earlier Years	S. B.	29
Flax Cropping in Mixture With Wheat, Oats, and Barley	T. B.	133
Field Studies on the Rust Resistance of Oat Varieties	T. B.	143
Milling and Baking Qualities of World Wheats	T. B.	197
Trading in Corn Futures	T. B.	199
Horticulture:		
Permanent Fruit and Vegetable Gardens	F. B.	1242, rev.
Horticultural Exhibitions	M. P.	85
Daffodils	Cir.	122
Experiments with Hot-Water Treatment of Daffodils in Relation to Forcing and Field Culture	Cir.	113
The City Home Garden	F. B.	1044, rev.
The Production of Hyacinth Bulbs	Cir.	112
The Production of Lily Bulbs	Cir.	102
Herbaceous Perennials	F. B.	1381, rev.
Insect Pests:		
Parasitism of the Mediterranean Fruit Fly in Hawaii, 1922–1924	Cir.	109, corrected edition.
Tree Hoppers and Their Control in the Orchards of the Pacific Northwest	Cir.	106
Parasitism of the Mediterranean Fruit Fly in Hawaii, 1922–1924	Cir.	109
Calcium-Arsenate Dusting as a Cause of Aphid Infestation	Cir.	116
The Asiatic Beetle, a Serious Pest in Lawns	Cir.	117
A Comparative Study of Dusting by Means of Airplane and Ground Machine for the Control of the Blueberry Maggot	Cir.	123
Traps for the Japanese Beetle	Cir.	130
Fighting the Corn Borer With Machinery in the Two-Generation Area	Cir.	132
Tiphia popilliavora Rohwer, a Parasite of the Japanese Beetle	Cir.	145
The Gipsy Moth and the Brown-Tail Moth	F. B.	1623
The Mexican Bean Beetle in the East and its Control	F. B.	1624
Tick Fever	F. B.	1625
The Hessian Fly and How Losses from it Can Be Avoided	F. B.	1627
An Annotated List of the Important North American Forest Insects	M. P.	74
The Western Grass-Stem Sawfly a Pest of Small Grains	T. B.	157
Life History, Habits, and Control of the Mormon Cricket	T. B.	161
The Bluegrass Webworm	T. B.	173
The Citrus Rust-Mite and Its Control	T. B.	176
Life History of the Oriental Peach Moth at Riverton, N. J., in Relation to Temperature	T. B.	183
Life History and Habits of the Plum Curculio in the Georgia Peach Belt	T. B.	188
A Study of the Lesser Migratory Grasshopper	T. B.	190
Control of the Mountain Pine Beetle in Lodgepole Pine by the Use of Solar Heat	T. B.	195
Relative Insecticidal Value of Commercial Grades of Pyrethrum	T. B.	198
A Biological Study of the *Trichogramma minutum* Riley as An Egg Parasite of the Oriental Fruit Moth	T. B.	215
Irrigation:		
Irrigation Practices in Growing Alfalfa	F. B.	1630
Surface Irrigation in the Eastern States	F. B.	1635
Flow of Water in Drainage Channels: The Results of Experiments to Determine the Roughness Coefficient *n* in Kutter's Formula	T. B.	129
The Flow of Water in Riveted Steel and Analogous Pipes	T. B.	150
Commercial Irrigation Companies	T. B.	177
Erosion and Silting of Dredged Drainage Ditches	T. B.	184
Irrigation Requirements of the Arid and Semiarid Lands of the Southwest	T. B.	185
Economic Status of Drainage Districts in the South in 1926	T. B.	194
Irrigation Requirements of the Arid and Semiarid Lands of the Columbia River Basin	T. B.	200
Effect of Irrigation Water on Vigor and Vitality of Seed Potatoes	T. B.	216
Livestock and Dairying:		
A Business Analysis of the Producers Live Stock Commission Association of National Stock Yards, Ill	Cir.	86
Equipment for City Milk Plants	Cir.	99
Johne's Disease (Paratuberculosis) of Livestock	Cir.	104
Foaming of Milk and Cream	Cir.	108
Within the Breed the Big Dairy Cows Excel	Cir.	114
Handling Livestock During Drought	Cir.	140
Feeding Dairy Cows	F. B.	1626
Karakul Sheep	F. B.	1632
Economic Benefits of Eradicating Tuberculosis from Livestock	M. P.	66
The 1929 Outbreak of Foot-and-Mouth Disease in Southern California	M. P.	68
Anthelmintics for the Removal of Thorn-Headed Worms from Swine	M. P.	79
Recommendations of the Bureau of Animal Industry on Problems of Livestock Production	M. P.	81
Feeding Wheat to Livestock	M. P.	96
Effect of Milk-Plant Arrangement and Methods of Operation on Labor Requirements	T. B.	153
Wintering Steers in the North Central Great Plains Section	T. B.	192
Beef Production From Purebred Grade and Native Calves	T. B.	203
Beef From Calves Fed Grain before and after Weaning	T. B.	208

Marketing and Cooperation:

Cooperative Marketing and Purchasing, 1920–1930	Cir.	121
Roadside Markets	Leaf.	68
Car-lot Shipments of Fruits and Vegetables from Stations in the United States for the Calendar Years 1926 and 1927	S. B.	27
Car-lot Shipments and Unloads of Important Fruits and Vegetables for the Calendar Years 1927 and 1928	S. B.	30
Wheat Futures: Volume of Trading, Open Commitments, and Prices from January 3, 1921, to December 31, 1929	S. B.	31
Cooperative Marketing of Fluid Milk	T. B.	179

Miscellaneous:

The Gehl Laboratory Rice-Scouring Device	Cir.	136
Chemistry and Analysis of the Permitted Coal-tar Food Dyes Ponceau SX, Sunset Yellow FCF, and Brilliant Blue FCF	D. B. 1390, Suppl.	1
Rural Buildings for Business and Social Uses	F. B.	1622
Construction of Chimneys and Fireplaces	F. B.	1649
Porcupine Control in the Western States	Leaf.	60
English-Sparrow Control	Leaf.	61
Preservation of Leather Bookbindings	Leaf.	69
Home Mixing of Fertilizers	Leaf.	70
Directory of Field Activities of the Bureau of Plant Industry	M. P.	64
List of Bulletins of the Agricultural Experiment Stations for the Calendar Years 1927 and 1928	M. P.	65
Workers in Subjects Pertaining to Agriculture in State Agricultural Colleges and Experiment Stations	M. P.	67
Construction of a Sled-Type Cornstalk Shaver	M. P.	69
Weather Forecasting from Synoptic Charts	M. P.	71
Lantern Slides and Film Strips of the United States Department of Agriculture	M. P.	72
Methods of Testing the Capacity of Fruit and Vegetable Containers under the United States Standard Containers Act	M. P.	75
The Results of Physical Tests of Road-Building Rock	M. P.	76
Summary of State and Territorial Plant Quarantines Affecting Interstate Shipments	M. P.	80
Directory of Field Activities of the Bureau of Entomology	M. P.	83
A Bibliography of the History of Agriculture in the United States	M. P.	84
The United States Department of Agriculture: Its Growth, Structure, and Functions	M. P.	88
Classified List of Projects of the Agricultural Experiment Stations, 1930	M. P.	89
Film Strips of the United States Department of Agriculture	M. P.	91
List of Technical Workers in the Department of Agriculture, and Outline of Department Functions, 1930	M. P.	93
Land Utilization and the Farm Problem	M. P.	97
List and Analytical Index of Publications of the Porto Rico Agricultural Experiment Station. (July, 1900 to March, 1930.)	Porto Rico Cir.	21
The Habits and Economic Importance of Alligators	T. B.	147
Fungous Diseases of the Honeybee	T. B.	149
Agricultural Survey of Europe: Hungary	T. B.	160
Tests of Various Aliphatic Compounds as Fumigants	T. B.	162
The Wearing Quality and Other Properties of Vegetable-Tanned and of Chrome-Retanned Sole Leather	T. B.	169
Taxation of Farm Property	T. B.	172
Ventilation of Farm Barns	T. B.	187
Toxic Effect of St. Johnswort (*Hypericum perforatum*) on Cattle and Sheep	T. B.	202
Mountain-Laurel (*Kalmia latifolia*) and Sheep Laurel (*Kalmia augustifolia*) as Stock-Poisoning Plants	T. B.	219

Plant Diseases:

The Sugar-Beet Leaf-Spot Disease and its Control by Direct Measures	Cir.	115
Methods of Eradicating Buckthorn (Rhamnus) Susceptible to Crown Rust (*Puccinia coronata*) of Oats	Cir.	133
Blemishes and Discoloration of Market Onions	Cir.	135
The Spread of Cranberry False Blossom in the United States	Cir.	147
Chestnut Blight	F. B.	1641
Seed Treatment Reduces Loss from Plant Diseases	M. P.	94
The Bacterial Blight of Beans Caused by *Bacterium phaseoli*	T. B.	186
Experiments on the Control of Tomato Yellows	T. B.	189
Seed Treatment for Controlling Covered Smut of Barley	T. B.	207

Poultry and Eggs:

An Analysis of the Business of the Poultry Producers of Central California	Cir.	111
Pathological Conditions Ascribed to Nematodes in Poultry	Cir.	126
Business Records for Poultry Keepers	F. B.	1614
Construction and Packing of an Egg Case	Leaf.	64

Reports:

The Farm Real-Estate Situation, 1929–30	Cir.	150
The Agricultural Outlook for 1930	M. P.	73
The Agricultural Outlook for the Southern States, 1930–31	M. P.	102
Cooperative Extension Work, 1928	Unnumbered.	
Report of the Guam Agricultural Experiment Station, 1928	Unnumbered.	
Report of the Hawaii Agricultural Experiment Station, 1929	Unnumbered.	
Report of the Porto Rico Agricultural Experiment Station, 1928	Unnumbered.	
Report of the Virgin Islands Agricultural Experiment Station, 1929	Unnumbered.	

Soil Surveys:

- Alabama, Montgomery County.
- Arizona, Buckeye-Beardsley Area.
- California—
  - Oroville Area.
  - Salinas Area.
- Georgia—
  - Bartow County.
  - Lee County.
  - Wayne County.
- Idaho, Bear Lake Valley Area.
- Indiana—
  - Hancock County.
  - Putnam County.
  - Wayne County.
- Iowa—
  - Carroll County.
  - Chickasaw County.
  - Clayton County.
  - Kossuth County.
- Maryland, Prince Georges County.
- Massachusetts—
  - Dukes and Nantucket Counties.
  - Essex County.
- Michigan—
  - Jackson County.
  - Kent County.
  - Menominee County.

SOIL SURVEYS—Continued.

Minnesota, Lake of the Woods County.

Missouri, Polk County.

Nebraska—
- Keith County.
- Nuckolls County.

North Carolina—
- Lenoir County.
- Nash County.
- Rockingham County.
- Wilson County.

Ohio—
- Muskingum County.
- Washington County.

Oregon, Grande Ronde Valley Area.

South Dakota—
- Brown County.
- Hyde County.
- Moody County.

Texas—
- Hidalgo County.
- Milam County.

Texas—Continued.
- Nacogdoches County.
- Navarro County.
- Willacy County.

West Virginia, Monroe County.

Wisconsin—
- Calumet County.
- Sauk County.

Wyoming, Wheatland Area.

SOILS:

Method and Procedure of Soil Analysis Used in the Division of Soil Chemistry and Physics	Cir.	139
Steam Sterilization of Soil for Tobacco and Other Crops	F. B.	1629
Fertilizers for Pecan Soils	Leaf.	71
A Pipette Method of Mechanical Analysis of Soils Based on Improved Dispersion Procedure	T. B.	170
Properties of Soils which Influence Soil Erosion	T. B.	178
Factors Affecting the Mechanical Application of Fertilizers to the Soil	T. B.	182
Some Methods for Detecting Differences in Soil Organic Matter	T. B.	211
Mechanical Analysis of Finely Divided Natural Phosphates	T. B.	212
The Physical and Chemical Characteristics of Certain American Peat Profiles	T. B.	214

TRUCK AND SPECIAL CROPS:

Soybean Utilization	F. B.	1617
Sorgo for Sirup Production: Culture, Harvesting, and Handling	F. B.	1619
Growing Cucumbers for Pickling	F. B.	1620
Broomcorn Growing and Handling	F. B.	1631
Growing Sweet Corn for the Cannery	F. B.	1634
Sugar-Beet Culture in the Humid Area of the United States	F. B.	1637
Potato Production in the Far Western States	F. B.	1639
Asparagus Culture	F. B.	1646
Utilization and Composition of Oriental Vegetables in Hawaii — Hawaii	Bul.	60
American Medicinal Plants of Commercial Importance	M. P.	77
The World Cotton Situation, with Outlook for 1931–32, and the Long-Time Outlook for Southern Agriculture	M. P.	104
Vegetable Propagation from the Standpoint of Plant Anatomy	T. B.	151
Breeding Tobacco for Resistance to Thielavia Root Rot	T. B.	175

CROP AND LIVESTOCK PRODUCTION TRENDS

Charts of production statistics for important products, covering 40 years, as far as available

Prepared under the direction of the Statistical Committee: J. A. Becker, chairman, Lewis B. Flohr, secretary, C. A. Burmeister, L. M. Davis, S. W. Mendum, and E. J. Working

This series of charts traces the growth of production of some of the more important agricultural commodities over a period of 40 years. Uniform treatment has not been possible at this time because of lack of comparable figures for the full period. Crop reporting developed earlier than livestock reporting except for numbers on farms on January 1, and, in general, is now more complete in detail.

The figures used in the charts are for the most part those given in the several related tables in the statistical section of this Yearbook.

In addition to the charts for the United States as a whole, a few charts depicting the variations in States or regions are given, and others showing the relation of production in the United States to production in other parts of the world.

Increase in production prior to 1900 was rapid with the opening of new producing territory west of the Mississippi River; since then the increase has come mainly from shifts in farming. During the early years of this period of expanding production the Nation's export trade furnished an outlet for much of the increase, and this outlet was further expanded during the war period; but in the last few years the export outlet has been considerably curtailed, thus forcing a larger proportion of the Nation's production on the domestic market.

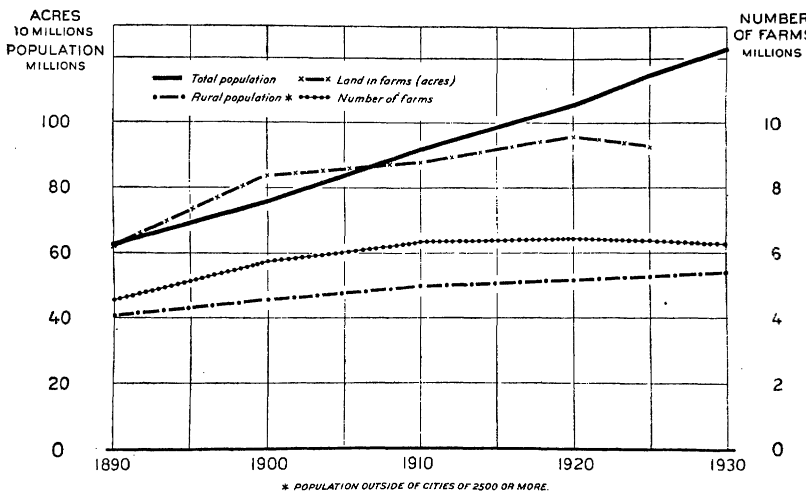


FIGURE 1.—POPULATION, NUMBER OF FARMS, AND LAND IN FARMS, CENSUS YEARS, 1890–1930

In the last 40 years the population of the continental United States has doubled. The number of persons to be provided for has increased steadily and relatively uniformly, and continued growth of population even at a slower rate has been counted upon to absorb the increasing quantities of farm products brought forth by expansion in area and by improvements in technic. The increase in domestic demand for farm products has, however, not increased as fast as the producing power of farms and farmers. Land in farms has declined from the maximum reached in 1920, and number of farms has changed very little since 1900. Rural population, which now includes nearly 20,000,000 people not on farms, has dropped from two-thirds of the population in 1900 to less than one-half.

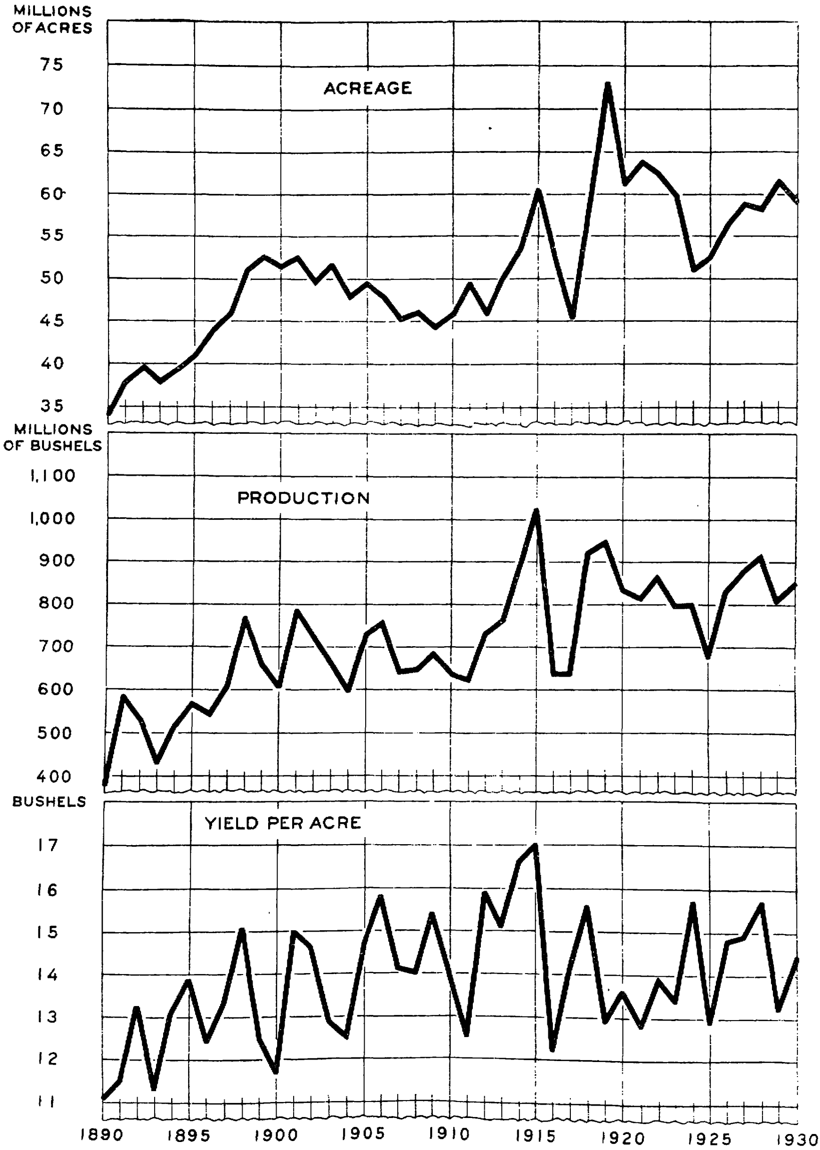


FIGURE 2.—WHEAT: ACREAGE, PRODUCTION, AND YIELD PER ACRE IN THE UNITED STATES, 1890–1930

Wheat acreage has not quite doubled in 40 years, but yield per acre has increased so that production has fallen below 800,000,000 bushels in only 1 of the last 13 years. Domestic consumption per capita is less than it was 30 years ago. Exports have not been so large as they were and carry-overs in recent years have been large. Yields as low as 13 bushels per acre have been exceptional. For the next few years, unless acreage is reduced below 50,000,000 acres any yield per acre above 13 bushels will supply probable domestic demand.

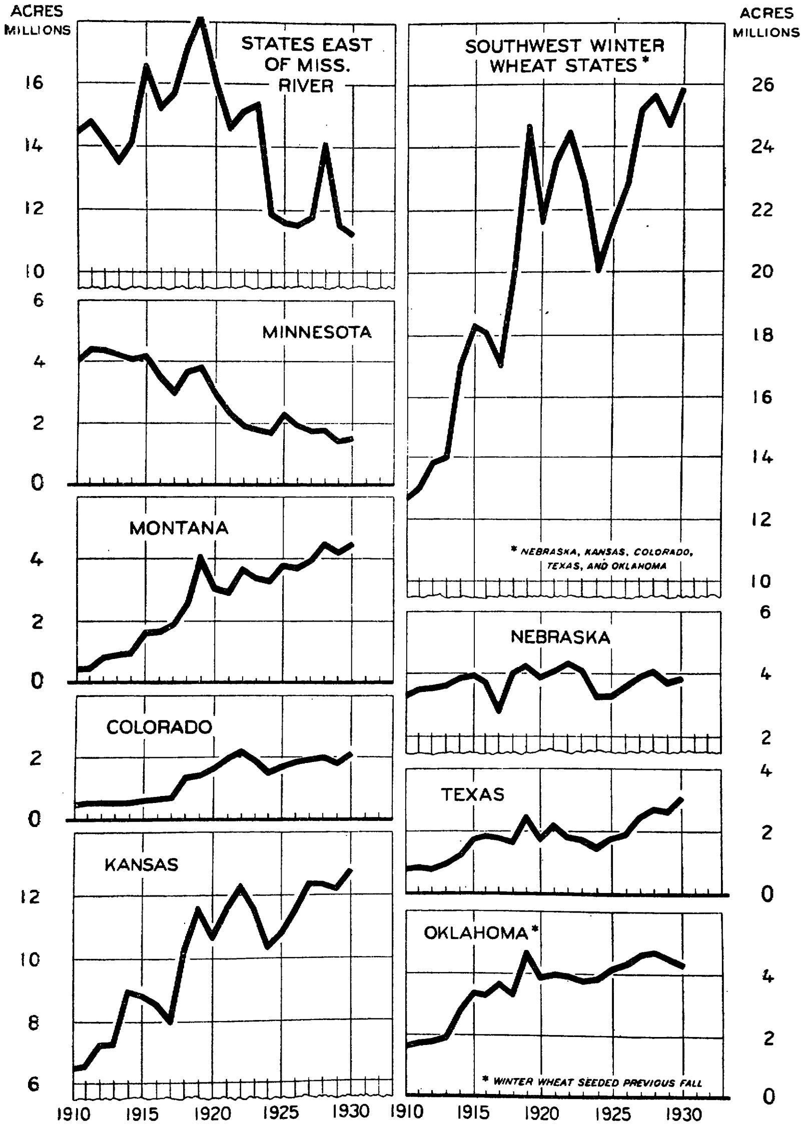


FIGURE 3.—WHEAT ACREAGE, BY REGIONS (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1910–1930

Increase in wheat acreage since 1910 has been large in five southwestern winter-wheat States. States east of the Mississippi River increased acreage during the war period, but since then appear to have reduced acreage to below pre-war levels. Acreage decreases in Minnesota in the last 10 years have about offset the increases in Montana. These are the most striking changes in acreages since 1910. Elsewhere production (acreage times yield per acre) has varied without showing positive evidence of marked increase or marked decrease not associated with climatic factors affecting acreage seeded or yield per acre.

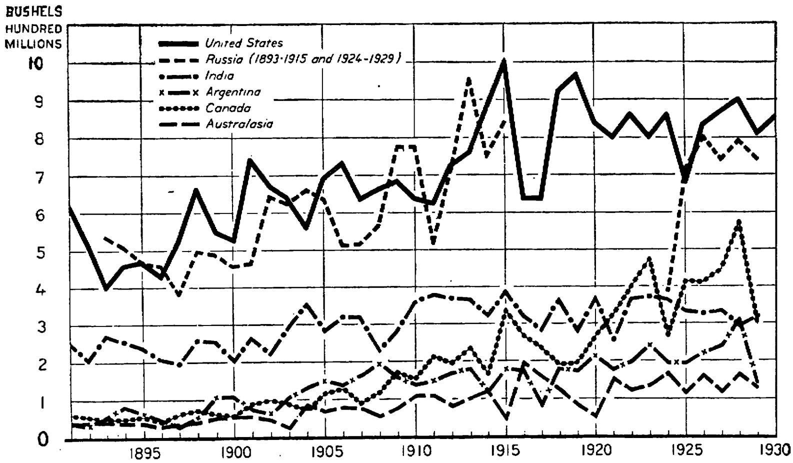


FIGURE 4.—WHEAT PRODUCTION: LEADING COUNTRIES, 1891–1930

World wheat production in the last 10 years, outside of Russia and China, has not gone below the maximum pre-war figure, and in 1928, the record year, was 21 per cent greater than the previous maximum of 1913. The large world acreage of wheat is so widely distributed that conditions making for decreased production in any part tend to be offset by conditions in other parts making for increased production. Russian production is now near pre-war levels and may be much increased in the near future. Wheat production in China has little effect on the world trade in wheat.

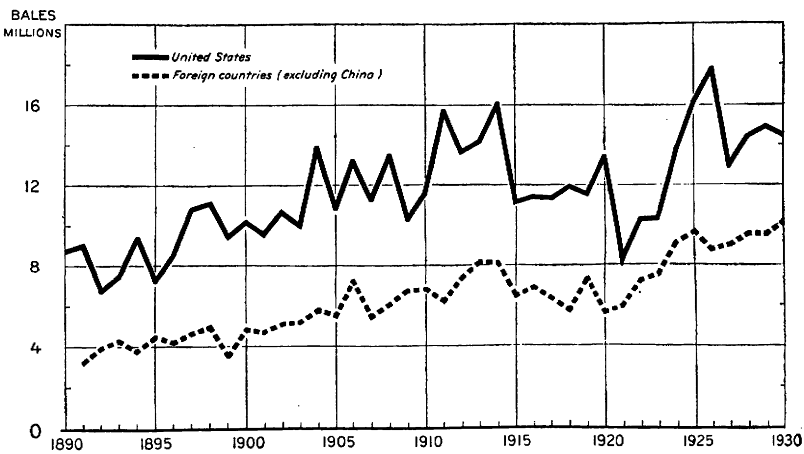


FIGURE 5.—COTTON PRODUCTION IN THE UNITED STATES AND FOREIGN COUNTRIES, 1890–1930

World cotton production (excluding China) in recent years has been only a few million bales larger than it was just before the war. Production in foreign countries has definitely increased; for seven years it has been above the previous maximum. The relative importance of American cotton in consumption in foreign countries has decreased. Breaks in the upward trend of production in the United States in 1915 and again in 1921 are associated with extension of serious boll-weevil infestation in new territory. The peak of production, in 1926, resulted from a record acreage and the highest yield per acre since 1914.

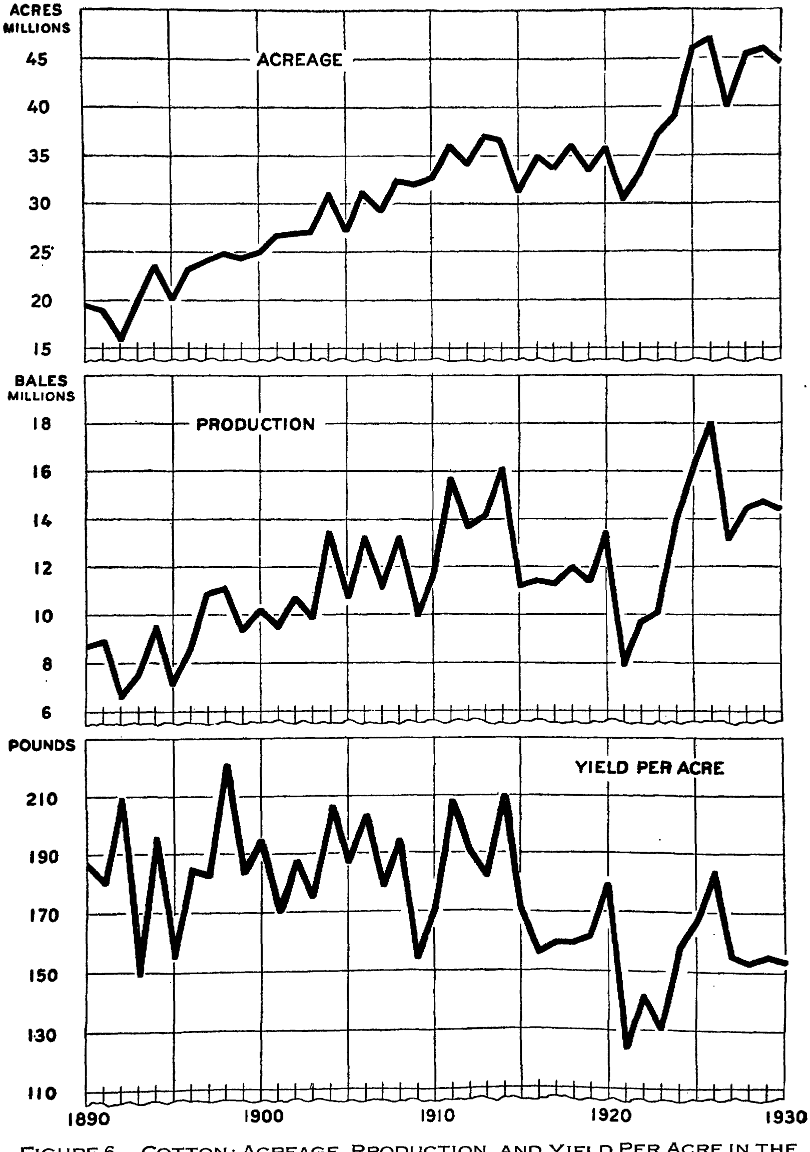


FIGURE 6.—COTTON: ACREAGE, PRODUCTION, AND YIELD PER ACRE IN THE UNITED STATES, 1890–1930

The upward trend in acreage of cotton, halted during the war period, was resumed in 1923 by extensions in most of the States, but chiefly in Texas and Oklahoma. Production on the larger total area has been held down by the lower average yields. Average yields on the 45,000,000 acres of recent years mean crops large enough to make marketing difficult, in view of the increasing competition from foreign cottons and other fibers, and the heavy carry-overs.

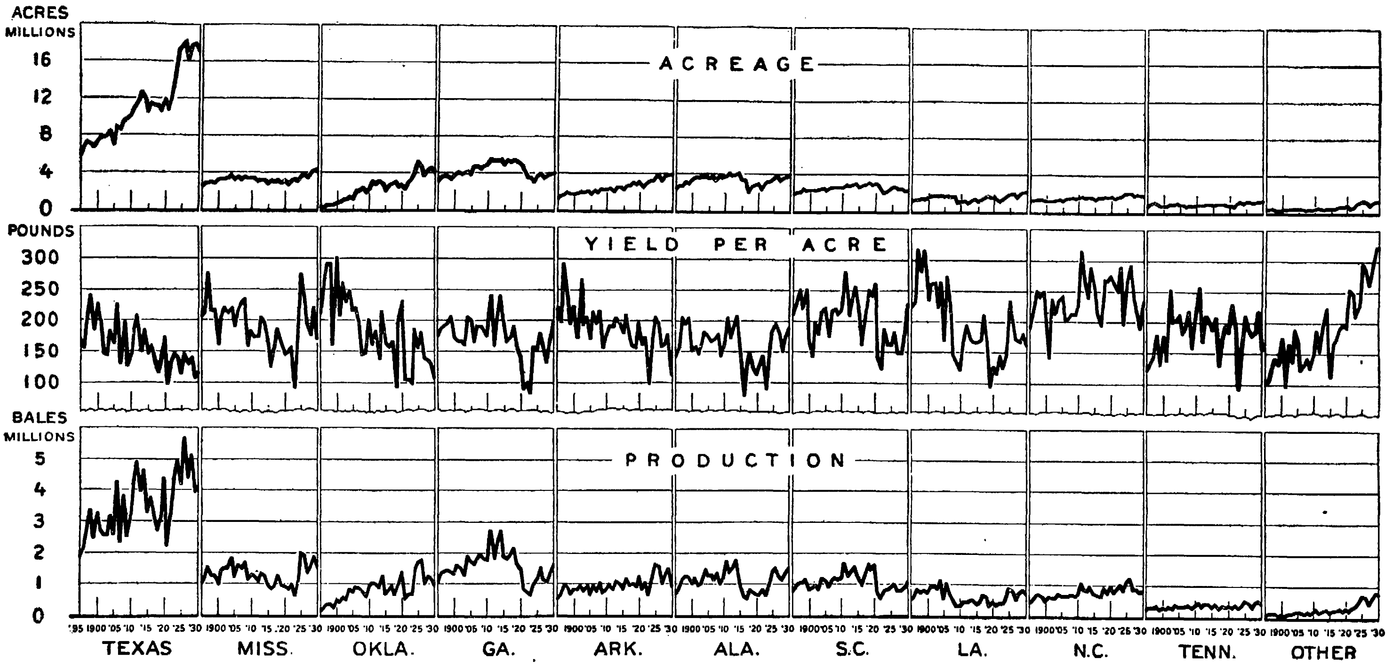


FIGURE 7.—COTTON: ACREAGE, YIELD PER ACRE, AND PRODUCTION, BY STATES, 1895–1930

The outstanding features of cotton production in the last 40 years are the extension of cotton acreage in Texas and Oklahoma, with increased production in spite of declining yields per acre, and the moderate changes in the remainder of the South. Reductions in acreage and production were largely caused by boll-weevil damage in Louisiana in 1908, in Alabama in 1915, in Georgia in 1920, and in South Carolina in 1921, but were followed by gradual recovery. Yield per acre has been highly variable.

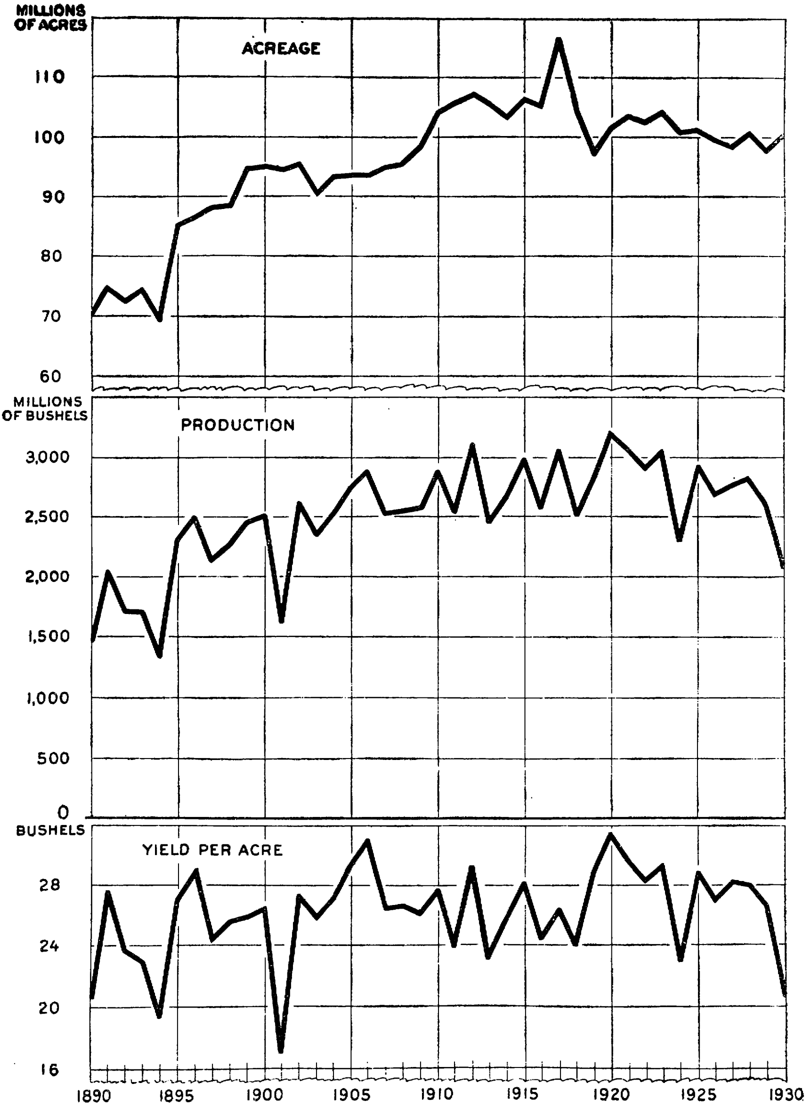


FIGURE 8.—CORN: ACREAGE, PRODUCTION, AND YIELD PER ACRE IN THE UNITED STATES, 1890–1930

Corn acreage increased steadily from 1890 to 1912, receded slightly thereafter except for the record acreage of 1917 (116,700,000 acres), and since 1918 has remained close to 100,000,000 acres. Production has been below 2,000,000,000 bushels only once since 1894—in 1901, when yield per acre dropped to 17 bushels. Five 3,000,000,000-bushel crops have been produced, resulting from high yields rather than from high acreage. Production figures include the corn used as silage, as forage, or hogged down and grazed. About 90 per cent of the corn produced is used as feed for livestock.

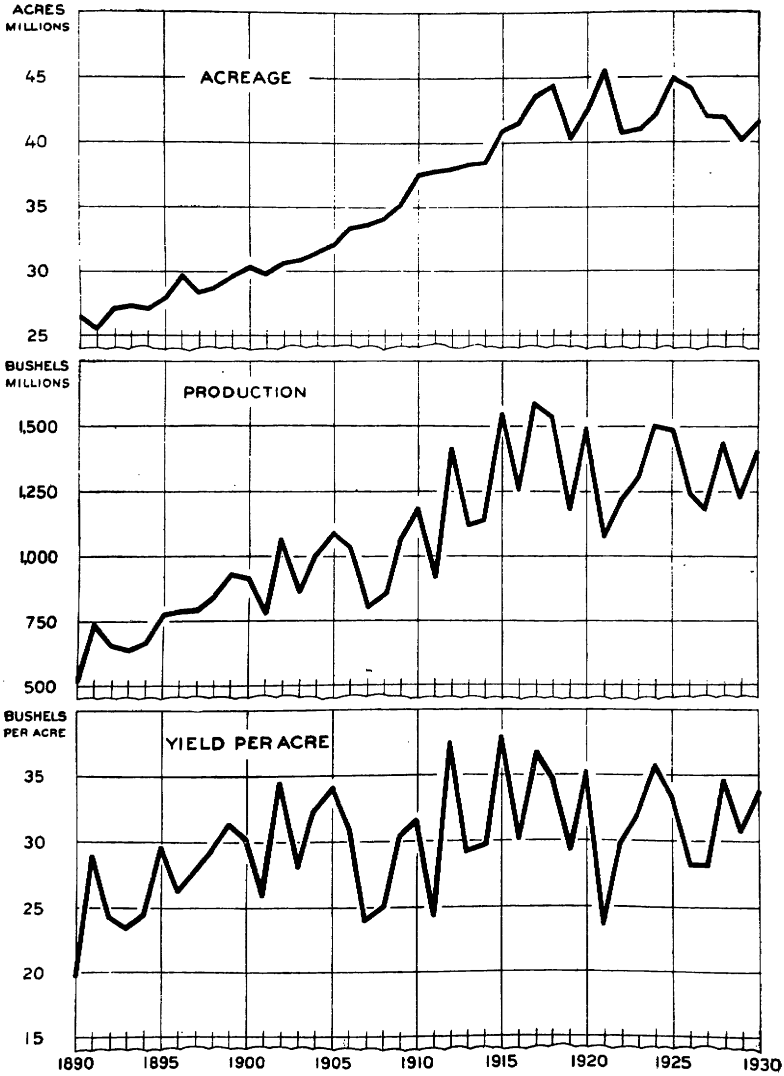


FIGURE 9.—OATS: ACREAGE, PRODUCTION, AND YIELD PER ACRE IN THE UNITED STATES, 1890–1930

Production of oats has just about doubled in 40 years, though there has been a tendency toward reduction during the last 10 years, during which numbers of horses and mules have declined greatly. One reason why a large acreage of oats is still grown is that the crop fits well in the rotation between corn and grass.

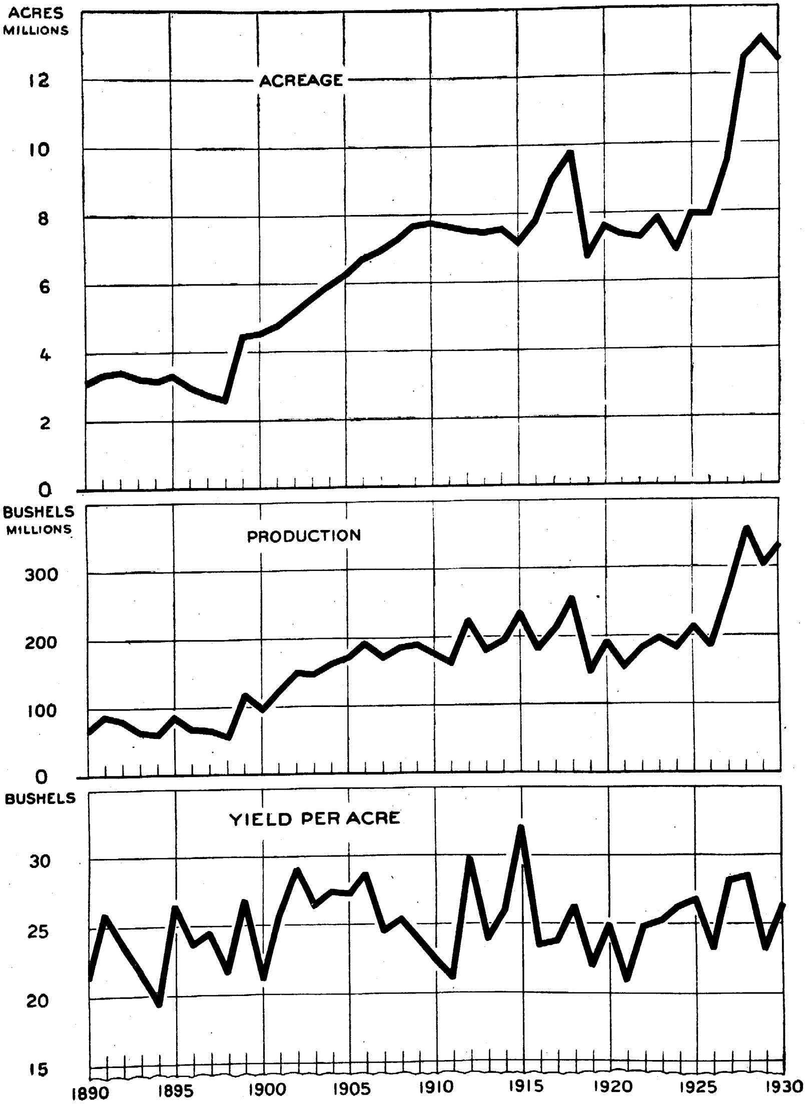


FIGURE 10.—BARLEY: ACREAGE, PRODUCTION, AND YIELD PER ACRE IN THE UNITED STATES, 1890–1930

Increase in barley production has been three-fold during the 40-year period, with little change in average yields. The marked increase in acreage and production since 1925 represents an extension of barley into the region to the north and west of the Corn Belt for use in feeding livestock, where corn is not so sure a crop; elsewhere barley sometimes takes the place of part of the oats.

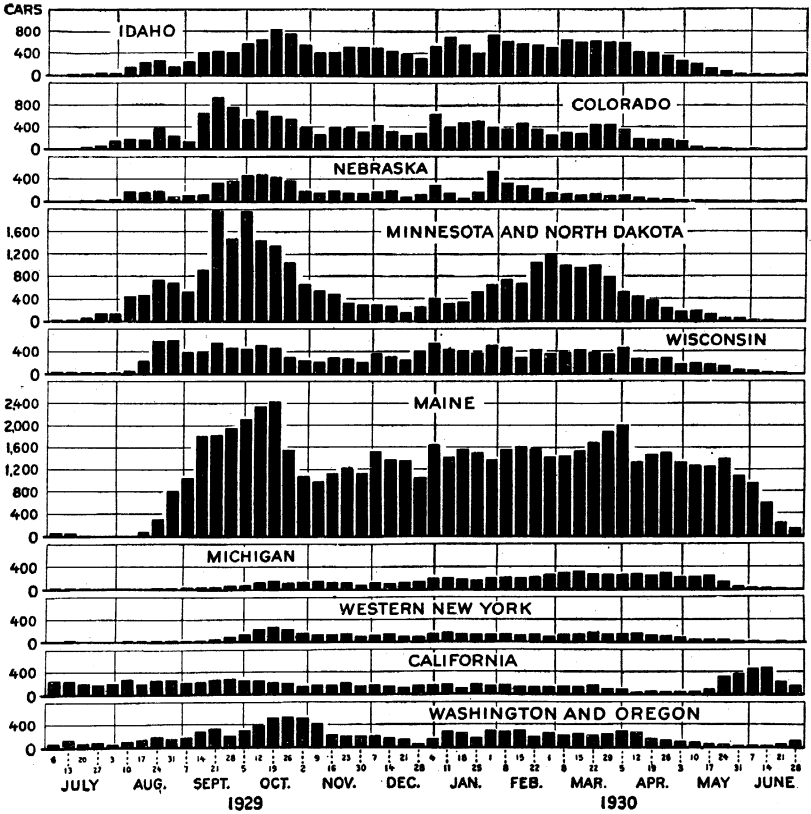


FIGURE 11.—LATE POTATOES: WEEKLY CAR-LOT SHIPMENTS, 1929–30

Though first shipments of main-crop or late potatoes begin to move from the farms in July, the heavy movement to market gets under way in September and continues through the following April. The size and distribution of the crop in the several States varies somewhat from year to year. Large quantities of late potatoes are sold locally or in markets within easy reach by motor truck and these are not reflected in this chart.

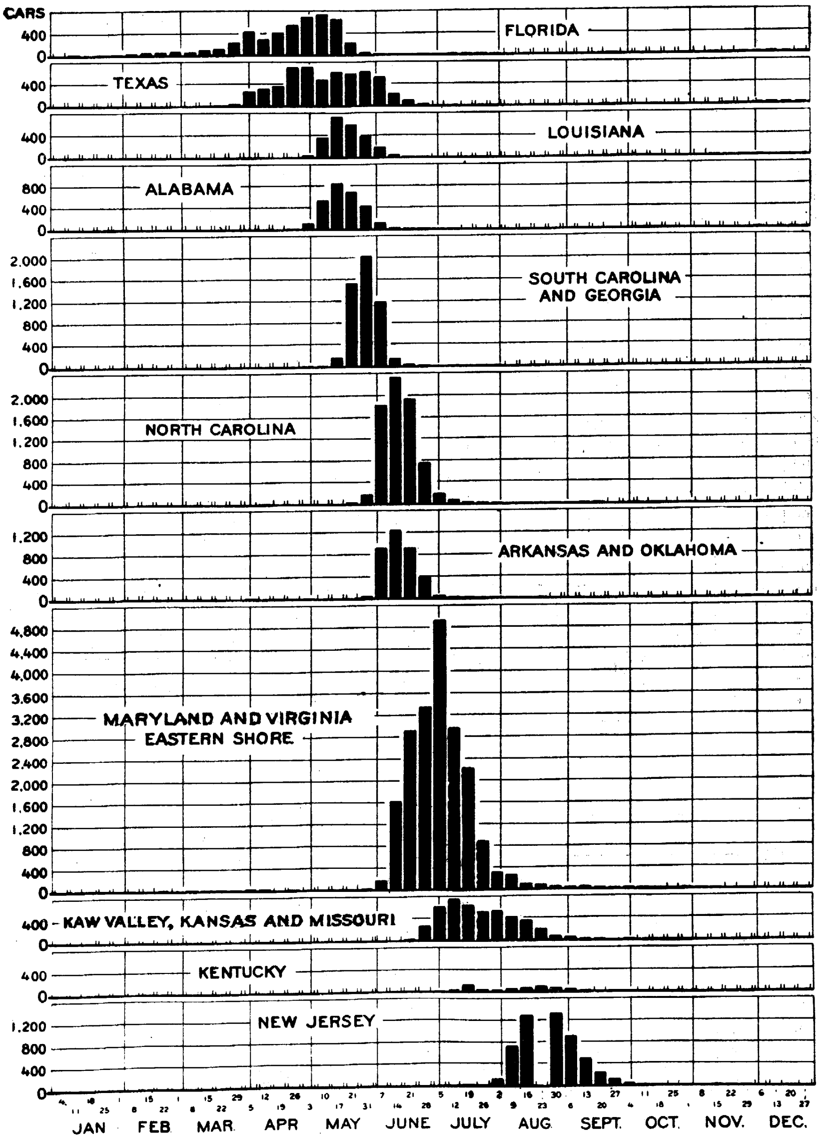


FIGURE 12.—EARLY POTATOES: WEEKLY CAR-LOT SHIPMENTS, 1930

Potatoes begin to move from Florida early in January, and movement from Texas begins before Florida shipments reach their peak. Early in May keen competition between areas begins. The outlet for early potatoes is affected by the supply and price of late potatoes still available, but as the season progresses the extent of the market for the early crop of a district is definitely limited by the appearance in volume of the early crop in districts closer to the consuming markets. The Eastern Shore of Maryland and Virginia is the principal source of early potatoes for city markets.

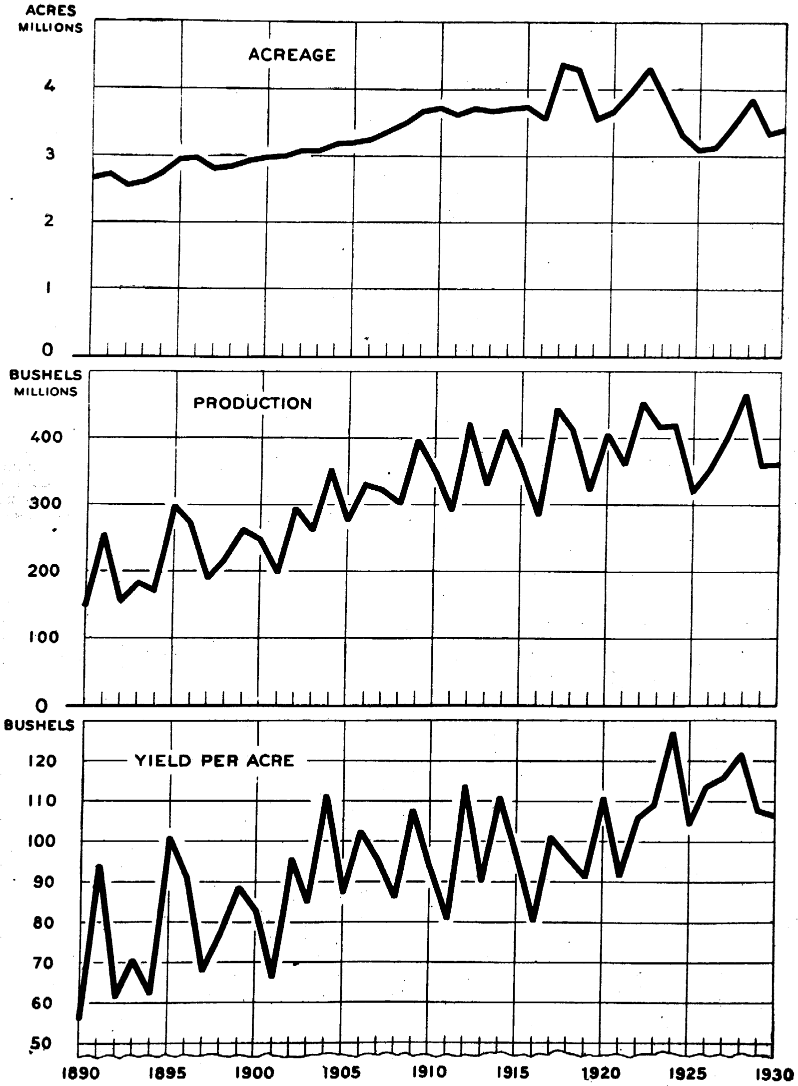


FIGURE 13.—POTATOES: ACREAGE, PRODUCTION, AND YIELD PER ACRE IN UNITED STATES, 1890–1930

Potato production has in general increased with population growth. Average yields per acre have increased about 50 per cent in the 40-year period with improvements in production methods and concentration in the more favored districts. In the last 15 years producer response to price has been promptly reflected in acreage change, and shifts in acreage from year to year have been greater than they were previously. Effectiveness of acreage changes has been reduced by the rather wide variations in yield resulting from a combination of factors in which weather is important.

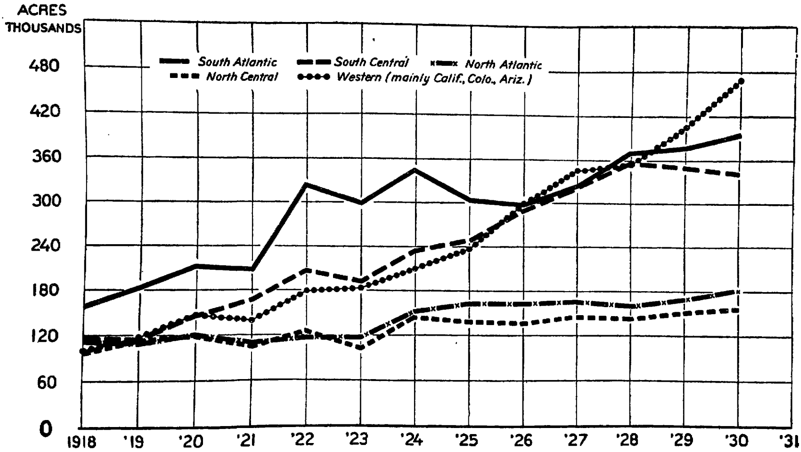


FIGURE 14.—ACREAGE OF COMMERCIAL TRUCK CROPS, 1918–1930 [1]

Acreage of truck crops has shown a steady expansion in recent years, especially in the 11 Western States. In the South Atlantic States the expansion came earlier and has been moderate since 1924. The term "commercial" covers those acreages grown for shipment to market or for canning and manufacture, but not market gardens or home gardens, and in this case early potatoes are not included. Figures for years prior to 1918 are available for only a few crops, and census figures relate to total acreage rather than to the commercial acreage.

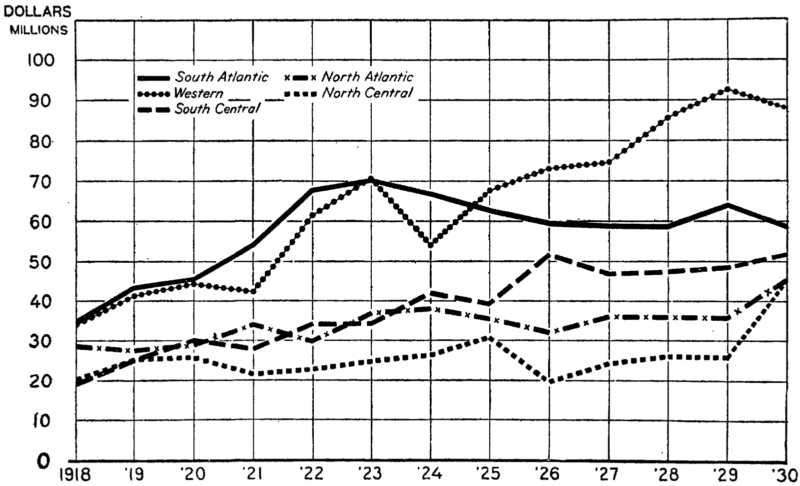


FIGURE 15.—VALUE OF COMMERCIAL TRUCK CROPS, 1918–1930 [1]

Value of commercial truck crops as defined in the legend of Figure 14 has increased markedly in the 11 Western States, but not to the same extent as the acreage. Values at the farm are sensitive to variations in supply and distribution. City markets are now so well supplied with fresh and processed goods the year around that competition between producing areas is keen, and results to growers are increasingly dependent on high quality, wide distribution, and the avoidance of market supplies in excess of the consumer demand at the time and place of marketing the crop. The market situation in recent years suggests that further increases in demand are likely to be moderate.

[1] Excluding early potatoes, but including strawberries, cantaloupes, and watermelons.

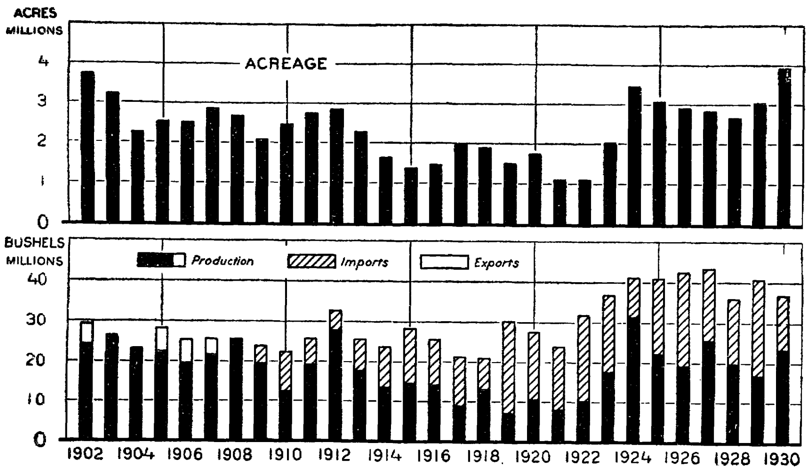


FIGURE 16.—FLAXSEED: ACREAGE, PRODUCTION, IMPORTS, AND EXPORTS, 1902–1930

Acreage and production of flaxseed in the United States have been highly variable during the last 40 years. The record acreage of 1930 was only slightly larger than that of 1902, the first year of annual acreage figures, and for 9 years (1914–1922) acreage was lower than it was in 1889. In 1924 a combination of high yield per acre on an acreage only once before exceeded gave a record crop of 31,547,000 bushels. Yields have varied between 4.6 and 11.2 bushels per acre. Since 1907 there have been no net exports. A high yield on an acreage equal to that of 1930 would reduce the imports to a very small quantity.

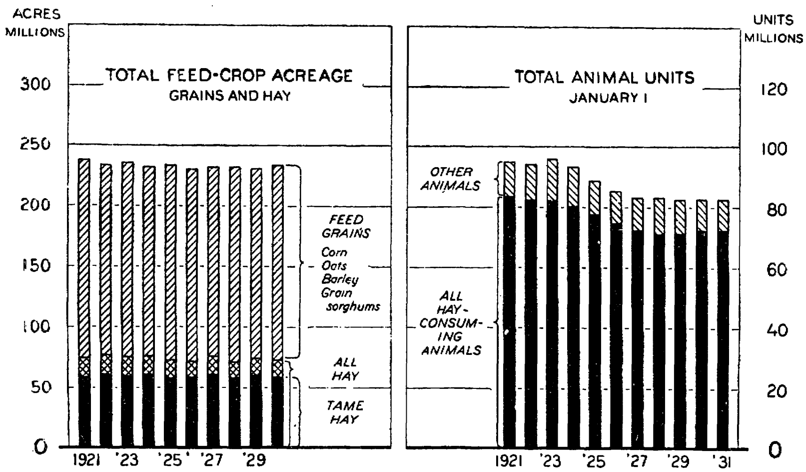


FIGURE 17.—FEED-CROP ACREAGE, HAY ACREAGE, AND LIVESTOCK NUMBERS, UNITED STATES, 1921–1931

In the last 10 years the acreage of feed grains and hay has remained practically stationary, but the numbers of animal units were less at the end of the decade than they were at the beginning. The "animal unit" is based on the feed consumption of the mature horse or mule; 8 sheep, or 5 hogs, or 1.2 cattle and calves are considered as 1 animal unit. Hay and feed consumption depends to some extent on the pasture available and the feeding practice. In recent years the ratio of production of livestock and livestock products to numbers on hand on January 1 has been somewhat larger than it was 20 years and more ago.

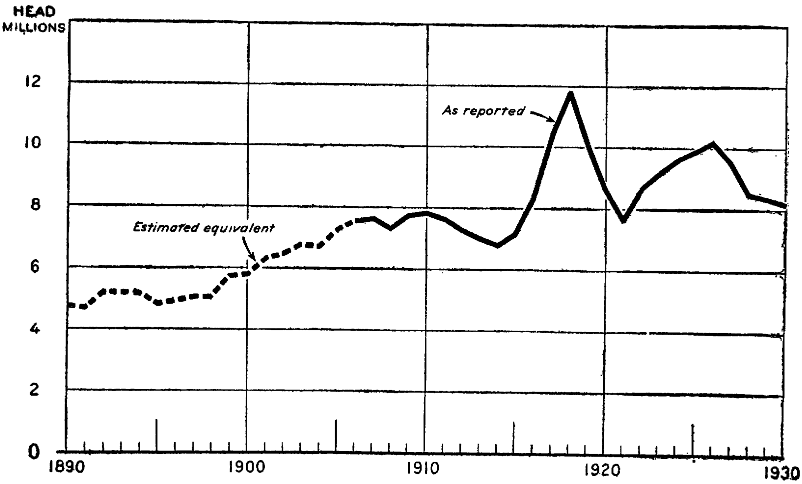


FIGURE 18.—CATTLE: ESTIMATED EQUIVALENT FEDERALLY INSPECTED SLAUGHTER, 1890–1906, AND SLAUGHTER UNDER FEDERAL INSPECTION, 1907–1930

The general trend of cattle slaughter has been upward in the last 40 years. The years of largest slaughter were during the war period, when production was stimulated by the war demands for beef. During the last 30 years there have been two cycles of cattle production of 14 to 16 years in length. These production cycles were reflected in similar cycles of cattle slaughter which began about 2 years later. The slaughter cycle which began about 1914 was distorted somewhat by the war and the abnormal economic conditions which followed.

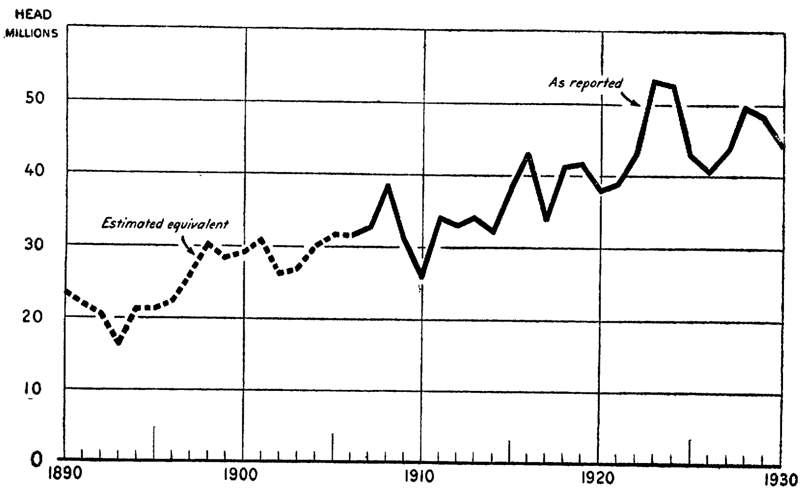


FIGURE 19.—HOGS: ESTIMATED EQUIVALENT FEDERALLY INSPECTED SLAUGHTER, 1890–1906, AND SLAUGHTER UNDER FEDERAL INSPECTION, 1907–1930

Annual hog slaughter tends to fluctuate in cycles of 3 to 5 years in length, but the general trend has been sharply upward during the past 40 years. Hog production is influenced to a large extent by variations in the relationship of corn prices to hog prices. These variations account largely for the cyclical variations in slaughter.

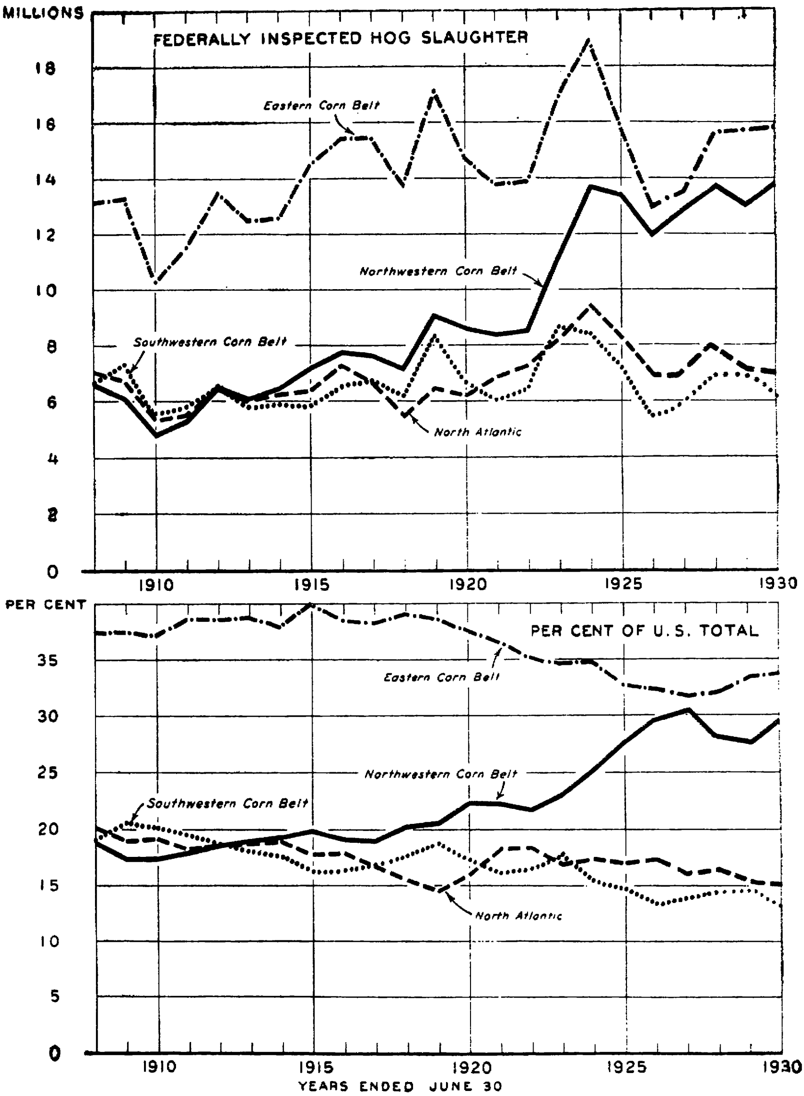


FIGURE 20.—FEDERALLY INSPECTED HOG SLAUGHTER BY AREAS, 1908–1930

Changes in both production and slaughter of hogs in the United States have accompanied the shifts in corn production. For several years there has been an upward trend in corn acreage in the northwestern Corn Belt (Iowa, Nebraska, Minnesota, North Dakota, and South Dakota), whereas the acreages in other areas of the Corn Belt have remained about stationary or have decreased. Similar changes have taken place in hog production and hog slaughter. Most of the increase in total hog slaughter during the last 15 years has been due to the increase that has taken place in the northwestern Corn Belt.

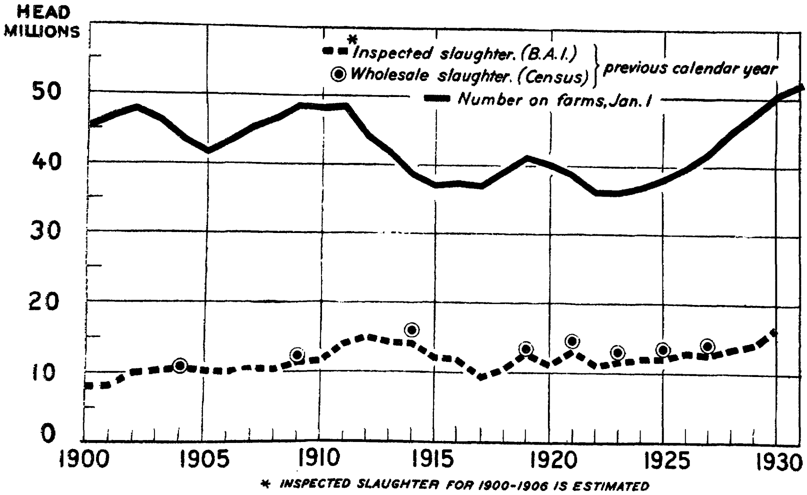


FIGURE 21.—SHEEP AND LAMBS: NUMBER ON FARMS JANUARY 1 AND INSPECTED AND WHOLESALE SLAUGHTER, 1900–1931

Sheep numbers in the United States reached the highest level on record in 1931, and a new slaughter record was established in 1930. In the last 30 years both numbers and slaughter have tended to move in cycles which have varied somewhat in length, with the slaughter cycle lagging behind the production cycle. The increase in numbers since 1922 has been more marked than that of slaughter, due to the holding back of a large proportion of the lamb crop each year for flock expansion purposes.

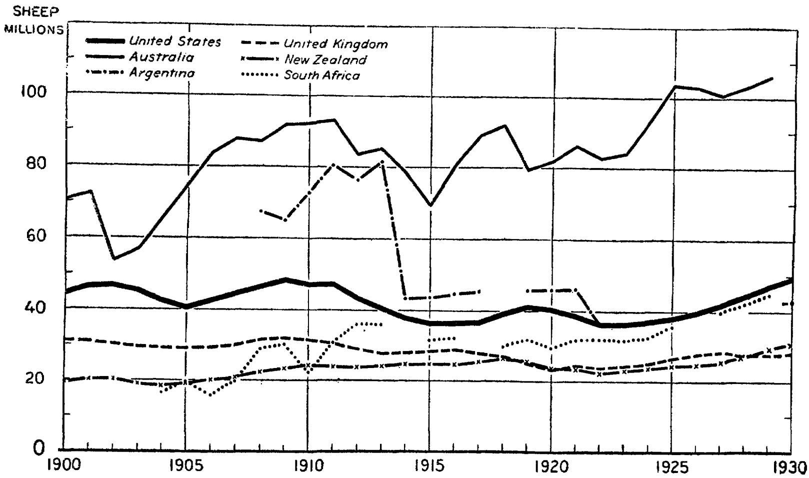


FIGURE 22.—NUMBER OF SHEEP IN IMPORTANT COUNTRIES, 1900–1930

Sheep and wool production in most important producing countries tends to move in cycles, although the general trend in world numbers has been upward in the last 30 years. Sheep numbers in Australia, South Africa, and the United States have increased greatly since 1922. Australia is the largest sheep-producing and wool-exporting country in the world. In New Zealand and Argentina, also important wool-exporting countries, sheep numbers have increased gradually during recent years. Because of the large imports of wool into the United States, wool prices in this country are influenced considerably by the world production of wool.

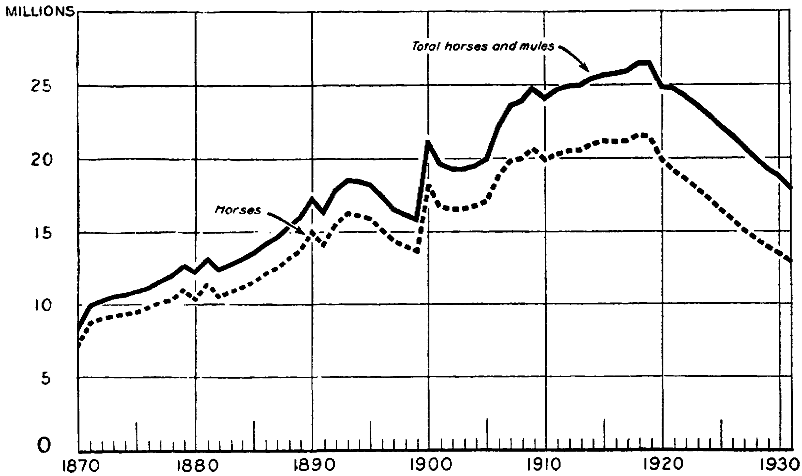


FIGURE 23.—HORSES AND MULES: NUMBERS ON FARMS, 1870–1931

Total numbers of horses and mules in the United States increased from around 10,000,000 head in the early seventies to more than 25,000,000 at the end of the World War. Since 1918 the trend in horse numbers has been downward, and the total now is the smallest in more than 40 years. The number of mules continued to increase until 1926 but has since decreased slightly. The reduction in horse numbers in the last decade has been due to decreased demand caused by the increased use of mechanical power in carrying on farm operations and by the replacement of horses by motor vehicles in towns and cities.

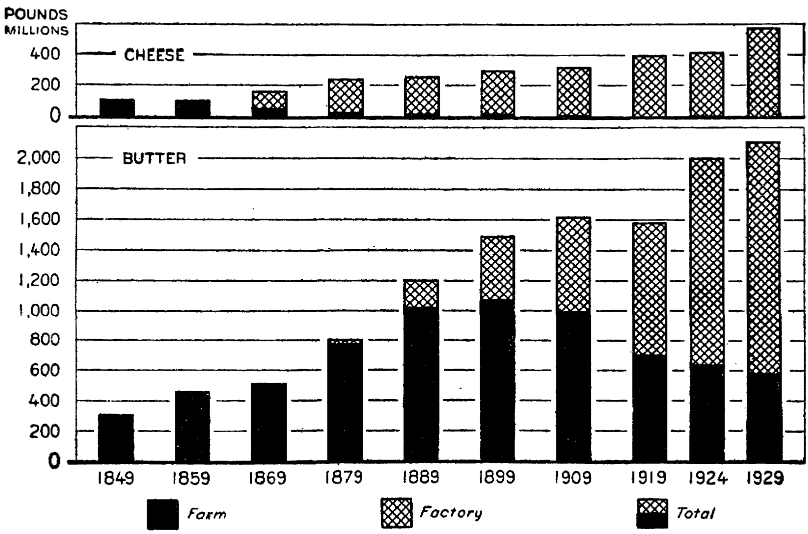


FIGURE 24.—PRODUCTION OF FARM AND FACTORY CHEESE AND BUTTER, UNITED STATES, CENSUS YEARS, 1849–1929

Production of butter in the United States has shown a more marked upward trend than population. During the last 50 years there has been a pronounced shift from the production of butter on farms to factory production. The rate of increase in cheese production has been considerably less than that for butter. Since 1869 only a small percentage of the total cheese produced has been made on farms.

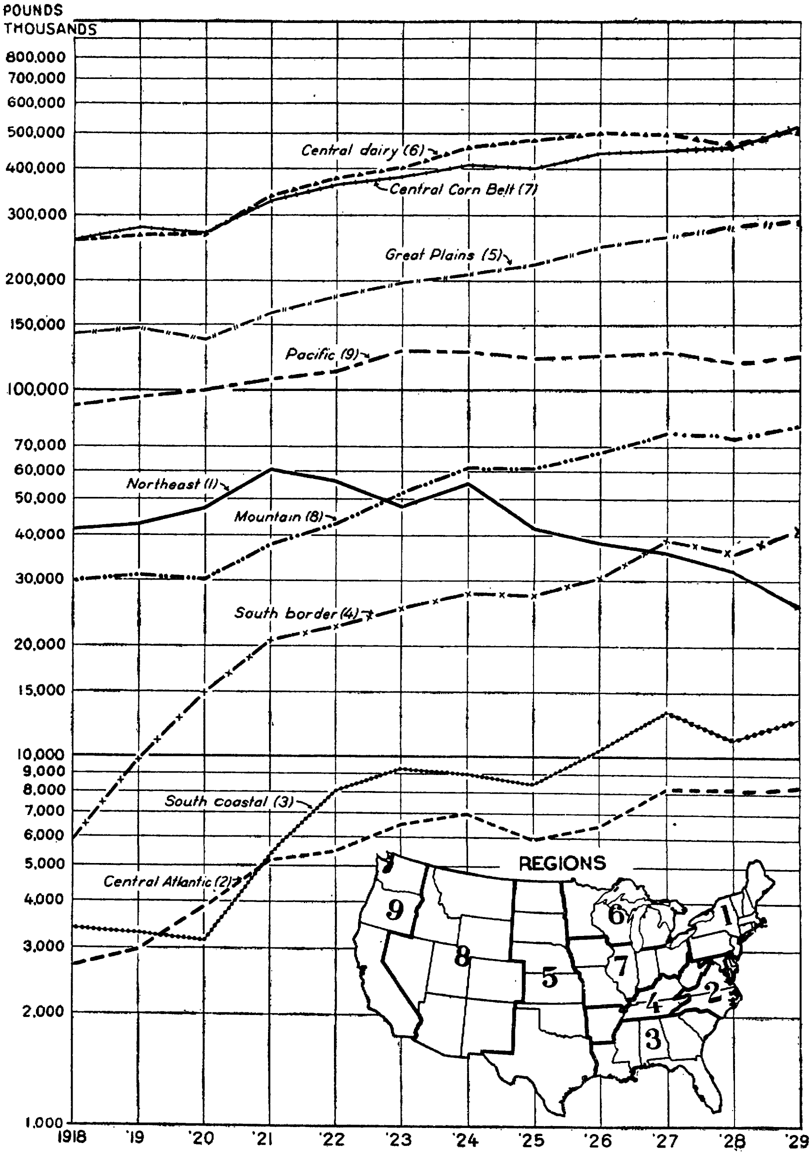


FIGURE 25.—YEARLY PRODUCTION OF CREAMERY BUTTER, BY REGIONS, UNITED STATES, 1918–1929

The trend in butter production in all regions of the United States was upward during the years of 1918 to 1929 with the exception of the northeastern region, where the trend has been downward since 1921. Since 1918 the greatest percentage increases in creamery-butter production have occurred in the Southern States, although as yet their total production is relatively small.

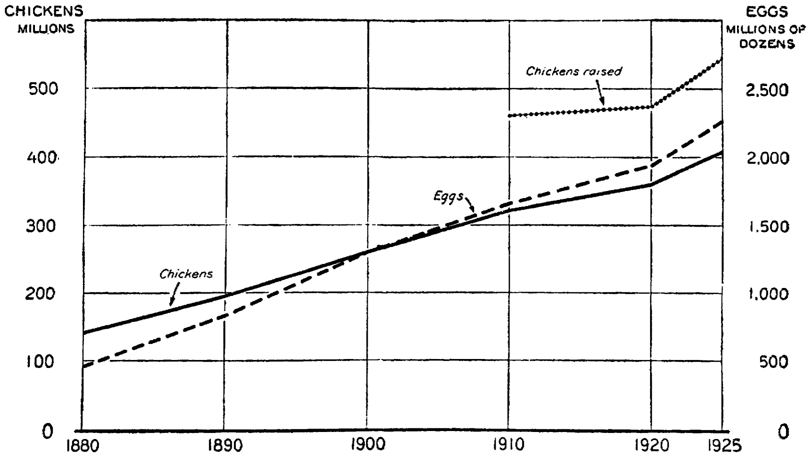


FIGURE 26.—NUMBER OF CHICKENS ON HAND JANUARY 1, AND PRODUCTION OF EGGS IN THE UNITED STATES, CENSUS YEARS, 1880–1925

The trend in poultry and egg production has been markedly upward during the last 50 years, the peak in production being reached in 1928. During this period poultry numbers tripled, while yearly egg production more than quadrupled. United States census figures adjusted.

AGRICULTURAL STATISTICS

UNITED STATES DEPARTMENT OF AGRICULTURE YEARBOOK, 1931

Prepared under the direction of the Statistical Committee: Joseph A. Becker, chairman, Lewis B. Flohr, secretary, S. W. Mendum, C. A. Burmeister, L. M. Davis, and E. J. Working.

INTRODUCTION

The statistical section of this Yearbook brings together in one place what seem from experience to be the most important agricultural statistics for the United States, and for the world so far as the agriculture of this country is concerned. Historical and geographical series have been given. These are basic data helpful to the producer in his problems of production and marketing.

For greater detail on individual commodities than can be shown in the Yearbook, the Statistical Bulletin series of the department may be consulted.

For current statistics to supplement the Yearbook statistics the following sources should be used: (1) Crops and Markets—a monthly publication of the department carrying the latest current statistics available on agriculture in the United States; (2) Foreign Crops and Markets—issued weekly by the Bureau of Agricultural Economics and devoted to current world statistics of crops, livestock, and markets; (3) foreign commodity news—published by the Bureau of Agricultural Economics and showing the latest world information on single commodities and released as important information is received; (4) market news reports of the Bureau of Agricultural Economics—issued daily, weekly, monthly, quarterly, or at irregular intervals, at Washington and at the principal markets.

Statistical data from the following bureaus are included: Weather Bureau, Bureau of Plant Industry, Bureau of Animal Industry, Forest Service, Bureau of Public Roads, Bureau of Agricultural Economics, Bureau of Dairy Industry, Extension Service, Biological Survey, Plant Quarantine and Control Administration, and Grain Futures Administration.

The crop and livestock reporting service estimates acreage, condition of crop, yield per acre, production, and farm prices of crops, and numbers, production, farm prices, and values of livestock and livestock products. The organization of this work outside of the crop-reporting board and the office force in Washington consists of 41 State field offices, each with an agricultural statistician in charge. There is one field office for the New England States, one for Maryland and Delaware, and one for Utah and Nevada.

Acreages for the year 1909 are as reported by the Bureau of the Census; acreages in 1919 and 1924 are based upon the census supplemented by State enumerations. In the intercensal years, from 1910 to 1915, estimated acreages were obtained by applying estimated percentages of decrease or increase to the published acreage in the preceding year. The estimates from 1916 to 1918, from 1920 to 1923, and from 1925 to 1930 are based upon acreage changes from year to year as shown by a sample of over 2 per cent of the crop acreages in each year, supplemented by State enumerations. Yields per acre are estimates based upon reports of one or more farmers in each agricultural township on the average yield per acre in their localities. Production is acreage times yield per acre.

Estimates of farm stocks, shipments, quality, crop condition, and miscellaneous information concerning crops are based either upon sample data or upon estimates of crop reporters for their localities.

The term "commercial" is used in connection with certain crop estimates to distinguish some part of the total production of a crop. Except for indicating that the entire production is not represented in the estimate, "commercial" does not have the same meaning in each instance where used. The commercial apple estimate, for example, represents that portion of the total apple crop which is sold or available for sale for consumption as fresh fruit. That portion of the crop which is used for cider, vinegar, canning, evaporating, or other manufacture is not included in the commercial estimate as defined in this case. The commercial orange and grapefruit crops in Florida represent the portion shipped or to be shipped by rail or boat as differentiated from the portion canned, juiced, sold, or consumed locally, wasted, etc. Until recently, cherry estimates represented the commercial sales in certain States and included only the quantities shipped to market or utilized by canners, cold packers, and other processors. The estimates now include the total production in these commercially important States. Estimates of commercial truck-crop production are concerned only with those areas growing the crops primarily to supply the larger consuming markets more or less distant from the producing center. Production in home and market gardens, intended principally for local sale, is excluded. Similarly with truck crops grown for commercial canning or manufacture the estimates include only amounts grown for use by canning or packing establishments and exclude amounts canned in the home. The truck and canning crop estimates are designed to include the total quantity produced on the commercial acreage in the areas concerned, whether or not the entire crop finds a market or a use.

Monthly estimated prices received by producers on the specified dates are based upon reports from special price reporters, who are mostly country dealers, on the average price paid to farmers and do not relate to any specified grade.

Farm values of crops as shown are mostly computed by applying the December 1 farm price to the total production. These prices are reported by the crop reporters, who are mostly farmers. The average price received for the portion of the crop sold may be greater or less than this price, depending upon the prices previous and subsequent to December 1 and the amount of the crop sold at the different prices. For commercial truck and canning crops, and for certain fruit crops, the prices shown are the estimated seasonal averages of the prices received by growers at the shipping point, the cost of the container included if a customary requirement of delivery.

Numbers of livestock on farms on January 1, 1920 and 1925, are based upon the census enumeration as of that date, supplemented by enumerations by State agencies, such as assessors and brand inspection boards, and by records of shipments during 1920 and 1925. In the intercensal years, from 1911 to 1916, the numbers of livestock were obtained by methods identical with those used for crop acreages. Estimates from 1917 to 1919, from 1921 to 1924, and from 1926 to 1931 are based upon a sample of over 2 per cent, supplemented by trends derived from assessors' enumerations, reports of brand inspection boards, market movements, and stockyard receipts. The census bases are not always comparable from one decade to another, because of changes of dates and classifications.

The average value per head on January 1 is estimated from reports of correspondents relating to livestock in their vicinity. These tend to reflect inventory values as distinguished from the monthly prices which relate to sales. The farm value on January 1 is computed by applying the average value per head to the number on farms.

The Federal market news service supplies much of the information on market prices and movements. The leased-wire system in use by the service extends from the Atlantic to the Pacific and reaches most of the important markets of the country. At each of the branch offices commodity specialists gather information regarding the supply, the demand, and prices for the products on which they report. They observe the sales actually made on the markets and are constantly in touch with the traders, who in many instances give them access to their office records in order that they may have specific information on which to base their reports. Car-lot shipments are reported by officials and agents of railroads, express companies, and boat lines. Data on receipts, slaughter, and shipments of livestock are obtained from monthly reports submitted by the public stockyards. Data on cold-storage stocks are obtained directly from all important cold-storage warehouses, and data on commercial stocks of grain are reported by boards of trade, etc. Leaf-tobacco stocks are reported directly by dealers and manufacturers.

Where a weighting factor is available, market prices as shown are weighted averages; but in many cases a weighting factor is not available, and the prices shown are usually the means of ranges of quotations without reference to quantity. The weighted market prices of grain are based on the number of carload sales reported. The weighted average price of hogs at Chicago is based on total sales of butcher and packer hogs to slaughterers.

Prices derived from different sources may not be strictly comparable, although for most general purposes they are satisfactory. The data as to commercial stocks and movements of various commodities are as nearly complete as practicable and feasible, and are considered fairly representative.

The statistics of grain grading are based on work done by licensed grain inspectors located throughout the United States.

Statistics of acreage and production in foreign countries are compiled as far as possible from official sources and are therefore subject to whatever errors may result from shortcomings in the reporting and statistical services of the various countries. Inaccuracies also result from differences in nomenclature and classification in foreign countries. Except where otherwise stated, pre-war data refer to pre-war boundaries. Yields per acre are calculated from acreage and production, both rounded to thousand units, and are therefore subject to a greater possibility of error when calculated for countries with small acreage.

The tables of international trade cover substantially the international trade of the world. The total imports and the total exports in any one year can not be expected to balance, although disagreements tend to be compensated over a series of years. Among the sources of disagreement are: The different periods covered by the "year" of various countries; imports received in the year subsequent to the year of export; lack of uniformity in classification of goods as among countries; different trade practices and varying degrees of failure in recording countries of origin and ultimate destinations; different practices in recording reexported goods; and different methods of treating free ports. The exports given are domestic exports and the imports given are imports for consumption whenever it is possible to distinguish such imports from general imports, that is, "special" or net instead of general. General imports are all imports reported. In foreign countries "special" trade is imports for consumption, or net imports, or imports less reexports. In the United States imports for consumption are those entered for actual consumption and include withdrawals from warehouse for consumption. Special or net figures are used in the international trade tables for the following countries: Belgium, Denmark, Egypt, Irish Free State, China, Dutch East Indies, France, and United Kingdom. In the United States trade tables and wherever United States figures are given, they are domestic exports and general imports unless otherwise specified. While there are some inevitable omissions, there may be some duplication because of reshipments which do not appear as such in the official reports. In the trade tables, figures for the United States include Alaska, Porto Rico, and Hawaii, but not the Philippine Islands.

As an aid to the comprehension and use of these statistics, the following table of weights, measures, and conversion factors will be useful:

Weights, measures, and conversion factors used in the Department of Agriculture

Commodity	Unit [1]	Weight in pounds
Alfalfa seed	Bushel	60
Almonds	Short ton	2,000
Apricots	do	2,000
Do	Bushel	48
Asparagus	Short ton	2,000
Barley	Bushel	48
Beans, snap	Short ton	2,000
Beans, dry	Bushel	60
Beet sugar	Short ton	2,000
Broomcorn	do	2,000
Buckwheat	Bushel	48
Cabbage	Short ton	2,000
Cane sugar	do	2,000
Clover seed	Bushel	60
Corn, shelled	do	56
Corn, ear, husked	do	70
Cottonseed	Short ton	2,000
Cotton, ginned	Bale	[2] 478 [3] 500
Cottonseed oil	Gallon	7.5
Cranberries	Barrel	100
Flaxseed	Bushel	56
Figs	Short ton	2,000
Grapefruit	Box	[2] 70
Grapes	Short ton	2,000
Hay	do	2,000
Hempseed	Bushel	44

Commodity	Unit [1]	Weight in pounds
Lemons	Box	[2] 74
Milk	Gallon	8.6
Oats	Bushel	32
Oranges (Calif.)	Box	[2] 70
Oranges (Fla.)	do	[2] 80
Orchard grass	Bushel	14
Peanut oil	Gallon	7.5
Plums	Short ton	2,000
Potatoes	Bushel	60
Prunes	Short ton	2,000
Rapeseed	Bushel	50
Raisins	Short ton	2,000
Rice, rough	Bushel	45
Rice, cleaned	do	60
Rye	do	56
Rye flour	Barrel	196
Soybean oil	Gallon	7.5
Spelt	Bushel	40
Sugar	Short ton	2,000
Sugar beets	Short ton	2,000
Sugarcane	do	2,000
Timothy seed	Bushel	45
Tomatoes	do	56
Wheat	do	60
Wheat flour	Barrel	196
Walnuts	Short ton	2,000

Commodity	Equivalents
Almonds	1 pound shelled is equivalent to about 3⅓ pounds unshelled.
Apples	1 pound dried is equivalent to about 5 pounds of fresh.
Barley flour	1 barrel (196 pounds) is equivalent to about 9 bushels of barley.
Buckwheat flour	1 barrel (196 pounds) is equivalent to about 7 bushels of buckwheat.
Filberts	1 pound shelled is equivalent to about 2.22 pounds unshelled.
Malt	1.1 bushel (34 pounds) is equivalent to about 1 bushel of barley.
Oatmeal	1 barrel (196 pounds) is equivalent to about 10⅚ bushels of oats.
Do	18 pounds is equivalent to about 1 bushel of oats.
Peanuts	1 pound shelled is equivalent to about 1½ pounds unshelled.
Peaches (Calif.)	1 pound dried is equivalent to about 5½ pounds fresh.
Prunes	1 pound dried is equivalent to about 2½ pounds fresh.
Rye flour	1 barrel (196 pounds) is equivalent to about 6 bushels of rye.
Raisins	1 pound is equivalent to about 4 pounds of grapes.
Wheat flour	1 barrel (196 pounds) is equivalent to about 4.7 bushels of wheat.[4]
Walnuts (English)	1 pound shelled is equivalent to about 2.38 pounds unshelled.

[1] Standard bushel used in the United States contains 2.150.42 cubic inches; the gallon, 231 cubic inches.
[2] Net.
[3] Gross.
[4] Due to changes in milling processes, equivalents have varied as follows: 1790–1879, 5; 1880–1908, 4.75; 1909–1917, 4.7; 1918–1919, 4.5; 1920, 4.6; 1921–1927, 4.7.

STATISTICS OF GRAINS

TABLE 1.—*Wheat, all: Acreage, production, value, exports, etc., United States, 1849, 1859, 1866–1930*

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Spring wheat, price per bushel at Chicago, year beginning July 1 [1]	No. 2 red winter wheat, price per bushel at Chicago, year beginning July 1 [2]	Foreign trade, including flour, year beginning July 1 [3]			
								Domestic exports [4]	Imports [5]	Net exports [6]	
										Total	Percentage of production
	1,000 acres	*Bush.*	*1,000 bush.*	*Cts.*	*1,000 dolls.*	*Cts.*	*Cts.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Per cent*
1849			*100, 486*			66		7, 536	2, 913	5, 701	5. 7
1859			*173, 105*			90	82	17, 213	[7] 4, 493	[7] 12, 720	7. 3
1866	15, 424	9. 9	152, 000	152. 7	232, 110	219	94	12, 647	3, 093	10, 828	7. 1
1867	18, 322	11. 6	212, 441	145. 2	308, 387	198	145	26, 323	2, 014	24, 550	11. 6
1868	18, 460	12. 1	224, 037	108. 5	243, 033	134	123	29, 717	1, 830	28, 314	12. 6
1869			*287, 746*								
1869	19, 181	13. 6	260, 147	76. 5	199, 025	98	84	53, 901	1, 286	53, 126	20. 4
1870	18, 993	12. 4	235, 885	94. 4	222, 767	116	84	52, 574	867	52, 195	22. 1
1871	19, 944	11. 6	230, 722	114. 5	264, 076	124	109	38, 996	2, 411	37, 587	16. 3
1872	20, 858	12. 0	249, 997	111. 4	278, 522	121	111	52, 015	1, 841	50, 705	20. 3
1873	22, 172	12. 7	281, 255	106. 9	300, 670	116	103	91, 510	2, 117	90, 418	32. 1
1874	24, 967	12. 3	308, 103	86. 3	265, 881	95	98	72, 913	368	72, 845	23. 6
1875	26, 382	11. 1	292, 136	89. 5	261, 397	106	86	74, 751	1, 664	74, 508	25. 5
1876	27, 627	10. 5	289, 356	97. 0	280, 743	122	92	57, 044	366	57, 148	19. 8
1877	26, 278	13. 9	364, 194	105. 7	385, 089	111	121	92, 142	1, 391	92, 028	25. 3
1878	32, 109	13. 1	420, 122	77. 6	325, 814	90	95	150, 503	2, 074	150, 253	35. 8
1879	*35, 430*	*13. 0*	*459, 483*								
1879	35, 430	14. 1	499, 893	110. 6	552, 884	110	99	181, 807	487	181, 951	36. 4
1880	37, 987	13. 1	498, 550	95. 1	474, 202	100	105	188, 308	212	188, 250	37. 8
1881	37, 709	10. 2	383, 280	119. 2	456, 880	128	115	123, 371	867	123, 211	32. 1
1882	37, 067	13. 6	504, 185	88. 4	445, 602	105	118	150, 113	1, 088	150, 000	29. 8
1883	36, 456	11. 6	421, 086	91. 1	383, 649	93	102	113, 822	33	113, 892	27. 0
1884	39, 476	13. 0	512, 765	64. 5	330, 862	79	83	135, 232	213	135, 301	26. 4
1885	34, 189	10. 4	357, 112	77. 1	275, 320	81	88	96, 611	389	96, 569	27. 0
1886	36, 806	12. 4	457, 218	68. 7	314, 226	77	76	156, 685	283	156, 760	34. 3
1887	37, 642	12. 1	456, 329	68. 1	310, 613	75	75	122, 616	596	122, 524	26. 8
1888	37, 336	11. 1	415, 868	92. 6	385, 248	95	88	90, 944	136	91, 030	21. 9
1889	*33, 580*	*13. 9*	*468, 374*								
1889	33, 580	12. 9	434, 383	69. 5	301, 869	81	86	112, 488	163	112, 507	25. 9
1890	34, 048	11. 1	378, 097	83. 3	315, 112	97	89	109, 017	586	109, 054	28. 8
1891	37, 826	11. 5	584, 504	83. 4	487, 463	89	96	229, 465	2, 463	228, 841	39. 2
1892	39, 552	13. 3	527, 987	62. 2	328, 331	73	78	196, 068	968	195, 672	37. 1

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns.

[1] Spring wheat prices compiled as follows: 1849–1870, from Chicago newspapers, quoted; 1849, spring wheat, contract grade; 1859, standard spring, contract grade; 1866–1870, No. 1 spring, contract grade; 1871–1884, annual reports of Chicago Board of Trade, quoted as No. 2 spring, contract grade; 1885–1896, Bartel's Red Book, quoted as No. 2 spring; January, 1897–June, 1904, Chicago Daily Trade Bulletin, average of daily ranges; quotations used; January–October, 1897, No. 3 spring; November, 1897–June, 1898, No. 3 spring, hard varieties; July, 1898–June, 1904, No. 1 spring; from February, 1897, "free on board" was used when available; July, 1904–December, 1918, Bartel's Red Book, average of daily ranges, quoted as No. 1 northern. Subsequently from the Chicago Daily Trade Bulletin and are averages of the daily cash price per bushel weighted by car-lot sales.

[2] Prices, 1839–1898, are from the Price Current Grain Reporter 1924 Yearbook, p. 4, and are average cash prices for calendar years; subsequently from the Chicago Daily Trade Bulletin and are averages of the daily cash price per bushel weighted by car-lot sales.

[3] Compiled from Commerce and Navigation of the United States, 1849, 1859, 1866-1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927-1930. Wheat flour converted to terms of grain on the following basis: 1849, 1859, 1866–1879, 1 barrel is the product of 5 bushels of grain; 1880–1908 4.75; 1909–1917, 4.7; 1918–1919, 4.5; 1920, 4.6; 1921–1930, 4.7.

[4] Includes flour milled from imported wheat.

[5] Includes wheat imported for milling in bond and export.

[6] Total exports (domestic plus foreign) minus total imports.

[7] Imports of flour estimated.

TABLE 1.—*Wheat, all: Acreage, production, value, exports, etc., United States, 1849, 1859, 1866–1930*—Continued

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Spring wheat, price per bushel at Chicago, year beginning July 1	No. 2 red winter wheat, price per bushel at Chicago, year beginning July 1	Foreign trade, including flour, year beginning July 1: Domestic exports	Foreign trade: Imports	Net exports: Total	Net exports: Percentage of production
	1,000 acres	*Bush.*	*1,000 bush.*	*Cts.*	*1,000 dolls.*	*Cts.*	*Cts.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Per cent*
1893	37,934	11.3	427,553	53.5	228,599	60	68	168,498	1,183	167,531	39.2
1894	39,425	13.1	516,485	48.9	252,709	57	57	148,630	1,439	147,740	28.6
1895	40,848	13.9	569,456	50.3	286,539	61	62	130,099	2,117	130,345	22.9
1896	43,916	12.4	544,193	71.7	390,346	70	67	148,767	1,545	148,725	27.3
1897	46,046	13.3	610,254	80.9	493,683	91	86	221,143	2,060	220,965	36.2
1898	51,007	15.1	772,163	58.2	449,022	71	90	227,240	1,875	227,300	29.4
1899	*52,589*	*12.5*	*658,534*								
1899	52,589	12.1	636,051	58.6	372,982	70	[8] 72	190,772	320	190,749	30.0
1900	51,387	11.7	602,708	62.0	373,578	75	76	220,653	603	220,723	36.6
1901	52,473	15.0	788,638	62.6	493,766	74	72	239,212	121	239,137	30.3
1902	49,649	14.6	724,808	63.0	456,851	77	75	207,835	1,080	208,016	28.7
1903	51,632	12.9	663,923	69.5	461,439	90	83	124,977	229	124,926	18.8
1904	47,825	12.5	596,911	92.4	551,788	114	[9] 100	46,319	3,296	43,612	7.3
1905	49,389	14.7	726,819	74.6	542,543	89	[8] 88	101,089	273	100,849	13.9
1906	47,800	15.8	756,775	66.2	501,316	84	77	150,597	602	150,594	19.9
1907	45,116	14.1	637,981	86.5	552,074	107	90	166,525	530	166,304	26.1
1908	45,970	14.0	644,656	92.2	594,128	116	96	116,373	475	115,901	18.0
1909	*44,263*	*15.4*	*683,379*								
1909	44,262	15.8	700,434	98.4	689,108	114	110	89,173	845	88,465	12.6
1910	45,681	13.9	635,121	88.3	561,051	107	102	71,338	1,175	70,164	11.0
1911	49,543	12.5	621,338	87.4	543,063	110	90	81,891	3,445	78,447	12.6
1912	45,814	15.9	730,267	76.0	555,280	94	103	145,159	1,304	143,938	19.7
1913	50,184	15.2	763,380	79.9	610,122	93	88	147,955	2,402	146,306	19.2
1914	53,541	16.6	891,017	98.6	878,680	132	108	335,702	728	335,162	37.6
1915	60,469	17.0	1,025,801	91.9	942,303	120	113	246,221	7,254	239.591	23.4
1916	52,316	12.2	636,318	160.3	1,019,968	196	168	205,962	24,960	181,067	28.5
1917	45,089	14.1	636,655	200.8	1,278,112	227	225	132,579	31,215	102,775	16.1
1918	59,181	15.6	921,438	204.2	1,881,826	234	222	287,402	11,289	276,615	30.0
1919	*73,099*	*12.9*	*945,403*								
1919	75,694	12.8	967,979	214.9	2,080,056	276	224	222,030	5,511	216,671	22.4
1920	61,143	13.6	833,027	143.7	1,197,263	198	223	369,313	57,682	312,625	37.5
1921	63,696	12.8	814,905	92.6	754,834	136	125	282,566	17,375	265,590	32.6
1922	62,317	13.9	867,598	100.7	873,412	122	114	224,900	20,031	205,079	23.6
1923	59,659	13.4	797,394	92.3	736,006	119	102	159,880	28,079	131,892	16.5
1924	*50,862*	*15.7*	*800,877*								
1924	52,535	16.5	864,428	129.9	1,123,086	155	158	260,803	6,201	254,695	29.5
1925	52,367	12.9	676,765	141.6	958,364	166	164	108,035	15,679	92,669	13.7
1926	56,359	14.8	831,381	119.8	996,308	140	138	219,160	13,264	205,994	24.8
1927	58,784	14.9	878,374	111.5	979,813	140	140	206,259	15,734	190,578	21.7
1928	58,272	15.7	914,876	97.0	887,184	118	138	163,687	21,442	142,301	15.8
1929	61,464	13.2	809,176	104.2	843,030	127	130	153,316	12,956	140,432	17.4
1930 [10]	59,153	14.4	850,965	60.8	517,407						

[8] Weighted average for 11 months.
[9] Weighted average for 10 months.
[10] Preliminary.

TABLE 2.—*Wheat, all: Acreage harvested and production, by States, average, 1924–1928, annual 1927–1930*

State and division	Acreage harvested					Production				
	Average, 1924–1928	1927	1928	1929	1930[1]	Average, 1924–1928	1927	1928	1929	1930[1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	5	4	4	4	3	114	72	80	92	66
Vermont	1	1	1	1	1	28	20	16	18	20
New York	306	301	316	281	263	5,599	6,291	4,702	4,488	4,800
New Jersey	58	60	60	55	52	1,215	1,380	1,200	1,045	1,222
Pennsylvania	1,129	1,098	1,108	1,119	1,122	20,450	20,301	17,171	20,138	25,236
North Atlantic	1,499	1,464	1,489	1,460	1,441	27,406	28,064	23,169	25,781	31,344
Ohio	1,551	1,615	872	1,646	1,613	27,335	29,068	9,475	32,093	28,716
Indiana	1,576	1,790	910	1,631	1,615	25,302	27,749	10,040	27,723	29,058
Illinois	2,202	2,509	1,563	2,451	2,296	34,737	34,844	22,939	36,537	41,952
Michigan	893	897	887	904	824	17,232	19,270	14,202	16,810	19,336
Wisconsin	121	145	104	105	109	2,587	3,142	2,141	2,190	2,331
Minnesota	1,841	1,763	1,532	1,372	1,301	27,366	20,925	22,964	19,723	21,525
Iowa	422	441	452	416	405	8,096	8,236	8,723	8,076	8,937
Missouri	1,559	1,568	1,511	1,730	1,420	20,054	15,700	19,194	17,300	19,880
North Dakota	9,763	10,246	10,810	10,197	9,336	121,692	130,191	155,358	97,262	99,807
South Dakota	2,685	3,037	3,360	3,211	3,420	31,783	45,386	34,928	31,200	40,840
Nebraska	3,223	3,630	3,672	3,548	3,810	55,300	73,826	69,919	56,555	73,275
Kansas	9,797	9,946	10,473	11,516	11,775	135,319	111,327	177,833	138,060	158,862
North Central	35,631	37,587	36,146	38,727	37,924	506,804	519,664	547,716	483,529	544,519
Delaware	101	98	102	107	106	1,885	1,862	1,836	2,033	2,067
Maryland	514	525	530	536	509	9,638	9,188	8,745	9,380	11,707
Virginia	661	687	673	700	644	9,373	8,381	9,758	8,960	9,982
West Virginia	132	135	122	134	134	1,826	1,796	1,586	1,782	2,345
North Carolina	439	483	444	457	343	5,211	5,168	5,150	5,347	4,288
South Carolina	59	80	64	64	42	723	880	800	768	538
Georgia	100	125	94	85	49	1,101	1,150	1,034	850	588
South Atlantic	2,006	2,133	2,029	2,083	1,827	29,756	28,425	28,909	29,120	31,515
Kentucky	222	296	125	240	238	2,773	2,812	1,000	2,832	3,284
Tennessee	413	528	422	405	308	4,635	3,696	3,714	3,645	3,542
Alabama	6	7	4	4	4	70	74	44	40	40
Mississippi	5	6	3	4	4	76	102	60	68	68
Arkansas	29	28	22	26	27	350	322	253	312	351
Oklahoma	3,867	3,708	4,413	4,236	3,547	50,566	33,372	59,576	44,478	33,696
Texas	1,570	1,850	2,016	2,520	2,570	20,944	17,945	22,176	37,800	28,270
South Central	6,112	6,423	7,005	7,435	6,698	79,414	58,323	86,823	89,175	69,251
Montana	3,622	3,850	4,275	4,226	3,913	57,954	80,208	77,998	40,688	33,698
Idaho	1,026	1,171	1,160	1,083	1,027	25,580	32,374	28,792	25,515	28,223
Wyoming	193	226	243	256	247	3,332	4,186	3,897	3,409	3,565
Colorado	1,374	1,419	1,339	1,397	1,459	18,395	20,112	18,564	18,012	21,780
New Mexico	157	55	186	305	206	2,364	570	2,054	5,742	1,921
Arizona	41	58	47	42	46	1,015	1,450	1,269	1,134	1,288
Utah	234	242	257	266	268	5,490	5,678	6,861	6,403	6,999
Nevada	16	18	18	16	15	424	460	482	404	386
Washington	2,112	2,261	2,271	2,430	2,445	42,922	58,436	48,644	44,910	40,065
Oregon	994	1,065	1,027	1,058	1,017	20,478	26,782	23,318	23,114	23,391
California	645	812	780	680	620	11,830	13,642	16,380	12,240	13,020
Western	10,415	11,177	11,603	11,759	11,263	189,785	243,898	228,259	181,571	174,336
United States	55,663	58,784	58,272	61,464	59,153	833,165	878,374	914,876	809,176	850,965

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 3.—*Wheat, winter: Acreage harvested and production, by States, average 1924–1928, annual 1927–1930*

State and division	Acreage harvested: Average, 1924–1928	Acreage harvested: 1927	Acreage harvested: 1928	Acreage harvested: 1929	Acreage harvested: 1930 [1]	Production: Average, 1924–1928	Production: 1927	Production: 1928	Production: 1929	Production: 1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
New York	297	289	306	272	253	5,431	6,069	4,529	4,352	4,630
New Jersey	58	60	60	55	52	1,215	1,380	1,200	1,045	1,222
Pennsylvania	1,124	1,090	1,101	1,112	1,116	20,375	20,165	17,066	20,016	25,110
North Atlantic	1,479	1,439	1,467	1,439	1,421	27,021	27,614	22,795	25,413	30,962
Ohio	1,546	1,610	864	1,642	1,609	27,219	28,980	9,331	32,019	28,640
Indiana	1,569	1,782	900	1,627	1,611	25,199	27,621	9,900	27,659	28,998
Illinois	2,054	2,293	1,261	2,270	2,088	32,078	30,956	17,654	33,369	37,584
Michigan	888	891	882	900	819	17,138	19,156	14,112	16,740	19,246
Wisconsin	62	73	42	39	42	1,357	1,716	777	936	924
Minnesota	156	155	165	150	151	3,024	3,317	2,640	3,150	3,020
Iowa	388	400	411	379	370	7,552	7,600	8,014	7,466	8,325
Missouri	1,548	1,558	1,496	1,720	1,410	19,906	15,580	18,999	17,200	19,740
South Dakota	104	105	105	94	120	1,361	1,890	1,260	1,316	2,016
Nebraska	3,038	3,457	3,492	3,354	3,622	52,456	70,868	66,697	53,664	70,267
Kansas	9,782	9,936	10,433	11,476	11,735	135,180	111,283	177,361	137,712	158,422
North Central	21,133	22,260	20,051	23,651	23,577	322,471	318,967	326,745	331,231	377,182
Delaware	101	98	102	107	106	1,885	1,862	1,836	2,033	2,067
Maryland	514	525	530	536	509	9,638	9,188	8,745	9,380	11,707
Virginia	661	687	673	700	644	9,373	8,381	9,758	8,960	9,982
West Virginia	132	135	122	134	134	1,826	1,796	1,586	1,782	2,345
North Carolina	439	483	444	457	343	5,211	5,168	5,150	5,347	4,288
South Carolina	59	80	64	64	42	723	880	800	768	538
Georgia	100	125	94	85	49	1,101	1,150	1,034	850	588
South Atlantic	2,006	2,133	2,029	2,083	1,827	29,756	28,425	28,909	29,120	31,515
Kentucky	222	296	125	240	238	2,773	2,812	1,000	2,832	3,284
Tennessee	413	528	422	405	308	4,635	3,696	3,714	3,645	3,542
Alabama	6	7	4	4	4	70	74	44	40	40
Mississippi	5	6	3	4	4	76	102	60	68	68
Arkansas	29	28	22	26	27	350	322	253	312	351
Oklahoma	3,867	3,708	4,413	4,236	3,547	50,566	33,372	59,576	44,478	33,696
Texas	1,570	1,850	2,016	2,520	2,570	20,944	17,945	22,176	37,800	28,270
South Central	6,112	6,423	7,005	7,435	6,698	79,414	58,323	86,823	89,175	69,251
Montana	563	648	803	532	585	9,489	14,256	12,045	7,448	5,440
Idaho	447	501	456	520	520	10,253	12,274	10,488	11,440	13,520
Wyoming	48	54	75	95	107	777	918	1,125	1,235	1,605
Colorado	1,069	1,086	923	1,043	1,147	13,289	14,118	11,076	11,994	16,632
New Mexico	123	25	150	263	166	1,826	150	1,500	4,734	1,361
Arizona	41	58	47	42	46	1,015	1,450	1,269	1,134	1,288
Utah	148	152	162	166	166	2,940	2,888	3,726	3,403	3,735
Nevada	4	4	4	4	2	100	96	104	104	48
Washington	1,014	1,228	1,424	1,210	920	24,306	36,226	35,600	27,830	20,240
Oregon	751	900	837	896	806	16,150	23,400	20,088	19,712	18,538
California	645	812	780	680	620	11,830	13,642	16,380	12,240	13,020
Western	4,854	5,468	5,661	5,451	5,085	91,975	119,418	113,401	101,274	95,427
United States	35,585	37,723	36,213	40,059	38,608	550,636	552,747	578,673	576,213	604,337

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 4.—*Wheat, spring: Acreage harvested and production, by States, average 1924–1928, annual 1927–1930*

[Spring wheat other than Durum]

State and division	Acreage harvested: Average, 1924–1928	Acreage harvested: 1927	Acreage harvested: 1928	Acreage harvested: 1929	Acreage harvested: 1930 [1]	Production: Average, 1924–1928	Production: 1927	Production: 1928	Production: 1929	Production: 1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	5	4	4	4	3	114	72	80	92	66
Vermont	1	1	1	1	1	28	20	16	18	20
New York	9	12	10	9	10	168	222	173	136	170
Pennsylvania	[2] 7	8	7	7	6	[2] 125	136	105	122	126
North Atlantic	20	25	22	21	20	385	450	374	368	382
Ohio	5	5	8	4	4	116	88	144	74	76
Indiana	6	8	10	4	4	102	128	140	64	60
Illinois	148	216	302	181	208	2, 659	3, 888	5, 285	3, 168	4, 368
Michigan	5	6	5	4	5	94	114	90	70	90
Wisconsin	59	72	62	66	67	1, 230	1, 426	1, 364	1, 254	1, 407
Minnesota	1, 472	1, 340	1, 032	1, 001	950	21, 042	14, 070	14, 964	13, 413	15, 105
Iowa	34	41	41	37	35	544	636	709	610	612
Missouri	10	10	15	10	10	149	120	195	100	140
North Dakota	5, 942	6, 024	5, 660	6, 283	6, 283	68, 948	71, 083	78, 108	59, 688	64, 087
South Dakota	1, 615	1, 953	1, 933	1, 757	1, 940	18, 187	27, 342	19, 523	16, 692	22, 504
Nebraska	185	173	180	194	188	2, 844	2, 958	3, 222	2, 891	3, 008
Kansas	15	10	40	40	40	139	44	472	348	440
North Central	9, 498	9, 858	9, 288	9, 581	9, 734	116, 054	121, 897	124, 216	98, 372	111, 897
Montana	3, 018	3, 187	3, 443	3, 664	3, 298	47, 865	65, 652	65, 417	32, 976	28, 033
Idaho	578	670	704	563	507	15, 327	20, 100	18, 304	14, 075	14, 703
Wyoming	145	172	168	161	140	2, 555	3, 268	2, 772	2, 174	1, 960
Colorado	305	333	416	354	312	5, 106	5, 994	7, 488	6, 018	5, 148
New Mexico	34	30	36	42	40	537	420	554	1, 008	560
Utah	86	90	95	100	102	2, 550	2, 790	3, 135	3, 000	3, 264
Nevada	12	14	14	12	13	325	364	378	300	338
Washington	1, 098	1, 033	847	1, 220	1, 525	18, 617	22, 210	13, 044	17, 080	19, 825
Oregon	243	165	190	162	211	4, 328	3, 382	3, 230	3, 402	4, 853
Western	5, 520	5, 694	5, 913	6, 278	6, 148	97, 210	124, 180	114, 322	80, 033	78, 684
United States	15, 038	15, 577	15, 223	15, 880	15, 902	213, 649	246, 527	238, 912	178, 773	190, 963
DURUM WHEAT										
Minnesota	213	268	335	221	200	3, 300	3, 538	5, 360	3, 160	3, 400
North Dakota	3, 821	4, 222	5, 150	3, 914	3, 053	52, 743	59, 108	77, 250	37, 574	35, 720
South Dakota	966	979	1, 322	1, 360	1, 360	12, 236	16, 154	14, 145	13, 192	16, 320
Montana	40	15	29	30	30	600	300	536	264	225
Total	5, 040	5, 484	6, 836	5, 525	4, 643	68, 879	79, 100	97, 291	54, 190	55, 665

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary. 3-year average.

TABLE 5.—*Wheat: Yield per acre and estimated price per bushel, December 1, by States, averages, and annual, 1925–1930*

ALL WHEAT, INCLUDING DURUM

State and division	Yield per acre							Estimated price per bushel, Dec. 1						
	Average, 1919–1928	1925	1926	1927	1928	1929	1930	Average, 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	22.1	28.0	20.0	18.0	20.0	23.0	22.0	171	170	175	175	165	150	105
Vermont	18.9	21.0	20.0	20.0	16.0	18.0	20.0	141	150	132	140	131	125	100
New York	19.3	19.5	17.5	20.9	14.9	16.0	18.3	138	152	132	125	137	124	79
New Jersey	19.8	21.0	22.0	23.0	20.0	19.0	23.5	136	143	132	125	124	123	87
Pennsylvania	18.0	20.0	20.0	18.5	15.5	18.0	22.5	135	147	129	127	129	121	80
North Atlantic	18.4	20.0	19.6	19.2	15.6	17.7	21.8	135.9	148.0	129.8	126.6	130.4	121.7	80.3
Ohio	16.2	15.0	22.5	18.0	10.9	19.5	17.8	137	158	127	125	131	116	76
Indiana	14.8	14.5	20.0	15.5	11.0	17.0	18.0	134	155	124	124	124	112	71
Illinois	16.2	16.1	18.0	13.9	14.7	14.9	18.3	138	150	122	120	112	111	69
Michigan	17.8	17.0	18.3	21.5	16.0	18.6	23.5	133	156	122	120	128	113	73
Wisconsin	18.2	20.1	20.3	21.7	20.6	20.9	21.4	123	136	126	117	106	110	73
Minnesota	13.1	13.4	12.9	11.9	15.0	14.4	16.5	119	137	123	110	96	105	57
Iowa	18.7	16.2	21.4	18.7	19.3	19.4	22.1	120	136	120	117	100	106	65
Missouri	12.7	13.2	15.3	10.0	12.7	10.0	14.0	130	150	124	122	121	113	74
North Dakota	10.8	11.7	8.0	12.7	14.4	9.5	10.7	112	131	117	103	81	98	51
South Dakota	10.7	11.8	6.1	14.9	10.4	9.7	11.9	112	128	118	106	85	93	46
Nebraska	15.4	12.8	13.0	20.3	19.0	15.9	19.2	116	140	117	109	94	99	53
Kansas	13.2	9.0	14.8	11.2	17.0	12.0	13.5	121	148	119	117	94	100	56
North Central	13.1	12.1	13.3	13.8	15.2	12.5	14.4	119.5	141.8	120.3	112.2	93.7	102.8	58.3
Delaware	16.8	18.5	20.0	19.0	18.0	19.0	19.5	134	145	130	125	125	116	78
Maryland	17.4	21.0	23.0	17.5	16.5	17.5	23.0	136	151	130	127	127	118	77
Virginia	13.1	14.2	16.5	12.2	14.5	12.8	15.5	141	161	131	132	135	125	97
West Virginia	13.2	13.5	16.0	13.3	13.0	13.3	17.5	143	158	135	137	137	133	102
North Carolina	10.7	11.0	14.1	10.7	11.6	11.7	12.5	154	171	143	145	152	141	109
South Carolina	11.2	11.0	16.0	11.0	12.5	12.0	12.8	165	185	155	152	161	150	131
Georgia	10.3	10.5	15.0	9.2	11.0	10.0	12.0	165	182	150	155	167	155	135
South Atlantic	13.5	15.2	17.7	13.3	14.2	14.0	17.2	142.9	158.9	134.3	134.2	136.9	127.1	91.6
Kentucky	11.6	14.0	18.5	9.5	8.0	11.8	13.8	142	160	133	135	138	126	91
Tennessee	10.5	12.5	18.0	7.0	8.8	9.0	11.5	146	166	136	139	143	132	100
Alabama	10.6	11.0	13.4	10.6	11.0	10.0	10.0	162	175	160	155	157	152	135
Mississippi	14.9	18.0	17.0	17.0	20.0	17.0	17.0	142	160	129	135	137	135	135
Arkansas	11.3	13.0	13.5	11.5	11.5	12.0	13.0	132	150	128	125	122	129	98
Oklahoma	12.7	8.2	17.5	9.0	13.5	10.5	9.5	122	147	118	120	100	99	59
Texas	12.3	8.0	18.2	9.7	11.0	15.0	11.0	127	155	120	121	110	105	70
South Central	12.4	8.8	17.7	9.1	12.4	12.0	10.3	125.2	151.4	120.4	122.3	105.0	103.9	67.4
Montana	13.3	10.8	12.5	20.8	18.2	9.6	8.6	111	139	112	96	83	95	48
Idaho	23.8	28.1	23.6	27.6	24.8	23.6	27.5	110	125	106	98	90	95	52
Wyoming	16.8	17.5	18.8	18.5	16.0	13.3	14.4	104	124	107	94	83	89	49
Colorado	13.9	11.8	12.7	14.2	13.9	12.9	14.9	110	136	107	104	85	93	53
New Mexico	13.6	6.2	22.7	10.4	11.0	18.8	9.3	122	150	110	119	107	96	61
Arizona	24.3	23.0	25.0	25.0	27.0	27.0	28.0	142	175	130	135	130	135	105
Utah	21.7	26.2	23.2	23.5	26.7	24.1	26.1	113	130	105	102	98	102	66
Nevada	24.8	30.4	24.0	25.6	26.8	25.2	25.7	132	146	116	125	122	129	104
Washington	19.5	19.4	19.4	25.8	21.4	18.5	16.4	117	130	116	108	100	107	56
Oregon	20.7	19.6	18.2	25.1	22.7	21.8	23.0	120	136	120	112	103	111	58
California	17.8	19.0	18.4	16.8	21.0	18.0	21.0	134	148	130	118	118	120	85
Western	17.2	16.4	16.6	21.8	19.7	15.4	15.5	114.2	134.1	113.4	103.1	93.4	101.9	56.9
United States	14.1	12.9	14.8	14.9	15.7	13.2	14.4	120.0	141.6	119.8	111.5	97.0	104.2	60.8
DURUM														
Minnesota	14.4	15.2	14.0	13.2	16.0	14.3	17.0	----	----	----	105	81	91	51
North Dakota	12.2	14.6	9.5	14.0	15.0	9.6	11.7	----	----	----	100	71	89	46
South Dakota	12.4	13.9	6.6	16.5	10.7	9.7	12.0	----	----	----	102	73	85	42
Montana	12.7	10.0	8.6	20.0	18.5	8.8	7.5	----	----	----	97	84	88	42
Average	12.3	14.4	9.2	14.4	14.2	9.8	12.0	----	----	----	100.6	71.9	88.1	45.1

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

TABLE 6.—*Wheat, winter and spring: Acreage sown and harvested, production, and farm value, United States, 1910–1930*

Year	Winter wheat						Spring wheat, including durum				
	Acreage sown in preceding fall	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Total farm value Dec. 1	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Total farm value Dec. 1
	1,000 acres	*1,000 acres*	*Bush.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*1,000 acres*	*Bush.*	*1,000 bushels*	*Cents*	*1,000 dollars*
1910	31,659	27,329	15.9	434,142	88.1	382,318	18,352	11.0	200,979	88.9	178,733
1911	32,648	29,162	14.8	430,656	88.0	379,151	20,381	9.4	190,682	86.0	163,912
1912	33,229	26,571	15.1	399,919	80.9	323,572	19,243	17.2	330,348	70.1	231,708
1913	33,274	31,699	16.5	523,561	82.9	433,995	18,485	13.0	239,819	73.4	176,127
1914	37,158	36,008	19.0	684,990	98.6	675,623	17,533	11.8	206,027	98.6	203,057
1915	42,431	41,308	16.3	673,947	94.7	638,149	19,161	18.4	351,854	86.4	304,154
1916	39,245	34,709	13.8	480,553	162.7	781,906	17,607	8.8	155,765	152.8	238,062
1917	38,359	27,257	15.1	412,901	202.8	837,237	17,832	12.5	223,754	197.0	440,875
1918	43,126	37,130	15.2	565,099	206.3	1,165,995	22,051	16.2	356,339	200.9	715,831
1919	51,483	50,494	15.1	760,377	210.5	1,600,805	25,200	8.2	207,602	230.9	479,251
1920	44,861	40,016	15.3	610,597	148.6	907,291	21,127	10.5	222,430	130.4	289,972
1921	45,625	43,414	13.8	600,316	95.1	571,044	20,282	10.6	214,589	85.6	183,790
1922	47,930	42,358	13.8	586,878	104.7	614,399	19,959	14.1	280,720	92.3	259,013
1923	46,091	39,508	14.5	571,777	95.1	543,530	20,151	11.2	225,617	85.3	192,476
1924	38,916	35,656	16.6	592,259	131.6	779,548	16,879	16.1	272,169	126.2	343,538
1925	39,951	31,346	12.8	402,070	147.9	594,746	21,021	13.1	274,695	132.4	363,618
1926	39,887	36,987	17.0	627,433	121.2	760,406	19,372	10.5	203,948	115.7	235,902
1927	43,373	37,723	14.7	552,747	116.7	645,326	21,061	15.5	325,627	102.7	334,487
1928	47,317	36,213	16.0	578,673	103.5	599,207	22,059	15.2	336,203	85.7	287,977
1929	42,720	40,059	14.4	576,213	106.5	613,621	21,405	10.9	232,963	98.5	229,409
1930 [1]	42,513	38,608	15.7	604,337	64.3	388,627	20,545	12.0	246,628	52.2	128,780

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 7.—*Winter wheat: Percentage of acreage abandoned, average 1919–1928, annual 1926–1930* [1]

State	Average, 1919–1928	1926	1927	1928	1929	1930	State	Average, 1919–1928	1926	1927	1928	1929	1930
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*		*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
N. Y.	3.1	8.0	1.0	6.0	2.0	8.0	Ky.	13.8	2.5	3.0	65.0	3.0	3.5
N. J.	3.4	3.0	1.0	5.0	1.0	1.0	Tenn.	7.7	1.7	5.0	28.0	4.0	4.0
Pa.	2.8	2.0	2.5	9.0	1.0	2.5	Ala.	8.5	3.0	10.0	15.0	3.0	4.0
Ohio	13.2	3.0	3.0	64.0	1.0	15.0	Miss.	21.7	20.0	10.0	40.0	10.0	20.0
Ind.	11.0	3.0	3.0	60.0	4.0	7.0	Ark.	8.7	3.0	20.0	30.0	10.0	5.0
Ill.	11.7	5.0	5.5	62.0	8.0	9.0	Okla.	9.5	2.0	20.0	7.0	6.0	14.0
Mich.	3.6	7.0	2.0	10.0	1.5	3.0	Tex.	16.4	3.0	24.0	23.0	7.0	16.0
Wis.	11.2	10.0	2.5	32.0	2.0	5.0	Mont.	26.8	20.0	12.0	18.0	15.0	23.8
Minn.	11.8	7.0	2.0	45.0	3.5	8.0	Idaho	6.4	6.0	4.0	5.0	3.0	4.0
Iowa	5.5	4.0	2.5	22.0	3.0	1.9	Wyo.	10.0	4.0	12.0	10.0	12.0	15.0
Mo.	7.9	5.5	11.0	32.0	4.0	7.0	Colo.	21.9	20.0	30.0	40.0	20.0	24.0
S. Dak.	17.6	20.0	10.0	40.0	5.0	5.0	N. Mex.	36.7	3.0	89.0	45.0	20.0	52.0
Nebr.	9.0	12.0	4.0	10.0	9.0	2.5	Ariz.	5.0	2.0	1.0	1.0	2.0	2.1
Kans.	13.9	11.0	20.0	15.2	5.0	5.0	Utah	3.4	2.0	3.0	2.0	2.5	3.0
Del.	2.4	2.0	1.0	1.0	1.0	1.0	Nev.	3.3	0	0	1.0	1.5	0
Md.	2.3	1.5	1.5	3.0	1.5	1.5	Wash.	14.8	4.0	6.0	6.0	10.0	28.0
Va.	2.7	1.5	2.0	6.0	1.5	1.3	Oreg.	9.2	3.0	1.0	3.0	3.0	5.0
W. Va.	4.6	1.0	1.5	15.0	1.5	1.0	Calif.	16.8	7.0	3.0	9.0	20.0	10.0
N. C.	2.7	2.0	3.0	7.0	2.0	4.5							
S. C.	4.8	2.5	6.0	12.0	5.0	4.0	U. S.	11.7	7.3	13.0	23.5	6.2	9.2
Ga.	10.2	3.0	8.0	15.0	6.0	6.0							

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] For entire season, planting to harvest. Includes winter abandonment, which is estimated on May 1 of each season.

TABLE 8.—*Wheat: World production, 1890–91 to 1930–31*

Crop year	World production excluding Russia and China	Northern Hemisphere production excluding Russia and China	European production excluding Russia	Selected countries						
				Russia [1]	United States	Canada	India	Argentina	Australia	France
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1890–91	1,878	1,802	1,056	212	378	42	229	31	27	330
1891–92	1,989	1,904	900	173	585	42	257	36	26	215
1892–93	2,053	1,938	1,045	255	528	48	227	59	33	311
1893–94	2,076	1,936	1,097	375	428	41	286	82	37	278
1894–95	2,128	2,018	1,080	355	516	43	271	61	28	344
1895–96	2,126	2,039	1,057	310	569	41	261	46	18	340
1896–97	2,057	1,986	1,103	412	544	33	201	32	21	340
1897–98	1,893	1,790	842	340	610	47	200	53	28	242
1898–99	2,552	2,374	1,168	459	772	63	269	105	41	365
1899–1900	2,319	2,150	1,113	454	636	57	255	102	40	365
1900–01	2,210	2,064	1,096	423	603	56	200	75	48	326
1901–02	2,472	2,357	1,103	428	789	85	265	56	39	311
1902–03	2,510	2,368	1,207	607	725	94	227	104	12	328
1903–04	2,651	2,412	1,266	621	664	78	298	130	74	363
1904–05	2,478	2,238	1,116	667	597	69	360	151	55	300
1905–06	2,673	2,441	1,223	636	727	106	283	135	69	335
1906–07	2,950	2,694	1,356	543	757	126	320	156	66	329
1907–08	2,619	2,344	1,176	571	638	93	317	192	45	381
1908–09	2,544	2,283	1,181	628	645	112	229	156	63	317
1909–10 [2]	2,819	2,554	1,240	846	700	167	285	131	90	359
1910–11 [2]	2,777	2,495	1,201	836	635	132	360	146	95	253
1911–12 [2]	3,043	2,758	1,347	563	621	231	376	166	72	322
1912–13 [2]	3,093	2,770	1,284	801	730	224	371	187	92	334
1913–14 [2]	3,098	2,853	1,301	1,028	763	232	368	105	103	319
1914–15	2,834	2,601	1,072	[3] 834	891	161	312	169	25	283
1915–16	3,497	3,102	1,125	[4] 827	1,026	394	377	169	179	223
1916–17	2,734	2,457	1,049	[5] 531	636	263	323	84	152	205
1917–18	2,574	2,178	740	622	637	234	382	235	115	[6] 135
1918–19	2,911	2,608	909	---------	921	189	370	180	76	229
1919–20	2,821	2,517	899	---------	968	193	280	217	46	187
1920–21	2,948	2,595	949	320	833	263	378	156	146	237
1921–22	3,169	2,787	1,216	205	815	301	250	191	129	323
1922–23	3,225	2,868	1,044	243	868	400	367	196	109	243
1923–24	3,551	3,119	1,257	419	797	474	372	248	125	276
1924–25	3,150	2,737	1,058	472	864	262	361	191	165	281
1925–26	3,441	3,073	1,397	782	677	395	331	191	115	330
1926–27	3,448	2,997	1,216	914	831	407	325	230	161	232
1927–28	3,680	3,207	1,274	785	878	480	335	282	118	276
1928–29 [7]	3,976	3,397	1,408	795	915	567	291	349	160	281
1929–30 [7]	3,498	3,130	1,453	703	809	305	321	163	126	320
1930–31 [7]	3,778	3,213	1,361	---------	851	396	387	271	215	231

Bureau of Agricultural Economics. Production figures are for the harvesting season which begins in the spring, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

[1] Includes all Russian territory reporting for years named.
[2] The average production for the 1909–10 to 1913–14 period as computed from figures given here for estimated world total, Northern Hemisphere total, European total, and European countries whose boundaries were changed by the World War will not agree with estimates appearing elsewhere for present territory, due to changes in boundary.
[3] Total Russian Empire exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.
[4] Exclusive of Russian Poland, Lithuania, parts of present Latvia and Ukraine, and 2 Provinces of Transcaucasia.
[5] Beginning with this date estimated production is within present boundaries of the Union of Socialist Soviet Republics, excluding Turkestan, Transcaucasia, and the Far East, which regions in 1924 produced 51,706,000 bushels, and in 1925, 58,000,000 bushels.
[6] Beginning with this date production is within postwar boundaries and therefore not comparable with earlier years.
[7] Preliminary.

40442°—31——38

TABLE 9.—*Wheat: Acreage, yield per acre, and production in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1928–29 to 1930–31*

Country	Acreage					Yield per acre					Production				
	Average, 1909-10 to 1913-14 [1]	Average, 1921-22 to 1925-26	1928-29	1929-30	1930-31*	Average, 1909-10 to 1913-14 [1]	Average, 1921-22 to 1925-26	1928-29	1929-30	1930-31*	Average, 1909-10 to 1913-14 [1]	Average, 1921-22 to 1925-26	1928-29	1929-30	1930-31*
NORTHERN HEMISPHERE															
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
North America:															
Canada	9,945	22,083	24,119	25,255	24,898	19.8	16.6	23.5	12.1	15.9	197,119	366,483	566,726	304,520	395,854
United States	47,097	58,115	58,272	61,464	59,153	14.7	13.8	15.7	13.2	14.4	690,108	804,218	914,876	809,176	850,965
Mexico	[2] 2,174	2,098	1,283	1,293	1,207	[2] 5.3	5.0	8.6	8.8	9.3	[3] 11,481	10,388	11,031	11,333	11,274
Guatemala		24	20	18	13		9.2	8.4	10.4			222	167	187	
Europe:															
United Kingdom—															
England and Wales	1,787	1,746	1,396	1,330	1,346	31.2	33.7	33.9	35.7	29.7	55,770	58,800	47,264	47,451	39,954
Scotland	57	57	58	51	54	39.9	39.5	39.9	42.5	39.4	2,273	2,251	2,315	2,165	2,128
Northern Ireland	8	4	5	4	5	35.9	27.8	36.6	35.5		287	111	183	142	
Irish Free State	35	34	31	29		37.4	33.3	38.3	40.8		1,310	1,131	1,186	1,184	
Norway	12	27	28	30		25.5	23.6	28.5	25.0		306	637	798	750	776
Sweden	255	352	562	574	646	31.8	30.1	34.1	33.2	34.3	8,103	10,602	19,155	19,031	22,130
Denmark	154	202	252	257	252	41.1	44.4	48.5	45.8	41.6	6,322	8,973	12,214	11,772	10,472
Netherlands	138	147	148	112	142	36.1	42.6	49.6	48.8	35.0	4,976	6,262	7,336	5,467	4,971
Belgium	404	339	408	356	414	37.6	38.9	42.2	37.1	32.7	15,199	13,194	17,215	13,225	13,547
Luxemburg	27	23	37	21	25	22.8	17.0	19.3	13.1	18.2	615	392	713	275	455
France	16,500	13,507	12,956	12,749	13,202	19.7	21.5	21.7	25.1	17.5	325,644	290,774	281,285	319,863	231,119
Spain	9,547	10,457	10,479	10,622	10,530	13.7	13.6	11.4	14.5	13.8	130,446	142,420	119,885	154,245	145,093
Portugal	[4] 1,211	1,078	1,102	1,091		[4] 9.8	10.3	6.8	9.9		[4] 11,850	11,103	7,546	10,814	13,143
Italy	11,793	11,537	12,263	11,795	11,906	15.6	17.2	18.6	22.1	17.7	184,393	198,307	228,598	260,123	210,515
Switzerland	105	112	127	121		31.6	30.9	35.2	36.1		3,314	3,457	4,474	4,372	
Germany	4,029	3,613	4,269	3,955	4,399	32.6	27.3	33.2	31.1	29.9	131,274	98,714	141,593	123,073	131,380
Austria	635	456	514	515	501	20.2	18.4	25.1	22.4	22.7	12,813	8,400	12,915	11,559	11,384
Czechoslovakia	1,718	1,523	1,918	2,017	2,112	22.0	23.6	27.6	26.2	25.1	37,879	36,015	52,861	52,902	53,077
Hungary	3,712	3,345	4,144	3,708	4,071	19.3	17.8	23.9	20.2	18.0	71,493	59,678	99,211	74,985	73,334
Yugoslavia	3,982	3,953	4,683	5,310	5,357	15.6	14.9	22.1	17.9	16.6	62,024	58,753	103,294	94,999	89,005
Greece	[4] 1,134	1,075	1,329	1,249		[4] 14.4	8.8	9.8	6.8		[4] 16,273	9,417	13,085	8,502	
Bulgaria	2,409	2,390	2,813	2,661	2,958	15.7	13.1	17.5	12.5	20.6	37,823	31,399	49,153	33,192	60,994
Rumania	[3] 9,515	7,068	7,923	6,764	7,551	[3] 16.7	12.7	14.6	14.7	17.3	[3] 158,672	89,570	115,544	99,753	130,770
Poland	3,343	2,957	3,187	3,526		18.4	16.5	18.6	18.7		61,665	48,708	59,219	65,862	79,733
Lithuania	211	214	393	488	526	15.5	16.6	16.1	19.1	20.7	3,264	3,563	6,327	9,329	10,913
Latvia	85	89	164	145	179	17.4	16.0	15.2	16.1	20.5	1,475	1,426	2,499	2,336	3,676
Estonia	23	47	70	82	84	15.8	14.2	14.8	15.5	15.0	364	667	1,037	1,268	1,263

Finland	8	36	46	47	51	17.1	20.5	21.7	23.3	23.7	137	739	998	1,095	1,210
Russia	74,031	43,128	71,956	81,000	--------	10.2	9.8	11.1	8.7	--------	757,347	424,233	795,235	702,851	--------
Estimated European total, excluding Russia	72,800	66,000	71,300	69,600	72,300	--------	--------	--------	--------	--------	1,348,000	1,194,000	1,408,000	1,453,000	1,361,000
Africa:															
Morocco	(1,700)	2,272	2,665	3,011	2,757	--------	9.6	10.5	10.5	7.1	(17,000)	21,758	28,061	31,764	19,476
Algeria	3,521	3,406	3,656	3,766	3,824	10.0	7.8	8.3	8.8	7.7	35,161	26,716	30,302	33,150	29,431
Tunis	1,310	1,425	2,020	1,732	1,656	4.8	5.5	6.0	7.1	5.8	6,224	7,892	12,125	12,309	9,663
Egypt	1,314	1,462	1,590	1,614	--------	25.6	25.2	23.5	28.0	--------	33,662	36,806	37,296	45,228	41,116
Asia:															
Cyprus	162	191	168	196	--------	13.7	12.0	9.3	11.2	--------	2,216	2,292	1,557	2,195	--------
India	29,224	29,560	32,193	31,973	31,347	12.0	11.4	9.0	10.0	12.3	351,841	336,269	290,864	320,731	386,512
Japanese Empire—															
Japan	1,179	1,197	1,201	1,213	1,198	21.3	22.5	25.7	25.1	24.7	25,088	26,899	30,812	30,495	29,538
Chosen	574	882	896	874	848	12.0	11.6	9.6	9.5	10.6	6,898	10,208	8,595	8,320	8,985
Taiwan	15	7	1	1	--------	11.3	9.1	15.0	13.0	--------	169	64	15	13	--------
Kwantung	[5] 4	4	4	3	--------	[5] 10.0	11.8	8.0	11.0	--------	[5] 40	47	32	33	--------
Estimated Asiatic total, excluding Russia and China	37,600	37,900	39,000	38,900	38,200	--------	--------	--------	--------	--------	419,000	447,000	387,000	427,900	493,000
Estimated Northern Hemisphere total, excluding Russia and China	177,500	195,100	204,100	206,600	205,900	--------	--------	--------	--------	--------	2,759,000	2,917,000	3,397,000	3,130,000	3,213,000
SOUTHERN HEMISPHERE															
Brazil	--------	[3] 224	358	--------		--------	21.9	12.9	--------	--------	--------	4,908	4,628	--------	--------
Chile	1,003	1,446	1,715	1,758	1,646	20.0	17.8	17.3	21.1	--------	20,062	25,761	29,679	37,051	--------
Uruguay	[3] 791	867	1,256	1,105	--------	[3] 8.2	11.2	11.7	12.1	--------	[3] 6,517	9,680	14,672	13,404	--------
Argentina	16,051	16,932	22,780	20,474	21,285	9.2	12.0	15.3	7.9	12.8	147,059	203,388	349,051	162,576	271,404
Union of South Africa	[4] 803	868	984	942	1,137	[4] 7.5	8.6	6.8	11.8	10.1	[4] 6,034	7,451	6,693	11,140	11,450
Southern Rhodesia	--------	[5] 4	3	5	--------	--------	[5] 7.8	7.7	9.0	--------	--------	[5] 31	23	45	--------
Australia	7,603	10,010	14,840	14,931	18,160	11.9	12.8	10.8	8.5	11.8	90,497	128,520	159,679	126,477	214,780
New Zealand	241	224	255	236	--------	28.7	29.6	34.6	30.7	--------	6,925	6,640	8,833	7,240	--------
Estimated Southern Hemisphere total	26,700	31,000	42,800	40,300	44,300	--------	--------	--------	--------	--------	282,000	390,000	579,000	368,000	565,000
Estimated world total, excluding Russia and China	204,200	226,100	246,900	246,900	250,200	--------	--------	--------	--------	--------	3,041,000	3,307,000	3,976,000	3,498,000	3,778,000

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Figures in parentheses indicate unofficial estimates. Acreage and production figures are for the harvesting season which begins in the spring, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

* Preliminary.

[1] Where changes in boundary have occurred, averages are estimates for territory within present boundaries.

[2] 2-year average.

[3] 4-year average.

[4] 1-year only.

[5] 3-year average.

TABLE 10.—*Wheat, all: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–18 to 1929–30*

Crop year	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917–18	7.4	12.4	19.3	18.0	13.7	7.6	4.7	3.9	3.7	4.1	3.1	2.1	100.0
1918–19	17.6	19.9	18.0	13.8	8.7	7.3	4.6	3.1	2.0	1.6	1.9	1.5	100.0
1919–20	17.1	23.2	15.6	11.1	7.5	5.7	4.2	3.0	2.9	3.1	3.4	3.2	100.0
1920–21	12.1	14.3	15.9	10.6	6.9	6.2	5.5	5.3	4.9	5.0	6.4	6.9	100.0
1921–22	19.1	18.2	16.4	10.6	6.8	5.4	4.4	4.9	3.9	3.2	3.5	3.6	100.0
1922–23	14.8	17.3	14.2	12.0	8.6	7.4	5.5	5.1	4.3	3.7	3.4	3.7	100.0
1923–24	13.4	17.6	16.7	13.7	9.5	6.2	4.6	4.8	3.3	2.9	3.7	3.6	100.0
1924–25	13.6	19.8	17.5	14.5	8.6	5.6	5.3	4.2	2.5	1.6	3.1	3.7	100.0
1925–26	14.6	18.6	18.7	10.9	8.6	7.0	4.7	4.0	3.0	3.0	2.9	4.0	100.0
1926–27	21.8	20.3	13.2	10.0	5.8	5.0	4.6	4.6	3.6	2.4	3.2	5.5	100.0
1927–28	15.4	18.6	19.6	12.6	7.7	5.6	4.5	4.1	3.8	2.5	2.5	3.1	100.0
1928–29	17.9	18.6	17.0	11.6	7.0	5.4	3.8	4.3	3.4	2.5	2.6	5.9	100.0
1929–30	26.7	23.4	13.5	8.1	4.5	4.5	3.0	2.8	2.3	2.4	2.6	6.2	100.0

Bureau of Agricultural Economics.

TABLE 11.—*Wheat, all: Stocks and shipments, United States, 1909–10 to 1930–31*

Year beginning July	Stocks of old wheat on farms July 1[1]	Stocks of old wheat in country mills and elevators July 1[2]	Merchant mill stocks July 1[3]	Bradstreet's visible supply[4]	Weight per measured bushel of new wheat[5]	Stocks of wheat on farms on Mar. 1[1]	Stocks of wheat in country mills and elevators on Mar. 1[2]	Shipped out of county where grown[6]
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Pounds*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1909–10	14,171			12,771	57.9	163,371		428,262
1910–11	36,725			16,396	58.5	162,705	98,597	352,906
1911–12	34,071			29,639	57.8	122,041	95,710	348,739
1912–13	23,876			27,615	58.3	156,471	118,400	449,881
1913–14	35,515			34,420	58.7	151,795	93,627	411,733
1914–15	32,236			17,136	58.0	152,903	85,955	541,198
1915–16	28,972			10,734	57.9	244,448	155,027	633,380
1916–17	74,731			50,515	57.1	100,650	89,173	361,088
1917–18	15,611			19,901	58.5	107,745	66,138	325,500
1918–19	8,063			2,465	58.8	128,703	107,037	541,666
1919–20	19,261	19,672		10,873	56.3	169,904	123,233	591,552
1920–21	49,546	37,304		23,404	57.4	217,037	87,075	491,035
1921–22	56,707	27,167		9,966	57.0	134,253	75,071	502,470
1922–23	32,359	28,756		20,342	57.7	156,087	102,908	584,089
1923–24	35,894	37,117		29,403	57.4	137,721	98,284	505,792
1924–25	30,981	36,626		38,597	58.9	112,095	67,673	630,819
1925–26	29,357	25,287		29,285	58.3	100,174	76,376	483,741
1926–27	20,982	29,501	24,505	16,486	59.1	130,274	85,928	580,351
1927–28	27,222	21,776	37,038	25,516	58.5	130,944	75,428	644,525
1928–29	23,729	19,277	31,920	42,208	58.5	151,396	82,419	672,821
1929–30	45,483	41,546	48,279	95,684	58.2	129,754	95,950	564,206
1930–31[7]	47,161	54,031	46,670	112,755	58.9			

Bureau of Agricultural Economics. Prior to 1918 stocks in mills and elevators not included.

[1] Based on percentage of crop on farms as estimated by crop reporters.
[2] Based on percentage of crop as estimated by about 3,500 mill and elevator operators.
[3] Stocks in mills and attached mill elevators, reporting to Bureau of the Census, raised to represent all merchant mills.
[4] Includes grain stored at approximately 50 interior and seaboard points of accumulation and grain in transit by canals and lakes; also Pacific coast stocks at Portland, Tacoma, and Seattle.
[5] Based on estimates of crop reporters on Nov. 1.
[6] Based on percentage shipped out as estimated by crop reporters.
[7] Preliminary.

TABLE 12.—*Wheat, all: Receipts inspected, by markets, 1917–18 to 1929–30*

Market	Year beginning July						
	1917–18	1918–19	1919–20	1920–21	1921–22	1922–23	1923–24
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Minneapolis	90, 311	123, 119	127, 145	119, 107	109, 461	126, 508	99, 366
Duluth	23, 481	113, 911	16, 611	50, 194	55, 995	71, 154	38, 460
Kansas City	24, 848	69, 182	116, 694	115, 200	126, 025	77, 302	59, 948
Chicago	12, 146	73, 446	62, 244	22, 190	45, 483	39, 207	43, 017
St. Louis	17, 120	43, 001	43, 685	27, 109	32, 262	27, 254	26, 859
Omaha	10, 829	24, 066	30, 031	31, 031	30, 140	28, 760	19, 763
Wichita	7, 000	15, 332	21, 100	16, 363	25, 186	21, 185	22, 151
Portland, Oreg	5, 957	10, 612	12, 468	28, 842	36, 566	22, 395	36, 732
New York	22, 950	49, 990	28, 821	52, 750	33, 136	27, 368	9, 186
Philadelphia	8, 180	34, 713	23, 816	19, 564	17, 598	36, 893	6, 252
Baltimore	6, 434	25, 724	24, 522	25, 653	12, 817	13, 434	16, 480
New Orleans	2, 710	16, 409	15, 678	67, 483	30, 325	24, 628	6, 261
Galveston	1, 996	10, 128	26, 042	73, 334	44, 126	17, 400	7, 055
All other inspection points	111, 858	200, 241	236, 976	204, 418	242, 466	224, 418	213, 715
Total	345, 820	809, 874	785, 833	853, 238	841, 586	757, 906	605, 245

Market	Year beginning July					
	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Minneapolis	76, 960	118, 730	85, 466	129, 966	119, 605	83, 291
Duluth	102, 654	67, 447	49, 985	98, 032	89, 357	41, 822
Kansas City	86, 713	51, 571	90, 535	74, 595	101, 190	83, 123
Chicago	59, 831	19, 058	30, 811	34, 592	25, 827	28, 492
St. Louis	26, 909	25, 148	26, 247	24, 423	34, 714	27, 769
Omaha	31, 660	16, 903	21, 642	30, 008	34, 689	31, 673
Wichita	29, 559	18, 972	28, 166	21, 191	30, 584	28, 985
Portland, Oreg	21, 559	27, 892	35, 299	42, 931	27, 612	26, 332
New York	21, 978	6, 334	33, 855	45, 096	41, 102	11, 939
Philadelphia	18, 236	5, 767	6, 933	4, 026	1, 378	1, 525
Baltimore	14, 286	13, 862	21, 204	13, 904	17, 854	8, 862
New Orleans	32, 630	2, 235	8, 908	7, 622	5, 810	10, 035
Galveston	33, 953	2, 769	44, 781	11, 332	16, 572	22, 991
All other inspection points	256, 192	201, 036	308, 383	260, 728	346, 593	368, 688
Total	813, 120	577, 724	792, 215	798, 466	892, 887	775, 527

Bureau of Agricultural Economics. Compiled from reports of licensed inspectors through district offices of Federal grain supervision. Car-lot receipts were converted to bushels by using factor 1,300 bushels to a car.

TABLE 13.—*Wheat: Receipts inspected, all inspection points, by classes, 1925–26 to 1929–30*

Class and year beginning July	Grade						Total
	No. 1	No. 2	No. 3	No. 4	No. 5	Sample	
Hard red spring:	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1925–26	86, 832	36, 280	28, 471	14, 683	5, 042	5, 173	176, 481
1926–27	51, 160	29, 373	23, 823	17, 677	4, 114	10, 706	136, 853
1927–28	106, 285	56, 839	41, 268	18, 763	6, 200	11, 939	241, 294
1928–29	110, 602	36, 986	22, 562	8, 462	4, 625	40, 812	224, 049
1929–30	76, 072	24, 489	13, 376	2, 759	980	5, 602	123, 278
Durum:							
1925–26	9, 733	28, 610	7, 975	4, 272	686	1, 568	52, 844
1926–27	2, 405	10, 548	6, 548	7, 764	1, 395	4, 403	33, 063
1927–28	11, 331	31, 170	9, 692	5, 567	2, 147	2, 414	62, 321
1928–29	5, 248	33, 789	14, 652	9, 169	5, 478	5, 508	73, 844
1929–30	4, 340	20, 261	4, 206	1, 894	1, 258	880	32, 839
Hard red winter:							
1925–26	51, 498	92, 972	33, 812	9, 239	3, 918	3, 143	194, 582
1926–27	201, 893	145, 602	31, 067	10, 084	7, 821	10, 978	407, 445
1927–28	100, 264	123, 475	41, 434	19, 331	11, 127	14, 664	310, 295
1928–29	141, 045	168, 205	69, 541	28, 330	18, 914	16, 836	442, 871
1929–30	99, 115	202, 095	110, 726	34, 014	11, 495	13, 022	470, 467
Soft red winter:							
1925–26	8, 309	30, 939	10, 273	2, 877	1, 249	1, 463	55, 110
1926–27	35, 810	40, 147	11, 656	7, 903	2, 881	6, 011	104, 408
1927–28	10, 563	25, 795	13, 659	7, 942	2, 305	3, 371	63, 635
1928–29	8, 317	15, 856	7, 416	4, 924	1, 654	3, 967	42, 134
1929–30	4, 933	25, 803	19, 668	4, 107	970	1, 709	57, 190
White:							
1925–26	5, 091	20, 435	11, 816	3, 840	649	543	42, 374
1926–27	10, 981	25, 696	8, 215	1, 999	423	659	47, 973
1927–28	17, 822	25, 819	8, 733	3, 072	1, 370	3, 492	60, 308
1928–29	17, 412	19, 438	2, 791	650	228	322	40, 841
1929–30	13, 098	22, 785	3, 667	481	131	346	40, 508
Mixed:							
1925–26	15, 119	24, 019	10, 115	4, 017	1, 533	1, 530	56, 333
1926–27	15, 877	20, 626	10, 011	7, 340	2, 597	6, 022	62, 473
1927–28	14, 807	22, 624	12, 042	5, 570	2, 453	3, 097	60, 593
1928–29	14, 150	23, 338	13, 111	8, 395	5, 621	4, 533	69, 148
1929–30	11, 187	20, 687	11, 454	3, 914	2, 076	1, 927	51, 245
Total:							
1925–26	176, 582	233, 255	102, 462	38, 928	13, 077	13, 420	577, 724
1926–27	318, 126	271, 992	91, 320	52, 767	19, 231	38, 779	792, 215
1927–28	261, 072	285, 722	126, 828	60, 245	25, 602	38, 977	798, 446
1928–29	296, 774	297, 612	130, 073	59, 930	36, 520	71, 978	892, 887
1929–30	208, 745	316, 120	163, 097	47, 169	16, 910	23, 486	775, 527

Bureau of Agricultural Economics. Compiled from reports of licensed inspectors through district offices of Federal grain supervision. Car-lot receipts were converted to bushels by using factor 1,300 bushels to a car. See 1927 Yearbook, p. 752, for data for earlier years.

TABLE 14.—*Wheat all: Visible supply in the United States,*[1] *1909–10 to 1930–31*

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909–10	12, 771	12, 611	15, 514	28, 589	37, 820	41, 688	37, 949	36, 638	34, 461	37, 558	33, 771	24, 795
1910–11	16, 396	17, 053	38, 352	48, 437	53, 420	57, 002	59, 369	56, 357	50, 566	42, 697	34, 656	32, 769
1911–12	29, 639	46, 389	54, 581	61, 500	73, 792	81, 215	81, 501	70, 748	66, 982	59, 826	48, 022	35, 994
1912–13	27, 615	23, 595	26, 862	40, 998	52, 494	67, 575	77, 471	76, 131	73, 895	69, 000	53, 508	43, 697
1913–14	34, 420	43, 198	51, 980	61, 485	66, 663	72, 061	74, 854	71, 264	66, 191	59, 931	49, 327	33, 662
1914–15	17, 136	36, 456	39, 964	61, 784	76, 262	86, 332	85, 957	81, 776	58, 923	46, 287	31, 407	22, 871
1915–16	10, 734	9, 361	12, 679	22, 498	33, 338	60, 678	80, 150	77, 834	73, 748	66, 691	57, 658	52, 512
1916–17	50, 515	49, 591	65, 754	70, 420	75, 455	76, 191	73, 584	59, 477	54, 160	48, 525	32, 831	34, 876
1917–18	19, 901	11, 692	10, 315	13, 072	22, 855	29, 633	26, 476	20, 436	15, 484	10, 180	6, 656	4, 379
1918–19	2, 465	20, 462	54, 236	98, 155	131, 852	131, 584	129, 627	140, 607	127, 207	100, 505	55, 247	27, 626
1919–20	10, 873	25, 968	65, 479	95, 550	107, 783	101, 058	85, 117	68, 494	58, 632	51, 909	47, 756	41, 233
1920–21	23, 404	20, 226	24, 195	32, 169	41, 596	48, 273	47, 797	38, 475	31, 945	22, 229	17, 584	10, 598
1921–22	9, 966	28, 727	47, 159	62, 758	62, 767	53, 507	56, 776	48, 802	46, 714	42, 287	36, 644	31, 497
1922–23	20, 342	23, 077	32, 479	38, 025	39, 023	39, 764	43, 856	53, 823	54, 562	51, 862	49, 521	37, 203
1923–24	29, 403	40, 526	63, 922	72, 930	79, 034	82, 269	84, 030	75, 111	72, 914	66, 739	50, 383	48, 686
1924–25	38, 597	46, 193	79, 700	92, 353	100, 712	108, 997	99, 121	84, 476	76, 437	62, 766	49, 529	38, 328
1925–26	29, 285	34, 041	39, 800	56, 639	52, 394	52, 686	59, 244	52, 730	48, 105	38, 173	33, 798	23, 170
1926–27	16, 486	34, 575	72, 884	84, 724	81, 175	78, 910	70, 811	62, 317	61, 271	53, 827	42, 402	31, 115
1927–28	25, 516	37, 533	71, 908	88, 755	98, 675	100, 013	94, 336	83, 720	77, 949	73, 220	66, 184	52, 460
1928–29	42, 208	66, 762	96, 798	118, 327	143, 003	145, 234	146, 813	133, 759	130, 034	128, 339	116, 559	99, 966
1929–30	95, 684	145, 504	196, 886	205, 778	209, 426	198, 557	188, 171	173, 483	165, 174	158, 176	140, 315	123, 035
1930–31	112, 755	165, 616	201, 541	219, 108	211, 600	207, 479	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Bradstreet's. Includes grain stored at approximately 50 interior and seaboard points of accumulation and grain in transit by canals and lakes; also Pacific coast stocks at Portland, Tacoma, and Seattle.

[1] Saturday nearest the 1st of each month.

TABLE 15.—*Wheat: Commercial stocks in store, 1926–27 to 1929–30*

DOMESTIC WHEAT IN UNITED STATES [1]

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27	-------	-------	-------	-------	-------	-------	66, 340	56, 303	56, 262	49, 910	37, 667	27, 833
1927–28	21, 052	33, 677	62, 042	78, 811	89, 684	91, 589	88, 581	79, 152	72, 858	68, 791	61, 957	48, 286
1928–29	38, 587	52, 421	93, 870	115, 469	139, 493	140, 172	144, 351	129, 646	126, 377	124, 756	113, 392	96, 059
1929–30	90, 442	136, 423	186, 847	198, 211	202, 461	189, 926	185, 151	168, 346	160, 674	153, 122	135, 470	120, 303
1930–31	109, 327	161, 897	201, 319	223, 826	211, 381	206, 618	-------	-------	-------	-------	-------	-------

UNITED STATES WHEAT IN CANADA

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1926–27	-------	-------	-------	-------	-------	-------	1, 067	549	437	378	746	1, 344
1927–28	1, 362	1, 280	4, 249	4, 560	7, 258	5, 156	3, 933	2, 285	1, 680	977	863	2, 314
1928–29	2, 506	2, 258	2, 546	3, 295	8, 602	8, 280	7, 328	3, 930	2, 139	1, 586	1, 738	4, 865
1929–30	3, 332	2, 288	4, 450	8, 770	9, 065	9, 101	8, 546	7, 517	6, 613	5, 860	5, 431	4, 359
1930–31	4, 729	3, 961	3, 812	4, 699	4, 756	4, 790	-------	-------	-------	-------	-------	-------

CANADIAN WHEAT IN UNITED STATES [2]

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1926–27	-------	-------	-------	-------	-------	-------	23, 394	14, 500	9, 532	6, 650	10, 724	16, 749
1927–28	7, 472	4, 835	3, 410	3, 784	8, 617	31, 375	35, 764	28, 703	19, 260	11, 848	6, 597	11, 549
1928–29	11, 132	13, 605	3, 789	7, 548	18, 291	33, 902	46, 717	38, 327	32, 851	23, 854	28, 772	25, 538
1929–30	23, 196	23, 550	22, 025	21, 753	28, 316	34, 527	38, 837	35, 517	31, 516	25, 285	17, 587	14, 372
1930–31	16, 435	16, 468	12, 603	17, 304	22, 112	30, 297	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Compiled from weekly reports to the grain, hay, and feed market news service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes wheat in store in public and private elevators in 39 important markets and also the wheat afloat in vessels or barges in the harbors of lake and seaboard ports. Wheat in transit either by rail or water, mill stocks, or small private stocks of wheat intended only for local purposes, not included.
[2] Includes wheat stored at lake and seaboard ports, exclusive of wheat in transit on lakes and canals.

TABLE 16.—*Wheat, all: Production and farm disposition, price per bushel, farm value, gross income, and cash income, United States, 1924–1929*

Year	Production	Used for seed	Fed to livestock	Loss, waste, and shrinkage	Ground at mills for home use or exchanged for flour	Sold or for sale	Farm price [1] per bushel	Farm value	Gross income	Cash income
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
1924	864, 428	80, 635	49, 649	7, 103	9, 965	717, 076	1. 25	1, 083, 009	907, 460	893, 403
1925	676, 765	78, 895	28, 919	5, 729	9, 935	553, 287	1. 43	972, 141	807, 709	792, 141
1926	831, 381	84, 062	36, 017	6, 667	10, 185	694, 450	1. 22	1, 014, 420	858, 977	845, 687
1927	878, 374	90, 383	42, 126	6, 667	10, 030	729, 168	1. 18	1, 045, 858	876, 891	863, 597
1928	914, 876	83, 582	53, 323	6, 566	8, 425	762, 980	. 99	914, 906	764, 890	754, 121
1929 [2]	809, 176	82, 384	55, 429	6, 524	9, 215	655, 624	1. 05	849, 541	696, 207	685, 328

Bureau of Agricultural Economics.

[1] Monthly prices, by States, weighted by estimated monthly marketing, by States, differ from weighted prices in Table 19, in which production weights are used.
[2] Preliminary.

TABLE 17.—*Wheat, all: Production, farm disposition, and price, by States, 1929 crop*

State	Production	Disposition					Farm price [1] per bushel
		Used for seed	Fed to livestock	Loss, waste, and shrinkage	Ground at mills for home use or exchanged for flour	Sold or for sale	
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*
Maine	92	6	18	1	30	37	1.25
Vermont	18	2	10	0	5	1	1.25
New York	4,488	513	1,346	54	70	2,505	1.23
New Jersey	1,045	90	418	8	10	519	1.25
Pennsylvania	20,138	2,072	5,034	282	1,200	11,550	1.18
Ohio	32,093	3,225	4,172	321	800	23,575	1.14
Indiana	27,723	2,778	2,772	166	450	21,557	1.09
Illinois	36,537	3,754	1,461	146	200	30,976	1.12
Michigan	16,810	1,528	2,522	219	500	12,041	1.12
Wisconsin	2,190	200	876	18	150	946	1.12
Minnesota	19,723	1,971	2,367	197	350	14,838	1.09
Iowa	8,076	700	808	97	50	6,421	1.07
Missouri	17,300	2,136	2,076	138	300	12,650	1.11
North Dakota	97,262	12,321	3,890	973	200	79,878	1.05
South Dakota	31,200	4,610	1,872	250	100	24,368	1.03
Nebraska	56,555	4,293	1,697	283	250	50,032	.99
Kansas	138,060	12,393	4,142	1,381	100	120,044	.99
Delaware	2,033	182	183	20	50	1,598	1.15
Maryland	9,380	827	657	94	200	7,602	1.15
Virginia	8,960	913	1,075	72	1,000	5,900	1.22
West Virginia	1,782	202	267	21	200	1,092	1.28
North Carolina	5,347	431	481	107	1,250	3,078	1.37
South Carolina	768	53	61	12	125	517	1.41
Georgia	850	62	68	13	250	457	1.48
Kentucky	2,832	321	255	17	100	2,139	1.25
Tennessee	3,645	417	255	36	300	2,637	1.29
Alabama	40	5	10	1	20	4	1.30
Mississippi	68	6	14	1	30	17	1.30
Arkansas	312	36	62	5	80	129	1.18
Oklahoma	44,478	4,536	2,224	311	125	37,282	.94
Texas	37,800	3,366	945	189	125	33,175	.95
Montana	40,688	5,881	2,441	326	150	31,890	.98
Idaho	25,515	1,574	3,827	383	60	19,671	.99
Wyoming	3,409	359	443	20	50	2,537	.96
Colorado	18,012	2,400	1,441	126	100	13,945	.96
New Mexico	5,742	386	115	34	50	5,157	1.00
Arizona	1,134	52	57	6	10	1,009	1.32
Utah	6,403	410	960	32	50	4,951	1.02
Nevada	404	21	202	4	5	172	1.32
Washington	44,910	4,354	2,246	90	50	38,170	1.14
Oregon	23,114	1,814	925	46	50	20,279	1.10
California	12,240	1,184	734	24	20	10,278	1.18
United States	809,176	82,384	55,429	6,524	9,215	655,624	1.05

Bureau of Agricultural Economics.

[1] Monthly prices, by States, weighted by estimated monthly marketing, by States, differ from weighted prices in Table 19, in which production weights are used.

TABLE 18.—*Wheat, all: Supply and distribution and per capita disappearance in the United States, averages 1899–1900 to 1925–26, annual 1927–28 to 1930–31*

Item	Year beginning July							
	Average, 1899–1900 to 1908–09	Average, 1909–10 to 1913–14	Average, 1914–15 to 1920–21	Average, 1921–22 to 1925–26	1927–28	1928–29	1929–30	1930–31
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Supply:								
Stock on farms, July 1[1]	46,423	28,872	32,631	37,059	27,222	23,729	45,483	47,161
Stocks in country mills and elevators, July 1[1]	27,000	29,000	26,997	30,991	21,776	19,277	41,546	54,031
Commercial visible, July 1[2]	31,817	24,168	19,290	25,519	25,516	42,208	95,684	112,755
Stocks of flour (in terms of wheat) July 1[3]	7,709	8,305	8,606	8,676	9,076	9,019	13,541	20,497
In merchant mills and elevators[4]	------	------	------	------	37,038	31,920	48,279	46,670
In transit to commercial mills[4]	------	------	------	------	11,274	10,893	16,237	14,706
New crop[1]	677,927	690,108	844,605	804,218	878,374	914,876	809,176	850,965
Imports (flour included), July 1 to June 30[5]	753	1,834	19,806	17,473	15,734	21,442	12,956	------
Total supply	791,629	782,287	951,935	923,936	1,026,010	1,073,364	1,082,902	------
Distribution:								
Exports (flour included), July 1 to June 30[5]	156,435	107,103	257,030	207,237	206,259	163,687	153,316	------
Reexports (flour included), July 1 to June 30[5]	399	195	562	221	53	55	72	------
Shipments (flour included) to Alaska, Hawaii, and Porto Rico[5]	2,034	2,549	2,546	2,836	2,690	3,172	2,977	------
Estimated seed requirements[6]	70,444	72,326	88,312	82,171	90,383	83,582	82,965	------
Carry-over on June 30—								
On farms[1]	40,654	32,485	36,127	29,912	23,729	45,483	47,161	------
In country mills and elevators[1]	25,400	31,600	26,449	31,457	19,277	41,546	54,031	------
Commercial visible[2]	28,668	25,326	18,265	26,822	42,208	95,684	112,755	------
Flour (in terms of wheat)[3]	7,374	8,935	8,290	9,240	9,019	13,541	20,497	------
In merchant mills and elevators[4]	------	------	------	------	31,920	48,279	46,670	------
In transit to commercial mills[4]	------	------	------	------	10,893	16,237	14,706	------
Accounted-for distribution	331,408	280,519	437,581	389,896	436,431	511,266	535,150	------
Disappearance, including food, feed, and loss	460,221	501,768	514,354	534,040	589,579	562,098	547,752	------
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	
Population, Jan. 1[7]	82,614	94,378	102,880	112,696	119,320	120,694	122,359	------
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	
Per capita disappearance, including food, feed, and loss	5.6	5.3	5.0	4.7	4.9	4.7	4.5	------

Bureau of Agricultural Economics. Compiled as follows:

1 Based on returns to the bureau from crop reporters.
2 From Bradstreet's.
3 From Chicago Daily Trade Bulletin.
4 Bureau of the Census figures raised to represent all merchant mills.
5 From reports of Foreign and Domestic Commerce of the United States.
6 Amount of seed used per acre from returns to the bureau from inquiries sent to crop reporters
7 Bureau of the Census.

TABLE 19.—*Wheat: Production, inspections for exports, and weighted average price per bushel of representative grades by classes, 1923–24 to 1930–31*

Year beginning July	Hard red spring	Durum	Hard red winter	Soft red winter	White [2]	Mixed [3]	Flour as wheat	Other wheat [4]	Total
	Estimated production [1]								
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1923–24	126,876	55,269	241,851	271,631	101,767	--------	--------	--------	797,394
1924–25	192,341	66,105	364,662	189,441	51,879	--------	--------	--------	864,428
1925–26	156,053	65,008	206,135	169,792	79,777	--------	--------	--------	676,765
1926–27	121,078	47,575	360,440	228,886	73,402	--------	--------	--------	831,381
1927–28	201,927	83,162	317,042	180,887	95,356	--------	--------	--------	878,374
1928–29	203,071	102,286	384,014	139,665	85,840	--------	--------	--------	914,876
1929–30	143,070	57,448	344,249	186,271	78,138	--------	--------	--------	809,176
1930–31	151,558	58,619	365,578	194,153	81,057	--------	--------	--------	850,965
	Inspections of United States wheat for export								
1923–24	1,022	4,908	19,640	9,810	18,653	5,435	81,087	19,325	159,880
1924–25	16,760	5,945	90,840	6,944	10,063	9,386	65,313	55,552	260,803
1925–26	3,338	4,170	7,358	2,282	16,914	5,944	44,846	23,183	108,035
1926–27	1,829	611	66,874	29,980	26,615	1,398	62,910	28,943	219,160
1927–28	5,209	3,496	41,603	9,915	28,150	1,874	60,260	55,752	206,259
1928–29	1,766	1,045	30,660	2,782	14,710	1,473	60,556	50,678	163,670
1929–30	1,490	360	49,290	2,547	17,527	751	61,141	20,210	153,316
	Average price per bushel [5]								
	Cents	*Cents*	*Cents*	*Cents*					
1923–24	124	106	105	107	--------	--------	--------	--------	--------
1924–25	158	156	135	159	--------	--------	--------	--------	--------
1925–26	165	144	163	169	--------	--------	--------	--------	--------
1926–27	151	155	135	138	--------	--------	--------	--------	--------
1927–28	141	132	135	149	--------	--------	--------	--------	--------
1928–29	126	113	112	139	--------	--------	--------	--------	--------
1929–30	129	119	120	130	--------	--------	--------	--------	--------

Bureau of Agricultural Economics. Estimated production by classes based on questionnaire surveys of local authorities; supplemented by judgment of cereal specialists. Inspections of United States wheat for export data furnished monthly by Federal grain supervision officers at the export markets. Inspections are made at the ports of export.

[1] Production estimates are based on the estimate of percentage classification by States as reported for 1920–21, 1923–24, and 1924–25; the percentages for 1921–22 and 1922–23 were interpolated from the 1920–21 and 1923–24 percentages. The estimated production for 1929–30 and 1930–31 is subject to revision.

[2] White wheat in the Pacific Northwest region consists of both spring and winter wheat; no attempt has been made to classify this wheat as other than white wheat, part of which is spring and part winter.

[3] Mixed wheats exported from Atlantic coast ports are estimated as approximately 70 per cent durum and the remainder as hard red spring; that exported from Gulf ports as approximately half and half hard and soft winter; and that exported from Pacific coast ports as approximately 90 per cent white and the remainder as hard and soft red winter wheats.

[4] Exports of wheat other than reported as "Federal inspected" including exports through Canada. These exports are not "Federal inspected" and are exported largely through the customs districts of Buffalo, Chicago, Duluth and Superior, Wisconsin, and Ohio.

[5] The representative grades and markets selected are No. 1 dark northern spring, Minneapolis; No. 2 amber durum, Minneapolis; No. 2 hard winter, Kansas City; and No. 2 red winter, St. Louis.

TABLE 20.—*Wheat, including flour in terms of grain: International trade, average 1909–10 to 1913–14, annual 1926–27 to 1929–30*

Country	Year beginning July									
	Average 1909–10 to 1913–14		1926–27		1927–28		1928–29		1929–30*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	447	94,286	408	304,948	476	305,658	1,331	422,732	1,392	184,213
United States	1,834	107,103	13,264	219,160	15,734	206,259	21,442	163,687	12,956	153,316
Argentina	[1] 3	85,220	14	138,240	2	168,214	-------	227,059	-------	161,265
Australia	[1] 7	[1] 49,732	4	96,584	1	72,962	4	107,785	-------	61,892
British India	332	50,821	2,899	12,598	2,310	15,668	27,549	5,687	8,444	4,957
Hungary	[2] 7,214	[2] 49,116	1	21,143	2	22,135	1	23,658	3	31,415
Russia	[2] 556	[2] 164,862	0	49,200	0	4,867	-------	-------	-------	-------
Yugoslavia	(3)	(3)	-------	10,029	-------	1,024	-------	7,919	-------	23,593
Rumania	[2] 196	54,630	[2] 1	[2] 11,038	[2] 0	[2] 7,431	[3] 0	[3] 1,653	-------	-------
Algeria	[2] 639	[2] 5,936	[2] 3,584	2,182	[2] 1,569	6,351	[2] 2,080	[2] 5,346	-------	-------
Chile	[1] 170	[1] 2,593	758	516	622	585	116	757	54	1,063
Tunis	[2] 1,746	[2] 960	1,142	1,970	1,127	629	[3] 350	[3] 5,378	[4] 170	[4] 6,178
Bulgaria	[2] 0	[2] 11,182	[2] 1	2,236	-------	2,125	-------	760	[4] 1,805	[4] 90
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	219,474	3,736	226,908	10,292	222,270	11,181	215,138	11,158	212,702	10,805
Italy	56,431	3,637	88,184	1,034	87,905	1,111	91,930	2,189	46,590	3,318
Germany	91,851	23,300	99,252	5,735	98,557	6,784	86,162	17,664	67,630	7,203
France	44,081	1,230	53,878	592	53,987	132	50,665	116	38,332	18,050
Belgium	72,877	21,965	41,236	1,378	44,848	2,618	44,061	2,542	44,516	1,950
Netherlands	[2] 80,702	[2] 58,435	29,060	867	31,532	586	29,518	709	30,992	856
Brazil	[1] 20,495	[1] 0	30,255	-------	34,653	-------	36,244	-------	33,889	-------
Japan	[2] 4,116	[2] 28	18,458	4,014	21,995	4,859	28,203	10,768	19,156	5,403
China [5]	6,691	5,401	22,354	374	15,464	1,464	20,328	4,265	49,123	1,865
Czechoslovakia	(3)	(3)	21,085	89	21,323	41	17,250	56	13,980	196
Austria	[2] 11,402	[2] 871	16,888	89	16,230	165	14,903	59	[4] 18,436	[4] 70
Swizerland	[2] 16,937	[2] 14	17,220	0	18,427	0	15,496	0	16,915	1
Greece	[1] 7,035	[1] 2	19,502	0	19,106	0	22,144	0	21,521	0
Irish Free State	(3)	(3)	19,511	37	18,691	56	17,905	110	17,900	-------
Sweden	[2] 7,080	[2] 23	8,484	2,576	10,391	1,660	10,553	3,076	9,309	2,147
Egypt	[2] 8,244	[2] 59	8,861	64	6,803	433	12,906	181	11,202	108
Denmark	[2] 7,155	[2] 597	7,695	1,085	10,701	220	17,149	110	8,080	310
Poland	(3)	(3)	8,331	833	7,840	225	3,865	106	602	790
Union of South Africa	[1] 6,274	[1] 253	4,116	216	8,215	223	8,148	261	5,036	326
Spain	6,009	71	56	985	[2] 3,299	[2] 370	-------	-------	-------	-------
Norway	[2] 3,674	0	5,944	[2] 4	6,862	[2] 4	8,538	[2] 8	7,130	-------
Cuba	4,248	0	5,695	0	5,740	0	5,531	0	-------	-------
Finland	[1] 4,912	[1] 0	4,854	0	5,499	0	6,095	0	5,623	0
New Zealand	[1] 163	[1] 918	2,769	1	1,032	1	793	2	889	364
Syria and Lebanon	0	0	1,980	0	[2] 2,119	[2] 15	[2] 5,487	[2] 37	[4] 1,304	[4] 18
Latvia	(3)	(3)	[4] 1,690	[2] 50	[2] 1,529	[2] 18	[2] 2,973	[2] 4	[4] 2,520	[4] 0
Indo-China	0	0	1,143	0	1,073	0	[4] 1,206	0	[4] 1,278	-------
Estonia	(3)	(3)	902	0	1,062	0	1,176	0	1,218	-------
Total, 41 countries	692,995	796,981	788,387	900,159	798,996	846,074	827,240	1,025,842	710,697	681,762

Bureau of Agricultural Economics. Official sources except where otherwise noted

* Preliminary.

[1] Average of calendar years, 1909–13.

[2] Year beginning August 1, International Yearbook of Agricultural Statistics.

[3] Figures for pre-war years are included in the countries of the pre-war boundaries.

[4] International Crop Report and Agricultural Statistics.

[5] Calendar year.

TABLE 21.—*Wheat, all: Estimated average price per bushel, received by producers, United States, 1909–1930*

Crop year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Cts.	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
1909–10	114.0	101.2	94.9	97.2	99.2	101.0	104.2	105.0	104.8	102.2	98.8	96.4	100.7
1910–11	97.1	97.4	94.8	92.1	89.4	88.4	89.2	87.6	84.6	84.2	85.4	85.3	91.7
1911–12	83.5	83.8	86.6	90.0	89.4	87.7	89.2	90.6	91.6	96.1	101.2	100.9	88.3
1912–13	94.4	87.8	84.6	83.6	79.7	76.1	78.0	80.2	79.8	80.0	81.8	82.0	83.3
1913–14	79.2	77.1	77.5	77.4	78.4	80.4	81.3	82.4	83.6	84.0	84.2	80.6	79.3
1914–15	76.7	84.9	93.4	95.4	97.9	103.2	118.8	131.8	132.6	135.6	135.6	117.2	99.4
1915–16	104.6	100.8	93.0	92.0	92.5	97.4	108.4	108.4	100.8	100.6	101.2	96.5	98.2
1916–17	100.0	119.2	133.8	147.4	159.4	155.3	157.6	164.6	172.2	213.0	247.2	234.3	144.4
1917–18	224.5	219.3	205.2	200.3	200.4	201.4	201.6	202.0	202.6	203.1	203.0	202.8	205.8
1918–19	203.8	205.0	205.7	205.9	205.1	204.5	206.2	207.8	211.1	222.6	229.8	225.2	206.3
1919–20	219.6	211.4	207.6	211.4	214.0	223.4	233.8	231.2	230.3	242.6	250.8	256.0	218.6
1920–21	242.9	225.4	216.5	201.2	165.8	146.4	149.2	148.2	140.4	122.1	119.0	119.8	182.9
1921–22	108.5	103.0	103.4	99.9	93.4	93.0	95.2	107.0	117.0	119.0	118.8	109.6	104.4
1922–23	99.8	92.6	89.2	94.1	99.4	103.2	104.6	104.4	106.0	108.4	108.2	100.8	98.0
1923–24	89.6	86.4	91.0	94.2	93.7	94.5	96.7	98.0	98.8	95.8	96.8	98.5	92.4
1924–25	105.8	116.8	114.2	129.7	133.6	141.1	162.1	169.8	164.0	140.5	149.1	152.7	127.8
1925–26	140.3	150.4	144.4	136.4	148.8	153.7	158.1	155.5	146.0	142.2	142.1	138.9	145.9
1926–27	127.7	125.1	117.7	121.4	123.6	122.8	122.2	122.8	120.9	117.2	123.2	130.1	123.8
1927–28	127.3	123.5	119.2	113.7	111.4	113.9	115.2	116.2	121.6	129.2	144.3	132.0	120.5
1928–29	118.1	95.2	94.4	98.7	97.1	98.2	98.5	104.2	104.7	99.8	90.1	86.8	100.1
1929–30	102.4	110.7	112.1	111.5	103.4	108.1	107.5	101.3	91.9	93.4	87.5	87.9	105.1
1930–31	70.6	74.0	70.3	65.6	60.0	61.3	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of wheat for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, July, 1909–December, 1923.

TABLE 22.—*Wheat: Weighted average price* [1] *per bushel of reported cash sales of all classes and grades, six markets combined, 1921–22 to 1930–31*

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	122.4	119.1	125.3	111.2	108.0	109.2	114.0	129.9	132.8	135.7	135.9	123.6	121.0
1922–23	116.1	105.9	102.7	108.8	116.3	117.8	115.6	116.1	117.0	122.0	117.9	109.5	112.4
1923–24	99.0	101.8	106.8	110.4	105.7	105.0	110.3	111.8	111.6	109.9	110.5	116.6	107.0
1924–25	125.7	123.5	128.3	144.8	148.2	163.6	188.8	184.8	172.1	150.8	165.5	161.6	145.3
1925–26	155.7	160.5	144.8	143.3	153.5	165.7	170.3	164.8	154.9	156.0	153.8	151.6	155.0
1926–27	141.6	135.3	135.6	139.4	137.7	139.5	138.8	136.2	133.6	134.7	145.1	148.6	138.3
1927–28	138.7	136.4	128.7	125.1	125.6	128.0	131.0	132.0	136.6	150.7	151.4	141.8	132.9
1928–29	126.0	109.4	108.9	107.0	109.1	107.4	113.7	118.1	114.2	109.2	101.1	105.3	110.6
1929–30	129.8	125.7	127.4	123.7	121.2	123.5	121.6	115.8	103.9	102.5	100.9	94.1	121.9
1930–31	82.6	84.7	79.0	76.0	69.8	72.5	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Compiled from daily trade papers of markets named. The markets are Chicago, Minneapolis, Kansas City, St. Louis, Omaha, and Duluth.

[1] Average of daily prices weighted by car-lot sales. The prices in this table are comparable with prices paid to producers, in that the latter are averages of the several prices reported which cover all classes and grades sold by producers.

TABLE 23.—*Wheat: Weighted average price [1] per bushel of reported cash sales at Minneapolis, St. Louis, and Kansas City, 1910–11 to 1930–31*

Grade, market, and crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Weighted average
No. 1 northern spring, Minneapolis:	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910–11	121	113	109	108	104	103	106	102	98	96	99	97	105
1911–12	99	105	109	110	105	102	106	106	108	110	116	113	107
1912–13	109	98	89	90	84	82	89	87	85	88	91	92	87
1913–14	91	88	87	84	85	86	87	93	92	91	94	92	88
1914–15	92	110	112	111	118	120	138	152	149	158	158	135	120
1915–16	144	118	97	102	102	114	129	126	114	122	122	111	109
1916–17	121	164	164	179	195	179	193	186	203	238	296	273	176
1917–18	266	247	217	217	217	217	217	217	217	217	217	217	220
1918–19	217	223	223	219	222	222	221	224	236	256	259	248	225
1919–20	266	259	256	267	285	307	301	267	284	306	309	293	272
1920–21	288	256	254	216	179	166	179	172	166	153	157	169	207
1921–22	167	148	151	134	125	131	134	151	151	158	161	149	143
1922–23	149	111	110	115	123	125	123	126	124	130	128	117	120
1923–24	112	118	121	120	114	116	119	121	121	121	122	125	117
1924–25	137	131	130	146	148	166	189	187	171	150	167	164	156
1925–26	159	164	150	149	155	169	173	167	161	164	162	163	161
1926–27	172	149	143	149	146	146	143	142	139	138	147	149	146
1927–28	147	143	134	129	130	132	135	134	139	153	157	148	136
1928–29	138	119	119	116	116	115	121	128	125	120	111	115	118
1929–30	143	135	135	131	128	131	127	125	112	111	107	100	133
1930–31	92	91	87	82	75	77	------	------	------	------	------	------	------
No. 2 red winter, St. Louis:													
1910–11	107	102	102	100	96	98	103	96	93	90	94	88	99
1911–12	84	88	94	100	96	97	102	101	104	113	121	111	94
1912–13	103	104	103	109	104	107	111	109	108	109	104	99	105
1913–14	85	88	94	93	94	95	96	95	95	94	96	84	89
1914–15	87	93	110	110	111	118	140	157	150	154	150	119	110
1915–16	117	114	114	121	116	123	134	130	117	122	120	110	120
1916–17	125	145	160	173	187	183	196	188	205	266	304	265	163
1917–18	236	232	215	215	215	215	215	215	215	215	215	215	223
1918–19	221	221	219	222	222	232	241	238	255	271	260	241	223
1919–20	222	220	221	224	229	248	270	255	258	276	299	289	230
1920–21	273	251	258	226	202	199	202	190	166	141	158	150	213
1921–22	123	123	136	126	120	121	122	138	142	141	138	118	127
1922–23	112	109	114	123	129	136	137	139	136	139	133	123	121
1923–24	97	99	109	116	112	114	116	118	114	113	112	116	107
1924–25	135	138	140	156	163	179	210	202	186	177	186	189	159
1925–26	159	172	171	170	171	184	194	185	170	171	162	147	169
1926–27	142	134	136	140	136	137	138	135	130	129	142	150	138
1927–28	141	142	142	145	141	144	151	156	169	196	196	179	149
1928–29	147	138	145	144	145	139	142	140	135	125	117	121	139
1929–30	139	132	135	132	129	135	134	123	118	117	114	105	130
1930–31	85	89	88	87	83	83	------	------	------	------	------	------	------
No. 2 hard winter, Kansas City:													
1910–11	104	100	99	95	91	93	95	90	88	88	90	88	98
1911–12	87	93	95	104	100	100	105	103	105	109	111	109	97
1912–13	92	89	88	88	83	84	87	86	86	88	87	88	88
1913–14	82	83	87	84	83	84	85	86	88	87	90	85	84
1914–15	78	91	104	102	108	113	134	154	149	154	150	121	105
1915–16	136	126	107	107	103	112	120	120	105	112	110	100	119
1916–17	114	141	157	167	185	172	189	182	197	243	301	274	171
1917–18	268	261	212	212	212	212	212	212	212	212	212	------	------
1918–19	220	216	216	216	215	224	231	226	239	262	260	247	219
1919–20	225	218	224	230	246	263	282	242	249	275	293	276	242
1920–21	268	245	244	207	176	169	172	162	155	133	147	138	183
1921–22	118	115	122	110	109	109	113	129	134	135	134	117	120
1922–23	113	104	104	113	117	117	114	115	116	120	116	104	113
1923–24	96	101	109	112	109	109	113	111	109	104	106	108	105
1924–25	120	119	120	137	143	162	182	181	171	151	163	160	135
1925–26	154	164	158	158	163	172	178	171	161	159	155	153	163
1926–27	137	131	132	139	137	138	137	135	133	131	142	144	135
1927–28	136	135	131	128	131	132	133	133	138	152	160	147	135
1928–29	120	106	107	110	112	111	114	118	116	110	101	105	112
1929–30	125	123	124	122	119	121	119	113	102	101	99	89	120
1930–31	80	81	78	74	69	71	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Minneapolis Daily Market Record, St. Louis Daily Market Reporter, and Kansas City Grain Market Review, formerly Daily Price Current. Data, 1899–1908 available in 1924 Yearbook, pp. 582–583, Table 32.

[1] Average of daily prices weighted by car-lot sales.

TABLE 24.—*Wheat, No. 3 Manitoba Northern: Average cash price per bushel at Winnipeg, in terms of United States money, 1909–10 to 1930–31* [1]

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909–10	124	102	94	94	94	94	99	98	100	98	91	87	98
1910–11	102	102	97	89	85	84	88	86	85	86	90	90	90
1911–12	91	95	95	94	90	85	87	89	91	96	97	100	93
1912–13	99	100	91	87	78	74	76	78	80	85	87	90	85
1913–14	89	88	82	77	80	78	81	85	87	86	91	89	84
1914–15	87	103	105	104	111	111	131	148	144	153	152	121	122
1915–16	127	125	89	92	96	103	116	117	104	109	111	105	108
1916–17	112	142	155	166	186	167	172	161	177	219	264	239	180
1917–18	228	235	215	214	215	215	213	213	212	211	212	211	216
1918–19	213	211	213	213	214	214	213	213	213	212	211	211	213
1919–20	210	220	247	247	245	238	234	221	229	235	231	226	232
1920–21	225	232	240	202	179	160	162	160	161	149	160	160	183
1921–22	156	150	125	100	93	94	95	118	124	126	130	117	119
1922–23	120	107	95	96	105	104	103	105	105	113	111	108	106
1923–24	99	103	96	89	87	83	86	90	88	89	92	105	92
1924–25	126	134	136	150	153	161	184	187	167	149	174	162	157
1925–26	153	160	132	120	136	149	146	144	138	146	144	144	143
1926–27	149	138	133	136	131	123	123	127	130	133	146	149	135
1927–28	153	145	131	127	124	124	123	124	131	141	142	130	133
1928–29	120	108	106	111	111	109	112	120	119	115	107	112	113
1929–30	152	152	144	134	126	130	123	110	100	103	104	98	123
1930–31	90	88	74	68	60	48	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled as follows: July, 1909–August, 1916, Winnipeg Farmers Advocate; September, 1916–June, 1921, annual reports of the Winnipeg Grain Exchange; July, 1921–July, 1928, Reports on the Grain Trade of Canada; August, 1928 to latest date shown, Minneapolis Daily Market Record. Conversions at current rate of exchange January, 1917–March, 1925. Exchange rates used are: January, 1917–June, 1919, mean of the monthly low and high, compiled from the Commercial and Financial Chronicle; July, 1919–March, 1925, monthly averages as reported by the Federal Reserve Board.

[1] Average of daily cash closing prices, basis, in store at Fort William and Port Arthur. Prices fixed by the Government Sept. 12, 1917–Aug. 17, 1920.

TABLE 25.—*Wheat: Average spot price per bushel of imported wheat at Liverpool, 1914–15 to 1930–31*

IMPORTED RED

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1914–15	105	128	129	128	138	147	167	195	191	194	198	165	157
1915–16	163	161	167	171	159	173	194	190	200	193	171	155	175
1916–17	158	196	200	215	222	239	239	243	242	246	246	246	224
1917–18	250	250	238	226	226	226	232	232	239	232	232	232	235
1918–19	232	232	232	239	246	246	246	246	243	241	241	239	240
1919–20	229	221	216	216	211	195	190	175	211	237	234	240	215
1920–21	234	220	213	234	253	230	233	214	213	213	217	[1] 196	223
1921–22	[1] 171	[1] 159	[1] 156	[1] 131	[1] 126	[1] 137	144	166	162	158	160	143	151
1922–23	152	137	132	148	148	148	148	143	140	145	149	138	144
1923–24	138	132	125	126	126	125	126	([2])	128	123	125	126	------
1924–25	143	160	163	176	179	189	210	214	198	175	184	182	181
1925–26	176	188	180	166	171	189	183	181	164	167	173	172	176

PARCELS

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
1925–26	169	173	160	149	165	185	181	175	161	171	173	169	169
1926–27	167	162	160	171	171	163	160	157	155	156	165	165	163
1927–28	161	160	151	149	147	148	149	146	151	159	155	147	152
1928–29	141	126	126	129	129	126	131	135	131	125	116	117	128
1929–30	141	142	137	136	125	141	140	124	119	120	114	110	129
1930–31	106	105	92	86	81	74	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Price per bushel of 60 pounds, good average imported red, July, 1914–June, 1926, compiled from Broomhall's 1921, 1925, and 1927 Corn Trade Yearbooks. Price per bushel of 60 pounds July, 1926, to date, compiled from Broomhall's Corn Trade News. These prices are simple averages of daily sales prices of parcels at Liverpool. Conversions at par beginning with January, 1926. Prior to that date conversions were made at monthly average rate of exchange as given in Federal Reserve Bulletins.

[1] No. 2 hard winter when available, otherwise No. 2 red winter. [2] No quotations.

TABLE 26.—*Wheat ground in merchant mills in the United States, census years, 1899–1929* [1]

Year	Merchant mills	Year	Merchant mills	Year	Merchant mills
	1,000 bushels		*1,000 bushels*		*1,000 bushels*
1899	471, 307	1919	612, 563	1927	544, 054
1904	494, 095	1921	521, 234	1929 [2]	546, 333
1909	496, 480	1923	538, 312		
1914	545, 728	1925	530, 593		

Bureau of Agricultural Economics. Rearranged from reports of the Bureau of the Census, as follows: 1899 and 1904 from 1910 Census of Manufactures, Vol. X, p. 415; 1909, 1914, and 1919 from 1919 Census of Manufactures, Vol. X, p. 110; 1921 from 1923 Biennial Census of Manufactures; 1923 and 1925 from 1925 Biennial Census of Manufactures; 1927 from release of Census of Manufactures, Mar. 6, 1929.

[1] Wheat ground in custom mills is as follows: 1909, 6,988,000 bushels; 1919, 6,105,000 bushels.
[2] Preliminary.

TABLE 27.—*Flour, wheat, spring patents: Average wholesale price per barrel,*[1] *Minneapolis, 1921–22 to 1930–31*

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	9. 27	8. 34	8. 62	7. 67	7. 39	7. 26	7. 33	8. 17	8. 27	8. 46	8. 32	7. 71	8. 07
1922–23	7. 95	7. 22	6. 68	6. 76	6. 88	6. 86	6. 71	6. 72	6. 72	7. 00	6. 80	6. 35	6. 89
1923–24	6. 21	6. 37	6. 45	6. 43	6. 21	6. 30	6. 44	6. 51	6. 49	6. 56	6. 83	7. 12	6. 49
1924–25	7. 72	7. 69	7. 52	8. 19	8. 22	9. 03	9. 80	10. 02	9. 34	8. 54	9. 12	8. 86	8. 67
1925–26	8. 78	9. 04	8. 52	8. 52	8. 81	9. 52	9. 85	9. 46	9. 19	9. 20	9. 00	9. 32	9. 10
1926–27	9. 27	8. 50	7. 87	8. 08	7. 85	8. 02	7. 95	7. 85	7. 74	7. 75	8. 23	8. 39	8. 12
1927–28	8. 26	7. 98	7. 52	7. 43	7. 38	7. 37	7. 48	7. 47	7. 88	8. 48	8. 68	8. 36	7. 86
1928–29	7. 92	7. 20	7. 16	6. 89	6. 79	6. 64	6. 84	7. 27	7. 29	7. 22	6. 82	6. 94	7. 08
1929–30	8. 57	8. 10	7. 94	7. 53	7. 44	7. 69	7. 44	7. 06	6. 86	6. 81	6. 58	6. 47	7. 37
1930–31	6. 12	5. 94	5. 67	5. 51	5. 18	5. 30	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Minneapolis Daily Market Record. Prices 1909–1920, appear in 1930 yearbook, Table 25.

[1] Packed in 98-pound cotton sacks.

TABLE 28.—*Bread: Average retail price per pound (baked weight) in leading cities of the United States, 1921–22 to 1930–31*

Year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	9. 7	9. 7	9. 6	9. 5	9. 3	9. 1	8. 8	8. 6	8. 7	8. 7	8. 8	8. 8	9. 1
1922–23	8. 8	8. 7	8. 7	8. 7	8. 7	8. 6	8. 7	8. 7	8. 7	8. 7	8. 7	8. 7	8. 7
1923–24	8. 8	8. 7	8. 7	8. 7	8. 7	8. 7	8. 7	8. 7	8. 7	8. 7	8. 7	8. 7	8. 7
1924–25	8. 7	8. 8	8. 8	8. 8	8. 9	8. 9	9. 2	9. 5	9. 4	9. 4	9. 4	9. 4	9. 1
1925–26	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4
1926–27	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 4	9. 3	9. 4
1927–28	9. 3	9. 3	9. 3	9. 3	9. 3	9. 2	9. 2	9. 2	9. 1	9. 1	9. 1	9. 2	9. 2
1928–29	9. 2	9. 2	9. 1	9. 1	9. 1	9. 0	9. 0	9. 0	9. 0	9. 0	9. 0	9. 0	9. 1
1929–30	9. 0	9. 0	9. 0	8. 9	8. 9	8. 9	8. 9	8. 8	8. 8	8. 8	8. 8	8. 8	8. 9
1930–31	8. 8	8. 7	8. 7	8. 6	8. 5	8. 5	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics retail prices, monthly Data for 1913–14 to 1920–21 are available in the 1930 Yearbook, p. 615, Table 26.

TABLE 29.—*Bran, standard: Average wholesale price per ton in 100-pound sacks, Minneapolis, 1921–22 to 1930–31*

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	14.06	13.91	12.95	12.15	14.79	20.63	20.98	24.75	23.85	22.29	20.91	15.35	18.05
1922–23	15.31	14.06	16.88	21.81	22.65	24.09	25.99	27.34	28.22	27.74	26.75	20.83	22.64
1923–24	19.84	23.62	27.79	28.07	25.65	24.77	24.98	23.66	22.00	20.84	17.66	19.12	23.17
1924–25	22.27	23.43	23.00	24.66	25.62	30.43	30.14	24.49	23.45	23.46	26.84	26.34	25.34
1925–26	23.58	24.20	23.09	22.83	25.73	26.34	26.17	23.68	22.24	25.05	23.30	21.31	23.96
1926–27	22.02	21.69	21.64	21.33	23.14	26.02	26.48	27.64	26.96	27.31	28.43	26.51	24.93
1927–28	25.13	26.85	25.88	25.96	28.41	30.09	30.66	32.47	35.68	34.28	35.03	29.68	30.01
1928–29	27.29	24.12	25.49	28.09	30.82	31.69	30.54	28.64	26.88	22.93	22.38	22.56	26.79
1929–30	26.17	26.44	29.19	28.21	27.90	27.66	26.58	24.45	23.17	27.43	25.06	21.25	26.13
1930–31	19.33	24.17	21.43	19.91	17.97	16.57	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Minneapolis Daily Market Record. Prices are simple averages of daily quotations.

TABLE 30.—*Middlings, standard: Average wholesale price per ton, in 100-pound sacks, Minneapolis, 1921–22 to 1930–31*

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	14.07	14.64	13.95	13.16	15.32	20.73	20.51	24.76	25.52	23.21	21.20	17.13	18.68
1922–23	17.30	16.24	18.03	13.06	23.23	23.73	25.81	27.26	28.11	27.79	28.85	25.69	23.76
1923–24	24.83	25.89	27.85	27.78	25.13	23.80	25.43	23.95	21.65	20.96	18.00	19.92	23.78
1924–25	24.46	25.68	25.27	26.64	27.99	31.44	33.08	26.09	23.62	24.28	29.07	29.68	27.28
1925–26	25.53	26.95	26.37	24.19	26.31	25.28	26.10	23.71	22.03	24.20	21.77	21.60	24.50
1926–27	22.96	23.01	22.67	22.31	24.16	27.38	27.35	28.61	28.46	27.79	29.13	29.10	26.08
1927–28	31.42	34.46	29.22	26.88	28.72	30.00	30.52	32.71	35.85	34.33	37.14	35.30	32.21
1928–29	32.18	24.31	27.44	28.61	31.01	31.21	30.46	28.31	26.28	22.76	21.98	22.64	27.27
1929–30	28.42	29.25	32.66	32.08	28.76	28.00	26.46	24.11	22.71	26.74	25.21	22.09	27.21
1930–31	20.64	25.10	22.17	19.55	17.49	16.00	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Minneapolis Daily Market Record. Prices are simple averages of daily quotations.

TABLE 31.—*Wheat futures: Volume of trading in all contract markets, by months, 1923–24 to 1929–30*

Month	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
July	806	1,333	1,460	1,438	1,018	996	2,889
August	784	1,300	1,561	1,226	1,144	1,133	2,265
September	678	1,068	1,475	1,156	923	818	1,401
October	785	1,596	1,573	1,090	918	916	1,738
November	677	1,340	1,500	1,227	838	750	1,805
December	528	1,528	2,349	972	543	517	1,608
January	373	1,908	1,456	704	384	1,085	1,334
February	417	1,781	1,284	581	508	892	1,484
March	594	2,273	1,864	920	923	1,083	1,201
April	451	1,482	1,397	846	1,590	1,361	1,501
May	374	1,508	1,222	1,260	1,471	1,253	1,004
June	850	1,759	1,204	1,164	941	1,391	1,377
Total	7,317	18,876	18,345	12,584	11,201	12,195	19,607

Grain Futures Administration.

TABLE 32.—*Wheat futures: Volume of trading in contract markets, by markets and by months, 1929–30*

Month	Chicago Board of Trade	Chicago Open Board	Minneapolis	Kansas City	Duluth	St. Louis	Milwaukee	Seattle	Portland
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
July	2,432	64	186	151	45	3	5	2	1
August	1,896	51	150	110	49	2	3	2	2
September	1,157	37	111	57	32	1	3	1	1
October	1,467	42	117	74	30	2	3	1	2
November	1,501	33	127	96	37	2	4	2	2
December	1,376	39	95	71	20	2	4	1	1
January	1,152	31	83	50	11	2	3	1	1
February	1,277	34	100	54	11	2	4	1	1
March	1,028	30	75	48	15	1	3	½	1
April	1,259	36	89	75	34	3	3	1	1
May	876	33	44	32	15	1	2	½	½
June	1,178	36	71	57	29	1	2	1	1
Total	16,599	466	1,248	875	328	22	39	14	15

Grain Futures Administration.

TABLE 33.—*Wheat: Amount of open commitments in the various futures on the Chicago Board of Trade shown semimonthly, June 29, 1929–December 31, 1930*

Date	Future					
	July	September	December	March	May	All futures
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1929						
June 29	13	84	43			140
July 15	3	91	70			164
July 31		87	120	2	2	210
Aug. 15		60	130	4	23	218
Aug. 31		18	147	6	44	216
Sept. 14		5	157	7	55	225
Sept. 30			162	8	73	243
Oct. 15			154	8	85	246
Oct. 31			119	10	92	221
Nov. 15	2		84	14	98	198
Nov. 30	6		26	17	140	190
Dec. 14	10		4	19	155	188
Dec. 31	15			19	151	184
1930						
Jan. 15	20			18	158	196
Jan. 31	26	5		15	156	201
Feb. 15	26	8		12	148	194
Feb. 28	30	12		7	129	178
Mar. 15	39	18		1	116	173
Mar. 31	43	20			105	168
Apr. 15	51	23	4		87	165
Apr. 30	66	30	12		33	140
May 15	66	36	17		14	132
May 31	65	39	21			125
June 14	53	48	26			127
June 30	14	56	35			105
July 15	4	61	44			110
July 31		66	57	3		126
Aug. 15		41	86	7	9	143
Aug. 29		14	98	9	21	142
Sept. 15		3	109	12	39	162
Sept. 30			99	14	54	167
Oct. 15	2		93	15	64	174
Oct. 31	2		89	17	77	185
Nov. 15	4		67	18	95	184
Nov. 29	10		29	18	104	161
Dec. 15	17		5	16	117	155
Dec. 31	27			11	106	145

Grain Futures Administration. The maximum open commitments in all wheat futures for crop year 1929–30 was 248,294,000 bushels on Oct. 16, 1929. The minimum was 105,171,000 bushels on June 30, 1930. The maximum for the six months July to December, 1930, was 188,527,000 on Nov. 3, 1930. The minimum was 104,820,000 on July 10, 1930.

TABLE 34.—*Wheat futures: Volume of trading on the Chicago Board of Trade by crop years, 1921–22 to 1929–30*

Crop year	Bushels	Crop year	Bushels	Crop year	Bushels
1921–22	12, 814, 000, 000	1924–25	16, 587, 000, 000	1927–28	9, 203, 000, 000
1922–23	9, 625, 000, 000	1925–26	15, 869, 000, 000	1928–29	9, 908, 000, 000
1923–24	6, 124, 000, 000	1926–27	10, 619, 000, 000	1929–30	16, 599, 000, 000

Grain Futures Administration.

TABLE 35.—*Rye: Acreage, production, value, exports, etc., United States, 1909–1930*

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel of No. 2 rye at Minneapolis year beginning July 1[1]	Foreign trade, including flour, year beginning July 1[2]			
							Domestic exports	Imports	Net exports[3]	
									Total	Percentage of production
	1,000 acres	*Bushels of 56 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*
1909	*2, 196*	*13. 4*	*29, 520*							
1909	2, 196	16. 1	35, 406	72. 2	25, 548	70	242	30	212	0. 6
1910	2, 185	16. 0	34, 897	71. 5	24, 953	77	40	227	[4] 187	. 5
1911	2, 127	15. 6	33, 119	83. 2	27, 557	86	31	134	[4] 103	. 3
1912	2, 117	16. 8	35, 664	66. 3	23, 636	60	1, 855	1	1, 854	5. 2
1913	2, 557	16. 2	41, 381	63. 4	26, 220	58	2, 273	37	2, 236	5. 4
1914	2, 541	16. 8	42, 779	86. 5	37, 018	98	13, 027	147	12, 880	30. 1
1915	3, 129	17. 3	54, 050	83. 4	45, 083	94	15, 250	566	14, 684	27. 2
1916	3, 213	15. 2	48, 862	122. 1	59, 676	135	13, 703	428	13, 275	27. 2
1917	4, 317	14. 6	62, 933	166. 0	104, 447	193	17, 186	834	16, 352	26. 0
1918	6, 391	14. 2	91, 041	151. 6	138, 038	158	36, 467	638	35, 829	39. 4
1919	*7, 679*	*9. 9*	*75, 992*							
1919	6, 307	12. 0	75, 483	133. 2	100, 573	160	41, 531	1, 077	40, 454	53. 6
1920	4, 409	13. 7	60, 490	126. 8	76, 693	161	47, 337	452	46, 885	77. 5
1921	4, 528	13. 6	61, 675	69. 7	43, 014	92	29, 944	700	29, 244	47. 4
1922	6, 672	15. 5	103, 362	68. 5	70, 841	75	51, 663	99	51, 564	49. 9
1923	5, 171	12. 2	63, 077	65. 0	40, 971	65	19, 902	2	19, 900	31. 5
1924	*3, 744*	*14. 9*	*55, 674*							
1924	4, 156	15. 8	65, 520	106. 4	69, 742	114	50, 242	1	50, 241	76. 7
1925	3, 974	11. 7	46, 456	78. 2	36, 340	88	12, 647		12, 646	27. 2
1926	3, 574	11. 4	40, 749	83. 4	33, 991	98	21, 698	1	21, 697	53. 2
1927	3, 648	15. 9	58, 164	85. 3	49, 609	104	26, 346	2	26, 345	45. 3
1928	3, 480	12. 5	43, 366	86. 0	37, 290	95	9, 488	1	9, 487	21. 9
1929	3, 331	12. 6	41, 911	86. 4	36, 225	90	2, 600	1	2, 599	6. 2
1930 [5]	3, 722	13. 5	50, 234	41. 6	20, 895					

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, page 764, for data for earlier years.

[1] Prices are from Minneapolis Daily Market Record and are averages of daily prices weighted by car-lot sales.

[2] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929, and official records of the Bureau of Foreign and Domestic Commerce. Rye—General imports, 1909; imports for consumption, 1910–1929. Rye flour—Imports for consumption, 1909–1930. Rye flour converted to rye on the basis that 1 barrel of rye flour is the product of 6 bushels of grain.

[3] Total exports (domestic plus foreign) minus total imports.

[4] Net imports.

[5] Preliminary.

TABLE 36.—*Rye: Acreage harvested and production, by States, average 1924–1928, annual 1927–1930*

State and division	Acreage harvested					Production				
	Average, 1924–1928	1927	1928	1929	1930[1]	Average, 1924–1928	1927	1928	1929	1930[1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
New York	29	21	20	20	24	472	368	314	310	415
New Jersey	42	36	41	36	31	774	720	758	684	620
Pennsylvania	104	86	103	124	124	1, 693	1, 462	1, 596	1, 984	2, 108
North Atlantic	175	143	164	180	179	2, 947	2, 550	2, 668	2, 978	3, 143
Ohio	45	35	30	42	36	708	560	399	655	540
Indiana	131	119	86	125	106	1, 699	1, 618	946	1, 625	1, 378
Illinois	77	62	62	75	79	1, 119	899	899	1, 088	1, 224
Michigan	198	178	182	166	171	2, 700	2, 617	2, 366	2, 241	2, 565
Wisconsin	250	238	167	185	191	3, 898	4, 046	2, 171	2, 960	2, 960
Minnesota	472	383	421	396	416	7, 961	7, 009	6, 315	6, 930	7, 197
Iowa	39	43	49	44	35	635	645	760	704	630
Missouri	20	16	19	20	20	250	176	228	200	250
North Dakota	1, 371	1, 381	1, 298	1, 038	1, 194	16, 604	23, 063	14, 278	9, 861	13, 134
South Dakota	168	154	162	222	400	1, 996	2, 772	1, 458	2, 442	5, 800
Nebraska	234	274	249	262	333	3, 093	4, 110	3, 486	3, 694	4, 995
Kansas	39	45	27	19	24	489	576	437	238	288
North Central	3, 045	2, 928	2, 752	2, 594	3, 005	41, 151	48, 091	33, 743	32, 638	40, 961
Delaware	4	3	3	4	4	56	45	45	58	56
Maryland	15	14	15	18	18	255	214	225	297	333
Virginia	41	42	46	53	50	509	496	621	625	650
West Virginia	9	8	7	8	8	119	104	94	93	107
North Carolina	88	94	89	98	89	1, 013	1, 128	1, 024	1, 176	1, 068
South Carolina	8	9	7	7	7	92	117	80	88	81
Georgia	22	26	22	18	15	223	260	220	171	150
South Atlantic	186	196	189	206	191	2, 266	2, 364	2, 309	2, 508	2, 445
Kentucky	14	14	7	15	16	178	154	87	165	184
Tennessee	24	26	25	32	27	256	208	205	256	270
Arkansas	1	1	1	1	1	10	10	9	9	10
Oklahoma	31	22	26	28	25	396	198	312	308	262
Texas	16	14	15	16	9	197	98	180	240	112
South Central	86	77	74	92	78	1, 038	668	793	978	838
Montana	111	134	154	111	113	1, 594	2, 412	2, 156	1, 221	1, 130
Idaho	3	3	3	3	3	46	48	48	42	39
Wyoming	49	54	40	40	38	583	675	400	360	342
Colorado	80	76	74	81	93	832	798	814	891	1, 070
New Mexico	1	1	1	1	1	14	6	12	18	6
Utah	4	4	3	3	3	33	40	24	21	30
Washington	17	22	18	12	9	218	352	279	144	104
Oregon	9	10	8	8	9	128	160	120	112	126
Western	274	304	301	259	269	3, 449	4, 491	3, 853	2, 809	2, 847
United States	3, 766	3, 648	3, 480	3, 331	3, 722	50, 851	58, 164	43, 366	41, 911	50, 234

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 37.—*Rye: Acreage, yield per acre, and production in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1928–29 to 1930–31*

Country	Acreage					Yield per acre					Production				
	Average, 1909–10 to 1913–14 [1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14 [1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14 [1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*
NORTHERN HEMISPHERE	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
North America:															
Canada	117	1,386	840	992	1,448	17.9	14.4	17.4	13.3	15.4	2,094	19,994	14,618	13,161	22,286
United States	2,236	4,900	3,480	3,331	3,722	16.1	13.9	12.5	12.6	13.5	36,093	68,018	43,366	41,911	50,234
Total	2,353	6,286	4,320	4,323	5,170	16.2	14.0	13.4	12.7	14.0	38,187	88,012	57,984	55,072	72,520
Europe:															
Norway	37	28	18	18	----	26.3	27.9	27.6	29.9	----	973	780	497	538	587
Sweden	977	836	682	631	592	24.7	26.2	25.1	25.8	32.4	24,100	21,911	17,152	16,282	19,169
Denmark	636	535	361	376	372	30.0	24.6	26.8	27.7	27.0	19,104	13,162	9,683	10,411	10,039
Netherlands	557	499	485	488	494	29.5	31.5	35.7	37.5	25.1	16,422	15,731	17,333	18,300	12,385
Belgium	672	559	572	567	564	35.2	36.8	40.5	39.1	35.0	23,644	20,564	23,154	22,162	19,757
Luxemburg	26	18	15	18	22	25.0	19.4	23.5	23.1	18.9	651	349	352	416	415
France	3,095	2,196	1,900	1,936	1,878	17.0	18.5	17.9	20.4	15.6	52,501	40,645	34,079	39,432	29,255
Spain	1,988	1,802	1,384	1,519	1,446	13.9	15.4	10.4	15.1	14.3	27,636	27,721	14,413	22,935	20,725
Portugal	[2] 271	604	619	577	----	[2] 8.5	8.5	6.4	8.1	----	[2] (2,300)	5,110	3,966	4,686	4,863
Italy	346	317	311	308	301	18.3	19.8	21.0	22.4	20.3	6,317	6,277	6,535	6,909	6,121
Switzerland	60	55	56	56	50	29.7	31.8	35.0	33.3	30.3	1,783	1,747	1,962	1,862	1,514
Germany	12,713	10,745	11,452	11,680	11,640	29.0	23.8	29.3	27.5	26.1	368,337	255,937	335,499	321,045	303,444
Austria	1,110	878	938	925	922	21.4	18.3	21.2	21.7	22.4	23,785	16,086	19,920	20,097	20,613
Czechoslovakia	2,605	2,128	2,480	2,690	2,676	24.4	24.5	28.2	26.8	25.4	63,538	52,200	70,046	72,185	68,047
Hungary	1,608	1,591	1,608	1,623	1,571	19.5	16.9	20.3	19.4	16.8	31,377	26,839	32,587	31,423	26,429
Yugoslavia	732	477	496	602	625	12.3	12.6	15.2	13.7	15.3	9,004	6,001	7,527	8,268	9,562
Greece	76	84	137	172	----	14.9	12.5	12.6	7.5	----	1,129	1,051	1,731	1,295	----
Bulgaria	542	442	487	536	647	15.4	13.2	16.6	13.7	20.1	8,345	5,831	8,067	7,337	12,991
Rumania	[3] 1,286	692	686	773	968	[3] 16.1	12.1	16.7	17.2	20.5	[3] 20,644	8,371	11,483	13,266	19,822
Poland	12,570	12,911	13,197	14,328	----	17.9	16.0	18.2	19.3	----	224,836	206,884	240,545	275,959	272,426
Lithuania	1,749	1,355	1,161	1,113	1,197	13.9	16.9	16.1	19.8	20.8	24,283	22,942	18,717	22,030	24,842
Latvia	888	624	637	590	660	14.7	15.3	13.3	16.1	21.0	13,061	9,535	8,459	9,503	13,851
Estonia	486	[3] 394	357	329	367	16.7	[3] 15.9	15.5	17.4	22.2	8,129	[3] 6,246	5,537	5,736	8,136
Finland	589	578	550	556	568	17.8	19.6	20.0	23.2	25.2	10,490	11,316	10,998	12,909	14,332
Russia	61,910	59,672	64,460	68,581	----	12.0	11.4	11.6	11.9	----	743,497	679,304	749,979	818,497	----

Total European countries reporting all years	32,665	26,721	26,618	27,316	27,560	23.1	21.3	24.6	24.3	23.3	753,151	569,411	653,503	662,508	641,449
Estimated European total, excluding Russia	[4] 45,200	39,200	40,600	42,500	43,200						[4] 978,000	781,000	901,000	946,000	922,000
Total Northern Hemisphere countries reporting all years	35,018	33,007	30,938	31,639	32,730	22.6	19.9	23.0	22.7	21.8	791,338	657,423	711,487	717,580	713,969
Estimated total, excluding Russia and China	[4] 48,000	45,900	45,400	47,200	48,700						[4] 1,023,000	875,000	965,000	1,007,000	1,000,000
SOUTHERN HEMISPHERE															
Chile	5	4	9	8	7	22.2	16.0	16.2	17.9		111	64	146	143	
Argentina	85	380	1,275	1,291	1,364	7.5	8.1	7.0	3.4		640	3,061	8,976	4,401	
Union of South Africa	108	[2] 164	110			6.7	[2] 5.5	6.3			724	[2] 909	694		
Australia	9	4	5			12.7	12.8	15.8			114	51	79		
New Zealand	[5] 4	1	[6]			[5] 28.5	23.0				[5] 114	23	9		
Estimated world total, excluding Russia and China	[4] 48,300	46,500	46,800	48,700	50,300						[4] 1,025,000	881,000	976,000	1,013,000	1,012,000

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Acreage and production figures are for the harvesting season which begins in the spring, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

* Preliminary.

[1] Where changes of boundary have occurred, averages are for estimates for territory within present boundaries.

[2] 3-year average.

[3] 4-year average.

[4] The estimate for the 5-year period, 1909–10 to 1913–14, given in this table is somewhat larger than the figures obtained by averaging the five years in Table 39. This is because in this table estimates for warring countries are for postwar boundaries, whereas in Table 39 they are for pre-war territory. As a result, in excluding Russia, which country lost territory in the war, a smaller area is excluded in this table than in Table 39.

[5] 2-year average.

[6] Less than 500 acres.

TABLE 38.—*Rye: Yield per acre, average 1919–1928, annual 1925–1930, and estimated price per bushel December 1, average 1924–1928, and annual 1925–1930, by States*

State and division	Yield per acre: Average 1919–1928	1925	1926	1927	1928	1929	1930	Estimated price per bushel Dec. 1: Average 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
New York	16.4	16.5	15.5	17.5	15.7	15.5	17.3	106	100	100	105	112	114	74
New Jersey	18.1	18.0	19.0	20.0	18.5	19.0	20.0	100	93	95	97	104	103	70
Pennsylvania	16.4	17.0	16.0	17.0	15.5	16.0	17.0	105	105	97	105	107	106	79
North Atlantic	16.8	17.1	16.7	17.8	16.3	16.5	17.6	104.1	101.4	96.8	102.7	106.7	106.1	76.6
Ohio	15.1	15.0	17.5	16.0	13.3	15.6	15.0	96	88	88	92	103	98	67
Indiana	13.1	11.4	14.5	13.6	11.0	13.0	13.0	92	85	85	88	94	90	55
Illinois	15.2	13.8	15.0	14.5	14.5	14.5	15.5	93	90	86	92	92	89	53
Michigan	13.6	12.5	13.5	14.7	13.0	13.5	15.0	89	78	78	89	93	88	55
Wisconsin	15.2	14.8	15.0	17.0	13.0	16.0	15.5	90	76	84	90	90	89	45
Minnesota	16.4	13.0	13.5	18.3	15.0	17.5	17.3	85	71	76	85	85	82	31
Iowa	16.9	16.4	17.5	15.0	15.5	16.0	18.0	87	80	82	86	86	85	48
Missouri	12.1	12.0	12.9	11.0	12.0	10.0	12.5	111	120	113	110	106	107	77
North Dakota	11.3	10.0	7.6	16.7	11.0	9.5	11.0	80	65	73	80	76	76	24
South Dakota	12.9	9.5	6.2	18.0	9.0	11.0	14.5	80	67	73	79	79	76	25
Nebraska	13.2	12.3	10.3	15.0	14.0	14.1	15.0	80	71	76	77	77	76	38
Kansas	11.9	8.9	11.7	12.8	16.2	12.5	12.0	93	98	94	92	82	85	58
North Central	13.4	11.4	10.7	16.4	12.3	12.6	13.6	84.0	71.6	78.3	82.7	81.8	81.3	33.9
Delaware	14.1	15.0	15.0	15.0	15.0	14.5	14.0	118	120	110	115	120	115	90
Maryland	15.7	19.0	18.0	15.3	15.0	16.5	18.5	113	114	105	110	115	110	87
Virginia	12.0	12.0	13.5	11.8	13.5	11.8	13.0	120	127	112	115	120	120	115
West Virginia	12.2	13.0	13.0	13.0	13.5	11.6	13.4	117	120	110	110	115	116	96
North Carolina	10.1	11.5	13.0	12.0	11.5	12.0	12.0	142	157	125	135	145	140	123
South Carolina	11.2	10.5	14.0	13.0	11.5	12.5	11.6	187	210	175	175	185	190	168
Georgia	9.7	9.3	12.0	10.0	10.0	9.5	10.0	173	180	160	165	175	189	161
South Atlantic	11.5	12.3	13.4	12.1	12.2	12.2	12.8	136.6	144.5	124.6	132.3	137.9	135.1	117.9
Kentucky	12.0	13.0	15.5	11.0	12.4	11.0	11.5	122	125	108	120	132	122	96
Tennessee	9.6	11.0	14.0	8.0	8.2	8.0	10.0	131	130	120	129	138	133	108
Arkansas	10.2	11.0	11.0	10.0	9.0	9.0	10.0	133	130	125	140	140	135	114
Oklahoma	12.6	12.0	15.5	9.0	12.0	11.0	10.5	98	110	90	99	92	90	68
Texas	12.4	4.0	19.0	7.0	12.0	15.0	12.5	105	120	97	95	103	92	66
South Central	11.7	10.6	15.7	8.7	10.7	10.6	10.7	112.1	119.2	102.9	113.2	111.3	107.5	87.4
Montana	11.8	12.5	12.0	18.0	14.0	11.0	10.0	76	74	75	73	69	72	25
Idaho	15.8	20.0	15.5	16.0	16.0	14.0	13.0	84	80	73	75	72	85	50
Wyoming	13.4	12.0	14.0	12.5	10.0	9.0	9.0	72	64	67	69	72	68	33
Colorado	10.5	10.0	11.5	10.5	11.0	11.0	11.5	73	67	71	70	70	71	37
New Mexico	12.2	4.0	18.0	6.0	12.0	18.0	6.0	88	100	85	75	80	82	45
Utah	9.1	11.0	9.0	10.0	8.0	7.0	10.0	91	100	80	82	87	91	60
Washington	12.4	11.0	12.0	16.0	15.5	12.0	11.5	108	125	100	90	90	95	60
Oregon	13.0	14.0	13.0	16.0	15.0	14.0	14.0	108	110	96	95	102	115	60
Western	11.9	11.6	12.3	14.8	12.8	10.8	10.6	77.6	74.7	74.6	74.1	72.3	74.5	34.1
United States	13.4	11.7	11.4	15.9	12.5	12.6	13.5	87.9	78.2	83.4	85.3	86.0	86.4	41.6

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

TABLE 39.—*Rye: World production, 1894–95 to 1930–31*

Crop year	World production excluding Russia and China	Northern Hemisphere production excluding Russia and China	European production excluding Russia	Selected countries						
				Russia [1]	United States	Germany	France	Poland	Hungary	Czechoslovakia
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000 000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1894–95	663	662	618	863	30	279	75		80	
1895–96	620	618	573	773	31	260	72	---------	47	---------
1896–97	664	663	621	790	29	285	70	---------	37	---------
1897–98	599	598	551	654	33	273	48	---------	26	---------
1898–99	667	666	619	738	33	297	67	---------	33	---------
1899–1900	710	708	664	912	30	342	67	---------	36	---------
1900–1901	675	673	629	920	31	337	59	---------	31	---------
1901–2	690	688	644	755	31	321	58	---------	31	---------
1902–3	733	731	682	919	35	374	46	---------	38	---------
1903–4	768	767	721	912	32	391	58	---------	37	---------
1904–5	755	754	709	1,008	32	396	53	---------	33	---------
1905–6	782	781	732	737	35	378	59	---------	38	---------
1906–7	787	785	736	668	37	379	51	---------	39	---------
1907–8	751	749	700	815	35	384	56	---------	30	---------
1908–9	827	826	776	790	36	423	52	---------	34	---------
1909–10 [2]	872	870	821	904	35	447	56	---------	47	---------
1910–11 [2]	818	816	768	875	35	414	44	---------	52	---------
1911–12 [2]	828	826	779	769	33	428	47	---------	54	---------
1912–13 [2]	862	860	810	1,051	36	457	49	---------	57	---------
1913–14 [2]	892	889	834	1,011	41	481	50	---------	56	---------
1914–15	766	763	707	[3] 870	43	347	44	---------	45	---------
1915–16	691	689	621	[4] 910	54	301	33	---------	48	---------
1916–17	663	661	598	[5] 771	49	287	33	---------		---------
1917–18	548	545	466	614	63	[6] 228	25	---------	---------	---------
1918–19	590	588	476	---------	91	250	29	---------	---------	---------
1919–20	681	679	581	---------	75	238	31	103	---------	---------
1920–21	619	616	533	368	60	194	37	74	[6] 20	33
1921–22	853	850	760	401	62	268	44	175	23	54
1922–23	864	858	716	568	103	206	38	203	25	51
1923–24	925	919	826	784	63	263	37	243	31	53
1924–25	745	741	655	737	66	226	40	148	22	45
1925–26	1,016	1,009	947	906	46	317	44	265	33	53
1926–27	830	823	763	941	41	252	30	204	31	56
1927–28	904	893	814	950	58	269	34	232	22	60
1928–29 [7]	976	965	901	750	43	335	34	241	33	70
1929–30 [7]	1,013	1,007	946	818	42	321	39	276	31	72
1930–31 [7]	1,012	1,000	922	---------	50	303	29	272	26	68

Bureau of Agricultural Economics. Production figures are for the harvesting season which begins in the spring, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

[1] Includes all Russian territory reporting for the years shown.
[2] The average production for the 1909–10 to 1913–14 period as computed from figures given here for estimated world total, Northern Hemisphere total, European total and European countries whose boundaries were changed by the World War, will not agree with estimates appearing elsewhere for present territory due to changes in boundary.
[3] Exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.
[4] Exclusive of Russian Poland, Lithuania, parts of Latvia and the Ukraine, and the two Provinces of Batum and Elizabetpol in Transcaucasia.
[5] Beginning with this year estimates for the present territory of the Union of Socialist Soviet Republics exclusive of Turkestan, Transcaucasia, and the Far East, which territory in 1924 produced 8,646,000 bushels.
[6] Beginning with this year postwar boundaries, therefore not comparable with earlier years.
[7] Preliminary.

TABLE 40.—*Rye: Classification of receipts graded by licensed inspectors, all inspection points, 1923–1929*

Year beginning July	Grade					
	No. 1	No. 2	No. 3	No. 4	Sample	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1923–24	14,394	13,532	3,872	1,061	473	33,332
1924–25	27,977	24,251	8,841	2,957	876	64,902
1925–26	3,969	11,730	5,111	1,794	494	23,098
1926–27	3,892	9,921	5,794	3,597	1,445	24,649
1927–28	10,659	15,573	4,976	1,409	564	33,181
1928–29	1,787	13,081	6,646	1,994	626	24,134
1929–30	8,985	10,611	1,642	475	288	22,001

Bureau of Agricultural Economics.

TABLE 41.—*Rye: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–18 to 1929–30*

Crop year	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917–18	2.8	14.8	20.5	17.1	11.3	7.6	5.8	6.4	7.6	3.4	1.7	1.0	100.0
1918–19	5.6	11.3	14.9	14.5	12.2	9.5	8.4	4.9	6.3	4.8	3.4	4.2	100.0
1919–20	8.2	15.0	13.3	12.4	7.8	9.1	8.5	4.7	6.2	6.4	4.3	4.1	100.0
1920–21	7.3	20.7	18.1	12.2	8.8	7.0	6.6	4.7	4.3	3.7	3.3	3.3	100.0
1921–22	13.9	20.8	17.6	10.6	6.3	5.9	4.5	4.8	4.9	4.0	4.2	2.5	100.0
1922–23	10.7	20.5	14.8	12.3	10.2	8.7	6.5	5.3	4.0	2.9	2.2	1.9	100.0
1923–24	5.3	18.8	19.2	14.2	9.4	8.5	5.4	5.9	3.5	2.5	3.0	4.3	100.0
1924–25	3.9	16.9	25.4	23.3	10.7	7.0	5.0	3.1	1.7	1.0	1.2	0.8	100.0
1925–26	5.2	19.2	23.3	12.4	8.7	8.9	6.6	4.6	3.1	2.4	2.8	2.8	100.0
1926–27	8.0	20.1	19.7	13.0	8.5	6.0	6.0	6.0	3.7	2.6	3.0	3.4	100.0
1927–28	4.7	19.0	25.6	17.5	9.8	5.8	4.4	4.1	3.7	2.4	1.7	1.3	100.0
1928–29	4.5	19.5	27.0	16.3	9.3	6.1	4.5	5.1	2.9	1.9	1.4	1.5	100.0
1929–30	12.3	34.0	18.0	11.6	6.6	6.0	3.4	2.3	1.7	1.4	1.5	1.2	100.0

Bureau of Agricultural Economics.

TABLE 42.—*Rye: Commercial stocks in store, 1926–27 to 1930–31*

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
DOMESTIC RYE IN UNITED STATES [1]												
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushest*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27							13,092	12,880	13,897	13,905	7,818	3,783
1927–28	1,018	1,454	2,091	2,608	2,077	2,970	3,281	4,027	4,321	5,090	5,544	2,662
1928–29	2,499	2,170	1,351	2,684	4,771	5,589	6,176	6,185	6,440	6,914	6,598	6,532
1929–30	6,632	6,614	8,561	9,771	11,453	12,033	12,914	14,536	14,379	14,285	13,701	12,572
1930–31	12,481	12,073	14,248	17,010	17,291	17,173						
UNITED STATES RYE IN CANADA												
1926–27							1,658	1,704	1,583	1,384	3,379	869
1927–28	1,465	589	686	1,385	1,390	1,208	930	772	351	259	47	512
1928–29	750	449	357	838	1,248	1,478	1,707	1,426	1,255	1,310	1,367	1,379
1929–30	1,182	1,255	1,540	2,900	2,883	2,113	2,734	2,720	2,519	2,692	2,871	3,821
1930–31	3,789	3,761	3,432	3,139	2,792	2,900						
CANADIAN RYE IN UNITED STATES [2]												
1926–27							2,266	1,922	1,631	494	689	792
1927–28	63	50	20	124	441	802	851	458	203	90	90	371
1928–29	248	255	12	83	205	258	208	532	559	440	451	480
1929–30	380	394	432	320	429	431	431	431	371	370	426	270
1930–31	188	187	172	172	430	651						

Bureau of Agriculture Economics. Compiled from weekly reports to the grain, hay, and feed market news service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes rye in store in public and private elevators in 39 important markets and also the rye afloat in vessels or barges in harbors of lake and seaboard ports. Rye in transit either by rail or water, mill stocks or small private stocks of rye intended only for local purposes, not included.

[2] Includes rye stored at lake and seaboard ports, exclusive of rye in transit on lakes and canals.

TABLE 43.—*Rye: Receipts at specified markets, 1921–22 to 1929–30*

Year beginning July	Minneapolis	Duluth	Chicago	Milwaukee	Omaha	Total, 5 markets	Fort William and Port Arthur [1]
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1921–22	4,754	17,444	4,235	2,282	2,048	30,763	5,297
1922–23	15,111	42,744	7,585	3,241	1,916	70,597	11,552
1923–24	13,336	16,836	2,952	1,449	736	35,309	6,837
1924–25	8,447	38,496	12,586	2,733	1,207	63,469	5,265
1925–26	7,872	10,907	2,426	876	892	22,973	5,329
1926–27	4,123	13,351	2,355	1,268	941	22,038	7,763
1927–28	5,423	25,088	4,151	673	1,564	36,899	11,963
1928–29	7,375	10,881	5,288	1,053	1,354	25,951	8,180
1929–30 [2]	7,265	7,039	7,628	736	1,852	24,520	5,391

Bureau of Agricultural Economics. Compiled from reports of Minneapolis Chamber of Commerce, Duluth Board of Trade, Chicago Board of Trade, Milwaukee Chamber of Commerce, Omaha Grain Exchange, American Elevator and Grain Trade, and Canadian Grain Statistics.

[1] Crop year begins September. [2] Figures subject to revision.

TABLE 44.—*Rye, including flour in terms of grain: International trade, average 1909-10 to 1913-14, annual 1926-27 to 1929-30*

Country	Year beginning July									
	Average 1909-10 to 1913-14		1926-27		1927-28		1928-29		1929-30*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
United States	0	888	0	21,698	0	26,346	0	9,488	0	2,600
Russia	[1] 5,381	[1] 33,979	0	16,694	0	5,901	----	----	----	----
Canada	65	58	47	8,229	114	10,379	166	6,430	298	835
Hungary	[1] 140	[1] 14,150	1	10,455	1	4,431	1	5,136	0	5,935
Argentina	0	[2] 273	0	5,902	0	7,060	0	5,862	0	1,912
Poland	----	----	4,273	5,063	4,832	375	792	1,415	34	14,150
Rumania [1]	[3] 26	2,992	0	1,503	0	2,180	0	879	----	----
Bulgaria	0	[1] 1,925	0	506	0	807	0	1,046	0	[4] 16
Yugoslavia [1]	(5)	(5)	0	506	18	13	9	54	0	59
Algeria [1]	0	0	0	17	0	40	8	63	----	----
PRINCIPAL IMPORTING COUNTRIES										
Germany	16,226	43,936	22,797	7,876	24,861	10,199	7,235	22,965	5,035	20,484
Finland	----	----	5,296	10	4,932	10	7,757	12	6,509	9
Norway	[1] 10,644	[1] [6] 51	7,038	0	7,307	0	6,024	0	7,023	0
Denmark	[1] 8,753	[1] 288	6,550	445	7,401	417	7,216	392	10,767	394
Netherlands	[1] 29,557	[1] 17,889	4,037	840	4,148	629	3,451	531	4,943	207
Czechoslovakia	(5)	(5)	4,631	131	7,622	102	2,581	1,664	501	2,815
Austria	[1] 1,469	[1] 2	4,277	248	4,617	101	5,054	64	4,823	4
Sweden	[1] 3,940	[1] 59	633	1,645	4,177	636	4,550	260	4,225	49
Latvia [1]	(5)	(5)	2,194	20	1,960	9	5,386	16	3,913	12
France	3,316	26	5,016	1	753	8	573	5	439	13
United Kingdom [7]	2,120	7	792	173	717	83	489	42	----	25
Estonia	(5)	(5)	1,944	0	1,085	0	2,680	0	3,591	0
Belgium	5,755	830	3,484	18	753	67	376	33	1,598	15
Italy	654	2	538	2	107	16	219	1	576	1
Switzerland	[1] 728	[1] 1	15	0	53	0	6	0	296	0
Total, 25 countries	88,774	117,356	73,563	81,982	75,458	69,809	54,573	56,358	54,571	49,535

Bureau of Agricultural Economics. Official sources except where otherwise noted.

*Preliminary.
[1] Year beginning Aug. 1, International Yearbook of Agricultural Statistics.
[2] Average of calendar years, 1909-13.
[3] Average for the seasons 1911-12 to 1913-14.
[4] International Crop Report and Agricultural Statistics.
[5] Figures for pre-war years are included in the countries of the pre-war boundaries.
[6] Season 1913-14.
[7] Calendar year.

TABLE 45.—*Rye: Estimated average price per bushel, received by producers, United States, 1921-22 to 1930-31*

Crop year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921-22	101.0	94.0	89.2	81.6	72.2	69.6	70.0	77.0	83.8	85.9	87.8	82.8	86.9
1922-23	74.0	66.9	63.2	65.2	68.2	70.7	71.7	71.0	70.1	70.8	69.2	62.2	68.1
1923-24	56.3	55.3	57.2	58.8	62.1	63.9	63.5	64.5	62.8	60.4	60.1	61.6	59.4
1924-25	68.8	79.8	80.1	105.7	108.6	112.7	126.2	132.2	125.1	100.9	103.6	101.8	96.3
1925-26	92.3	92.8	81.9	74.1	73.4	86.8	88.2	82.5	73.4	73.8	72.5	76.0	83.1
1926-27	80.7	86.1	81.6	82.4	83.0	82.4	83.6	88.4	86.4	85.2	90.1	94.9	84.2
1927-28	91.2	80.6	81.4	81.0	84.0	87.8	88.0	89.5	96.0	99.8	111.5	106.8	84.7
1928-29	99.2	83.6	81.8	87.1	86.3	87.2	87.9	91.5	91.5	86.0	79.1	75.7	85.4
1929-30	85.3	91.8	89.2	89.9	85.5	88.4	85.7	78.3	68.4	68.7	63.8	60.7	87.7
1930-31	43.6	53.0	53.1	47.6	41.6	41.1	----	----	----	----	----	----	----

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of rye for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, July, 1909-December, 1923.

TABLE 46.—*Rye No. 2: Weighted average price* [1] *per bushel of reported cash sales, Minneapolis, 1921–22 to 1930–31*

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	115	100	99	80	72	78	75	95	97	97	102	86	92
1922–23	76	69	66	71	81	83	82	80	76	81	72	64	75
1923–24	61	62	66	66	64	65	67	66	63	61	63	70	65
1924–25	83	86	95	121	123	133	154	154	130	106	114	111	114
1925–26	95	100	83	77	81	98	99	91	81	85	83	89	88
1926–27	102	97	93	95	94	94	99	102	99	99	109	111	98
1927–28	104	92	92	92	99	102	103	106	114	124	128	123	104
1928–29	111	94	94	94	98	97	101	105	100	89	85	84	95
1929–30	107	98	97	97	95	98	91	78	66	68	65	57	90
1930–31	55	60	55	49	43	44							

Bureau of Agricultural Economics. Compiled from Minneapolis Daily Market Record. Chicago prices, 1909–1927 appear in 1927 Yearbook, Table 46. Minneapolis prices, 1909–1920, appear in 1930 Yearbook, Table 43.

[1] Average of daily prices weighted by car-lots sales.

TABLE 47.—*Rye futures: Volume of trading in all contract markets by months 1923–24 to 1929–30*

Month	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
July	25, 350	108, 011	35, 466	86, 884	39, 400	52, 690	61, 096
August	41, 868	103, 143	51, 481	51, 900	65, 689	45, 955	49, 790
September	42, 191	148, 266	57, 468	36, 254	65, 630	52, 533	33, 965
October	32, 680	159, 373	28, 943	26, 860	47, 174	53, 853	34, 716
November	42, 101	111, 437	47, 880	55, 787	48, 966	32, 544	59, 552
December	26, 853	99, 052	94, 250	33, 747	26, 913	26, 541	45, 020
January	14, 575	115, 408	38, 300	49, 048	19, 257	32, 963	54, 978
February	13, 038	90, 968	47, 755	37, 961	23, 906	26, 870	58, 682
March	28, 379	117, 173	44, 830	52, 472	37, 586	21, 488	83, 975
April	50, 204	76, 000	57, 486	60, 883	49, 837	34, 222	60, 111
May	24, 869	48, 149	37, 005	65, 639	42, 565	29, 817	29, 607
June	75, 407	51, 777	68, 896	48, 762	45, 705	32, 940	72, 768
Total	417, 515	1, 228, 757	609, 760	606, 197	512, 628	442, 416	644, 260

Grain Futures Administration.

TABLE 48.—*Rye futures: Volume of trading in contract markets, by markets and by months, 1929–30*

Month	Chicago Board of Trade	Chicago Open Board	Minneapolis	Duluth	Milwaukee
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
July	49, 739	35	6, 703	4, 110	509
August	35, 457		6, 593	7, 321	419
September	24, 567		3, 439	5, 827	132
October	27, 859		3, 188	3, 496	173
November	48, 176		5, 691	5, 446	239
December	38, 001		2, 821	4, 050	148
January	51, 104		2, 940	806	128
February	54, 295		2, 728	1, 429	230
March	75, 262	165	3, 883	4, 408	257
April	50, 160	90	4, 530	4, 905	426
May	26, 071	16	2, 143	1, 191	185
June	59, 751	94	7, 449	5, 117	357
Total	540, 442	400	52, 108	48, 106	3, 204

Grain Futures Admininistration.

TABLE 49.—*Corn: Acreage, production, value, exports, etc., United States, 1890–1930*

Year	Acreage	Average yield per acre	Production	Production as grain	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel at Chicago [1]	Foreign trade, including meal, year beginning July 1 [2]: Domestic exports	Imports	Net exports [3]: Total	Net exports [3]: Percentage of production
	1,000 acres	*Bushels of 56 lbs. shelled*	*1,000 bushels*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*
1890	70,390	20.7	1,460,406	-----------	50.0	729,647	58	32,042	2	32,039	2.2
1891	74,496	27.6	2,055,823	-----------	39.7	816,917	47	76,602	16	76,596	3.7
1892	72,610	23.6	1,713,688	-----------	38.8	664,390	41	47,122	2	47,120	2.7
1893	74,434	22.9	1,707,572	-----------	35.9	612,998	41	66,490	3	66,487	3.9
1894	69,396	19.3	1,339,680	-----------	45.1	604,523	44	28,585	17	28,569	2.1
1895	85,567	27.0	2,310,952	-----------	25.0	578,408	26	101,100	5	101,096	4.4
1896	86,560	28.9	2,503,484	-----------	21.3	532,884	25	178,817	7	178,811	7.1
1897	88,127	24.3	2,144,553	-----------	26.0	558,309	30	212,056	4	212,052	9.9
1898	88,304	25.6	2,261,119	-----------	28.4	642,747	34	177,255	4	177,252	7.8
1899	*94,914*	*28.1*	*2,666,324*	-----------	-------	-----------	------	--------	------	--------	-----
1899	94,914	25.9	2,454,628	-----------	29.9	734,916	36	213,123	3	213,121	8.7
1900	95,042	26.4	2,505,148	-----------	35.1	878,243	43	181,405	5	181,400	7.2
1901	94,636	17.0	1,613,528	-----------	60.1	969,285	62	28,029	19	28,011	1.7
1902	95,517	27.4	2,619,499	-----------	40.1	1,049,791	47	76,639	41	76,598	2.9
1903	90,661	25.9	2,346,897	-----------	42.1	987,882	49	58,222	17	58,210	2.5
1904	93,340	27.1	2,528,662	-----------	43.7	1,105,690	48	90,293	16	90,278	3.6
1905	93,573	29.4	2,748,949	-----------	40.8	1,120,513	44	119,894	11	119,883	4.4
1906	93,643	30.9	2,897,662	-----------	39.3	1,138,053	50	86,368	11	86,358	3.0
1907	94,971	26.5	2,512,065	-----------	50.9	1,277,607	68	55,064	20	55,044	2.2
1908	95,603	26.6	2,544,957	-----------	60.0	1,527,679	65	37,665	258	37,437	1.5
1909	*98,383*	*25.9*	*2,552,190*	-----------	-------	-----------	------	--------	------	--------	-----
1909	98,383	26.1	2,572,336	-----------	58.6	1,507,185	59	38,128	118	38,010	1.5
1910	104,035	27.7	2,886,260	-----------	48.0	1,384,817	53	65,615	53	65,562	2.3
1911	105,825	23.9	2,531,488	-----------	61.8	1,565,258	71	41,797	54	41,744	1.6
1912	107,083	29.2	3,124,746	-----------	48.7	1,520,454	53	50,780	903	49,913	1.6
1913	105,820	23.1	2,446,988	-----------	69.1	1,692,092	70	10,726	12,368	[4] 1,639	-----
1914	103,435	25.8	2,672,804	-----------	64.4	1,722,070	70	50,668	9,899	40,816	1.5
1915	106,197	28.2	2,994,793	-----------	57.5	1,722,680	79	39,897	5,211	34,761	1.2
1916	105,296	24.4	2,566,927	-----------	88.9	2,280,729	111	66,753	2,270	65,092	2.5
1917	116,730	26.3	3,065,233	-----------	127.9	3,920,228	163	49,073	3,197	45,950	1.5
1918	104,467	24.0	2,502,665	-----------	136.5	3,416,240	162	23,019	3,346	19,684	.8
1919 [5]	*87,772*	*26.7*	-----------	*2,345,833*	-------	-----------	------	--------	------	--------	-----
1919	97,170	28.9	2,811,302	-----------	134.5	3,780,597	159	16,729	10,283	6,509	.2
1920	101,699	31.5	3,208,584	-----------	67.0	2,150,332	62	70,906	5,791	66,116	2.1
1921	103,740	29.6	3,068,569	-----------	42.3	1,297,213	55	179,490	142	179,374	5.8
1922	102,846	28.3	2,906,020	-----------	65.8	1,910,775	73	96,596	182	96,415	3.3
1923	104,324	29.3	3,053,557	2,600,891	72.6	2,217,229	88	23,135	240	22,896	.7
1924 [5]	*82,329*	*22.2*	-----------	*1,823,880*	-------	-----------	------	--------	------	--------	-----
1924	100,863	22.9	2,309,414	1,900,204	98.2	2,266,771	106	9,791	4,618	5,348	.2
1925	101,302	28.8	2,916,106	2,445,632	67.4	1,966,162	75	24,783	637	24,150	.8
1926	99,615	27.0	2,691,531	2,233,173	64.2	1,728,970	87	19,819	1,098	18,731	.7
1927	98,393	28.1	2,763,093	2,300,845	72.3	1,997,759	101	19,409	5,463	14,364	.5
1928	100,673	28.0	2,818,901	2,364,069	75.2	2,119,046	92	41,874	490	41,387	1.5
1929	97,856	26.7	2,614,132	2,193,512	78.1	2,042,893	83	10,280	497	9,787	.4
1930 [6]	100,829	20.6	2,081,048	1,743,795	66.3	1,378,874	------	--------	------	--------	-----

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board and relate to equivalent production of grain on entire acreage grown for all purposes; italic figures are census returns. See 1927 Yearbook, p. 774, for data for earlier years.

[1] Prices 1890–1898 are averages of the weekly quotations for No. 2 or better in annual reports of Chicago Board of Trade; subsequently prices are compiled from the Chicago Daily Trade Bulletin, average of daily prices weighted by car-lot sales, No. 3 yellow.

[2] Compiled from Commerce and Navigation of the United States, 1890–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1930 and official records of the Bureau of Foreign and Domestic Commerce. Corn—General imports 1890–1909 and 1912–1929; imports for consumption 1910–11. Corn meal—Imports for consumption, 1890–1930. Corn meal converted to terms of grain on the basis of 4 bushels of corn to a barrel of meal.

[3] Total exports (domestic plus foreign) minus total imports.

[4] Net imports, i. e., total imports minus total exports (domestic and foreign).

[5] Corn harvested for grain; total acreage of corn in 1924 is 98,401,627 acres.

[6] Preliminary.

TABLE 50.—*Corn: Acreage and production, by States, average 1924–1928, annual 1927–1930*

State and division	Acreage					Production				
	Average, 1924–1928	1927	1928	1929	1930[1]	Average, 1924–1928	1927	1928	1929	1930[1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
Maine	13	14	13	13	13	510	518	520	520	546
New Hampshire	14	15	14	13	13	638	615	560	533	585
Vermont	83	84	80	67	64	3,668	3,276	3,520	2,747	2,752
Massachusetts	44	46	45	40	39	1,950	1,886	1,890	1,560	1,794
Rhode Island	9	10	10	9	9	373	380	390	378	378
Connecticut	54	55	55	53	54	2,321	2,090	2,310	2,279	2,268
New York	670	663	650	670	657	23,197	22,542	22,100	20,837	19,710
New Jersey	188	179	181	179	175	7,951	7,160	6,968	6,444	6,300
Pennsylvania	1,334	1,270	1,283	1,309	1,322	55,440	50,165	50,037	46,470	29,084
North Atlantic	2,410	2,336	2,331	2,353	2,346	96,048	88,632	88,295	81,768	63,417
Ohio	3,557	3,376	3,646	3,518	3,483	132,495	109,720	136,725	128,407	88,816
Indiana	4,496	4,205	4,483	4,124	4,206	156,990	132,458	157,802	131,968	110,197
Illinois	9,117	8,469	9,570	8,900	9,345	326,691	254,070	367,488	311,500	238,298
Michigan	1,545	1,418	1,461	1,344	1,384	50,733	38,995	48,944	32,928	28,372
Wisconsin	2,142	2,100	2,121	1,995	2,035	77,770	68,250	89,082	79,800	79,365
Minnesota	4,267	4,172	4,089	4,253	4,380	137,379	127,246	139,026	148,855	135,780
Iowa	11,084	10,901	11,202	10,883	11,100	417,137	386,986	464,883	429,878	360,750
Missouri	6,314	5,796	6,260	5,384	5,922	175,139	168,084	181,540	126,524	72,841
North Dakota	1,068	959	997	1,057	1,089	23,952	23,975	24,426	16,384	19,058
South Dakota	4,609	4,655	4,469	4,916	4,965	98,617	134,995	93,849	112,085	76,958
Nebraska	8,910	8,805	8,937	9,144	9,171	214,381	291,446	212,701	237,744	235,695
Kansas	6,148	5,897	6,634	6,103	6,347	131,564	176,910	179,118	106,802	76,164
North Central	63,257	60,753	63,869	61,621	63,427	1,942,848	1,913,135	2,095,584	1,862,875	1,522,294
Delaware	136	135	136	134	138	4,446	4,725	4,488	4,288	2,815
Maryland	536	515	530	520	530	21,064	22,660	19,345	18,980	7,791
Virginia	1,625	1,626	1,626	1,522	1,568	41,546	47,967	44,715	44,138	18,032
West Virginia	473	441	459	441	441	15,649	14,774	16,524	15,876	5,865
North Carolina	2,350	2,352	2,305	2,259	2,530	46,929	53,626	42,642	50,828	51,865
South Carolina	1,516	1,497	1,422	1,422	1,635	20,780	25,449	17,064	23,321	26,978
Georgia	3,840	3,893	3,620	3,656	3,729	47,049	54,502	38,010	50,453	45,494
Florida	582	573	607	625	625	7,971	7,449	7,891	8,438	7,500
South Atlantic	11,059	11,032	10,705	10,579	11,196	205,434	231,152	190,679	216,322	166,340
Kentucky	3,052	2,885	3,029	2,938	2,909	80,949	75,010	66,638	80,207	31,417
Tennessee	3,044	2,944	2,915	2,944	2,915	68,522	70,656	56,842	73,600	41,102
Alabama	2,794	2,800	2,650	2,676	2,810	39,010	44,800	30,475	37,464	29,505
Mississippi	1,964	1,918	1,765	1,765	1,730	31,628	34,140	24,710	35,300	19,895
Arkansas	2,010	1,925	2,002	1,882	1,788	34,733	36,575	34,034	26,348	8,404
Louisiana	1,201	1,161	1,242	1,180	1,109	19,516	20,318	21,114	21,476	12,199
Oklahoma	2,800	3,177	3,050	3,020	3,141	57,816	84,190	70,150	48,320	36,436
Texas	4,131	5,189	4,722	4,533	4,941	82,719	119,347	99,162	86,127	91,408
South Central	20,996	21,999	21,375	20,938	21,343	414,894	485,036	403,125	408,842	270,366
Montana	351	305	274	301	271	6,093	7,168	5,206	3,612	3,252
Idaho	68	76	53	54	59	2,697	3,116	2,438	1,944	2,301
Wyoming	178	176	167	157	170	3,253	3,520	2,672	2,198	3,570
Colorado	1,396	1,284	1,438	1,366	1,516	16,806	19,902	18,694	23,222	37,142
New Mexico	196	166	199	209	215	3,500	2,490	3,482	4,180	3,010
Arizona	39	44	39	41	41	1,048	1,408	1,014	1,148	1,353
Utah	18	19	18	19	20	440	513	522	589	620
Nevada	2	2	2	2	2	47	50	44	56	44
Washington	48	43	46	48	50	1,684	1,591	1,794	1,824	1,900
Oregon	74	81	82	86	83	2,440	2,916	2,952	3,010	2,739
California	78	77	75	82	90	2,576	2,464	2,400	2,542	2,700
Western	2,447	2,273	2,393	2,365	2,517	40,585	45,138	41,218	44,325	58,631
United States	100,169	98,393	100,673	97,856	100,829	2,699,809	2,763,093	2,818,901	2,614,132	2,081,048

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 51.—*Corn: Utilization for grain, silage, hogging down, grazing, and forage, by States, 1929 and 1930*

State and division	1929					1930 [1]				
	For grain		For silage		Hogging down, grazing, and forage acreage	For grain		For silage		Hogging down, grazing, and forage acreage
	Acreage	Production	Acreage	Production		Acreage	Production	Acreage	Production	
	1,000 acres	*1,000 bushels*	*1,000 acres*	*1,000 tons*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 acres*	*1,000 tons*	*1,000 acres*
Maine	2	80	9	90	2	2	84	9	104	2
New Hampshire	3	123	9	108	1	3	135	9	104	1
Vermont	6	246	51	510	10	6	258	48	509	10
Massachusetts	9	351	24	264	7	10	460	23	271	6
Rhode Island	2	84	5	55	2	2	84	5	62	2
Connecticut	17	731	32	368	4	17	714	33	412	4
New York	170	5, 287	355	3, 018	145	162	4, 860	362	3, 005	133
New Jersey	142	5, 112	30	255	7	136	4, 896	31	264	8
Pennsylvania	993	35, 252	237	1, 683	79	939	20, 658	296	1, 717	87
North Atlantic	1, 344	47, 266	752	6, 351	257	1, 277	32, 149	816	6, 448	253
Ohio	2, 956	109, 372	253	1, 771	309	2, 897	77, 640	304	1, 581	282
Indiana	3, 410	110, 825	172	1, 204	542	3, 574	99, 000	198	1, 188	434
Illinois	7, 906	280, 663	349	2, 443	645	8, 301	219, 146	384	2, 304	660
Michigan	635	16, 510	383	1, 915	326	660	14, 520	425	1, 998	299
Wisconsin	855	35, 482	930	6, 975	210	880	35, 200	975	6, 435	180
Minnesota	2, 598	93, 528	420	2, 814	1, 235	2, 702	86, 464	445	2, 937	1, 233
Iowa	9, 620	380, 952	239	2, 032	1, 024	9, 616	316, 366	258	1, 806	1, 226
Missouri	4, 936	115, 996	58	348	390	5, 259	68, 367	78	351	585
North Dakota	236	3, 894	83	183	738	235	4, 348	79	229	775
South Dakota	3, 248	75, 678	74	333	1, 594	3, 313	54, 664	83	299	1, 569
Nebraska	7, 792	202, 592	44	233	1, 308	8, 013	205, 934	46	216	1, 112
Kansas	5, 444	95, 270	114	570	545	5, 522	69, 025	171	650	654
North Central	49, 636	1, 520, 762	3, 119	20, 821	8, 866	50, 972	1, 250, 674	3, 446	19, 994	9, 009
Delaware	130	4, 160	3	22	1	132	2, 693	5	34	1
Maryland	477	17, 410	27	162	16	477	7, 155	35	140	18
Virginia	1, 424	41, 296	64	512	34	1, 404	17, 269	96	336	68
West Virginia	409	14, 724	20	132	12	385	5, 198	32	128	24
North Carolina	2, 161	48, 622	14	91	84	2, 424	49, 692	14	84	92
South Carolina	1, 365	22, 386	7	24	50	1, 576	26, 004	7	32	52
Georgia	3, 571	49, 280	10	30	75	3, 629	44, 274	10	25	90
Florida	612	8, 262	2	11	11	612	7, 344	2	11	11
South Atlantic	10, 149	206, 140	147	984	283	10, 639	159, 629	201	790	356
Kentucky	2, 747	74, 993	46	276	145	2, 613	30, 572	64	256	232
Tennessee	2, 788	69, 700	30	180	126	2, 732	39, 614	28	98	155
Alabama	2, 590	36, 260	5	18	81	2, 708	28, 434	5	15	97
Mississippi	1, 639	32, 780	14	70	112	1, 563	18, 756	11	38	156
Arkansas	1, 796	25, 144	6	21	80	1, 662	7, 978	6	12	120
Louisiana	1, 130	20, 566	11	50	39	1, 063	11, 693	11	44	35
Oklahoma	2, 954	47, 264	12	55	54	3, 048	35, 966	12	38	81
Texas	4, 413	83, 847	11	24	109	4, 809	88, 966	12	36	120
South Central	20, 057	390, 554	135	694	746	20, 198	261, 979	149	537	996
Montana	76	912	8	20	217	42	504	8	24	221
Idaho	33	1, 221	9	86	12	37	1, 480	9	90	13
Wyoming	103	1, 545	4	20	50	108	2, 268	4	20	58
Colorado	936	16, 380	50	325	380	1, 086	27, 150	50	350	380
New Mexico	183	3, 660	7	35	19	187	2, 618	7	35	21
Arizona	29	812	4	28	8	29	957	4	26	8
Utah	9	288	5	43	5	10	320	5	42	5
Nevada	1	28	1	8	0	1	24	1	8	0
Washington	20	760	17	162	11	22	836	16	160	12
Oregon	48	1, 776	28	190	10	45	1, 575	28	190	10
California	44	1, 408	20	220	18	48	1, 632	22	242	20
Western	1, 482	28, 790	153	1, 137	730	1, 615	39, 364	154	1, 187	748
United States	82, 668	2, 193, 512	4, 306	29, 987	10, 882	84, 701	1, 743, 795	4, 766	28, 956	11, 362

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 52.—*Corn: Acreage, yield per acre, and production in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1928–29 to 1930–31*

Country	Acreage					Yield per acre					Production				
	Average, 1909–10 to 1913–14[1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14[1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14[1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*
NORTHERN HEMISPHERE															
North America:	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	309	293	139	152	161	56.0	44.3	37.7	34.1	29.8	17,297	12,974	5,241	5,183	4,801
United States	104,229	102,615	100,673	97,856	100,829	26.0	27.8	28.0	26.7	20.6	2,712,364	2,850,733	2,818,901	2,614,132	2,081,048
Mexico	[2] 6,093	7,575	7,690	7,228	7,348	[2] 13.5	11.3	11.1	8.2	7.1	133,362	85,241	85,540	59,631	52,147
Guatemala	(500)	390	298	347	245		11.8	14.1	14.4		[3] 6,245	4,614	4,195	5,006	
Total North American countries reporting area and production, all years	110,631	110,483	108,502	105,236	108,338	25.9	26.7	26.8	25.5	19.7	2,863,023	2,948,948	2,909,682	2,678,946	2,137,996
Estimated North American, total	111,700	111,900	109,600	106,400	109,400						2,877,000	2,968,000	2,925,000	2,694,000	2,153,000
Europe:															
France	1,160	830	849	851	762	19.4	17.8	14.3	23.1		22,467	14,754	12,115	19,646	
Spain	1,134	1,167	959	1,006	1.072	23.4	22.2	22.3	24.6	25.5	26,548	25,933	21,374	24,793	27,327
Italy	4,090	3,802	3,710	3,745	3,736	25.1	24.9	17.5	26.7	29.0	102,676	94,800	64.990	100,129	108,504
Austria	190	140	143	138	139	23.8	26.7	29.7	33.5	31.8	4,530	3,739	4,248	4,617	4,417
Czechoslovakia	376	390	355	333	325	22.3	26.8	24.7	27.4	25.1	8,398	10,444	8,763	9,113	8.142
Hungary	2,192	2,437	2,623	2,774	2,664	27.7	23.9	18.9	25.5	19.6	60,813	58,353	49,592	70,631	52,328
Yugoslavia	4,786	4,759	5,018	5,883	6,079	23.4	23.0	14.3	27.8	22.7	111,897	109,399	71,612	163,285	137,886
Bulgaria	1,492	1,458	1,601	1,976	1,696	17.6	14.4	12.7	18.7	20.0	26,277	21,021	20,272	36,995	33,974
Rumania	[4] 9,644	8,799	11,010	11,848	10,939	[4] 20.0	16.0	9.9	21.2	14.2	[4] 193,209	140.515	108,512	251,410	155,435
Poland	164	197	224	218		17.2	14.9	14.9	17.2		2,822	2,926	3,348	3,752	
Russia, European and Asiatic	3,246	5,238	11,103	8,753	9,625	16.1	17.4	11.4	18.1		52,185	91.344	126,806	158,471	
Total European countries reporting area and production, all years	23,904	22,952	25,419	27,703	26,650	22.4	20.2	13.7	23.9	19.8	534,348	464,204	349,363	660,973	528,013
Estimated European total, excluding Russia	26,400	25,200	27,800	30,000	28,900						[5] 581,000	500,000	384,000	705,000	572,000
Africa:															
Morocco	(438)	437	599	600	664		8.3	12.8	9.1	7.8	(3,500)	3,629	7,665	5,455	5,173
Egypt	[6] 1,705	1,988	2,131			[6] 37.7	34.8	36.8			[6] 64,273	69,096	78,336		
Estimated African total	2,600	3.100	3,300	4,300	4,200						75,000	83,000	102,000	111.000	110,000
Asia:															
India	6,372	5,937	5,943			[3] 13.9	13.9	15.2			[3] 82,620	82,482	90,240		
Japan	133	141	121			25.7	25.9	23.5			3,423	3,655	2,838		

Chosen	156	231	255	251	----	14.3	12.2	12.5	12.9	----	2,236	2,829	3,190	3,237	----
Kwantung	99	162	203	220	----	17.5	17.1	21.4	21.5	----	1,737	2,771	4,353	4,721	----
Philippines	[4] 812	1,338	1,284	1,273	----	[4] 9.2	12.4	13.1	11.0	----	[4] 7,461	16,561	16,765	14,024	----
Estimated Asiatic total	9,800	10,600	10,200	10,900	11,000	----	----	----	----	----	160,000	187,000	214,000	211,000	208,000
Total Northern Hemisphere countries reporting area and production, all years	134,973	133,872	134,520	133,539	135,652	25.2	25.5	24.3	25.1	19.7	3,400,871	3,416,781	3,266,710	3,345,374	2,671,182
Estimated Northern Hemisphere total, excluding Russia	150,500	150,800	150,900	151,600	153,500	----	----	----	----	----	[5] 3,693,000	3,738,000	3,625,000	3,721,000	3,043,000
SOUTHERN HEMISPHERE															
Brazil	(6,000)	6,980	7,904	----	----	----	25.4	24.6	----	----	(140,000)	177,338	194,235	----	----
Chile	56	62	115	112	----	26.0	23.6	24.3	28.7	----	1,455	1,466	2,796	3,209	----
Uruguay	589	470	525	437	----	10.4	10.5	5.6	4.8	----	6,120	4,919	2,966	2,082	----
Argentina	8,710	8,491	8,694	9,430	----	22.0	26.8	26.7	26.4	----	191,698	227,393	231,702	249,156	----
Union of South Africa	(2,300)	4,456	5,370	6,290	----	----	12.8	12.4	13.1	----	[4] 33,517	56,890	66,753	82,411	----
Southern Rhodesia	161	223	325	340	----	11.4	18.3	20.1	18.6	----	1,834	4,079	6,523	6,339	----
Java and Madura	(3,000)	3,982	4,603	----	----	----	14.6	16.6	----	----	(42,000)	57,975	76,496	----	----
Australia	353	326	315	----	----	28.5	26.5	26.4	----	----	10,057	8,641	8,323	----	----
Total Southern Hemisphere countries reporting area and production, all years through 1929-30	11,816	13,702	15,029	16,609	----	19.9	21.5	20.7	20.7	----	234,624	294,747	310,740	343,197	----
Estimated Southern Hemisphere total	21,900	26,400	31,100	31,700	36,900	----	----	----	----	----	445,000	565,000	655,000	617,000	----
Total Northern and Southern Hemisphere countries reporting area and production, all years through 1929-30, excluding Russia	149,680	150,722	152,662	153,308	----	24.6	24.9	23.7	24.4	----	3,678,463	3,755,983	3,621,416	3,738,957	----
Estimated world total, excluding Russia	172,400	177,200	182,000	183,300	190,400	----	----	----	----	----	[5] 4,138,000	4,303,000	4,280,000	4,338,000	----

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Figures in parentheses indicate unofficial estimates. Acreage and production figures are for the harvesting season which begins in July, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

* Preliminary.
[1] Where changes in boundary have occurred, the averages reported are estimates for the crop within present boundaries.
[2] 1 year only.
[3] 2-year average.
[4] 4-year average.
[5] The estimate for the 5-year period 1909-10 to 1913-14 given in this table is somewhat larger than the figure obtained by averaging the same 5-year period in Table 54. This is because in this table estimates for warring countries are for post-war boundaries, whereas in Table 54 they are for pre-war territory. As a results in excluding Russia, which lost territory in the war, a smaller area is excluded in this table than in Table 54.
[6] Includes some sorghum.

TABLE 53.—*Corn: Yield per acre, average 1919–1928 and annual 1925–1930, and estimated price per bushel December 1, average 1924–1928 and annual 1925–1930 by States*

State and division	Yield per acre							Estimated price per bushel Dec. 1						
	Average, 1919–1928	1925	1926	1927	1928	1929	1930	Average, 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	42.9	45.0	35.0	37.0	40.0	40.0	42.0	115	112	100	110	115	120	100
New Hampshire	45.2	50.0	43.0	41.0	40.0	41.0	45.0	112	100	100	105	120	110	105
Vermont	45.0	48.0	43.0	39.0	44.0	41.0	43.0	106	100	95	105	110	105	100
Massachusetts	44.5	50.0	44.0	41.0	42.0	39.0	46.0	121	110	115	120	130	135	100
Rhode Island	41.2	45.0	41.0	38.0	39.0	42.0	42.0	126	120	115	120	135	140	110
Connecticut	44.3	50.0	42.0	38.0	42.0	43.0	42.0	119	110	115	120	130	110	105
New York	37.0	36.0	35.0	34.0	34.0	31.1	30.0	99	97	86	96	99	103	90
New Jersey	42.4	52.0	46.0	40.0	38.5	36.0	36.0	90	73	80	85	97	101	95
Pennsylvania	43.1	51.0	41.0	39.5	39.0	35.5	22.0	92	80	78	91	93	100	95
North Atlantic	41.5	46.8	39.9	37.9	37.9	34.8	27.0	95.6	85.3	82.7	93.9	97.7	102.3	94.4
Ohio	39.2	48.0	41.0	32.5	37.5	36.5	25.5	75	57	60	77	76	78	67
Indiana	36.3	43.5	38.0	31.5	35.2	32.0	26.2	67	55	50	68	69	74	61
Illinois	35.6	42.0	35.0	30.0	38.4	35.0	25.5	70	58	56	71	70	72	62
Michigan	34.8	40.0	34.0	27.5	33.5	24.5	20.5	85	75	73	85	84	89	77
Wisconsin	39.7	46.5	34.5	32.5	42.0	40.0	39.0	83	72	75	84	78	83	72
Minnesota	34.9	36.0	34.0	30.5	34.0	35.0	31.0	65	56	56	64	62	65	53
Iowa	40.3	43.9	39.0	35.5	41.5	39.5	32.5	68	56	56	69	67	70	58
Missouri	28.6	29.5	27.2	29.0	29.0	23.5	12.3	76	69	68	75	73	86	75
North Dakota	25.8	23.5	18.0	25.0	24.5	15.5	17.5	64	55	68	62	61	68	53
South Dakota	26.0	17.5	18.0	29.0	21.0	22.8	15.5	63	60	58	57	62	62	47
Nebraska	26.6	26.0	15.5	33.1	23.8	26.0	25.7	71	61	68	62	71	69	51
Kansas	21.1	16.6	11.0	30.0	27.0	17.5	12.0	70	66	70	61	65	74	59
North Central	32.8	34.4	29.0	31.5	32.8	30.2	24.0	69.9	59.9	59.7	68.0	69.3	72.4	59.2
Delaware	33.0	37.0	31.0	35.0	33.0	32.0	20.4	82	65	64	80	88	88	91
Maryland	39.4	45.0	39.8	44.0	36.5	36.5	14.7	83	70	64	80	88	88	93
Virginia	26.8	22.0	27.5	29.5	27.5	29.0	11.5	101	101	85	92	100	100	105
West Virginia	33.5	36.5	33.0	33.5	36.0	36.0	13.3	104	100	94	100	103	106	109
North Carolina	20.3	18.5	22.0	22.8	18.5	22.5	20.5	103	110	88	91	103	100	93
South Carolina	15.1	12.3	15.5	17.0	12.0	16.4	16.5	104	110	90	90	106	99	90
Georgia	13.0	10.7	14.5	14.0	10.5	13.8	12.2	95	100	76	81	105	88	86
Florida	13.8	15.0	14.0	13.0	13.0	13.5	12.0	100	100	92	97	100	85	90
South Atlantic	19.3	17.6	20.5	21.0	17.8	20.4	14.9	97.9	98.8	82.4	88.2	101.0	95.7	92.3
Kentucky	26.9	26.5	33.0	26.0	22.0	27.3	10.8	86	81	65	88	96	91	92
Tennessee	23.5	20.0	27.5	24.0	19.5	25.0	14.1	89	89	66	83	100	92	93
Alabama	14.2	13.5	16.2	16.0	11.5	14.0	10.5	100	100	76	92	110	98	96
Mississippi	16.2	18.0	19.2	17.8	14.0	20.0	11.5	99	94	82	93	102	93	98
Arkansas	18.5	14.0	20.5	19.0	17.0	14.0	4.7	92	97	80	87	91	98	96
Louisiana	17.0	18.0	17.5	17.5	17.0	18.2	11.0	97	94	90	90	94	90	93
Oklahoma	20.8	7.5	26.0	26.5	23.0	16.0	11.6	72	90	56	59	68	79	65
Texas	21.6	8.5	27.8	23.0	21.0	19.0	18.5	85	110	60	65	78	85	73
South Central	20.4	15.9	24.6	22.0	18.9	19.5	12.7	86.3	91.5	67.5	77.3	88.2	89.7	83.1
Montana	17.4	16.5	11.0	23.5	19.0	12.0	12.0	88	95	92	72	82	84	66
Idaho	38.3	41.0	41.0	41.0	46.0	36.0	39.0	90	75	90	82	92	94	70
Wyoming	20.4	23.0	20.0	20.0	16.0	14.0	21.0	77	70	72	74	75	85	67
Colorado	15.2	15.0	7.0	15.5	13.0	17.0	24.5	73	70	71	68	68	75	62
New Mexico	18.4	18.0	20.0	15.0	17.5	20.0	14.0	96	100	87	93	89	89	77
Arizona	27.4	26.0	28.0	32.0	26.0	28.0	33.0	123	130	120	115	125	130	115
Utah	23.9	24.0	24.0	27.0	29.0	31.0	31.0	116	100	115	110	110	100	100
Nevada	25.1	25.0	24.0	25.0	22.0	28.0	22.0	118	120	120	115	112	120	115
Washington	36.6	35.0	35.0	37.0	39.0	38.0	38.0	98	95	95	90	99	103	88
Oregon	32.0	29.0	33.0	36.0	36.0	35.0	33.0	105	107	100	95	100	98	83
California	33.5	35.1	31.5	32.0	32.0	31.0	30.0	115	118	106	108	105	112	87
Western	19.0	18.6	13.1	19.9	17.2	18.7	23.3	86.0	83.1	85.8	78.1	81.2	85.0	68.3
United States	28.2	28.8	27.0	28.1	28.0	26.7	20.6	75.5	67.4	64.2	72.3	75.2	78.1	66.3

Bureau of Agricultural Economics, Estimates of the crop-reporting board.

TABLE 54.—*Corn: World production, 1900–01 to 1930–31*

Crop year	Estimated world production, excluding Russia	Estimated European production, excluding Russia	Selected countries						
			United States	Argentina	Rumania	Italy	Brazil	Yugoslavia	Russia[1]
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1900–01	3,582	440	2,505	99	85	88	----------	18	34
1901–02	2,745	497	1,614	84	117	100	----------	19	68
1902–03	3,683	392	2,619	149	68	71	----------	18	49
1903–04	3,551	459	2,347	175	80	89	----------	19	51
1904–05	3,502	279	2,529	141	20	91	----------	9	26
1905–06	3,902	404	2,749	195	59	97	----------	21	34
1906–07	4,088	533	2,898	72	131	93	----------	28	92
1907–08	3,768	441	2,512	136	58	88	----------	18	64
1908–09	3,831	465	2,545	177	79	96	----------	21	82
1909–10	3,858	499	2,572	175	70	102	----------	34	55
1910–11	4,060	564	2,886	28	104	104	----------	29	102
1911–12	3,907	501	2,531	296	111	95	----------	27	95
1912–13	4,321	547	3,125	197	104	101	----------	----------	94
1913–14	3,890	576	2,447	263	115	111	----------	----------	84
1914–15	4,186	559	2,673	325	103	105	----------	----------	[2] 90
1915–16	4,352	520	2,995	161	86	122	----------	----------	[3] 72
1916–17	3,775	389	2,567	59	----------	82	204	----------	[4] 62
1917–18	4,178	351	3,065	171	----------	83	95	----------	----------
1918–19	3,579	299	2,503	224	31	77	87	----------	----------
1919–20	4,242	454	2,811	259	[5] 141	86	197	----------	----------
1920–21	4,689	520	3,209	230	182	89	186	[5] 101	46
1921–22	4,312	394	3,069	176	111	92	181	74	46
1922–23	4,241	424	2,906	176	120	77	202	90	81
1923–24	4,523	469	3,054	277	153	89	180	85	67
1924–25	3,858	589	2,309	186	155	106	162	149	91
1925–26	4,582	626	2,916	322	164	110	162	149	172
1926–27	4,482	653	2,692	321	230	118	148	134	131
1927–28	4,347	485	2,763	312	139	87	130	83	118
1928–29	4,280	384	2,819	232	109	65	194	72	127
1929–30	4,338	705	2,614	249	251	100		163	158
1930–31[6]	----------	572	2,081	----------	155	109	----------	138	----------

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Production figures are for the harvesting season, which begins in July, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

[1] Includes all Russian territory reporting for the years shown.
[2] Total Russian Empire exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.
[3] Exclusive of Russian Poland, Lithuania, parts of present Latvia and the Ukraine, and the Provinces of Batum and Elizabetpol in Transcaucasia.
[4] Beginning this year, estimates within present boundaries of the Union of Socialist Soviet Republics, exclusive of Turkestan, Transcaucasia, and the Far East, which territory in 1924-25 produced 26,048,000 bushels.
[5] Production in present boundaries beginning this year, therefore not comparable with earlier years.
[6] Preliminary.

TABLE 55.—*Corn: Monthly marketings, by farmers, as reported by about 3,500 mills and elevators, United States, 1917–18 to 1929–30*

Crop year	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917–18	5.3	4.0	3.4	3.8	8.8	12.2	14.2	16.1	13.7	7.1	5.6	5.8	100.0
1918–19	6.7	6.9	8.4	6.7	7.3	12.0	15.0	7.2	7.5	8.2	8.0	6.1	100.0
1919–20	4.5	5.6	4.9	5.6	9.2	15.0	12.9	9.5	8.7	5.9	7.6	10.6	100.0
1920–21	5.4	5.6	6.9	5.3	7.1	11.3	14.3	11.7	8.9	5.6	8.5	9.4	100.0
1921–22	4.9	7.3	8.6	6.7	6.6	12.4	13.8	12.4	7.5	4.7	7.6	7.5	100.0
1922–23	6.8	7.5	9.1	8.2	8.7	13.6	10.7	11.0	6.6	5.3	6.1	6.4	100.0
1923–24	6.8	7.2	6.1	5.6	10.4	12.3	12.9	13.3	7.4	6.1	5.9	6.0	100.0
1924–25	6.6	6.2	6.5	7.0	11.1	13.0	13.6	9.5	8.1	6.3	7.8	4.3	100.0
1925–26	5.1	7.6	5.9	5.9	9.3	14.6	12.1	10.4	8.5	5.3	7.1	8.2	100.0
1926–27	5.7	6.2	6.6	10.1	9.1	12.9	11.7	10.8	6.9	4.8	6.1	9.1	100.0
1927–28	5.1	6.5	6.3	6.2	8.6	15.5	13.8	11.7	8.9	5.4	6.6	5.4	100.0
1928–29	5.8	5.8	5.4	6.6	12.5	16.7	12.9	11.5	7.4	3.8	4.3	7.3	100.0
1929–30	6.6	7.0	7.6	6.9	9.3	13.4	10.9	10.6	7.4	7.1	6.9	6.3	100.0

Bureau of Agricultural Economics.

TABLE 56.—*Corn: Farm stocks, growing conditions, and shipments, United States, 1909–1930*

Year beginning November	Stocks of old corn on farms Nov. 1[1]	Condition of new crop				Proportion merchantable[1]	Stocks of corn on farms on Mar. 1[1]	Shipped out of county where grown[1]
		July 1	Aug. 1	Sept. 1	Oct. 1			
	1,000 bush.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*1,000 bush.*	*1,000 bush.*
1909–10	77, 403	89. 3	84. 4	74. 6	73. 8	82. 7	980, 848	620, 057
1910–11	113, 919	85. 4	79. 3	78. 2	80. 3	86. 4	1, 165, 378	661, 777
1911–12	123, 824	80. 1	69. 6	70. 3	70. 4	80. 1	884, 059	517, 766
1912–13	64, 764	81. 5	80. 0	82. 1	82. 2	85. 0	1, 290, 642	680, 831
1913–14	137, 972	86. 9	75. 8	65. 1	65. 3	80. 1	866, 352	422, 059
1914–15	80, 046	85. 8	74. 8	71. 7	72. 9	84. 5	910, 894	498, 285
1915–16	96, 009	81. 2	79. 5	78. 8	79. 7	71. 1	1, 116, 559	560, 824
1916–17	87, 908	82. 0	75. 3	71. 3	71. 5	83. 9	782, 303	450, 589
1917–18	34, 448	81. 1	78. 8	76. 7	75. 9	60. 0	1, 253, 290	678, 027
1918–19	114, 678	87. 1	78. 5	67. 4	68. 6	82. 4	855, 269	362, 589
1919–20	69, 835	86. 7	81. 7	80. 0	81. 3	87. 1	1, 045, 575	470, 328
1920–21	139, 083	84. 6	86. 7	86. 4	89. 1	86. 9	1, 564, 832	705, 481
1921–22	285, 769	91. 1	84. 3	85. 1	84. 8	87. 5	1, 305, 559	587, 893
1922–23	177, 287	85. 1	85. 6	78. 6	78. 4	88. 3	1, 093, 306	518, 779
1923–24	83, 856	84. 9	84. 0	83. 3	82. 0	80. 8	1, 153, 847	600, 745
1924–25	102, 429	72. 0	70. 7	66. 4	65. 3	66. 0	757, 890	417, 780
1925–26	58, 248	86. 4	79. 8	75. 5	76. 2	78. 8	1, 329, 281	578, 380
1926–27	182, 994	77. 9	72. 5	73. 8	72. 4	71. 1	1, 134, 191	446, 951
1927–28	113, 399	69. 9	71. 2	69. 7	73. 6	73. 1	1, 011, 908	501, 748
1928–29	53, 753	78. 1	83. 3	78. 4	77. 7	83. 1	1, 021, 873	538, 540
1929–30	76, 359	77. 6	78. 8	67. 9	71. 0	76. 9	986, 595	442, 426
1930–31[2]	72, 383	79. 9	62. 0	51. 6	58. 8			

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Based on reported percentages of entire crop on farms, proportion merchantable, and per cent shipped out of county where grown.
[2] Preliminary.

TABLE 57.—*Corn: Receipts at primary markets, 1921–22 to 1929–30*

Year beginning November	Chicago	St. Louis	Kansas City	Peoria	Omaha	Indianapolis	Total 10 markets[1]
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1921–22	187, 884	34, 055	16, 031	24, 960	31, 115	21, 291	375, 409
1922–23	116, 711	30, 263	15, 595	21, 284	23, 308	18, 839	253, 590
1923–24	101, 200	39, 289	21, 105	17, 744	27, 679	17, 728	274, 128
1924–25	80, 700	23, 185	21, 470	21, 234	13, 345	17, 613	202, 504
1925–26	92, 283	27, 952	18, 643	26, 678	20, 076	18, 363	226, 192
1926–27	91, 880	21, 039	14, 767	23, 292	20, 482	19, 977	217, 881
1927–28	105, 134	34, 943	47, 603	23, 434	31, 019	22, 712	290, 492
1928–29	95, 099	38, 517	34, 536	27, 390	16, 276	25, 519	268, 609
1929–30[2]	77, 394	23, 377	29, 269	23, 088	24, 795	23, 757	231, 938

Bureau of Agricultural Economics. Compiled from reports of Chicago Board of Trade, Duluth Board of Trade, Indianapolis Board of Trade, Kansas City Board of Trade, Omaha Grain Exchange, St. Louis Merchants Exchange, Milwaukee Chamber of Commerce, Minneapolis Chamber of Commerce, and American Elevator and Grain Trade.

[1] Includes also Milwaukee, Minneapolis, Duluth, and Toledo. [2] Subject to revision.

TABLE 58.—*Shelled corn: Classification of receipts graded by licensed inspectors, all inspection points, 1917–1929*

TOTAL OF ALL CLASSES UNDER EACH GRADE

Year beginning November	Grade							
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	Sample	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1917–18	2, 281	18, 714	58, 562	56, 240	45, 610	44, 621	98, 844	324, 872
1918–19	12, 661	34, 727	40, 872	41, 491	28, 832	16, 061	19, 638	194, 262
1919–20	28, 517	47, 961	38, 774	56, 647	27, 313	9, 188	13, 058	221, 458
1920–21	68, 550	88, 875	64, 237	63, 081	21, 176	9, 420	8, 738	324, 077
1921–22	30, 970	197, 254	115, 207	42, 880	21, 963	15, 979	4, 951	429, 204
1922–23	21, 580	141, 563	98, 932	24, 262	4, 270	3, 526	3, 711	297, 844
1923–24	3, 038	59, 592	111, 932	69, 365	35, 905	15, 410	10, 742	305, 984
1924–25	7, 883	80, 883	56, 542	34, 431	31, 370	17, 252	12, 345	240, 706
1925–26	3, 358	59, 985	62, 757	51, 092	48, 348	40, 116	31, 473	297, 129
1926–27	1, 616	34, 390	57, 931	48, 217	50, 195	46, 180	31, 171	269, 700
1927–28	9, 682	87, 801	78, 352	47, 890	34, 638	27, 553	29, 006	314, 922
1928–29	25, 809	92, 285	73, 331	93, 367	40, 594	10, 400	7, 247	343, 033
1929–30	26, 394	85, 038	49, 806	50, 916	39, 995	19, 475	16, 580	288, 204

Bureau of Agricultural Economics.

TABLE 59.—*Corn, including meal in terms of grain: International trade, average 1909–10 to 1913–14, annual 1926–27 to 1929–30*

Country	Year beginning July									
	Average 1909–10 to 1913–14		1926–27		1927–28		1928–29		1929–30*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Argentina	[1] 2	[1] 115, 749	------	272, 454	------	279, 455	------	243, 424	------	168, 585
United States	[2] 4, 441	41, 409	1, 098	19, 819	5, 463	19, 410	490	41, 874	496	10, 280
Rumania	[1 2] 364	[1 2] 46, 998	0	[3] 59, 037	0	------	------	------	------	------
Yugoslavia	([4])	([4])	------	14, 496	------	671	------	534	------	18, 436
Union of South Africa	[1] 143	[1] 3, 952	1, 371	1, 647	300	17, 843	129	18, 769	52	18, 361
Russia	[5] 299	[5] 28, 354	0	8, 170	------	981	------	------	------	------
Bulgaria	[1] 44	[5] 9, 234	0	5, 365	0	2, 366	------	2, 000	------	------
Hungary	([4])	([4])	330	2, 524	688	2, 028	1, 124	802	350	6, 109
Dutch East Indies [6]	0	[1] 1, 215	10	2, 684	13	3, 054	15	8, 500	[7] 12	[7] 4, 241
Indo-China	0	0	0	2, 691	0	2, 979	------	------	------	------
British India	0	[1 8] 580	0	2	0	1, 058	0	29	0	6
China [6]	[9] 38	[9] 148	0	983	0	490	0	946	0	2, 022
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	80, 441	[1] 115	71, 196	2, 794	75, 705	2, 552	71, 672	2, 308	68, 975	2, 313
Netherlands	[5] 30, 377	[5] 8, 641	47, 149	736	53, 234	729	41, 471	717	41, 798	1, 067
Germany	32, 056	2	57, 910	4	72, 050	4	32, 915	5	31, 590	2
France	19, 793	88	29, 123	94	25, 594	32	30, 771	21	29, 924	88
Belgium	25, 818	8, 238	26, 873	1, 501	27, 317	1, 121	22, 630	1, 096	21, 895	1, 023
Denmark	[5] 11, 777	0	22, 727	0	29, 727	0	14, 853	0	9, 873	0
Irish Free State	([4])	([4])	15, 679	172	16, 847	152	17, 536	142	16, 607	61
Spain [6]	9, 775	44	14, 011	1	12, 147	1	13, 212	0	------	------
Italy	14, 829	265	16, 134	23	21, 135	24	40, 971	17	27, 238	26
Canada	10, 678	27	14, 924	56	15, 151	41	14, 815	98	14, 010	34
Czechoslovakia	([4])	([4])	13, 073	2	13, 930	7	10, 579	1	9, 035	2
Austria	[5 10] 15,455	[5 10] 263	7, 946	18	6, 136	13	5, 338	21	[3] 7, 157	[3] 24
Switzerland	[5] 3, 984	[5] 1	4, 832	0	5, 459	0	5, 370	0	4, 297	0
Norway	[5 11] 1, 292	0	5, 048	0	5, 176	0	3, 642	0	4, 575	0
Sweden	[5] 1, 656	[5] 26	4, 652	0	7, 752	0	5, 533	0	3, 853	------
Cuba	2, 821	0	2, 935	0	2, 068	0	1, 155	0	------	------
Australia	[1] 440	[1] 10	1, 193	2	143	143	22	272	------	------
Mexico [6]	4, 459	101	4, 303	2	1, 545	------	721	------	------	------
Poland	([4])	([4])	4, 235	21	3, 018	8	1, 144	15	636	8
Greece	------	------	1, 270	------	1, 005	------	1, 145	------	380	------
Egypt	[9] 504	[5] 63	294	235	30	5, 855	31	2, 761	82	77
Japan	0	0	1, 515	0	1, 172	0	1, 599	0	2, 532	0
Tunis	[5] 442	[5] 8	684	35	1, 145	------	[3] 244	[3] 12	------	------
Algeria	[1] 231	[1] 1	600	12	240	25	------	------	------	------
Finland	[1] 260	0	148	0	206	0	293	0	262	0
Uruguay [5]	5	201	878	4	615	2	------	2, 364	------	394
Estonia	([4])	([4])	0	0	23	0	292	0	0	0
Total, 39 countries	272, 424	265, 733	372, 141	395, 584	405, 034	341, 044	339, 712	326, 728	295, 629	233, 159

Bureau of Agricultural Economics. Official sources except where otherwise noted. Maicena or maizena is included with "Corn and corn meal."

* Preliminary.
[1] Average of calendar years. International Yearbook of Agricultural Statistics.
[2] 3-year average.
[3] International Crop Report and Agricultural Statistics.
[4] Figures for pre-war years are included in the countries of the pre-war boundaries.
[5] Averag of years beginning Aug. 1, International Yearbook of Agricultural Statistics.
[6] Calendar year.
[7] Java and Madura only.
[8] 2-year average.
[9] 4-year average.
[10] Average for Austria-Hungary.
[11] 1 year only.

TABLE 60.—*Corn: Visible supply in United States,*[1] *1909–10 to 1930–31*

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909–10	2,653	3,289	8,465	9,764	13,480	13,778	10,603	5,940	5,146	3,770	2,750	5,011
1910–11	3,510	1,545	5,099	9,145	11,794	11,166	7,047	4,685	7,482	7,100	6,724	6,339
1911–12	1,703	2,054	5,140	6,900	14,257	15,914	7,490	5,699	8,204	2,451	1,823	3,101
1912–13	2,689	1,525	5,879	9,717	17,918	21,494	7,270	2,549	11,479	6,389	2,612	7,308
1913–14	6,206	2,026	12,126	16,505	18,374	18,812	9,380	4,409	7,589	3,203	3,923	5,461
1914–15	3,114	3,382	19,703	34,156	41,238	32,877	20,203	12,795	5,225	2,306	2,382	3,444
1915–16	3,288	4,387	8,919	14,773	24,605	27,697	21,004	14,505	6,870	5,167	3,330	5,093
1916–17	2,361	2,677	5,838	10,671	12,931	11,974	7,173	2,629	3,277	2,841	2,371	1,163
1917–18	1,277	1,932	3,155	4,623	8,939	19,016	16,111	13,038	11,487	9,466	5,232	5,503
1918–19	4,733	2,216	2,415	5,549	4,483	2,514	4,245	2,600	4,038	2,461	956	2,163
1919–20	1,484	1,477	2,921	3,575	4,951	5,669	5,035	2,740	4,364	6,152	2,564	7,587
1920–21	10,085	4,597	5,409	14,297	22,333	32,896	23,018	15,103	24,304	14,584	11,500	11,765
1921–22	18,891	15,518	23,279	30,778	44,792	46,889	35,564	27,046	29,337	19,509	7,314	12,206
1922–23	8,806	11,072	16,760	21,658	27,529	28,742	22,339	6,734	3,366	2,373	1,587	2,052
1923–24	809	2,690	8,799	9,379	18,898	26,074	17,978	12,288	8,279	4,887	5,070	7,154
1924–25	8,097	7,563	18,573	27,571	32,292	32,727	23,379	17,140	13,094	6,093	6,524	5,470
1925–26	1,790	2,461	17,861	28,092	33,878	36,485	32,408	25,453	30,333	24,930	19,771	17,381
1926–27	22,258	28,699	34,712	38,792	45,103	47,244	36,621	29,961	34,427	30,205	22,312	23,687
1927–28	20,574	19,216	27,034	31,849	40,998	43,856	33,556	25,496	16,008	13,267	9,516	6,791
1928–29	2,030	6,419	17,146	26,042	33,302	34,150	25,687	14,259	13,054	8,751	5,417	4,197
1929–30	3,237	3,267	9,892	15,215	22,667	23,532	19,986	10,825	6,825	3,656	3,940	4,643
1930–31	4,379	6,964	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Compiled from the Chicago Daily Trade Bulletin.

[1] Saturday nearest the 1st of each month.

TABLE 61.—*Corn: Commercial stocks in store, 1926–27 to 1930–31*

DOMESTIC CORN IN UNITED STATES[1]

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27	-------	-------	36,019	40,670	47,515	49,759	39,010	31,224	36,268	31,782	23,324	24,913
1927–28	21,661	20,254	28,741	30,717	44,786	48,273	36,835	27,497	17,650	12,304	9,768	6,894
1928–29	2,032	6,353	18,565	28,797	36,927	37,744	28,863	15,951	13,740	9,086	6,340	4,421
1929–30	3,639	2,982	8,228	16,079	24,944	25,671	21,073	11,463	7,049	3,421	4,220	4,710
1930–31	4,550	7,332	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
UNITED STATES CORN IN CANADA												
1926–27	-------	-------	2,147	1,715	1,788	1,403	1,781	1,452	1,184	1,706	1,188	2,010
1927–28	1,994	2,263	1,891	1,598	1,312	976	626	1,634	1,337	818	510	534
1928–29	252	268	580	737	601	356	1,759	1,602	911	746	480	987
1929–30	847	375	253	180	152	120	428	745	697	135	147	928
1930–31	750	723	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Compiled from weekly reports to the grain, hay, and feed market news service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes corn in store in public and private elevators in 39 important markets and also the corn afloat in vessels or barges in the harbors of lake and seaboard ports. Corn in transit either by rail or water, mill stocks, or small private stocks of corn intended only for local purposes, not included.

TABLE 62.—*Corn: Stocks of old corn on farms November 1, by selected States and by geographic divisions, 1909–1930*

[In millions of bushels]

Year	Principal producing States							Geographic divisions					
	Iowa	Illinois	Nebraska	Missouri	Indiana	Ohio	Total	North Atlantic	East North Central	West North Central	South Atlantic	South Central	Western
1909	12.9	10.5	9.3	7.3	4.4	3.8	48.2	2.0	21.8	37.0	5.3	13.6	0.1
1910	20.5	21.9	14.1	6.9	10.9	8.0	82.3	2.4	44.1	53.6	4.7	10.6	.3
1911	18.6	19.6	9.6	17.6	8.3	5.0	78.7	3.6	36.0	58.5	7.4	18.1	.3
1912	8.9	10.4	2.5	4.6	4.9	4.2	35.5	3.5	22.3	21.5	6.5	10.8	.1
1913	23.8	24.3	6.5	15.9	11.0	7.8	89.3	3.7	47.1	60.8	7.2	18.7	.4
1914	14.2	9.0	2.9	5.2	6.3	5.4	43.0	2.6	24.9	28.0	9.4	14.9	.2
1915	27.3	10.2	7.8	3.2	6.5	5.0	60.0	2.9	26.7	47.9	7.7	10.2	.6
1916	5.4	10.1	7.0	6.7	6.7	5.4	41.3	2.9	24.2	33.5	9.5	17.4	.5
1917	4.0	3.6	3.9	1.9	2.6	1.7	17.7	1.8	9.1	12.6	4.6	6.2	.1
1918	14.4	16.7	15.0	16.9	7.9	2.2	73.1	2.8	27.2	52.4	10.4	21.5	.3
1919	11.7	13.8	4.3	4.0	6.6	2.3	42.7	2.4	24.3	26.0	7.6	9.2	.3
1920	33.2	21.6	12.9	6.4	10.5	8.1	92.7	5.0	44.6	62.4	8.3	17.9	.7
1921	61.6	28.3	51.1	21.3	21.1	14.1	197.5	6.1	71.3	167.9	13.2	24.0	3.3
1922	38.8	15.9	24.9	11.0	10.2	9.3	110.1	6.0	42.0	99.3	8.0	20.7	1.3
1923	17.7	6.3	4.7	6.4	4.4	6.0	45.5	4.4	22.9	38.3	6.4	11.3	.5
1924	18.3	11.8	10.3	5.1	9.6	5.8	60.9	3.7	30.9	50.7	8.3	7.2	1.6
1925	6.1	8.0	7.7	4.5	2.8	1.8	30.9	2.1	13.9	30.0	4.1	7.7	.5
1926	34.5	35.5	20.1	10.7	20.3	16.2	137.3	6.2	80.5	79.8	6.5	9.1	.9
1927	20.0	21.9	4.5	7.0	12.6	8.8	74.8	3.8	46.8	37.1	7.6	17.7	.4
1928	5.0	2.8	11.7	3.2	2.0	1.4	26.1	2.3	7.1	30.1	5.4	8.2	.6
1929	16.3	11.0	6.4	5.4	4.7	3.4	47.2	2.5	21.7	40.9	4.0	6.6	.8
1930	17.2	9.3	10.7	2.5	4.0	3.2	46.9	2.1	18.2	40.3	5.1	5.9	.8

Bureau of Agricultural Economics. Compiled from estimates which are based on percentages of crop on farms as estimated by crop reporters. Stocks as given here are comparable with United States totals in Table 56, except for 1909 and 1910, for which years revisions are not available by States and geographic regions to make them comparable with the latest revisions of the United States total.

TABLE 63.—*Corn: Estimated average price per bushel, received by producers, United States, 1909–1930*

Crop year	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909-10	60.0	60.1	63.8	65.6	65.7	64.5	64.4	65.7	66.7	66.8	63.7	56.8	63.2
1910-11	50.3	48.1	48.6	49.0	49.3	50.8	53.4	57.6	62.9	65.8	65.8	65.2	53.5
1911-12	63.2	62.0	63.4	65.6	68.8	75.2	81.0	81.8	80.2	78.4	73.9	64.3	68.8
1912-13	53.6	48.8	49.8	51.4	53.0	55.2	58.7	61.9	64.3	70.4	75.4	73.0	56.7
1913-14	69.9	69.4	69.0	68.7	69.9	71.4	73.6	75.2	76.2	79.2	79.8	74.4	71.8
1914-15	67.5	65.3	69.5	74.0	75.1	76.4	77.8	77.8	78.3	78.1	73.9	66.2	71.4
1915-16	59.7	59.8	64.4	67.4	69.2	71.3	73.2	74.8	77.4	81.5	83.0	83.6	69.6
1916-17	87.0	89.4	92.9	98.4	107.2	132.0	155.4	162.4	180.6	186.0	175.3	160.6	119.0
1917-18	137.0	131.4	136.8	146.6	154.0	154.6	154.1	153.1	156.7	162.7	162.6	149.9	148.1
1918-19	138.4	140.6	141.4	137.6	143.4	156.1	166.9	173.8	183.8	188.3	169.6	143.6	153.1
1919-20	134.0	137.4	143.6	147.6	153.6	164.1	177.4	185.4	174.6	159.7	138.5	104.3	151.5
1920-21	77.2	66.8	64.6	63.4	63.8	61.2	61.0	62.4	62.0	59.0	53.6	46.0	62.1
1921-22	41.7	42.8	44.6	50.3	55.8	58.3	60.6	61.9	63.3	63.6	62.2	62.2	54.3
1922-23	64.3	67.6	70.2	72.5	75.3	79.6	84.0	85.8	87.0	87.0	86.2	84.8	76.7
1923-24	78.3	72.2	73.6	76.5	77.2	78.2	78.6	80.8	98.3	107.4	109.7	108.9	84.0
1924-25	99.6	105.6	112.0	114.5	112.1	103.8	107.5	111.0	104.4	106.5	98.8	83.0	105.8
1925-26	74.6	70.7	69.6	68.5	66.6	65.7	67.1	68.6	71.5	79.5	76.2	74.5	71.0
1926-27	66.0	64.5	64.3	66.5	65.2	65.6	73.0	88.9	92.4	97.7	95.3	87.6	74.9
1927-28	73.7	75.1	75.2	79.0	86.2	91.9	102.5	102.2	102.4	98.2	95.1	84.7	85.2
1928-29	75.4	76.1	80.2	86.8	88.7	87.5	86.2	86.9	91.2	95.9	97.2	91.9	85.0
1929-30	81.0	78.0	77.3	77.4	74.5	78.3	77.7	79.0	77.1	90.0	91.7	81.9	79.8
1930-31	66.3	64.9	------	------	------	------	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of corn for each state; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, November, 1909–December, 1923.

TABLE 64.—*Corn, No. 3, yellow: Weighted average price* [1] *per bushel of reported cash sales, Chicago, 1909–10 to 1930–31*

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909–10	59	59	64	63	61	57	60	59	62	64	58	50	59
1910–11	49	45	45	45	45	50	54	55	63	65	67	73	53
1911–12	68	61	62	64	68	78	79	75	68	79	74	65	71
1912–13	52	46	46	48	49	55	57	60	62	74	75	70	53
1913–14	72	66	62	62	64	67	70	72	71	82	79	73	70
1914–15	67	64	71	74	72	75	77	74	78	81	74	65	70
1915–16	63	69	74	74	73	76	75	74	81	85	86	96	79
1916–17	98	92	98	100	109	140	159	170	199	206	210	203	111
1917–18	221	177	177	181	170	165	160	162	170	172	158	141	163
1918–19	133	145	143	127	153	162	174	178	192	195	155	141	162
1919–20	146	147	151	146	158	169	202	189	158	158	131	91	159
1920–21	77	74	65	63	62	57	60	63	60	56	53	45	62
1921–22	47	47	48	55	57	58	62	61	64	62	64	69	55
1922–23	71	73	70	72	73	79	82	84	88	88	89	104	73
1923–24	82	71	76	78	77	77	77	82	109	117	114	110	88
1924–25	111	120	124	122	117	105	115	113	108	102	91	82	106
1925–26	83	76	79	75	72	71	71	70	78	80	79	77	75
1926–27	71	75	74	73	68	71	87	99	102	109	97	84	87
1927–28	84	86	89	95	99	106	108	103	106	102	100	96	101
1928–29	84	83	93	94	94	90	87	91	99	101	101	95	92
1929–30	88	88	85	82	80	82	79	79	82	99	94	82	83
1930–31	71	69											

Bureau of Agricultural Economics. Compiled from Chicago Daily Trade Bulletin. Data for 1899–1908 available in 1924 Yearbook, p. 612, Table 73.

[1] Average of daily prices weighted by car-lot sales.

TABLE 65.—*Corn: Weighted average price* [1] *per bushel of reported cash sales of all classes and grades, Chicago, and six markets combined, 1918–19 to 1930–31*

CHICAGO

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1918–19	118.6	138.6	131.4	122.0	144.2	160.1	174.0	173.7	191.8	193.2	156.6	140.0	150.4
1919–20	143.8	141.6	144.9	139.5	155.1	159.7	197.4	183.3	155.3	154.9	132.2	95.9	144.1
1920–21	78.8	72.5	62.1	59.9	60.7	54.5	61.2	59.1	59.4	56.2	53.2	46.2	56.6
1921–22	46.7	47.1	47.3	54.0	57.1	58.2	61.4	60.0	63.7	62.0	63.0	69.0	56.9
1922–23	71.1	72.4	70.1	72.5	72.8	79.3	81.8	84.0	87.1	88.2	88.8	102.4	78.1
1923–24	76.1	69.8	74.4	75.2	74.4	76.4	76.7	82.6	109.1	117.2	114.9	110.0	86.0
1924–25	109.3	115.3	113.1	110.8	103.8	99.1	113.4	111.6	106.1	101.8	89.4	80.9	105.7
1925–26	70.3	67.8	69.5	63.1	65.2	65.3	67.4	65.7	74.0	76.1	75.9	73.1	68.4
1926–27	66.5	65.3	64.5	62.1	59.4	66.5	81.5	91.2	96.1	105.2	92.1	79.5	74.9
1927–28	79.8	78.9	78.7	84.0	89.4	98.8	104.6	101.3	104.7	100.3	98.6	88.8	91.0
1928–29	80.7	79.8	89.0	91.2	91.7	88.0	86.1	91.5	99.9	101.0	100.9	94.6	90.5
1929–30	81.7	81.0	79.1	76.9	74.0	81.3	79.0	78.7	82.3	99.2	94.5	80.6	81.8
1930–31	69.1	67.8											

SIX MARKETS COMBINED [2]

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Weighted average
1918–19	122.5	140.4	133.0	123.0	143.1	160.6	172.2	173.9	189.9	191.5	156.1	139.9	150.3
1919–20	143.2	140.4	143.2	137.9	153.1	163.8	191.7	181.0	154.8	153.2	130.1	94.3	146.5
1920–21	76.5	68.6	60.3	58.1	58.8	52.9	58.9	48.3	57.5	54.0	51.9	45.2	55.5
1921–22	45.6	45.7	46.0	53.3	55.4	56.5	59.6	59.3	62.1	60.1	62.3	69.4	55.7
1922–23	70.8	71.6	69.2	71.6	72.4	79.0	82.1	83.1	85.6	86.4	88.3	100.3	77.4
1923–24	74.9	67.5	72.8	73.7	72.7	74.7	75.4	82.7	106.6	114.4	113.7	109.2	83.0
1924–25	108.3	114.4	112.9	108.6	103.5	99.0	111.9	109.7	105.3	101.3	89.1	80.8	106.0
1925–26	71.0	68.3	69.5	63.2	64.6	66.4	68.0	66.9	76.3	78.3	76.5	73.2	69.0
1926–27	67.3	65.9	65.2	62.7	60.9	67.0	83.0	91.5	96.7	104.2	92.2	79.9	75.8
1927–28	78.7	77.0	78.6	84.1	89.6	98.2	104.0	100.8	102.7	96.8	97.5	89.3	89.2
1928–29	79.8	78.4	87.1	89.5	89.0	86.9	84.6	89.7	98.1	99.9	100.0	93.8	88.5
1929–30	81.0	79.1	77.7	75.9	73.5	80.2	78.5	77.8	80.6	97.6	93.2	80.3	80.3
1930–31	67.8	64.1											

Bureau of Agricultural Economics. Compiled from Chicago Daily Trade Bulletin, St. Louis Daily Market Reporter, Omaha Daily Price Current, Kansas City Grain Market Review, Minneapolis Daily Market Record, Cincinnati Daily Trade Bulletin. The prices in this table are comparable with prices paid to producers in that the latter are averages of the several prices reported which cover all classes and grades sold by producers.

[1] Average of daily prices weighted by car-lot sales.

[2] Markets are Chicago, St. Louis, Omaha, Kansas City, Minneapolis, and Cincinnati (not included November, 1918, December, 1919, and November, 1928–December, 1930).

TABLE 66.—*Corn, yellow, La Plata: Spot price per bushel of 56 pounds at Liverpool and Buenos Aires 1921–22 to 1929–30*

LIVERPOOL

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	78	88	92	108	108	103	106	101	110	110	109	108	102
1922–23	96	100	99	104	105	109	114	110	102	94	98	97	102
1923–24	96	102	103	115	111	107	112	100	94	104	114	124	107
1924–25	121	122	131	129	114	111	130	128	127	138	120	103	123
1925–26	107	110	97	91	89	94	89	87	100	98	90	93	95
1926–27	95	92	89	93	87	88	94	93	91	98	97	96	93
1927–28	97	104	110	119	127	129	127	125	123	119	107	116	117
1928–29	123	120	124	127	124	120	107	104	118	113	107	103	116
1929–30	99	89	84	79	75	91	85	76	84	90	77	62	83

BUENOS AIRES

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Average
1921–22	61	63	63	73	79	77	75	71	78	78	76	74	72
1922–23	70	74	80	82	81	80	77	75	73	69	74	78	76
1923–24	81	79	78	82	77	67	65	64	68	85	93	105	79
1924–25	106	107	112	108	96	92	100	92	93	96	91	82	98
1925–26	84	86	78	73	66	70	68	68	68	70	65	60	71
1926–27	56	55	60	63	62	60	60	63	70	76	77	76	65
1927–28	75	83	86	97	102	95	90	91	90	86	91	94	91
1928–29	97	93	97	99	90	91	79	87	87	87	87	84	90
1929–30	82	79	65	62	62	62	60	56	54	56	51	43	61

Bureau of Agricultural Economics. Compiled from International Yearbook of Agricultural Statistics, 1912–1921; subsequently Broomhall's Corn Trade News and Review of the River Plate. Average of weekly quotations. Conversiosn of Liverpool prices at monthly average rate of exchange as given in Federal Reserve Bulletins to December, 1925, inclusive, subsequently at par of exchange. Buenos Aires prices are averages of weekly quotations, converted at monthly average rate of exchange as given in the Federal Reserve Bulletin.

TABLE 67.—*Corn futures: Volume of trading in all contract markets, by months, 1923–24 to 1929–30*

Months	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
	Million bushels	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*
November	394	557	317	383	473	457	261
December	285	707	514	395	681	420	199
January	457	710	302	261	511	690	196
February	338	677	236	288	698	373	252
March	442	810	317	429	733	416	328
April	323	670	292	313	745	466	283
May	288	510	237	692	699	526	290
June	426	566	343	921	567	475	322
July	565	463	448	575	553	520	498
August	740	394	439	713	616	453	611
September	695	442	368	836	372	296	433
October	678	335	340	588	467	269	461
Total	5,631	6,841	4,153	6,394	7,115	5,361	4,134

Grain Futures Administration.

TABLE 68.—*Corn futures: Volume of trading in all contract markets, by markets, and by months, 1929–30*

Month	Chicago Board of Trade	Chicago Open Board	Kansas City	St. Louis	Milwaukee	Month	Chicago Board of Trade	Chicago Open Board	Kansas City	St. Louis	Milwaukee
	Million bushels	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*		*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*
Nov	238	7	14	¼	2	June	297	7	16	⅛	2
Dec	178	5	13	¼	2	July	465	11	21	¼	2
Jan	176	5	12	¼	2	Aug	572	11	25	½	3
Feb	225	7	17	1	2	Sept	405	10	15	½	3
Mar	297	8	19	1	2	Oct	429	10	20	¼	2
Apr	252	7	21	½	3						
May	265	7	15	⅛	2	Total	3,799	95	208	5	27

Grain Futures Administration.

TABLE 69.—*Corn futures: Volume of trading on the Chicago Board of Trade by crop years, 1921–22 to 1929–30*

Crop year	Bushels	Crop year	Bushels	Crop year	Bushels
1921–22	4,180,000,000	1924–25	6,363,000,000	1927–28	6,589,000,000
1922–23	4,535,000,000	1925–26	3,863,000,000	1928–29	4,924,000,000
1923–24	5,202,000,000	1926–27	5,982,000,000	1929–30	3,799,000,000

Grain Futures Administration.

TABLE 70.—*Oats: Acreage, production, value, exports, etc., United States, 1900–1930*

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel at Chicago, year beginning Aug. 1[1]	Foreign trade, including meal, year beginning July 1[2]: Domestic exports	Foreign trade: Imports	Net exports[3]: Total	Net exports[3]: Percentage of production
	1,000 acres	*Bushels of 32 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*
1900	30,290	30.2	913,800	25.4	232,074	26	42,269	32	42,237	4.6
1901	29,894	26.0	778,392	39.7	308,796	43	13,278	39	13,240	1.7
1902	30,578	34.5	1,053,489	30.6	322,423	34	8,382	150	8,233	.8
1903	30,866	28.2	869,350	34.0	295,232	38	1,961	184	1,857	.2
1904	31,353	32.2	1,008,931	31.1	313,488	32	8,395	56	8,339	.8
1905	32,072	34.0	1,090,236	28.9	314,868	31	48,435	40	48,395	4.4
1906	33,353	31.0	1,035,576	31.9	329,853	37	6,386	91	6,379	.6
1907	33,641	23.9	805,108	44.5	358,421	50	2,519	383	2,195	.3
1908	34,006	25.0	850,540	47.3	402,010	52	2,334	6,692	[4] 4,252	
1909	*35,159*	*28.6*	*1,007,143*							
1909	35,159	30.4	1,068,289	40.6	433,869	42	2,549	1,063	1,704	.2
1910	37,548	31.6	1,186,341	34.4	408,388	33	3,846	140	3,707	.3
1911	37,763	24.4	922,298	45.0	414,663	50	2,678	2,660	30	(5)
1912	37,917	37.4	1,418,337	31.9	452,469	35	36,455	765	35,695	2.5
1913	38,399	29.2	1,121,768	39.2	439,596	40	2,749	22,333	[4] 18,858	
1914	38,442	29.7	1,141,060	43.8	499,431	50	100,609	670	100,158	8.8
1915	40,996	37.8	1,549,030	36.1	559,506	41	98,960	720	98,648	6.4
1916	41,527	30.1	1,251,837	52.4	655,928	54	95,106	841	94,348	7.5
1917	43,553	36.6	1,592,740	66.6	1,061,474	71	125,091	2,915	122,273	7.7
1918	44,349	34.7	1,538,124	70.9	1,090,322	70	109,005	838	108,167	7.0
1919	*37,991*	*27.8*	*1,055,183*							
1919	40,359	29.3	1,184,030	70.4	833,922	80	43,436	6,077	37,365	3.2
1920	42,491	35.2	1,496,281	46.0	688,311	51	9,391	3,827	5,831	.4
1921	45,495	23.7	1,078,341	30.2	325,954	35	21,237	1,824	19,422	1.8
1922	40,790	29.8	1,215,803	39.4	478,948	41	25,413	340	25,087	2.1
1923	40,981	31.9	1,305,883	41.4	541,137	45	8,796	4,271	4,550	.3
1924	*37,650*	*34.7*	*1,304,599*							
1924	42,110	35.7	1,502,529	47.7	717,189	50	16,777	3,067	13,926	.9
1925	44,872	33.2	1,487,550	38.0	565,506	41	39,687	212	39,565	2.7
1926	44,177	28.2	1,246,848	39.8	496,582	43	15,041	135	14,988	1.2
1927	41,941	28.2	1,182,594	45.0	531,762	55	9,823	233	9,611	.8
1928	41,734	34.5	1,439,407	40.9	589,048	44	16,251	426	15,825	1.1
1929	40,043	30.7	1,228,369	43.5	533,807	44	7,966	175	7,791	.6
1930 [6]	41,598	33.7	1,402,026	32.4	453,973					

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, p. 788, for data for earlier years.

[1] From Chicago Daily Trade Bulletin, averages of the daily cash quotations of No. 3 white oats weighted by car-lot sales.

[2] Compiled from Commerce and Navigation of the United States, 1900–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1930; and official records of the Bureau of Foreign and Domestic Commerce. Oats—general imports, 1900–1929; oatmeal—general imports, 1900–1909; imports for consumption, 1910–1930.

[3] Total exports (domestic plus foreign) minus total imports.

[4] Net imports. Total imports minus total exports (domestic plus foreign).

[5] Less than 0.05 per cent.

[6] Preliminary.

TABLE 71.—*Oats: Acreage harvested and production, by States, average 1924–1928, annual 1927–1930*

State and division	Acreage harvested: Average, 1924–1928	Acreage harvested: 1927	Acreage harvested: 1928	Acreage harvested: 1929	Acreage harvested: 1930 [1]	Production: Average, 1924–1928	Production: 1927	Production: 1928	Production: 1929	Production: 1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
Maine	128	124	120	122	122	4, 956	4, 588	4, 200	4, 880	5, 002
New Hampshire	11	11	10	9	8	431	429	390	360	352
Vermont	81	83	79	67	68	3, 080	3, 237	2, 686	2, 479	2, 652
Massachusetts	8	8	7	7	8	285	280	224	266	304
Rhode Island	2	2	2	2	2	68	64	56	60	70
Connecticut	14	15	15	12	13	434	480	405	360	416
New York	999	1, 000	1, 020	979	1, 077	34, 738	35, 000	33, 660	24, 377	45, 234
New Jersey	49	49	50	40	42	1, 571	1, 764	1, 500	1, 200	1, 554
Pennsylvania	1, 088	1, 100	1, 067	1, 014	1, 075	37, 308	39, 600	34, 678	29, 913	40, 312
North Atlantic	2, 381	2, 392	2, 370	2, 252	2, 415	82, 872	85, 442	77, 799	63, 895	95, 896
Ohio	1, 979	1, 900	2, 413	1, 689	1, 790	74, 784	60, 800	89, 281	49, 826	64, 440
Indiana	2, 088	1, 948	2, 430	1, 895	1, 914	65, 870	48, 700	89, 910	54, 008	57, 420
Illinois	4, 509	4, 008	4, 649	4, 231	4, 569	145, 686	102, 204	174, 338	141, 738	153, 062
Michigan	1, 590	1, 617	1, 633	1, 372	1, 482	54, 991	54, 170	58, 461	40, 886	56, 316
Wisconsin	2, 537	2, 422	2, 495	2, 470	2, 470	105, 653	93, 247	108, 532	85, 215	108, 680
Minnesota	4, 466	4, 350	4, 089	4, 212	4, 338	159, 332	116, 580	153, 338	153, 738	171, 351
Iowa	6, 060	6, 001	6, 004	5, 997	6, 145	221, 765	192, 032	231, 154	215, 892	239, 655
Missouri	1, 799	1, 565	1, 706	1, 535	1, 781	41, 716	26, 605	47, 768	33, 770	48, 978
North Dakota	2, 211	2, 125	1, 934	1, 876	1, 838	58, 510	45, 688	59, 954	33, 768	38, 598
South Dakota	2, 479	2, 550	2, 193	2, 259	2, 236	71, 671	74, 715	59, 211	64, 382	64, 844
Nebraska	2, 505	2, 441	2, 392	2, 480	2, 485	68, 797	69, 813	78, 936	86, 304	80, 017
Kansas	1, 462	1, 301	1, 301	1, 197	1, 385	35, 405	30, 574	37, 729	28, 249	42, 104
North Central	33, 685	32, 228	33, 239	31, 213	32, 433	1, 104, 181	915, 128	1, 188, 612	987, 776	1, 125, 465
Delaware	4	4	4	3	4	114	116	120	84	120
Maryland	52	51	54	47	49	1, 701	1, 708	1, 701	1, 457	1, 592
Virginia	185	186	182	167	200	4, 367	3, 999	4, 641	3, 841	3, 800
West Virginia	193	217	204	216	216	5, 087	5, 251	5, 712	5, 616	4, 428
North Carolina	258	273	191	258	286	5, 260	5, 733	4, 202	6, 192	6, 521
South Carolina	388	449	337	408	408	8, 553	10, 327	7, 751	11, 016	9, 996
Georgia	374	442	265	424	360	7, 358	9, 282	5, 300	9, 540	8, 280
Florida	12	11	11	12	12	168	121	191	168	180
South Atlantic	1, 466	1, 633	1, 248	1, 535	1, 535	32, 608	36, 537	29, 618	37, 914	34, 917
Kentucky	252	215	305	290	218	5, 800	4, 085	7, 930	6, 235	3, 488
Tennessee	208	179	188	197	217	4, 513	3, 043	4, 042	3, 546	4, 340
Alabama	107	101	70	119	109	1, 890	1, 768	1, 225	2, 320	1, 908
Mississippi	58	48	41	55	33	1, 090	912	820	1, 210	594
Arkansas	228	207	155	186	195	4, 404	4, 140	3, 410	4, 836	4, 875
Louisiana	33	35	44	48	41	724	612	1, 078	1, 200	820
Oklahoma	1, 136	1, 112	890	792	919	27, 602	21, 128	23, 140	20, 592	25, 732
Texas	1, 583	2, 003	1, 402	1, 542	1, 696	44, 874	42, 063	35, 751	43, 176	46, 640
South Central	3, 606	3, 900	3, 095	3, 229	3, 428	90, 896	77, 751	77, 396	83, 115	88, 397
Montana	589	596	554	554	526	18, 113	23, 840	20, 221	9, 418	9, 205
Idaho	145	143	137	151	143	6, 366	6, 721	6, 439	6, 040	6, 149
Wyoming	126	120	132	139	126	4, 158	4, 320	3, 828	3, 614	3, 402
Colorado	205	189	193	212	212	5, 544	5, 481	5, 983	6, 572	7, 102
New Mexico	42	30	36	43	47	946	660	720	1, 161	987
Arizona	14	17	14	15	20	462	612	532	480	700
Utah	55	51	55	58	55	2, 280	2, 142	2, 475	2, 436	2, 310
Nevada	2	2	2	2	2	73	80	80	70	72
Washington	208	183	201	191	210	9, 272	9, 150	9, 447	8, 977	10, 080
Oregon	304	310	304	304	289	9, 740	10, 540	10, 944	12, 464	11, 849
California	139	147	154	145	157	4, 276	4, 190	5, 313	4, 437	5, 495
Western	1, 829	1, 788	1, 782	1, 814	1, 787	61, 229	67, 736	65, 982	55, 669	57, 351
United States	42, 967	41, 941	41, 734	40, 043	41, 598	1, 371, 786	1, 182, 594	1, 439, 407	1, 228, 369	1, 402, 026

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 72.—*Oats: Acreage, yield per acre, and production in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual, 1928–29 to 1930–31*

Country	Acreage					Yield per acre					Production				
	Average, 1909–10 to 1913–14[1]	Average, 1921–22 to 1925–26	1928–29	1929–30	9301–31*	Average, 1909–10 to 1913–14[1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14[1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*
NORTHERN HEMISPHERE	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
North America:															
Canada	9,597	14,585	13,137	12,479	13,259	38.9	33.4	36.6	24.1	34.4	373,670	486,570	480,413	300,516	455,978
United States	37,357	42,850	41,734	40,043	41,598	30.6	30.8	34.5	30.7	33.7	1,143,407	1,318,021	1,439,407	1,228,369	1,402,026
Total	46,954	57,435	54,871	52,522	54,857	32.3	31.4	35.0	29.1	33.9	1,517,077	1,804,591	1,919,820	1,528,885	1,858,004
Europe:															
England and Wales	2,039	2,039	1,762	1,854	1,778	47.5	47.5	57.3	57.8	52.8	96,913	96,796	101,017	107,240	93,863
Scotland	952	970	878	889	862	46.8	49.0	56.1	59.4	52.5	44,507	47,563	49,280	52,850	45,290
Irish Free State	699	736	649	666	637	63.5	49.3	68.7	72.5	----	44,353	36,310	44,610	48,257	----
Northern Ireland	350	344	307	314	307	59.5	54.0	63.0	63.9	----	20,816	18,582	19,356	20,072	----
Norway	264	274	246	239	239	38.9	41.6	51.5	50.8	58.8	10,276	11,406	12,680	12,146	14,047
Sweden	1,961	1,807	1,716	1,744	1,874	43.9	41.7	48.5	50.6	38.5	86,050	75,374	83,191	88,238	72,125
Denmark	1,161	1,118	999	968	967	52.2	54.2	73.0	73.6	73.7	60,557	60,542	72,960	71,276	71,236
Netherlands	346	380	377	396	380	52.2	51.4	65.8	65.1	45.6	18,070	19,531	24,801	25,776	17,327
Belgium	668	656	667	744	676	65.8	62.4	72.7	69.2	50.2	43,964	40,954	48,524	51,487	33,947
Luxemburg	77	70	71	77	70	43.9	30.4	42.3	47.0	39.3	3,382	2,130	3,001	3,617	2,749
France	10,084	8,521	8,657	8,665	8,557	36.5	35.3	39.3	45.7	35.4	368,462	300,569	340,252	395,752	302,747
Spain	1,276	1,623	1,965	1,839	1,768	22.8	22.1	17.7	24.9	29.8	29,110	35,900	34,781	45,812	52,740
Portugal	(600)	563	581	519	519	----	11.4	8.7	10.7	14.9	(7,000)	6,422	5,053	5,571	7,723
Italy	1,276	1,194	1,286	1,293	1,263	29.4	31.7	37.6	37.3	29.2	37,537	37,840	48,412	48,261	36,844
Switzerland	81	51	51	51	48	59.1	54.7	57.4	56.7	52.8	4,784	2,788	2,928	2,894	2,532
Germany	9,529	8,246	8,696	8,793	8,496	55.3	44.1	55.4	57.8	44.4	527,178	363,272	481,960	508,633	377,007
Austria	883	739	744	733	763	32.9	30.5	42.8	42.4	35.0	29,030	22,556	31,841	31,074	26,683
Czechoslovakia	2,506	2,039	2,141	2,150	2,140	38.4	40.2	47.4	47.9	39.9	96,147	82,029	101,385	102,927	85,437
Hungary	849	785	652	745	637	33.5	28.8	42.2	38.0	23.6	28,464	22,644	27,529	28,292	15,040
Yugoslavia	1,358	923	913	983	1,036	24.7	22.4	27.6	24.6	16.1	33,516	20,644	25,236	24,166	16,638
Greece	[2] 140	206	277	337	----	[2] 29.1	20.3	18.9	9.6	----	[2] 4,075	4,187	5,246	3,251	----
Bulgaria	408	362	298	387	340	21.2	19.6	20.6	24.3	29.3	8,651	7,100	6,139	9,416	9,961
Rumania	[3] 2,119	3,133	2,759	2,997	2,686	[3] 28.2	20.1	24.5	31.2	26.5	[3] 59,776	62,819	67,546	93,647	71,088
Poland	6,793	4,446	5,036	5,415	5,416	28.5	27.2	34.2	37.6	30.0	193,890	120,813	172,076	203,449	162,589
Lithuania	961	842	712	865	855	23.8	27.4	25.8	35.0	29.6	22,910	23,078	18,377	30,234	25,284
Latvia	765	740	590	747	790	25.1	24.6	17.0	31.4	29.7	19,188	18,206	10,037	23,433	23,433
Estonia	394	[3] 390	320	371	368	24.9	[3] 23.3	21.3	27.7	29.0	9,795	9,505	6,817	10,277	10,671
Finland	999	1,058	1,140	1,124	1,137	20.4	32.6	34.4	34.5	36.5	20,391	34,529	39,254	38,732	41,458
Russia, European and Asiatic	41,256	25,776	42,640	46,621	----	22.4	20.3	26.6	24.5	----	924,918	522,905	1,135,369	1,144,325	----
Total Europe reporting area and production all years	48,349	42,969	43,257	44,588	43,665	38.5	35.5	42.0	45.2	37.1	1,859,548	1,525,010	1,815,077	2,015,200	1,618,459
Estimated European total excluding Russia	49,500	44,300	44,500	45,900	44,900	----	----	----	----	----	[4] 1,929,000	1,584,000	1,884,000	2,087,000	1,690,000

Africa:															
Morocco	25	35	74	116	84	----	18.4	27.0	29.4	30.0	(500)	645	1,996	3,413	2,520
Algeria	449	605	601	639	632	30.0	21.0	24.1	23.1	21.4	13,489	12,713	14,492	14,785	13,503
Tunis	133	126	104	133	99	27.4	19.4	21.5	25.9	17.4	3,642	2,439	2,239	3,445	1,722
Total	607	766	779	888	815	29.0	20.6	24.0	24.4	21.8	17,631	15,797	18,727	21,643	17,745
Asia:															
Turkey	[2] 380	[5] 206	----	----	----	[2] 56.7	[2] 55.3	----	----	----	[2] 21,562	[2] 11,391	----	----	----
Syria and Lebanon	(12)	[3] 26	27	28	28	----	[3] 16.7	19.3	25.6	19.7	(175)	[3] 435	522	718	551
Japan	110	278	285	289	----	44.8	39.0	40.4	38.2	----	4,928	10,847	11,518	11,036	----
Chosen	141	276	265	270	----	15.6	16.5	15.3	16.2	----	2,202	4,545	4,061	4,370	----
Total Northern Hemisphere reporting area and production all years	95,922	101,196	98,934	98,026	99,365	35.4	33.1	37.9	36.4	35.2	3,394,431	3,345,833	3,754,146	3,566,446	3,494,759
Estimated Northern Hemisphere total excluding Russia and China	97,800	103,300	101,000	100,200	101,500	----	----	----	----	----	[4] 3,494,000	3,433,000	3,851,000	3,666,000	3,594,000
SOUTHERN HEMISPHERE															
Brazil	----	16	15	----	----	----	30.1	32.5	----	----	----	482	488	----	----
Chile	78	106	220	243	193	42.7	37.3	32.4	42.8	----	3,333	3,954	7,125	10,404	----
Uruguay	66	120	156	151	----	19.5	18.1	25.4	22.5	----	1,285	2,166	3,967	3,405	----
Argentina	1,974	1,844	2,199	2,160	2,049	27.5	32.2	29.6	31.6	33.3	54,246	59,286	65,172	68,293	68,324
Union of South Africa	809	640	624	688	535	11.9	10.4	12.6	15.0	14.5	9,661	6,624	7,844	10,289	7,739
Australia	745	1,000	1,046	1,461	----	23.8	19.0	16.9	11.8	14.5	17,768	19,010	17,636	17,198	----
New Zealand	366	125	73	68	----	49.1	48.0	51.2	53.8	----	17,978	5,996	3,736	3,659	----
Total Northern and Southern Hemisphere countries reporting area and production all years	98,705	103,680	101,757	100,874	101,949	35.0	32.9	37.6	36.1	35.0	3,458,338	3,411,743	3,827,162	3,645,028	3,570,822
Estimated world total excluding Russia and China	101,900	108,100	105,400	105,100	106,300	----	----	----	----	----	[4] 3,601,000	3,535,000	3,961,000	3,784,000	----

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Figures in parentheses indicate unofficial estimates. Acreage and production figures are for the harvesting season which begins in the spring, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

* Preliminary.

[1] Where changes in boundary have occurred the averages are estimates for territory within present boundaries.

[2] 1 year only.

[3] 4-year average.

[4] The estimate for the 5-year period, 1909–10 to 1913–14, given in this table is somewhat larger than the figure obtained by averaging the same 5 years in Table 74. This is because in this table estimates for warring countries are for postwar boundaries, whereas in Table 74 they are for pre-war territory. As a result, in excluding Russia which lost territory in the war, a smaller area is excluded in this table than in Table 74.

[5] 2-year average.

TABLE 73.—*Oats: Yield per acre, average 1919–1928 and annual 1925–1930, and estimated price per bushel, December 1, average 1924–1928 and annual 1925–1930, by States*

State and division	Yield per acre							Estimated price per bushel Dec. 1						
	Average, 1919–1928	1925	1926	1927	1928	1929	1930	Average, 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	37.9	45.0	38.0	37.0	35.0	40.0	41.0	64	55	63	68	70	70	52
New Hampshire	37.8	39.0	40.0	39.0	39.0	40.0	44.0	67	64	65	70	65	70	54
Vermont	35.6	40.0	38.0	39.0	34.0	37.0	39.0	65	59	60	65	70	65	53
Massachusetts	34.0	38.0	34.0	35.0	32.0	38.0	38.0	69	65	70	70	70	70	52
Rhode Island	30.4	33.0	32.0	32.0	28.0	30.0	35.0	71	65	70	75	70	75	55
Connecticut	30.0	33.0	32.0	32.0	27.0	30.0	32.0	67	61	66	69	70	70	55
New York	32.4	36.0	34.0	35.0	33.0	24.9	42.0	55	52	50	55	54	58	44
New Jersey	30.0	30.0	33.0	36.0	30.0	30.0	37.0	55	54	50	53	53	57	48
Pennsylvania	33.3	35.0	32.0	36.0	32.5	29.5	37.5	54	51	49	54	53	57	48
North Atlantic	33.2	36.0	33.4	35.7	32.8	28.4	39.7	55.3	52.2	51.0	55.8	55.1	58.9	46.5
Ohio	35.1	41.5	38.0	32.0	37.0	29.5	36.0	43	39	39	45	42	45	35
Indiana	30.3	28.0	30.0	25.0	37.0	28.5	30.0	40	37	35	43	37	40	30
Illinois	32.0	32.5	26.5	25.5	37.5	33.5	33.5	40	35	35	43	38	40	29
Michigan	32.2	32.0	33.0	33.5	35.8	29.8	38.0	44	40	40	48	43	48	34
Wisconsin	38.8	48.5	37.5	38.5	43.5	34.5	44.0	43	38	40	47	43	44	33
Minnesota	34.0	42.0	28.5	26.8	37.5	36.5	39.5	37	31	34	40	35	37	25
Iowa	35.6	39.2	31.5	32.0	38.5	36.0	39.0	38	32	35	42	37	39	28
Missouri	23.4	26.0	20.0	17.0	28.0	22.0	27.5	45	44	42	47	42	47	39
North Dakota	24.5	27.0	17.0	21.5	31.0	18.0	21.0	32	27	33	35	30	32	20
South Dakota	28.9	34.0	11.7	29.3	27.0	28.5	29.0	35	28	36	36	33	34	21
Nebraska	28.8	27.4	20.7	28.6	33.0	34.8	32.2	39	36	40	40	38	38	28
Kansas	24.6	23.0	21.6	23.5	29.0	23.6	30.4	44	44	44	45	42	46	35
North Central	31.8	34.9	27.2	28.4	35.8	31.6	34.7	39.3	34.4	36.9	42.2	38.0	39.8	29.0
Delaware	27.5	25.0	28.0	29.0	30.0	28.0	30.0	64	65	59	68	60	57	50
Maryland	31.1	32.0	32.8	33.5	31.5	31.0	32.5	55	53	50	54	56	59	47
Virginia	22.4	21.5	26.0	21.5	25.5	23.0	19.0	67	70	63	64	64	67	60
West Virginia	24.8	27.0	28.0	24.2	28.0	26.0	20.5	64	62	59	64	63	64	59
North Carolina	20.2	19.0	22.0	21.0	22.0	24.0	22.8	76	76	69	72	78	75	68
South Carolina	22.9	19.0	25.2	23.0	23.0	27.0	24.5	83	90	67	75	88	80	74
Georgia	19.4	17.0	23.0	21.0	20.0	22.5	23.0	82	87	69	75	85	80	74
Florida	14.3	14.0	16.7	11.0	17.4	14.0	15.0	83	90	65	80	88	89	79
South Atlantic	21.9	20.2	24.6	22.4	23.7	24.7	22.7	74.7	77.4	65.5	70.8	75.5	74.7	68.2
Kentucky	21.8	21.0	24.5	19.0	26.0	21.5	16.0	59	59	53	60	57	59	53
Tennessee	20.4	22.0	25.0	17.0	21.5	18.0	20.0	62	64	55	60	60	62	53
Alabama	18.4	17.0	22.0	17.5	17.5	19.5	17.5	76	78	68	70	75	76	64
Mississippi	18.7	19.0	22.0	19.0	20.0	22.0	18.0	75	78	66	70	75	76	68
Arkansas	21.5	16.0	22.0	20.0	22.0	26.0	25.0	58	58	52	58	59	62	52
Louisiana	22.2	21.0	26.6	17.5	24.5	25.0	20.0	72	80	64	66	65	70	55
Oklahoma	24.6	23.0	28.0	19.0	26.0	26.0	28.0	46	51	37	44	47	48	38
Texas	27.2	12.3	42.6	21.0	25.5	28.0	27.5	52	63	38	47	51	51	42
South Central	24.8	18.2	33.8	19.9	25.0	25.7	25.8	51.8	58.1	40.5	48.9	52.1	53.3	43.1
Montana	27.2	22.5	26.0	40.0	36.5	17.0	17.5	48	53	53	44	41	51	31
Idaho	41.4	49.0	40.0	47.0	47.0	40.0	43.0	49	43	45	50	48	48	32
Wyoming	31.0	35.0	35.0	36.0	29.0	26.0	27.0	47	46	45	42	45	51	36
Colorado	28.2	27.0	24.0	29.0	31.0	31.0	33.5	49	50	44	48	45	48	36
New Mexico	22.8	20.0	28.0	22.0	20.0	27.0	21.0	59	64	56	56	60	60	55
Arizona	32.5	30.0	35.0	36.0	38.0	32.0	35.0	75	75	75	70	75	80	65
Utah	38.2	47.0	40.0	42.0	45.0	42.0	42.0	62	62	60	60	56	60	41
Nevada	35.4	40.0	32.0	40.0	40.0	35.0	36.0	66	65	62	65	65	70	52
Washington	45.5	44.0	43.0	50.0	47.0	47.0	48.0	55	52	53	56	55	59	36
Oregon	32.4	33.0	29.0	34.0	36.0	41.0	41.0	53	51	50	53	51	56	35
California	30.2	34.7	32.5	28.5	34.5	30.6	35.0	64	61	48	63	60	61	43
Western	32.2	32.4	30.9	37.9	37.0	30.7	32.1	51.5	51.7	50.7	49.9	48.5	54.4	36.1
United States	31.0	33.2	28.2	28.2	34.5	30.7	33.7	42.3	38.0	39.8	45.0	40.9	43.5	32.4

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

TABLE 74.—*Oats: World production, 1894–95 to 1930–31*

Crop year	Estimated world production, excluding Russia and China	Estimated European production, excluding Russia	Selected countries: United States	Russia [1]	Germany	France	Canada	Poland	England and Wales	Argentina
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1894-95	2,303	1,451	716	744	453	294	---------	---------	119	---------
1895-96	2,503	1,432	886	717	430	306	---------	---------	105	---------
1896-97	2,320	1,376	780	800	411	296	---------	---------	93	---------
1897-98	2,232	1,282	791	664	394	253	---------	---------	99	1
1898-99	2,501	1,511	843	688	465	322	---------	---------	102	1
1899-1900	2,633	1,462	926	995	474	308	---------	---------	99	2
1900-01	2,624	1,454	914	854	489	285	---------	---------	99	2
1901-02	2,344	1,415	778	624	486	255	---------	---------	91	2
1902-03	2,888	1,576	1,053	931	514	320	---------	---------	115	4
1903-04	2,829	1,649	869	800	542	344	---------	---------	109	3
1904-05	2,716	1,435	1,009	1,124	478	291	---------	---------	112	4
1905-06	2,823	1,460	1,090	937	451	306	---------	---------	99	6
1906-07	3,673	1,683	1,036	714	581	295	---------	---------	109	12
1907-08	2,861	1,768	805	921	630	353	---------	---------	121	34
1908-09	2,832	1,632	851	959	530	327	266	---------	106	32
1909-10	3,415	1,863	1,068	1,163	629	383	376	---------	104	36
1910-11	3,223	1,660	1,186	1,065	544	332	259	---------	104	47
1911-12	3,135	1,683	922	876	531	349	388	---------	96	69
1912-13	3,700	1,720	1,418	1,089	587	355	416	---------	89	76
1913-14	3,580	1,909	1,122	1,251	669	357	430	---------	91	43
1914-15	3,266	1,681	1,141	[2] 915	623	318	333	---------	93	49
1915-16	3,594	1,401	1,549	[3] 897	412	239	494	---------	101	75
1916-17	3,259	1,469	1,252	[4] 845	484	277	436	---------	102	32
1917-18	3,217	1,047	1,593	761	[5] 250	[5] 220	428	---------	106	69
1918-19	3,216	1,117	1,538	---------	302	181	453	---------	141	34
1919-20	3,038	1,318	1,184	---------	310	180	419	76	110	31
1920-21	3,645	1,476	1,496	486	332	291	564	129	103	51
1921-22	3,103	1,451	1,078	359	345	244	453	92	100	31
1922-23	3,341	1,471	1,216	409	277	288	522	110	88	56
1923-24	3,791	1,719	1,306	405	421	337	599	153	95	76
1924-25	3,651	1,570	1,503	603	390	306	431	106	105	53
1925-26	3,789	1,708	1,488	838	385	328	427	144	97	80
1926-27	3,643	1,843	1,247	1,071	436	364	407	134	104	66
1927-28	3,526	1,748	1,183	917	437	343	467	147	94	52
1928-29	3,961	1,884	1,439	1,135	482	340	480	172	101	65
1929-30	3,784	2,087	1,228	1,144	509	396	301	203	107	68
1930-31 [6]	---------	1,690	1,402	---------	377	303	456	163	94	68

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Production figures are for the harvesting season, which begins in the spring, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

[1] Includes all Russian territory reporting for the years shown.

[2] Total Russian Empire, exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.

[3] Exclusive of Russian Poland, Lithuania, parts of present Latvia and the Ukraine, and the Provinces of Batum and Elizabetpol, in Transcaucasia.

[4] Beginning this year, estimates for the present territory of the Union of Socialist Soviet Republics, exclusive of Turkestan, Transcaucasia, and the Far East, which territory in 1924-25 produced 20,248,000 bushels.

[5] Beginning with this year post-war boundaries and therefore not comparable with earlier years.

[6] Preliminary.

TABLE 75.—*Oats: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–18 to 1929–30*

Year beginning July	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917–18	4.7	16.4	13.5	11.1	7.7	7.8	8.3	8.0	7.1	6.5	4.0	4.9	100.0
1918–19	8.0	19.6	11.9	9.9	7.2	6.7	6.7	4.5	5.5	6.3	7.0	6.7	100.0
1919–20	14.4	18.4	10.1	9.2	5.8	8.3	8.2	6.6	4.9	4.3	5.2	4.6	100.0
1920–21	8.3	18.7	13.8	9.5	5.5	5.8	6.6	6.6	6.0	4.6	6.8	7.8	100.0
1921–22	15.1	16.5	11.8	7.9	5.3	6.1	7.3	6.9	5.6	4.3	7.2	6.0	100.0
1922–23	8.9	15.7	11.9	10.1	7.8	8.6	7.4	7.1	6.5	4.7	5.4	5.9	100.0
1923–24	7.0	17.7	14.1	11.5	6.8	7.6	7.7	7.9	5.2	4.8	4.8	4.9	100.0
1924–25	14.0	20.7	17.8	11.5	5.6	4.8	4.7	3.5	3.9	3.9	5.0	4.6	100.0
1925–26	10.4	22.2	13.2	9.3	6.3	6.8	6.1	6.2	5.2	4.2	4.5	5.6	100.0
1926–27	10.9	21.8	11.7	8.7	5.8	6.4	6.1	6.7	5.6	4.4	5.5	6.4	100.0
1927–28	9.3	22.7	13.8	9.7	5.7	6.7	6.3	6.3	6.2	3.8	4.1	5.4	100.0
1928–29	6.8	23.4	13.8	10.2	5.8	7.4	5.6	6.5	5.1	4.9	4.3	6.2	100.0
1929–30	10.5	30.9	13.0	8.2	4.6	5.1	3.8	5.1	4.5	5.1	4.3	4.9	100.0

Bureau of Agricultural Economics.

TABLE 76.—*Oats: Farm stocks, growing conditions, and shipments, United States, 1909–1930*

Crop year	Stocks of old oats on farms Aug. 1 [1]	Conditions of new crop				Weight per measured bushel of new oats [2]	Stocks of oats on farms on Mar. 1 [1]	Shipped out of county where grown [1]
		June 1	July 1	Aug. 1	Sept. 1			
	1,000 bush.	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Pounds*	*1,000 bush.*	*1,000 bush.*
1909–10	27,478	88.7	88.3	85.5	83.8	32.7	385,705	343,968
1910–11	66,666	91.0	82.2	81.5	83.3	32.7	442,665	363,103
1911–12	67,801	85.7	68.8	65.7	64.5	31.1	289,989	265,944
1912–13	34,875	91.1	89.2	90.3	92.3	33.0	604,249	438,130
1913–14	103,916	87.0	76.3	73.8	74.0	32.1	419,481	297,365
1914–15	62,467	89.5	84.7	79.4	75.8	31.5	379,369	335,539
1915–16	55,607	92.2	93.9	91.6	91.1	33.0	598,148	465,823
1916–17	113,728	86.9	86.3	81.5	78.0	31.2	394,211	355,092
1917–18	47,834	88.8	89.4	87.2	90.4	33.4	599,208	514,117
1918–19	81,424	93.2	85.5	82.8	84.4	33.2	590,251	421,568
1919–20	93,045	93.2	87.0	76.5	73.0	31.1	409,730	312,364
1920–21	54,819	87.8	84.7	87.2	88.3	33.1	683,759	431,687
1921–22	161,108	85.7	77.6	64.5	61.1	28.3	411,934	258,259
1922–23	74,513	85.5	74.4	75.6	74.9	32.0	421,118	303,950
1923–24	70,965	85.6	83.5	81.9	80.3	32.1	447,366	322,971
1924–25	65,710	83.0	86.9	88.2	89.3	33.4	538,832	422,112
1925–26	90,179	79.6	76.3	79.1	82.1	32.9	571,248	364,407
1926–27	107,917	78.8	74.5	71.4	67.9	30.9	421,897	272,804
1927–28	61,237	79.9	79.9	74.8	70.3	30.4	373,167	229,089
1928–29	42,315	78.3	79.9	84.8	84.4	32.6	497,335	308,215
1929–30	86,816	82.0	79.0	75.6	74.6	31.8	396,310	247,251
1930–31 [3]	66,881	83.2	80.7	78.9	80.3	33.0		

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Based on percentage of crop as reported by crop reporters.
[2] Average weight per measured bushel as reported by crop reporters.
[3] Preliminary.

TABLE 77.—*Oats: Receipts at primary markets, 1921–22 to 1929–30*

Year beginning August	Chicago	Minneapolis	St. Louis	Milwaukee	Peoria	Omaha	Total 10 markets [1]
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1921–22	78,042	33,072	26,118	23,612	13,485	10,964	215,715
1922–23	85,169	25,706	33,261	22,780	15,947	14,886	224,104
1923–24	69,902	29,259	35,791	20,496	13,406	18,385	219,972
1924–25	74,698	54,886	34,724	20,542	11,164	16,023	261,562
1925–26	50,660	36,616	28,662	14,165	9,749	13,124	207,723
1926–27	49,420	18,170	19,746	14,857	8,256	6,636	149,031
1927–28	53,609	27,313	19,394	10,506	8,906	8,858	155,307
1928–29	40,954	20,827	24,421	7,534	7,305	6,832	138,058
1929–30 [2]	34,691	21,503	19,263	12,525	7,718	9,280	133,221

Bureau of Agricultural Economics. Compiled from reports of Chicago Board of Trade, Duluth Board of Trade, Indianapolis Board of Trade, Kansas City Board of Trade, Omaha Grain Exchange, St. Louis Merchants Exchange, Milwaukee Chamber of Commerce, Minneapolis Chamber of Commerce, and American Elevator and Grain Trade.

[1] Includes also Duluth, Toledo, Kansas City, and Indianapolis.
[2] Subject to revision.

TABLE 78.—*Oats: Classification of receipts graded by licensed inspectors, all inspection points, 1919–1929*

TOTAL OF ALL CLASSES UNDER EACH GRADE

Year beginning August	Grade					
	No. 1	No. 2	No. 3	No. 4	Sample	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1919–20	5,652	51,006	94,497	15,805	3,537	170,497
1920–21	8,803	60,169	73,072	14,766	6,831	163,641
1921–22	2,519	31,643	105,103	31,774	6,664	177,703
1922–23	2,548	47,348	95,984	17,004	4,640	167,524
1923–24	2,724	41,530	90,759	22,643	11,307	168,963
1924–25	1,489	33,631	110,377	24,580	14,853	184,930
1925–26	2,197	53,587	75,634	17,989	6,260	155,667
1926–27	1,465	19,692	49,581	28,548	17,695	116,981
1927–28	2,838	29,106	64,444	19,397	5,728	121,513
1928–29	4,408	14,144	77,823	20,684	9,305	126,364
1929–30	4,106	26,053	71,757	11,822	3,097	116,835

Bureau of Agricultural Economics.

TABLE 79.—*Oats: Visible supply in United States,[1] 1909–10 to 1930–31*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909–10	3,800	5,183	12,799	13,264	13,586	11,180	8,759	8,639	9,916	9,223	6,905	4,245
1910–11	2,761	12,551	18,802	17,022	15,505	16,129	15,997	15,769	13,129	10,559	8,125	9,570
1911–12	11,203	20,742	21,044	22,600	20,315	18,754	15,431	14,366	13,429	11,991	8,052	3,690
1912–13	1,031	4,160	9,260	10,552	10,774	8,457	9,646	12,343	13,115	8,704	8,105	14,756
1913–14	17,131	24,662	30,718	31,684	29,664	26,909	24,450	21,489	19,755	13,262	8,144	7,210
1914–15	6,482	20,124	27,285	31,866	32,471	32,956	33,173	33,258	27,284	23,022	12,623	4,345
1915–16	1,309	2,924	14,381	15,730	20,928	21,081	20,175	20,265	17,892	12,096	16,192	12,452
1916–17	8,537	27,691	38,866	45,580	47,467	48,823	42,675	36,740	34,191	28,933	17,454	9,741
1917–18	6,679	7,277	14,165	17,453	18,595	17,657	13,879	13,947	18,098	21,911	20,822	13,227
1918–19	7,876	19,309	24,689	22,050	29,143	34,828	30,505	27,666	22,882	21,507	15,827	18,094
1919–20	20,481	19,411	19,552	19,196	16,922	13,080	11,550	10,401	9,576	6,813	8,642	3,623
1920–21	3,786	8,149	27,602	34,414	33,961	32,194	33,632	34,142	33,903	30,740	28,426	34,401
1921–22	37,562	60,455	65,843	69,998	69,198	67,728	68,010	68,529	64,644	55,837	47,950	42,743
1922–23	36,667	38,355	35,968	34,077	32,940	32,391	30,861	27,683	24,044	21,932	13,514	8,523
1923–24	5,477	10,111	16,514	20,488	18,686	19,940	17,539	17,741	16,715	10,656	6,720	5,264
1924–25	3,086	11,403	52,715	66,564	67,265	72,128	73,570	72,386	61,104	48,082	35,331	33,263
1925–26	26,298	50,706	65,818	64,926	64,251	63,187	63,076	58,974	52,023	47,025	38,976	37,900
1926–27	33,772	43,671	48,450	48,097	48,288	44,927	45,422	43,454	37,145	29,573	20,502	17,790
1927–28	12,001	21,501	24,931	23,857	23,252	21,907	20,350	19,791	15,746	11,168	7,086	3,225
1928–29	2,377	13,376	15,193	14,472	13,295	13,968	13,611	14,898	12,609	10,276	9,280	7,430
1929–30	7,626	23,488	26,321	30,155	27,534	26,496	24,471	21,673	18,349	16,242	12,652	10,875
1930–31	8,467	23,230	30,495	30,815	28,269	-------	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Compiled from the Chicago Daily Trade Bulletin.

[1] Saturday nearest the 1st of each month.

TABLE 80.—*Oats: Commercial stocks in store, 1926–27 to 1930–31*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
DOMESTIC OATS IN UNITED STATES[1]												
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27						47, 123	47, 421	45, 105	38, 481	30, 513	22, 553	17, 686
1927–28	11, 886	23, 224	26, 513	25, 682	24, 784	23, 815	20, 006	21, 127	16, 803	11, 667	7, 171	3, 338
1928–29	1, 939	15, 992	17, 561	16, 900	15, 399	17, 314	16, 219	16, 800	14, 003	11, 493	10, 591	8, 592
1929–30	8, 668	24, 318	28, 597	32, 762	30, 064	29, 568	26, 097	22, 937	19, 484	16, 519	13, 247	11, 028
1930–31	9, 102	25, 844	32, 904	33, 265	30, 504							
UNITED STATES OATS IN CANADA												
1926–27						352	247	218	164	635	1, 432	1, 759
1927–28	1, 253	1, 238	1, 435	1, 110	825	670	563	438	216	57	239	60
1928–29	4	978	2, 326	1, 031	547	644	494	424	309	716	529	346
1929–30	334	2, 177	4, 711	4, 435	4, 410	3, 735	3, 236	2, 852	2, 407	1, 934	1, 580	936
1930–31	1, 106	2, 679	2, 524	2, 425	2, 103							
CANADIAN OATS IN UNITED STATES[2]												
1926–27						228	228	171	66	117	321	19
1927–28	24	26	0	139	296	609	312	247	117	21	199	122
1928–29	101	123	141	211	711	900	704	801	516	722	577	377
1929–30	341	341	283	426	670	699	634	615	488	330	264	91
1930–31	146	21	55	27	7							

Bureau of Agricultural Economics. Compiled from weekly reports to the Grain, Hay, and Feed Market News Service. Data are for stocks on the Saturday neares the 1st day of tha month.

[1] Includes oats in store in public and private elevators in 39 important markets and also the oats afloat in vessels or barges in the harbors of lake and seaboard ports. Oats in transit either by rail or water, mill stocks, or small private stocks of oats intended only for local purposes, not included.

[2] Includes oats stored at lake and seaboard ports, exclusive of oats in transit on lakes and canals.

TABLE 81.—*Oats: Estimated average price per bushel, received by producers, United States, 1909–1930*

Crop year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909–10	46.2	41.6	41.0	40.6	41.5	43.9	45.5	45.8	44.4	43.2	42.6	41.9	43.2
1910–11	40.0	37.3	35.6	34.6	33.8	33.2	33.0	32.6	32.8	34.0	36.1	38.8	36.2
1911–12	40.3	41.4	43.2	44.4	45.0	46.3	48.6	50.9	54.0	55.6	53.9	48.4	46.1
1912–13	39.6	34.3	33.6	32.8	32.0	32.3	32.8	33.1	33.6	35.1	36.8	37.6	34.9
1913–14	38.4	39.4	38.8	38.6	39.2	39.2	39.1	39.2	39.5	39.8	39.4	37.8	38.9
1914–15	39.5	42.8	43.1	43.4	44.4	47.6	51.1	52.8	53.4	52.4	49.0	46.0	44.9
1915–16	42.0	36.5	34.7	35.5	37.6	41.8	43.6	42.4	42.3	42.4	41.2	40.2	39.3
1916–17	41.6	43.8	46.8	50.7	51.9	53.3	56.0	59.2	66.2	70.4	69.4	71.3	51.4
1917–18	67.7	62.0	62.0	64.2	70.2	76.3	82.4	87.6	87.4	82.0	77.2	74.6	72.1
1918–19	71.6	70.6	69.6	69.6	70.8	67.6	63.4	64.2	68.4	71.0	71.0	73.1	70.1
1919–20	73.5	70.0	68.6	69.6	74.3	80.4	83.6	87.6	94.5	100.6	103.7	93.2	80.3
1920–21	76.0	65.4	57.6	50.2	45.8	43.7	41.8	40.6	38.0	37.4	36.8	34.7	51.1
1921–22	32.0	30.6	30.1	29.7	30.6	31.9	34.7	36.6	37.2	38.2	37.8	36.2	33.4
1922–23	33.6	33.4	36.4	38.8	40.3	41.5	42.4	43.5	44.8	45.3	43.7	40.2	39.0
1923–24	37.6	38.0	39.4	40.8	42.6	43.4	45.4	46.2	46.5	46.3	46.8	49.4	42.6
1924–25	49.1	47.1	48.9	47.4	50.6	54.0	53.4	49.7	44.7	45.4	48.3	45.3	48.3
1925–26	40.7	38.1	37.2	37.6	39.1	40.0	39.2	38.8	39.4	39.5	38.9	37.7	39.0
1926–27	37.9	35.6	39.0	39.8	41.1	42.6	43.4	43.4	43.2	45.4	48.0	46.3	41.2
1927–28	44.4	43.9	44.6	45.1	48.1	49.3	51.3	54.5	56.9	62.0	61.4	56.2	48.9
1928–29	38.4	36.7	39.0	39.8	42.5	43.7	47.0	46.6	45.8	44.6	42.5	42.9	41.1
1929–30	42.7	44.1	44.8	43.1	43.6	43.1	43.0	41.4	42.4	40.9	39.3	33.1	41.9
1930–31	35.7	36.1	34.7	31.5	32.3								

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of oats for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, August, 1909–December, 1923.

TABLE 82.—*Oats, including oatmeal in terms of grain: International trade, average 1909–10 to 1913–14, annual 1926–27 to 1929–30*

Country	Year beginning July									
	Average 1909–10 1913–14		1926–27		1927–28		1928–29		1929–30*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Argentina	[1] 55	[1] 42, 569	102	39, 691	80	28, 831	-------	25, 690	-------	20, 181
Canada	84	15, 245	2, 051	13, 381	2, 770	10, 194	3, 452	19, 532	3, 980	4, 600
United States	5, 352	9, 655	99	15, 041	202	9, 823	398	16, 251	152	7, 966
Rumania	[2] [3] 72	[2] [3] 10,493	8	6, 638	1	2, 611	(2)	[2] 914	(2)	[2] 5, 733
Russia	[2] 1, 206	[2] 70, 466	0	3, 661	0	3, 251	0	48	0	-------
Algeria	[2] 79	[2] 4, 102	1, 560	102	498	1, 565	[2] 261	[2] 2, 997	-------	-------
Chile	[1] 2	[1] 2, 469	0	6, 087	0	4, 333	0	2, 761	0	1, 807
Czechoslovakia	(4)	(4)	323	3, 595	530	5, 862	300	4, 453	402	4, 424
Hungary	[2] 1, 420	[2] 12, 416	0	2, 381	1	1, 199	1	790	1	2, 492
Irish Free State	(4)	(4)	1, 824	2, 756	460	5, 740	1, 271	2, 404	1, 279	2, 141
Tunis	[2] 2	[2] 2, 875	92	1, 047	283	414	-------	[5] 2, 225	-------	[5] 2, 632
Yugoslavia [6]	(4)	(4)	0	666	25	493	71	325	48	28
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	68, 371	[1] 1, 591	24, 911	2, 024	31, 309	713	25, 862	1, 020	33, 838	958
Germany	37, 202	33, 575	19, 255	7, 923	16, 522	13, 311	9, 961	25, 833	3, 960	47, 940
Switzerland	[2] 12, 464	[2] 13	9, 895	4	9, 770	4	10, 741	5	13, 613	6
Belgium	8, 420	62	6, 576	120	6, 607	30	9, 357	15	8, 894	40
France	29, 846	122	3, 309	488	2, 490	1, 735	7, 292	396	5, 799	234
Italy	8, 158	65	7, 723	0	9, 064	1	5, 429	1	5, 119	2
Netherlands	[2] 38, 862	[2] 30, 771	6, 452	167	6, 938	260	6, 486	773	11, 902	576
Austria	[2] 2, 295	[2] 114	5, 819	12	5, 303	12	[5] 5, 767	[5] 0	[5] 8, 674	[5] 7
Sweden	[2] 6, 468	[2] 1, 899	1, 631	2, 429	2, 215	536	4, 172	720	3, 853	490
Finland	[1] 1, 150	[1] 356	1, 279	4	990	92	3, 504	13	2, 154	0
Poland	(4)	(4)	2, 870	1, 048	1, 619	659	1, 465	267	256	5, 667
Denmark	[2] 4, 720	[2] 152	1, 922	164	2, 155	123	2, 574	326	8, 783	63
Norway	[2] [7] 497	[2] [7] 27	582	6	683	5	336	9	556	10
Cuba	1, 291	0	1, 321	0	1, 051	0	987	0	-------	0
Estonia	(4)	(4)	378	0	651	0	1, 356	0	389	0
Latvia [2]	(4)	(4)	705	6	1, 223	3	2, 883	0	309	513
Japan [2]	5	42	144	0	6	0	76	0	100	0
Greece	-------	-------	423	0	200	0	107	0	660	0
Australia	[1] 898	[1] 270	260	205	670	111	144	69	-------	-------
Union of South Africa	[1] 366	[1] 434	195	124	141	134	120	143	107	169
Total, 32 countries	229, 285	239, 783	101, 709	109, 770	104, 557	92, 045	104, 373	107, 980	114, 828	108, 679

Bureau of Agricultural Economics. Official sources except where otherwise noted.

* Preliminary.
[1] Average of calendar years 1909–1913.
[2] Year beginning Aug. 1, International Yearbook of Agricultural Statistics.
[3] Average for the season 1911–12 to 1913–14.
[4] Figures for pre-war years are included in the countries of the pre-war boundaries
[5] Monthly Crop Report and Agricultural Statistics.
[6] Calendar years.
[7] Season 1913–14.

TABLE 83.—*Oats, No. 3, white: Weighted average price*[1] *per bushel of reported cash sales, Chicago, 1909–10 to 1930–31*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909–10	38	39	40	40	44	48	47	44	42	40	38	41	42
1910–11	35	34	32	32	32	33	31	31	32	34	39	44	33
1911–12	41	45	47	48	47	50	52	53	57	55	53	49	50
1912–13	33	33	33	32	33	33	33	32	35	38	40	40	35
1913–14	42	43	40	40	40	39	39	39	39	40	40	37	40
1914–15	42	48	46	48	49	53	58	57	57	54	49	53	50
1915–16	41	34	36	36	42	48	45	42	44	43	39	41	41
1916–17	44	46	49	55	53	57	56	61	69	70	67	78	54
1917–18	61	60	60	65	77	82	89	93	89	77	77	77	71
1918–19	70	72	69	72	72	65	58	63	70	69	70	78	70
1919–20	73	68	70	73	82	86	86	93	101	109	113	91	80
1920–21	70	62	54	51	48	44	42	42	36	39	37	34	51
1921–22	32	35	31	33	34	34	36	36	38	38	37	36	35
1922–23	32	38	42	43	44	43	44	45	46	45	43	40	41
1923–24	38	40	43	43	44	46	48	47	48	48	51	54	45
1924–25	50	48	50	50	58	58	53	48	42	45	49	44	50
1925–26	41	39	39	40	42	42	41	40	42	41	40	42	41
1926–27	38	38	44	42	46	46	43	44	45	50	49	45	43
1927–28	47	47	48	49	54	55	56	59	63	67	68	56	55
1928–29	38	41	42	44	46	50	50	48	48	45	45	47	44
1929–30	43	48	47	45	45	45	44	43	43	41	38	35	44
1930–31	39	38	36	33	34	------	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Compiled from the Chicago Daily Trade Bulletin. Data for 1899–1908 available in 1924 Yearbook, p. 628, Table 94.

[1] Average of daily prices weighted by car-lot sales.

TABLE 84.—*Oats futures: Volume of trading in all contract markets, by months, 1923–24 to 1929–30*

Month	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
August	78,451	265,778	169,684	148,762	166,614	85,693	143,327
September	76,040	195,273	137,079	86,525	104,350	55,100	108,076
October	69,642	328,396	66,433	63,858	72,173	39,779	79,450
November	48,946	203,683	124,236	124,892	103,611	49,393	107,301
December	55,389	401,342	177,528	172,894	154,783	43,201	65,415
January	70,340	355,167	50,344	62,809	64,496	63,951	39,769
February	49,940	347,417	64,995	77,753	52,222	45,065	49,223
March	73,808	346,446	95,198	101,533	109,956	67,430	44,922
April	55,254	259,466	159,022	110,471	148,947	67,707	61,591
May	41,644	154,104	59,546	178,657	138,320	58,084	43,052
June	89,379	297,519	139,909	157,532	62,384	44,009	51,288
July	163,634	112,697	121,796	91,192	72,907	152,134	52,581
Total	872,467	3,267,288	1,365,770	1,376,878	1,250,763	771,546	845,995

Grain Futures Administration.

TABLE 85.—*Oat futures: Volume of trading in contract markets, by markets and by months, 1929–30*

Month	Chicago Board of Trade	Chicago Open Board	Minneapolis	Milwaukee	Month	Chicago Board of Trade	Chicago Open Board	Minneapolis	Milwaukee
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*		*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
August	123,082	1,360	17,290	1,595	March	38,599	277	5,293	753
September	94,664	1,052	11,402	958	April	48,563	290	11,720	1,018
October	68,826	699	9,134	791	May	36,763	288	5,335	666
November	90,037	485	15,766	1,013	June	41,837	245	8,721	485
December	59,436	230	5,047	702	July	48,298	189	3,564	530
January	34,662	172	4,446	489					
February	43,642	219	4,588	774	Total	728,409	5,506	102,306	9,774

Grain Futures Administration.

TABLE 86.—*Barley: Acreage, production, value, exports, etc., United States, 1900–1930*

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel at Chicago, year beginning August[1]	Foreign trade, including barley, flour, and malt, year beginning July 1[2]			
							Domestic exports	Imports	Net exports[3]	
									Total	Percentage of production
	1,000 acres	*Bushels of 48 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*
1900	4,545	21.1	96,041	40.5	38,896	[4] 56	6,619	175	6,445	6.7
1901	4,742	25.7	121,784	45.2	55,068	64	9,079	60	9,019	7.4
1902	5,126	29.1	149,389	45.5	67,944	56	8,745	59	8,686	5.8
1903	5,568	26.4	146,864	45.4	66,700	56	11,280	94	11,187	7.6
1904	5,912	27.4	162,105	41.6	67,427	49	11,105	84	11,021	6.8
1905	6,250	27.2	170,089	39.4	66,959	50	18,431	20	18,410	10.8
1906	6,730	28.6	192,270	41.6	80,069	61	8,616	41	8,632	4.5
1907	6,941	24.5	170,008	66.3	112,675	84	4,554	202	4,370	2.6
1908	7,294	25.3	184,857	55.2	102,037	67	6,729	4	6,725	3.6
1909	*7,699*	*22.5*	*173,344*							
1909	7,699	24.4	187,973	54.8	102,947	67	4,454	5	4,449	2.4
1910	7,743	22.5	173,832	57.8	100,426	92	9,507	187	9,320	5.4
1911	7,627	21.0	160,240	86.9	139,182	122	1,655	2,772	[5] 1,117	.7
1912	7,530	29.7	223,824	50.5	112,957	68	17,874	15	17,859	8.0
1913	7,499	23.8	178,189	53.7	95,731	65	6,945	351	6,594	3.7
1914	7,565	25.8	194,953	54.3	105,903	72	28,712	103	28,609	14.7
1915	7,148	32.0	228,851	51.6	118,172	69	30,821	37	30,783	13.5
1916	7,757	23.5	182,309	88.1	160,646	191	20,319	462	19,857	10.9
1917	8,933	23.7	211,759	113.7	240,758	146	28,717	517	28,200	13.3
1918	9,740	26.3	256,225	91.7	234,942	104	29,324	24	29,301	11.4
1919	*6,473*	*18.9*	*122,025*							
1919	6,720	22.0	147,608	120.6	178,080	145	34,691	335	34,356	23.3
1920	7,600	24.9	189,332	71.3	135,083	78	27,255	20	27,234	14.4
1921	7,414	20.9	154,946	41.9	64,934	61	27,546	8	27,538	17.8
1922	7,317	24.9	182,068	52.5	95,560	65	21,909	38	21,871	12.0
1923	7,835	25.2	197,691	54.1	107,038	72	13,913	55	13,858	7.0
1924	*6,767*	*23.5*	*159,139*							
1924	6,925	26.2	181,575	74.1	134,590	90	28,543	48	28,495	15.7
1925	7,997	26.7	213,863	58.8	125,709	72	30,448	53	30,395	14.2
1926	7,970	23.2	184,905	57.5	106,237	77	19,655	49	19,605	10.6
1927	9,476	28.1	265,882	67.8	180,200	91	39,274	45	39,230	14.8
1928	12,598	28.4	357,487	55.2	197,459	60	60,295	45	60,249	16.9
1929	13,068	23.2	302,892	55.0	166,613	62	24,054	41	24,013	7.9
1930 [6]	12,437	26.2	325,803	39.6	129,137					

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, p. 799, for data for earlier years.

[1] From Bureau of Labor Statistics as follows: Bulletin No. 39, 1900–1901. August, 1900–December, 1901, choice to fancy malting, by samples. Wholesale price bulletins—monthly quotations, January, 1902–December, 1913, choice to fancy malting; January, 1914–September, 1927, fair to good malting. Beginning October, 1927, grade reported as feeding, but as quality remained unchanged, no change was made in comparative prices.

[2] Compiled from Commerce and Navigation of the United States 1900–1917: Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues; 1919–1926; January and June issues, 1927–1930, and official records of the Bureau of Foreign and Domestic Commerce. Malt converted to terms of barley on the basis that 1.1 bushels of malt is the product of 1 bushel of barley. Barley flour converted on the basis that 1 barrel of flour is the product of 9 bushels of barley. Exports of flour not reported prior to 1919. Barley—general imports, 1900–1909; imports for consumption, 1910–1930. Malt—general imports, 1909–1914; imports for consumption, 1915–1929. Imports of flour not reported prior to 1915; imports for consumption, 1915–1930.

[3] Total exports (domestic exports plus reexports) minus total imports.

[4] Average for 11 months.

[5] Net imports. Total imports minus total exports (domestic plus foreign).

[6] Preliminary.

TABLE 87.—*Barley: Acreage harvested and production, by States, average 1924–1928, annual 1927–1930*

State and division	Acreage harvested					Production				
	Average, 1924–1928	1927	1928	1929	1930 [1]	Average, 1924–1928	1927	1928	1929	1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
Maine	4	4	4	4	3	105	108	112	124	102
Vermont	6	6	6	5	5	170	174	150	150	150
New York	166	188	169	155	144	4,770	5,452	4,648	3,426	4,608
New Jersey	1	2	2	1	1	45	74	60	22	33
Pennsylvania	19	21	29	36	47	506	588	783	882	1,386
North Atlantic	195	221	210	201	200	5,596	6,396	5,753	4,604	6,279
Ohio	154	155	333	103	122	4,408	4,185	9,191	2,420	3,355
Indiana	38	35	78	36	38	884	833	1,794	792	950
Illinois	382	453	680	456	337	11,647	13,364	20,060	12,084	10,110
Michigan	167	186	270	243	245	4,744	5,301	8,100	5,589	7,350
Wisconsin	544	620	725	703	703	19,148	21,390	26,898	22,848	26,011
Minnesota	1,356	1,460	2,000	2,200	1,980	39,739	43,800	60,000	59,400	55,836
Iowa	367	454	802	592	527	11,718	14,256	26,466	17,168	16,337
Missouri	8	7	13	14	15	190	161	286	238	322
North Dakota	1,703	1,663	2,179	2,462	2,290	39,232	42,406	55,564	34,960	40,075
South Dakota	1,073	1,200	1,680	2,016	1,935	25,087	36,000	36,456	37,296	42,570
Nebraska	277	246	430	647	725	7,646	7,577	14,018	18,892	22,330
Kansas	436	452	633	608	545	7,969	5,695	17,661	12,464	12,480
North Central	6,503	6,931	9,823	10,080	9,462	172,411	194,968	276,494	224,151	237,726
Maryland	11	9	13	13	15	363	274	416	416	525
Virginia	14	13	14	18	24	400	338	406	504	600
North Carolina	17	20	32	40	43	399	480	736	960	924
South Atlantic	42	42	59	71	82	1,162	1,092	1,558	1,880	2,049
Kentucky	5	6	2	7	9	144	162	50	206	216
Tennessee	29	42	21	24	29	664	798	420	480	609
Oklahoma	107	36	54	57	57	2,265	594	1,188	1,425	1,254
Texas	161	195	156	203	193	3,494	3,120	3,276	5,075	3,570
South Central	303	279	233	291	288	6,567	4,674	4,934	7,186	5,649
Montana	158	195	209	251	226	4,348	6,435	6,374	4,016	3,729
Idaho	125	129	144	147	165	5,025	5,676	6,192	5,733	6,930
Wyoming	51	59	95	124	136	1,580	2,006	2,660	2,976	3,332
Colorado	415	410	547	651	612	8,676	9,020	13,128	13,671	15,606
New Mexico	8	8	12	13	15	151	144	228	325	360
Arizona	20	20	17	18	19	704	700	646	630	684
Utah	23	30	34	39	41	1,010	1,410	1,666	1,560	1,763
Nevada	8	9	11	11	12	338	405	385	363	480
Washington	68	58	55	63	63	2,248	2,436	1,952	2,142	2,142
Oregon	88	91	105	116	104	2,751	3,185	3,675	4,292	3,744
California	987	994	1,044	992	1,012	28,176	27,335	31,842	29,363	35,420
Western	1,950	2,003	2,273	2,425	2,405	55,007	58,752	68,748	65,071	74,190
United States	8,993	9,476	12,598	13,068	12,437	240,742	265,882	357,487	302,892	325,893

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 88.—*Barley: Yield per acre, average 1919–1928 and annual 1925–1930, and estimated price per bushel, December 1, average 1924–1928 and annual 1925–1930, by States*

State and division	Yield per acre							Estimated price per bushel Dec. 1						
	Average, 1919–1928	1925	1926	1927	1928	1929	1930	Average, 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	28.4	35.0	30.0	27.0	28.0	31.0	34.0	97	80	92	94	110	100	81
Vermont	28.3	32.0	30.0	29.0	25.0	30.0	30.0	95	83	85	95	110	90	85
New York	26.9	29.0	28.3	29.0	27.5	22.1	32.0	80	77	75	80	78	84	62
New Jersey	[1] 31.2	27.0	33.0	37.0	30.0	22.0	33.0	87	88	85	83	86	85	65
Pennsylvania	25.2	25.5	27.0	28.0	27.0	24.5	29.5	85	86	80	83	84	90	70
North Atlantic	26.9	28.9	28.3	28.9	27.4	22.9	31.4	81.4	78.0	76.1	81.0	80.4	85.8	64.6
Ohio	26.9	31.0	32.0	27.0	27.6	23.5	27.5	70	70	62	72	60	61	50
Indiana	23.0	23.0	25.0	23.8	23.0	22.0	25.0	69	71	66	73	59	62	50
Illinois	29.7	33.0	31.0	29.5	29.5	26.5	30.0	64	63	58	73	53	56	48
Michigan	25.1	24.5	28.5	28.5	30.0	23.0	30.0	73	72	65	76	70	69	55
Wisconsin	31.6	36.8	34.5	34.5	37.1	32.5	37.0	70	66	65	75	65	65	51
Minnesota	26.4	30.0	25.0	30.0	30.0	27.0	28.2	57	52	51	65	50	48	35
Iowa	29.1	31.3	30.5	31.4	33.0	29.0	31.0	61	57	56	66	54	52	41
Missouri	25.5	31.0	24.0	23.0	22.0	17.0	21.5	86	95	80	95	80	80	60
North Dakota	20.2	22.5	14.3	25.5	25.5	14.2	17.5	51	43	46	59	43	42	26
South Dakota	22.4	26.0	10.1	30.0	21.7	18.5	22.0	54	47	52	58	48	45	29
Nebraska	25.9	24.3	20.7	30.8	32.6	29.2	30.8	56	54	58	55	51	50	35
Kansas	19.6	16.0	11.4	12.6	27.9	20.5	22.9	58	58	61	55	50	50	37
North Central	23.6	26.4	20.9	28.1	28.1	22.2	25.1	58.0	52.6	54.8	63.9	51.4	50.1	36.2
Maryland	32.0	33.0	34.3	30.5	32.0	32.0	35.0	86	87	80	87	85	82	75
Virginia	26.8	26.0	31.0	26.0	29.0	28.0	25.0	93	97	90	87	85	96	87
North Carolina	[1] 23.8	23.0	26.0	24.0	23.0	24.0	21.5	112	120	100	110	120	128	106
South Atlantic	27.6	27.4	29.9	26.0	26.4	26.5	25.0	97.7	98.4	90.4	97.1	101.5	109.3	92.5
Kentucky	26.7	26.0	33.0	27.0	25.0	29.5	24.0	93	95	86	91	91	99	83
Tennessee	22.2	23.0	30.0	19.0	20.0	20.0	21.0	105	110	96	100	110	102	98
Oklahoma	21.8	14.0	27.0	16.5	22.0	25.0	22.0	67	75	58	65	65	63	51
Texas	22.9	7.2	35.0	16.0	21.0	25.0	18.5	72	90	53	70	73	62	55
South Central	22.5	12.1	31.7	16.8	21.2	24.7	19.6	73.9	85.2	60.1	75.2	74.4	65.9	59.8
Montana	22.8	21.0	24.0	33.0	30.5	16.0	16.5	64	72	64	60	56	68	41
Idaho	36.9	44.0	37.0	44.0	43.0	39.0	42.0	66	56	60	68	63	66	41
Wyoming	29.5	33.0	33.0	34.0	28.0	24.0	24.5	63	61	62	61	61	64	44
Colorado	21.6	21.0	16.0	22.0	24.0	21.0	25.5	59	58	55	56	54	54	40
New Mexico	20.0	17.0	26.0	18.0	19.0	25.0	24.0	71	85	65	70	75	81	62
Arizona	34.2	35.0	35.0	35.0	38.0	35.0	36.0	86	100	85	75	80	85	65
Utah	36.9	43.0	40.0	47.0	49.0	40.0	43.0	79	85	72	76	73	78	52
Nevada	35.0	48.0	40.0	45.0	35.0	33.0	40.0	87	82	85	80	80	85	65
Washington	34.0	34.0	34.0	42.0	35.5	34.0	34.0	73	68	65	77	70	78	47
Oregon	30.2	33.0	28.0	35.0	35.0	37.0	36.0	77	73	65	77	72	77	50
California	27.7	31.0	30.0	27.5	30.5	29.6	35.0	83	75	58	93	72	70	48
Western	27.5	29.5	27.5	29.3	30.2	26.8	30.8	74.1	70.3	59.7	77.9	65.9	67.1	45.6
United States	25.0	26.7	23.2	28.1	28.4	23.2	26.2	62.7	58.8	57.5	67.8	55.2	55.0	39.6

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 5-year average.

TABLE 89.—*Barley: Acreage, yield per acre, and production in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1928–29 to 1930–31*

Country	Acreage: Average, 1909–10 to 1913–14[1]	Acreage: Average, 1921–22 to 1925–26	Acreage: 1928–29	Acreage: 1929–30	Acreage: 1930–31*	Yield per acre: Average, 1909–10 to 1913–14[1]	Yield per acre: Average, 1921–22 to 1925–26	Yield per acre: 1928–29	Yield per acre: 1929–30	Yield per acre: 1930–31*	Production: Average, 1909–10 to 1913–14[1]	Production: Average, 1921–22 to 1925–26	Production: 1928–29	Production: 1929–30	Production: 1930–31*
NORTHERN HEMISPHERE	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
North America:															
Canada	1,574	3,022	4,881	5,926	5,559	28.8	25.4	27.9	17.3	24.8	45,275	76,899	136,391	102,313	137,963
United States	7,620	7,498	12,598	13,068	12,437	24.3	24.8	28.4	23.2	26.2	184,812	186,029	357,487	302,892	325,893
Total	9,194	10,520	17,479	18,994	17,996	25.0	25.0	28.3	21.3	25.8	230,087	262,928	493,878	405,205	463,856
Europe:															
England and Wales	1,488	1,352	1,185	1,120	1,020	34.0	34.2	40.1	41.6	33.7	50,658	46,274	47,546	46,552	34,382
Scotland	191	158	112	101	107	37.6	38.6	42.9	46.7	41.4	7,173	6,092	4,807	4,713	4,433
Irish Free State	162	156	129	118	114	45.5	38.7	47.6	50.5	-------	7,366	6,033	6,146	5,960	-------
Norway	89	137	149	132	132	32.2	32.0	34.4	34.3	38.2	2,867	4,383	5,133	4,533	5,039
Sweden	448	409	272	307	325	33.6	31.6	35.8	37.4	30.7	15,035	12,921	9,743	11,485	9,967
Denmark	639	695	877	909	937	42.0	46.4	57.6	56.2	53.1	26,860	32,246	50,541	51,093	49,741
Netherlands	68	63	70	78	77	48.1	52.4	64.2	64.2	45.2	3,270	3,302	4,494	5,010	3,477
Belgium	88	84	77	63	74	50.5	49.1	56.7	45.0	44.5	4,446	4,127	4,364	2,834	3,291
France	1,987	1,713	1,756	1,853	1,835	26.6	25.6	29.0	31.9	24.7	52,826	43,892	50,856	59,023	45,335
Spain	3,510	4,343	4,506	4,489	4,390	21.3	21.2	18.4	21.7	22.9	74,689	92,268	82,852	97,339	100,563
Portugal	(170)	182	190	186	186	-------	11.3	7.5	10.5	14.3	(1,200)	2,053	1,430	1,958	2,651
Italy	647	576	560	579	582	16.4	17.9	19.7	20.8	19.2	10,638	10,283	11,024	12,071	11,165
Germany	3,464	3,198	3,753	3,835	3,753	38.6	31.3	41.0	38.1	32.8	133,787	100,182	153,721	146,089	122,939
Austria	421	320	386	391	414	23.9	22.1	33.6	31.6	27.3	10,065	7,072	12,951	12,374	11,312
Czechoslovakia	2,275	1,670	1,820	1,836	1,830	31.3	30.0	36.3	34.9	30.9	71,108	50,119	66,020	64,072	56,475
Hungary	1,322	1,096	1,020	1,178	1,129	24.5	20.3	30.1	26.6	21.8	32,369	22,198	30,671	31,352	24,618
Yugoslavia	1,058	902	974	1,108	1,129	19.1	15.6	18.6	17.1	17.0	20,229	14,027	18,105	18,917	19,231
Greece	[2] 369	383	499	535	-------	[2] 18.8	14.8	14.5	8.8	-------	[2] 6,953	5,676	7,246	4,724	-------
Bulgaria	516	539	605	542	673	20.1	17.2	25.8	17.3	33.0	10,380	9,266	15,621	9,380	22,184
Rumania	[3] 3,378	4,315	4,322	5,074	4,881	[3] 18.3	12.8	16.1	24.8	21.1	[3] 61,677	55,295	69,401	125,867	103,094
Poland	3,127	2,547	2,857	3,110	3,110	21.9	19.6	24.6	24.5	21.0	68,388	49,850	70,143	76,233	65,219
Lithuania	536	451	418	529	529	16.5	20.5	16.5	23.2	19.6	8,820	9,234	6,910	12,286	10,380
Latvia	463	414	362	451	437	17.1	16.9	9.0	21.2	18.6	7,922	6,979	3,275	9,548	8,143
Estonia	329	307	263	281	276	18.8	17.8	16.0	20.2	20.7	6,201	5,464	4,211	5,687	5,710
Finland	278	273	272	272	272	17.8	21.2	21.2	23.1	22.9	4,947	5,782	5,767	6,279	6,223
Russia, European and Asiatic	26,193	14,793	18,135	19,908	-------	16.0	12.7	14.1	16.3	-------	418,030	187,970	256,198	324,793	-------
Total Europe reporting area and production all years	26,492	25,744	26,806	28,424	28,098	25.9	23.0	27.2	28.7	25.8	685,555	593,309	729,586	814,695	725,572
Estimated European total excluding Russia	27,000	26,300	27,500	29,100	29,300	-------	-------	-------	-------	-------	[4] 701,000	606,000	744,000	827,000	737,000

Africa:															
Morocco	(3,000)	2,862	2,904	3,240	2,975		14.1	18.6	14.6	9.0	(38,000)	40,304	54,126	47,316	26,835
Algeria	3,395	3,017	3,411	3,482	3,543	13.5	10.2	11.6	11.5	10.6	45,974	30,779	39,716	40,081	37,663
Tunis	1,228	1,033	1,459	1,248	988	6.4	6.6	8.7	9.2	5.6	7,826	6,843	12,631	11,482	5,512
Egypt	398	381	366	401		29.8	30.0	29.5	31.6		11,867	11,427	10,798	12,669	10,610
Estimated African total	8,700	8,100	8,600	8,900	8,400						111,000	101,000	123,000	119,000	88,000
Asia:															
India	8,877	7,501	7,897	8,532		16.4	17.8	12.4	13.8		145,496	133,793	97,720	117,599	
Syria and Lebanon	(450)	[3] 682	892	750	840		10.7	15.4	31.8	25.6	(5,000)	7,300	13,705	23,865	21,464
Japan	3,042	2,630	2,242	2,195	2,110	31.5	31.4	36.3	36.6	34.3	95,784	82,490	81,477	80,374	72,472
Chosen	1,623	2,139	2,209	2,295	2,402	19.9	17.1	15.5	16.4	16.6	32,243	36,607	34,157	37,612	39,847
Total Northern Hemisphere countries reporting area and production all years	48,424	48,627	57,402	60,628	58,952	23.6	21.8	25.4	24.1	23.6	1,140,469	1,060,560	1,459,276	1,460,630	1,393,221
Estimated Northern Hemisphere total excluding Russia and China	64,300	62,900	70,000	73,900	72,300						1,407,000	1,316,000	1,664,000	1,700,000	1,622,000
SOUTHERN HEMISPHERE															
Chile	111	162	194	195	182	36.8	33.0	31.5	36.3		4,090	5,347	6,116	7,071	
Argentina	230	504	911	802	920	[3] 19.1	19.7	18.5	20.1	21.6	[3] 4,395	9,924	16,814	16,131	19,841
Union of South Africa [5]	[2] 109	99	74	91	70	[2] 11.7	11.8	18.6	23.0	16.6	[2] 1,274	1,172	1,376	2,097	1,161
Australia	154	307	355			19.6	19.7	19.4			3,021	6,048	6,893		
Estimated Southern Hemisphere total	800	1,400	2,100	2,100	2,100						17,000	31,000	39,000	47,000	
Total Northern and Southern Hemisphere countries reporting area and production all years	48,763	49,230	58,387	61,521	59,942	23.5	21.8	25.3	24.0	23.6	1,146,138	1,071,656	1,477,466	1,478,858	1,414,223
Estimated world total excluding Russia and China	65,100	64,300	72,100	76,000	74,400						[4] 1,424,000	1,347,000	1,703,000	1,747,000	

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Figures in parentheses indicate unofficial estimates. Acreage and production figures are for the harvesting season which begins in the spring, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

* Preliminary.
[1] Where changes in boundary have occurred, averages are estimated for territory within present boundaries.
[2] 1 year only.
[3] 4-year average.
[4] The estimate for the 5-year period, 1909–10 to 1913–14, given in this table is somewhat larger than the figure obtained by averaging the same 5 years in Table 90. This is because in this table estimates for warring countries are for post-war boundaries, whereas in Table 90 they are for pre-war territory. As a result, in excluding Russia, which lost territory during the war, a smaller area is excluded in this table than in Table 90.
[5] Excludes native locations which produced 38,550 bushels in 1917–18 and 29,056 bushels in 1920–21.

TABLE 90.—*Barley: World production, 1894–95 to 1930–31*

Crop year	Estimated world production excluding Russia	Estimated European production excluding Russia	Selected countries							
			United States	Russia [1]	Germany	Japan	Canada	India	Spain	Rumania
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000 000 bushels*	*1,000,000 bushels*
1894–95	935	544	78	197	131	81	------	------	57	17
1895–96	1,008	527	115	226	128	80	------	------	47	22
1896–97	973	528	99	254	125	71	------	------	36	32
1897–98	907	481	103	239	118	73	------	------	46	21
1898–99	1,040	564	100	307	130	83	------	------	73	30
1899–1900	1,017	533	117	227	137	77	------	------	54	5
1900–01	1,269	522	96	237	138	82	------	------	57	15
1901–02	1,085	570	122	240	153	83	------	------	80	24
1902–03	1,127	592	149	338	142	74	------	------	81	25
1903–04	1,099	589	147	357	153	60	------	------	64	30
1904–05	1,068	512	162	346	135	81	------	------	54	12
1905–06	1,067	532	170	347	134	77	------	------	46	26
1906–07	1,226	610	192	331	143	84	------	------	90	34
1907–08	1,161	569	170	377	161	90	------	------	54	20
1908–09	1,132	536	185	402	141	87	47	------	70	13
1909–10	1,338	621	188	502	161	87	55	------	79	20
1910–11	1,242	560	174	488	133	82	29	------	76	29
1911–12	1,326	606	160	437	145	86	44	------	87	26
1912–13	1,345	589	224	496	160	91	49	------	60	21
1913–14	1,400	637	178	600	169	101	48	------	69	27
1914–15	1,213	546	195	[2] 433	144	86	36	125	72	26
1915–16	1,244	477	229	[3] 429	114	95	54	143	84	29
1916–17	1,201	507	182	[4] 305	128	89	43	148	87	30
1917–18	1,170	427	212	325	[5] 90	89	55	156	78	------
1918–19	1,277	424	256	------	94	89	77	156	90	[5] 5
1919–20	1,120	483	148	------	88	95	56	130	82	32
1920–21	1,252	555	189	216	82	92	63	150	90	68
1921–22	1,240	555	155	118	89	88	60	117	89	44
1922–23	1,306	588	182	176	74	87	72	146	78	94
1923–24	1,416	649	198	196	108	71	77	145	112	61
1924–25	1,311	566	182	181	110	[6] 75	89	137	84	31
1925–26	1,461	672	214	269	119	91	87	123	99	47
1926–27	1,448	674	185	246	113	88	100	121	96	77
1927–28	1,483	659	266	203	126	82	97	119	92	58
1928–29	1,703	744	357	256	154	81	136	98	83	69
1929–30	1,747	827	303	325	146	80	102	118	97	126
1930–31 [7]	------	737	326	------	123	72	138	------	101	103

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Production figures are for the harvesting season which begins in the spring, extends through the autumn in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

[1] Includes all Russian territory reporting for the years shown.
[2] Total Russian Empire exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.
[3] Exclusive of Russian Poland, Lithuania, parts of present Latvia and the Ukraine, and two Provinces of Transcaucasia.
[4] Beginning this year estimates within present boundaries of the Union of Socialist Soviet Republics excluding Turkestan, Transcaucasia, and the Far East, which regions in 1924–25 produced 20,897,000 bushels.
[5] Postwar boundaries beginning this year and therefore not comparable with earlier years.
[6] Beginning this year weighed bushels, those reported for the earlier years being measured bushels.
[7] Preliminary.

TABLE 91.—*Barley: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–1929*

Crop year	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917–18	2.2	15.0	23.4	16.5	8.5	8.6	6.5	7.5	6.1	2.9	1.8	1.0	100.0
1918–19	1.9	9.8	13.6	10.5	7.9	7.8	8.1	5.4	7.2	9.0	11.6	7.2	100.0
1919–20	18.5	19.2	14.3	9.9	6.4	7.5	5.4	3.1	3.7	3.4	3.0	5.6	100.0
1920–21	7.0	16.5	15.0	9.9	9.9	7.2	6.7	5.5	6.5	4.2	5.7	5.9	100.0
1921–22	35.0	14.0	10.5	7.8	4.4	4.2	3.9	4.3	4.2	3.0	4.4	4.3	100.0
1922–23	17.4	22.9	14.6	10.8	5.2	6.0	4.8	3.2	3.5	1.9	2.7	7.0	100.0
1923–24	10.3	23.7	15.1	9.9	7.8	6.5	4.1	3.5	3.1	2.6	2.3	11.1	100.0
1924–25	9.0	16.8	21.4	17.0	8.1	5.7	5.1	3.8	3.3	2.4	2.7	4.7	100.0
1925–26	16.4	19.1	18.4	11.7	6.6	5.1	4.0	3.4	3.1	2.0	3.3	6.9	100.0
1926–27	17.4	16.5	11.6	7.4	6.2	4.8	5.1	3.2	3.9	3.6	4.1	16.2	100.0
1927–28	9.1	17.4	18.7	12.2	8.0	5.7	4.7	4.5	4.5	2.1	2.7	10.4	100.0
1928–29	12.6	21.4	18.3	11.8	6.7	6.0	3.5	3.9	3.2	2.7	2.5	7.4	100.0
1929–30	16.4	24.7	14.0	8.9	5.6	5.1	3.3	3.2	3.1	2.6	3.2	9.9	100.0

Bureau of Agricultural Economics.

TABLE 92.—*Barley: Commercial stocks in store, 1926–27 to 1929–30*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
	DOMESTIC BARLEY IN UNITED STATES [1]											
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27						7,097	6,664	6,116	5,339	3,675	3,046	2,720
1927–28	3,108	5,041	6,549	5,957	5,769	4,825	4,423	4,273	4,588	3,890	2,410	2,801
1928–29	3,395	9,318	10,681	11,067	11,744	10,926	11,985	11,399	9,998	8,412	7,373	6,861
1929–30	8,798	12,894	12,563	12,721	11,760	12,074	10,961	10,415	9,726	8,137	6,843	6,366
1930–31	6,746	10,945	15,856	15,018	14,637							
	UNITED STATES BARLEY IN CANADA											
1926–27						272	300	64	70	59	0	13
1927–28	5	66	665	344	152	40	42	9	25	9	1	20
1928–29	0	767	4,171	5,599	2,319	1,144	312	173	170	81	92	659
1929–30	279	246	1,266	1,749	955	972	937	938	936	993	963	937
1930–31	797	652	580	444	371							
	CANADIAN BARLEY IN UNITED STATES [2]											
1926–27						2,942	2,246	1,677	608	2,401	1,573	175
1927–28	19	27	27	717	1,768	1,945	1,499	1,191	557	112	483	278
1928–29	300	249	1,751	2,959	4,778	6,210	4,731	3,232	2,259	2,523	3,315	2,110
1929–30	2,277	1,711	1,654	1,999	2,637	3,086	3,006	2,928	2,781	2,715	2,376	2,376
1930–31	1,839	1,300	725	832	1,561							

Bureau of Agricultural Economics. Compiled from weekly reports to the grain, hay, and feed market news service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes barley in store in public and private elevators in 39 important markets and also barley afloat in vessels or barges in harbors of lake and seaboard ports. Barley in transit either by rail or water, mill stocks, or small private stocks of barley intended only for local purposes, not included.

[2] Includes barley stored at lake and seaboard ports, exclusive of barley in transit on lakes and canals.

TABLE 93.—*Barley: Farm stocks, growing conditions, and shipments, United States, 1910–1930*

Year beginning August	Stocks of old barley on farms Aug. 1 [1]	Condition of new crop				Weight per measured bushel of new barley [2]	Stocks of barley on farms on Mar. 1 [1]	Shipped out of county where grown [1]
		June 1	July 1	Aug. 1	Sept. 1			
	1,000 bushels	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Pounds*	*1,000 bushels*	*1,000 bushels*
1910–11	8,075	89.6	73.7	70.0	69.8	46.9	33,498	86,955
1911–12	5,763	90.2	72.1	66.2	65.5	46.0	24,754	91,620
1912–13	2,591	41.1	88.3	89.1	88.9	46.8	62,301	120,143
1913–14	11,252	87.1	76.6	74.9	73.4	46.5	44,126	86,262
1914–15	7,609	95.5	92.6	85.3	82.4	46.2	42,889	87,834
1915–16	6,336	94.6	94.1	93.8	94.2	47.4	58,301	98,965
1916–17	10,982	86.3	87.9	80.0	74.6	45.2	33,244	79,257
1917–18	3,775	89.3	85.4	77.9	76.3	46.6	44,419	84,056
1918–19	4,510	90.5	84.7	82.0	81.5	46.9	81,746	99,987
1919–20	11,897	91.7	87.4	73.6	69.2	45.2	33,820	50,471
1920–21	4,122	87.6	87.6	84.9	82.5	46.0	65,229	68,663
1921–22	13,487	87.1	81.4	71.4	68.4	44.4	42,294	55,738
1922–23	7,497	90.1	82.6	82.0	81.2	46.2	42,469	66,560
1923–24	6,805	89.0	86.1	82.6	79.5	45.3	44,930	68,190
1924–25	6,359	79.5	80.2	80.7	82.5	47.0	40,576	68,071
1925–26	5,728	83.1	81.2	79.5	80.3	45.9	52,253	80,547
1926–27	9,622	81.0	73.3	69.8	68.7	45.9	39,183	55,983
1927–28	3,754	81.5	84.2	83.3	82.9	46.8	61,972	87,975
1928–29	7,751	82.7	81.3	86.5	84.4	46.6	97,167	118,355
1929–30	17,071	83.7	76.7	70.1	68.8	45.9	72,160	81,134
1930–31 [3]	12,527	86.4	84.3	75.7	74.7	46.3	----------	----------

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Based on percentages of entire crop as reported by crop reporters.
[2] Average weight per measured bushel as reported by crop reporters.
[3] Preliminary.

TABLE 94.—*Barley: Receipts at specified markets, 1921–22 to 1929–30*

Year beginning August	Minneapolis	Duluth	Chicago	Milwaukee	Omaha	Total 5 markets	Fort William and Port Arthur [1]
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1921–22	11,926	5,179	7,573	9,330	1,152	35,160	11,597
1922–23	14,244	3,844	10,103	8,922	801	37,914	15,756
1923–24	15,396	3,654	9,755	9,077	948	38,830	15,910
1924–25	23,158	14,501	11,336	13,127	796	62,918	28,045
1925–26	23,245	13,244	9,540	10,673	729	57,431	36,662
1926–27	12,086	6,667	8,386	8,440	594	36,173	35,784
1927–28	22,982	22,630	11,320	11,061	1,768	69,761	23,652
1928–29	27,174	32,764	16,680	13,554	2,259	92,431	45,498
1929–30 [2]	18,317	11,092	6,601	13,121	1,559	50,690	18,761

Bureau of Agricultural Economics. Compiled from reports of Minneapolis Chamber of Commerce, Duluth Board of Trade, Chicago Board of Trade, Milwaukee Chamber of Commerce, Omaha Grain Exchange, American Elevator and Grain Trade, and Canadian Grain Statistics.

[1] Crop year begins September. [2] Subject to revision.

TABLE 95.—*Barley, excluding flour and malt: International trade, averages 1909–10 to 1913–14, annual 1926–27 to 1929–30*

Country	Year beginning July									
	Average 1909–10 to 1913–14		1926–27		1927–28		1928–29		1929–30*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	66	5, 210	29	42, 533	3	25, 131	8	38, 668	17	6, 396
Rumania [1]	[2] 63	[2] 16, 804	0	32, 971	0	24, 773	0	19, 358	------	------
United States	0	7, 896	0	17, 044	0	36, 580	0	56, 996	0	21, 544
Russia	[1] 124	[1] 173,240	0	20, 464	------	1, 414	------	------	------	------
Argentina	[3] 3	[3] 764	------	14, 217	------	11, 598	------	8, 591	------	5, 990
British India	[1,4] 23	[1] 10, 640	------	408	------	8, 289	------	1, 402	------	46
Czechoslovakia	([5])	([5])	9	5, 070	64	7, 367	14	3, 643	31	5, 293
Poland	([5])	([5])	111	4, 678	138	3, 084	102	7, 989	6	12, 476
Chile	[3] 88	[3] 1, 062	0	5, 516	0	2, 478	0	2, 137	0	1, 848
Algeria	[1] 213	[1] 5, 482	2, 736	388	166	6, 671	[1] 193	[1] 6, 035	------	------
Tunis	[1] 328	[1] 3, 055	------	3, 747	1, 309	1, 016	[6] 46	[6] 7, 050	[6] 83	[6] 6, 783
Australia	[3] 159	[3] 51	1	2, 106	0	1, 304	0	1, 332	[6] 0	[6] 675
Hungary	[1] 229	[1] 11, 836	3	2, 323	5	2, 221	2	1, 280	2	4, 969
Bulgaria	0	[1] 1, 876	0	1, 025	0	3, 488	[6] 14	1, 969	[6] 0	[6] 652
Sweden	[1] 28	[1] 102	5	1, 878	40	16	3	24	------	92
Yugoslavia [7]	([5])	([5])	------	1, 284	375	1, 095	484	256	375	491
Egypt	[1] 732	[1,8] 42	665	25	11	674	1	717	75	138
PRINCIPAL IMPORTING COUNTRIES										
Germany	148, 297	136	97, 886	75	85, 765	199	78, 441	409	102, 480	2, 000
United Kingdom	48, 550	------	29, 708	------	34, 033	------	31, 418	------	29, 779	------
Netherlands	[1] 38, 039	[1] 26, 975	13, 605	590	10, 177	711	17, 045	1, 159	16, 572	1, 066
Belgium	18, 351	3, 079	11, 618	205	11, 856	333	14, 592	192	16, 506	310
Denmark	[1] 2, 994	[1] 2, 906	3, 109	2, 635	2, 294	3, 291	1, 630	2, 884	7, 522	2, 738
Austria	[1] 716	[1] 8, 123	2, 962	159	2, 849	315	2, 432	38	[6] 3, 410	[6] 18
Switzerland	[1] 1, 140	[1] 1	2, 534	0	2, 841	0	4, 252	0	3, 802	0
France	6, 711	787	1, 708	263	1, 538	3, 108	5, 483	452	3, 230	693
Norway	[1] 4, 550	0	1, 227	0	1, 314	0	1, 102	0	1, 568	0
Greece	------	------	1, 028	0	145	0	603	0	874	0
Irish Free State	([5])	([5])	418	996	480	612	849	435	1, 067	53
Spain	640	117	1	[1] 1, 089	[1] 1	[1] 490	[1,9] 320	[1] 411	[1] 16	[1] 338
Cuba	255	0	328	0	171	0	3	0	------	0
Italy	824	20	326	1	273	16	128	17	193	3
Estonia	([5])	([5])	81	0	195	0	516	0	154	0
Total 32 countries	273, 123	280, 204	170, 096	161, 690	156, 043	146, 274	159, 681	163, 444	187, 792	74, 612

Bureau of Agricultural Economics. Official sources except where otherwise stated.

* Preliminary.
[1] Year beginning Aug. 1, International Yearbook of Agricultural Statistics.
[2] Average for season 1911–12 to 1913–14.
[3] Average for calendar year 1909–1913.
[4] Average for season 1909–10 to 1911–12.
[5] Figures for pre-war years are included in the countries of the pre-war boundaries.
[6] Monthly Crop Report and Agricultural Statistics.
[7] Calendar year.
[8] Average for season 1912–13 to 1913–14.
[9] Includes rye and oats.

TABLE 96.—*Barley: Classification of receipts graded by licensed inspectors, all inspection points, 1926–1929*

TOTAL OF ALL CLASSES AND SUBCLASSES UNDER EACH GRADE

Year beginning July	Grade											
	Choice No. 1	No. 1	Choice No. 2	Special No. 2	No. 2	Choice No. 3	No. 3	No. 4	No. 5	No. 1 feed	Sample	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1926 [1]	251	481	107	2, 168	2, 005	421	4, 929	4, 026	266	916	15, 063	30, 633
1927	262	2, 199	90	14, 913	12, 151	274	16, 299	6, 197	183	2, 875	10, 923	66, 366
1928	329	966	100	13, 128	20, 900	392	25, 264	20, 129	135	6, 502	11, 021	98, 866
1929	223	700	50	9, 966	5, 800	315	13, 907	7, 269	102	3, 602	5, 124	47, 058

TOTAL INSPECTIONS, BY GRADE AND CLASS, JULY 1, 1929, TO JUNE 30, 1930

	Choice No. 1	No. 1	Choice No. 2	Special No. 2	No. 2	Choice No. 3	No. 3	No. 4	No. 5	No. 1 feed	Sample	Total
Barley	0	264	0	9, 964	5, 310	0	13, 410	6, 934	0	3, 597	4, 929	44, 408
Western barley:												
Bright Western	196	360	46	0	432	268	372	302	84	1	138	2, 199
Western	18	67	1	1	46	46	121	30	17	0	57	404
2-rowed:												
Bright 2-rowed	8	8	3	0	11	1	2	0	1	0	0	34
2-rowed	1	1	0	0	1	0	0	0	0	1	0	4
Black	0	0	0	0	0	0	1	0	0	0	0	1
Mixed	0	0	0	1	0	0	1	3	0	3	0	8

Bureau of Agricultural Economics.

[1] Barley grades became effective Aug. 24, 1926.

TABLE 97.—*Barley: Estimated average price per bushel, received by producers, United States, 1909–1930*

Crop year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909–10	57. 9	54. 0	53. 4	53. 6	55. 8	58. 4	59. 8	60. 0	58. 1	56. 1	54. 8	54. 3	55. 6
1910–11	56. 0	56. 6	55. 7	56. 6	58. 8	62. 0	63. 6	66. 0	71. 6	73. 9	72. 0	69. 7	60. 8
1911–12	73. 2	79. 4	83. 3	85. 9	86. 6	88. 8	91. 1	91. 6	94. 2	93. 6	86. 5	74. 4	81. 9
1912–13	60. 2	54. 2	54. 3	52. 2	50. 2	50. 6	50. 2	48. 8	48. 4	50. 5	53. 2	52. 2	52. 7
1913–14	53. 0	56. 0	55. 8	54. 2	53. 0	52. 3	51. 8	51. 4	50. 5	49. 2	48. 3	46. 3	53. 0
1914–15	48. 8	52. 2	51. 8	53. 0	54. 3	58. 6	65. 3	66. 2	64. 2	62. 9	58. 9	56. 2	54. 8
1915–16	54. 3	49. 4	48. 4	50. 8	53. 2	58. 3	60. 6	58. 4	58. 4	59. 6	59. 4	59. 3	53. 8
1916–17	66. 1	74. 7	79. 8	85. 6	87. 6	89. 9	94. 8	99. 6	111. 2	119. 7	113. 0	110. 6	83. 4
1917–18	112. 2	112. 0	112. 6	112. 5	120. 1	129. 2	146. 5	165. 6	164. 4	147. 0	126. 9	114. 2	122. 5
1918–19	105. 4	98. 2	95. 2	93. 3	91. 5	89. 0	86. 1	89. 0	98. 3	106. 6	108. 8	113. 6	100. 0
1919–20	117. 2	115. 4	116. 2	118. 8	125. 4	133. 6	133. 2	134. 6	143. 2	147. 4	145. 2	131. 5	124. 9
1920–21	113. 0	98. 1	86. 4	76. 5	67. 8	60. 8	57. 0	55. 6	51. 8	50. 4	51. 1	50. 0	70. 7
1921–22	48. 2	46. 2	43. 6	41. 8	42. 8	44. 0	47. 0	51. 2	54. 6	57. 0	55. 0	51. 0	48. 4
1922–23	47. 7	46. 2	49. 2	52. 0	55. 6	56. 8	56. 2	58. 0	59. 6	60. 8	58. 3	54. 7	51. 8
1923–24	52. 2	51. 9	54. 7	55. 2	57. 6	56. 5	58. 0	60. 0	61. 0	60. 0	61. 9	68. 8	56. 6
1924–25	75. 7	75. 6	81. 4	79. 7	76. 2	82. 4	84. 8	81. 5	76. 1	75. 9	76. 4	73. 5	77. 4
1925–26	67. 1	60. 8	57. 6	58. 0	58. 4	59. 5	56. 3	54. 6	54. 8	55. 1	53. 7	55. 3	59. 2
1926–27	55. 0	52. 9	54. 4	56. 0	56. 4	58. 0	61. 3	62. 2	64. 1	68. 4	76. 3	71. 4	61. 9
1927–28	69. 0	69. 5	66. 8	66. 8	71. 5	73. 6	75. 4	79. 4	81. 3	84. 5	81. 7	77. 6	72. 7
1928–29	58. 9	54. 1	55. 2	54. 5	55. 0	56. 2	60. 5	60. 1	58. 0	55. 3	52. 6	55. 6	56. 1
1929–30	55. 8	55. 2	54. 7	53. 8	54. 6	53. 9	52. 5	51. 4	51. 7	50. 5	47. 5	40. 0	51. 8
1930–31	43. 6	45. 3	41. 9	38. 3	38. 8	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of barley for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, August, 1909–December, 1923.

TABLE 98.—*Barley, No. 2: Weighted average price*[1] *per bushel of reported cash sales, Minneapolis, 1909–10 to 1930–31*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909–10	45	48	49	52	57	61	60	58	54	54	53	60	54
1910–11	61	63	63	66	70	77	74	81	88	75	77	87	74
1911–12	85	94	95	98	91	105	100	95	101	99	76	60	92
1912–13	46	49	50	47	45	49	48	46	46	50	52	48	48
1913–14	58	61	56	53	50	52	50	48	47	48	47	45	51
1914–15	59	58	55	59	57	68	75	70	70	70	66	68	65
1915–16	59	48	51	56	61	70	66	65	68	70	68	69	63
1916–17	81	81	103	111	107	117	117	121	136	148	138	149	117
1917–18	131	133	128	127	149	156	188	212	182	146	123	118	149
1918–19	102	95	91	94	92	90	87	93	109	113	112	121	100
1919–20	133	127	129	133	152	152	137	151	160	174	149	116	143
1920–21	102	99	92	82	74	69	65	67	61	59	57	62	74
1921–22	58	55	50	54	47	51	56	58	61	62	56	56	55
1922–23	49	54	57	60	61	57	60	59	64	61	58	59	58
1923–24	56	58	60	61	62	62	68	70	75	70	73	76	63
1924–25	80	81	85	81	87	93	94	88	81	84	84	84	84
1925–26	72	66	65	63	65	65	62	62	63	65	64	67	67
1926–27	63	62	65	64	67	69	71	72	77	88	88	81	71
1927–28	77	72	73	77	83	84	87	90	92	93	94	85	84
1928–29	65	63	63	62	62	66	70	67	65	60	60	69	65
1929–30 [2]	62	63	59	60	60	58	57	56	57	56	50	48	59
1930–31 [2]	53	54	52	48	47	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Minneapolis Daily Market Record.

[1] Average of daily prices weighted by car-lot sales.
[2] Special No. 2 barley used, August, 1929, to end of table.

TABLE 99.—*Barley futures: Volume of trading in all contract markets, by months, 1923–24 to 1929–30*

Month	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
July	1,000	1,356	1,648	2,134	1,817	6,175	7,538
August	1,435	3,468	5,029	4,432	5,536	13,748	17,639
September	1,503	5,764	6,936	2,875	7,194	11,934	7,428
October	1,415	4,358	3,618	1,604	3,810	7,129	6,126
November	1,901	4,615	7,376	6,594	6,101	7,689	14,981
December	688	3,772	3,224	1,522	3,828	2,881	3,950
January	509	2,615	1,397	1,669	1,900	6,533	7,071
February	345	2,753	1,223	866	2,444	3,007	4,666
March	686	3,073	2,210	1,482	2,921	5,348	4,938
April	971	3,077	6,552	3,138	2,974	7,425	10,539
May	466	1,627	1,969	1,646	2,893	2,981	3,793
June	876	1,931	4,542	1,719	2,426	7,203	8,284
Total	11,795	38,409	45,724	29,683	43,844	82,053	96,953

Grain Futures Administration.

TABLE 100.—*Barley futures: Volume of trading in contract markets, by markets, and by months, 1929–30*

Month	Minneapolis	Duluth	San Francisco	Los Angeles	Month	Minneapolis	Duluth	San Francisco	Los Angeles
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushles*		*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
July	7,470	68	--------	--------	February	4,665	1	--------	--------
August	17,493	146	--------	--------	March	4,930	8	--------	--------
September	7,385	39	--------	4	April	10,455	84	--------	--------
October	6,086	40	--------	--------	May	3,787	6	--------	--------
November	14,784	197	--------	--------	June	8,191	85	8	--------
December	3,898	44	4	--------					
January	7,038	33	--------	--------	Total	96,182	751	12	4

Grain Futures Administration.

TABLE 101.—*Flaxseed: Acreage, production, value, foreign trade, net supply, etc., United States, 1909–1930*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel of No. 1 Flaxseed at Minneapolis, year beginning Sept. 1 [1]	Flaxseed, including linseed oil, in terms of seed, year beginning Sept. 1 [2]: Imports	Flaxseed, including linseed oil, in terms of seed, year beginning Sept. 1 [2]: Exports, domestic and foreign	Flaxseed, including linseed oil, in terms of seed, year beginning Sept. 1 [2]: Net imports	Net supply [3]
	1,000 acres	*Bushels of 56 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	*2,083*	*9.4*	*19,513*							
1909	2,083	9.5	19,699	152.8	30,093	206	6,074	152	5,922	25,621
1910	2,467	5.2	12,718	231.7	29,472	249	12,010	73	11,937	24,655
1911	2,757	7.0	19,370	182.1	35,272	214	7,848	126	7,722	27,092
1912	2,851	9.8	28,073	114.7	32,202	138	3,845	897	2,948	31,021
1913	2,291	7.8	17,853	119.9	21,399	152	9,772	216	9,556	27,409
1914	1,645	8.4	13,749	126.0	17,318	170	12,729	571	12,158	25,907
1915	1,387	10.1	14,030	174.0	24,410	204	14,441	313	14,128	28,158
1916	1,474	9.7	14,296	248.6	35,541	291	10,946	507	10,439	24,735
1917	1,984	4.6	9,164	296.6	27,182	378	14,042	467	13,575	22,739
1918	1,910	7.0	13,369	340.1	45,470	419	9,230	482	8,748	22,117
1919	*1,261*	*5.3*	*6,653*							
1919	1,503	4.8	7,178	438.5	31,475	452	26,483	467	26,016	33,194
1920	1,757	6.1	10,752	176.7	18,999	209	16,174	219	15,955	26,707
1921	1,108	7.2	8,029	145.1	11,648	219	23,389	149	23,240	31,269
1922	1,113	9.3	10,375	211.5	21,941	258	29,009	161	28,848	39,223
1923	2,014	8.5	17,060	210.7	35,951	244	19,557	145	19,412	36,472
1924	*3,435*	*8.2*	*28,246*							
1924	3,469	9.1	31,547	227.4	71,728	263	12,849	124	12,725	44,272
1925	3,078	7.3	22,424	226.5	50,783	252	20,858	148	20,710	43,134
1926	2,907	6.7	19,335	194.0	37,510	224	24,155	112	24,043	43,378
1927	2,837	9.1	25,847	186.0	48,079	220	18,177	120	18,057	43,904
1928	2,675	7.4	19,928	201.2	40,098	233	23,611	106	23,505	43,433
1929	3,050	5.6	17,049	284.2	48,459	292	18,539	109	18,430	35,479
1930 [4]	3,946	6.0	23,682	139.8	33,097					

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, page 809, for data for earlier years.

[1] The figures shown, 1909–1920 are averages of daily closing prices compiled from annual reports of the Minneapolis Chamber of Commerce; 1921–1928, are averages of daily prices weighted by car-lot sales, compiled from Minneapolis Daily Market Record.

[2] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June, July, and August issues, 1919–1929, January issues, 1927–1929, and official records of the Bureau of Foreign and Domestic Commerce. 1 bushel of flaxseed weighs 56 pounds; 1 bushel of seed yields 2½ gallons of oil; and 1 gallon of oil weighs 7½ pounds.

[3] Production minus net exports or plus net imports.

[4] Preliminary.

Table 102.—*Flaxseed: Acreage and production, by States, average 1924–1928, annual 1927–1930*

State	Acreage					Production				
	Average, 1924–1928	1927	1928	1929	1930 [1]	Average, 1924–1928	1927	1928	1929	1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Wisconsin	10	10	9	7	9	128	132	122	80	108
Minnesota	750	757	726	523	732	7, 264	7, 343	5, 808	4, 707	7, 320
Iowa	14	19	19	13	26	160	228	198	130	312
Missouri	4	7	7	6	6	27	46	56	36	51
North Dakota	1, 420	1, 242	1, 143	1, 463	1, 931	10, 307	10, 184	8, 344	6, 876	10, 041
South Dakota	546	594	554	637	670	4, 162	5, 940	3, 601	3, 758	3, 484
Nebraska	7	7	8	17	24	61	70	64	129	144
Kansas	39	31	25	23	37	256	170	172	136	270
North Carolina	------	------	------	------	4	------	------	------	------	41
Montana	202	170	183	343	480	1, 444	1, 734	1, 556	1, 098	1, 776
Wyoming	------	------	1	18	27	------	------	7	99	135
United States	2, 993	2, 837	2, 675	3, 050	3, 946	23, 816	25, 847	19, 928	17, 049	23, 682

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

Table 103.—*Flax: World production, 1920–21 to 1930–31*

Crop year	World production, including Russia [1]	Northern Hemisphere production, including Russia	European production, including Russia	Selected countries							
				Argentina [2]	Russia	United States	India	Canada	Poland	Lithuania [3]	Uruguay
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,100 bushels*
1920–21	113, 534	52, 361	14, 894	60, 006	9, 204	10, 752	16, 760	7, 998	637	1, 011	966
1921–22	75, 121	38, 427	14, 424	36, 046	9, 752	8, 029	10, 800	4, 112	856	909	519
1922–23	98, 745	50, 236	16, 813	47, 577	11, 043	10, 375	17, 440	5, 008	1, 816	1, 108	719
1923–24	125, 098	65, 797	19, 664	58, 005	13, 379	17, 060	21, 320	7, 140	2, 129	1, 056	1, 178
1924–25	131, 221	84, 460	23, 982	45, 084	16, 960	31, 547	18, 520	9, 695	1, 872	1, 332	1, 542
1925–26	159, 128	81, 876	32, 391	75, 113	23, 991	22, 424	20, 040	6, 237	2, 250	1, 571	2, 030
1926–27	153, 945	71, 080	28, 861	80, 783	20, 877	19, 335	16, 080	5, 995	2, 472	1, 574	1, 970
1927–28	158, 194	76, 715	29, 146	82, 672	21, 814	25, 847	16, 240	4, 885	2, 790	1, 405	1, 954
1928–29	147, 755	67, 300	29, 273	78, 377	22, 420	19, 928	13, 920	3, 614	2, 413	1, 000	2, 030
1929–30	121, 162	68, 163	35, 580	50, 004	26, 349	17, 049	12, 880	2, 060	3, 173	1, 718	2, 852
1930–31	------	------	------	68, 894	------	23, 682	14, 960	4, 459	------	1, 666	------

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Production figures are for the harvesting season which begins in the spring, extends through the calendar year in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

[1] Excludes a few minor producing countries for which no statistics are available and which do not enter into world trade. No production figures for Germany are available.

[2] Figures of area harvested are not available for all years but over 16-year period the harvested area average 10 per cent below the sown area.

[3] Flax and hemp.

TABLE 104.—*Flax: Acreage and production in specified countries, average 1909–10 to 1913–14 and 1921–22 to 1925–26, annual 1928–29 to 1930–31*

Country	Acreage					Seed production					Fiber production				
	Average, 1909–10 to 1913–14 [1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14 [1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14 [1]	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*
NORTHERN HEMISPHERE															
North America:	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Canada	1, 034, 874	769, 552	378, 081	382, 359	581, 800	12, 040	6, 438	3, 614	2, 060	4, 459	-------	-------	-------	-------	-------
United States	2, 489, 800	2, 156, 400	2, 638, 000	3, 050, 000	3, 946, 000	19, 543	17, 887	19, 928	17, 049	23, 682	-------	-------	-------	-------	-------
Total North America	3, 524, 674	2, 925, 952	3, 016, 081	3, 432, 359	4, 527, 800	31, 583	24, 325	23, 542	19, 109	28, 141	-------	-------	-------	-------	-------
Europe:															
United Kingdom—															
England and Wales	486	7, 801	5, 543	6, 403	4, 000	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Northern Ireland	53, 014	36, 267	37, 248	33, 911	28, 317	-------	-------	-------	-------	-------	19, 500	12, 123	13, 117	15, 487	-------
Irish Free State		8, 288	8, 032	6, 283	3, 950	-------	-------	-------	-------	-------	4, 200	2, 662	2, 636	2, 771	2, 645
Sweden [2]	[3] 4, 016	5, 651	-------	-------	-------	[4] 14	6	2	-------	-------	[4] 1, 128	685	276	-------	-------
Netherlands	33, 055	27, 839	39, 158	47, 456	37, 317	376	324	504	653	-------	17, 276	16, 166	30, 623	34, 000	19, 180
Belgium	48, 930	47, 290	58, 820	67, 589	56, 000	[3] 472	410	492	708	245	[3] 51, 888	40, 004	47, 496	41, 216	25, 100
France	61, 666	45, 508	83, 703	86, 460	74, 278	534	363	763	593	-------	40, 732	29, 123	72, 589	56, 304	-------
Spain	[5] 7, 349	[4] 3, 856	-------	1, 000	2, 000	[5] 26	[4] 48	-------	7	10	[3] 1, 995	[4] 1, 278	-------	617	840
Italy	[3] 42, 852	51, 700	43, 660	28, 000	24, 000	[3] 340	451	304	265	223	6, 675	5, 159	4, 674	7, 295	5, 553
Austria	12, 787	9, 055	11, 633	12, 100	11, 000	112	55	44	44	42	7, 480	7, 433	16, 416	15, 605	13, 294
Czechoslovakia	61, 404	56, 438	50, 171	47, 000	44, 000	435	349	323	308	277	39, 143	28, 397	22, 230	20, 728	16, 202
Hungary	7, 967	6, 918	7, 070	12, 469	-------	63	48	54	99	-------	6, 671	5, 237	2, 784	7, 912	-------
Yugoslavia	32, 274	33, 179	31, 100	34, 000	-------	161	-------	40	54	-------	22, 277	18, 465	15, 154	21, 212	-------
Bulgaria	756	635	591	722	1, 000	6	3	3	4	7	382	188	136	130	262
Rumania	[4] 71, 253	40, 021	47, 811	43, 000	44, 000	[4] 707	224	241	278	389	[4] 11, 044	[5] 10, 770	3, 978	5, 991	-------
Poland	202, 100	229, 360	281, 889	289, 000	285, 000	1, 738	1, 785	2, 413	3, 173	-------	92, 770	87, 774	114, 640	144, 849	-------
Lithuania [2]	143, 257	144, 360	235, 500	213, 000	204, 000	1, 126	1, 195	1, 000	1, 718	1, 606	49, 703	62, 119	76, 279	74, 913	68, 255
Latvia [2]	161, 906	132, 076	169, 800	137, 880	127, 000	953	783	411	904	755	62, 318	46, 964	32, 275	48, 347	42, 836
Estonia	135, 193	75, 365	82, 880	79, 000	80, 000	733	387	229	420	473	49, 518	22, 187	17, 195	21, 498	23, 731
Finland [1]	[6] 12, 236	14, 761	13, 578	12, 000	14, 000	-------	-------	-------	-------	-------	2, 710	3, 239	3, 549	3, 527	3, 527
Russia, including Asiatic Russia	3, 165, 082	2, 799, 900	4, 274, 830	4, 885, 000	5, 165, 000	18, 984	15, 025	22, 420	26, 349	-------	739, 990	644, 969	776, 901	942, 920	-------
Total, European countries reporting all years, including Asiatic Russia	4, 205, 977	3, 726, 664	5, 444, 847	5, 994, 804	6, 202, 862	4, 884	3, 857	3, 057	4, 649	4, 017	291, 293	234, 516	253, 509	270, 030	220, 585

40442°—31——42

North Africa:															
Kenya		7,154	284				19					1,090			
Morocco	[7] 18,061	40,844	42,600	42,239	39,000	[7] 248	363	388	400	293					
Algeria	1,366	643				13	7				[5] 188	[5] 441			
Tunis	8,000	5,996	6,635	5,400		37	30	51	47						
Egypt	[5] 4,628	3,181	2,657	4,249		[8] 37	31	34	52		[8] 7,265	2,090	2,496	4,865	
Asia:															
India	3,818,080	3,216,200	3,311,000	3,109,000	2,801,000	19,870	17,624	13,920	12,880	14,960					
Japanese Empire—															
Japan	12,139	49,911	19,081			[4] 98	304	92			30,003	61,242	29,532		
Chosen	3,000	3,386	3,987	3,815								1,141	1,147	1,052	
Total, Northern Hemisphere countries reporting all years	11,566,792	9,909,660	11,814,528	12,578,402	13,570,662	56,585	46,169	40,907	37,038	47,411	291,293	234,516	253,509	270,030	220,585
Estimated Northern Hemisphere total	11,648,000	10,030,000	11,890,000	12,666,000		78,666	64,159	67,300	68,163		1,264,900	1,110,900	1,287,100	1,501,500	
SOUTHERN HEMISPHERE															
Chile	[4] 748	913				19	16				[4] 127	[4] 734			
Uruguay	[4] 126,528	116,279	192,234	266,238		[4] 951	1,198	2,030	2,852						
Argentina [9]	4,113,434	5,224,757	6,943,213	7,090,535	7,522,268	31,117	52,365	78,377	50,004	68,894					
Australia	[5] 1,056	394	151			[5] 9	[4] 4				[5] 128	[3] 33			
New Zealand	[6] 2,565	8,693	2,800	7,757		40	121	46	141						
Total, Southern Hemisphere countries reporting all years	4,113,434	5,224,757	6,943,213	7,090,535	7,522,268	31,117	52,365	78,377	50,004	68,894					
Total, Northern and Southern Hemisphere countries reporting all years	15,680,226	15,134,417	18,757,741	19,668,937	21,092,930	87,702	98,534	119,284	87,042	116,305	291,293	234,516	253,509	270,030	220,519
Estimated world total [10]	15,892,000	15,381,000	19,028,000	20,030,000		110,802	117,863	147,755	121,162		1,265,100	1,111,700	1,287,100	1,501,500	

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Acreage and production figures are for the harvesting season which begins in the spring, extends through the calendar year in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

*Preliminary.
[1] Where changes in territory have occurred averages are estimates for territory within present boundary.
[2] Flax and hemp.
[3] 3-year average.
[4] 4-year average.
[5] 2-year average.
[6] 1 year only, 1910–11.
[7] Average 1915–16 to 1918–19.
[8] 1 year only, 1912–13.
[9] Acreage figures are for area sown; figures of area harvested are not available for all years, but over a 16-year period the harvested area averaged 10 per cent below the sown area.
[10] Excludes a few minor producing countries for which no statistics are available and which do not enter into world trade. No figures are included for Germany, whose acreage in 1913–14 was 37,800 acres and has now fallen from 118,000 acres in 1921–22 to 27,000 acres in 1930–31. No production figures are available.

TABLE 105.—*Flaxseed: Yield per acre, average 1919–1928, and annual 1925–1930, and estimated price per bushel December 1, average 1924–1928, and annual 1925–1930, by States*

State	Yield per acre							Estimated price per bushel Dec. 1						
	Average, 1919–1928	1925	1926	1927	1928	1929	1930	Average, 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Wisconsin	12.3	13.8	12.0	13.2	13.5	11.5	12.0	208	226	200	190	199	270	156
Minnesota	9.6	10.0	9.4	9.7	8.0	9.0	10.0	211	230	197	192	205	287	145
Iowa	10.4	10.5	11.6	12.0	10.4	10.0	12.0	207	220	195	195	198	275	155
Missouri	7.8	7.5	8.0	6.5	8.0	6.0	8.5	198	190	195	188	190	265	150
North Dakota	6.9	6.5	5.5	8.2	7.3	4.7	5.2	206	226	193	184	201	287	139
South Dakota	7.9	6.8	5.8	10.0	6.5	5.9	5.2	205	225	190	185	201	280	133
Nebraska	8.4	9.0	8.7	10.0	8.0	7.6	6.0	201	230	185	175	190	280	125
Kansas	6.6	6.8	6.9	5.5	6.9	5.9	7.3	197	200	200	185	185	234	156
North Carolina	-----	-----	-----	-----	-----	-----	10.2	-----	-----	-----	-----	-----	-----	150
Montana	6.0	4.5	4.2	10.2	8.5	3.2	3.7	199	220	185	175	192	280	131
Wyoming	[1] 6.9	4.0	-----	-----	7.0	5.5	5.0	-----	-----	-----	-----	195	275	129
United States	7.6	7.3	6.7	9.1	7.4	5.6	6.0	207.0	226.5	194.0	186.0	201.2	284.2	139.8

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 8-year average.

TABLE 106.—*Flaxseed: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–18 to 1929–30*

Crop year	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917–18	1.8	3.6	21.5	28.1	17.6	7.6	4.7	4.0	4.8	1.8	1.6	2.9	100.0
1918–19	1.8	2.9	14.8	21.5	15.0	10.9	5.2	4.4	5.8	4.3	5.0	8.4	100.0
1919–20	3.6	8.0	20.6	22.2	11.1	7.4	5.0	6.3	3.1	3.1	2.6	7.0	100.0
1920–21	2.1	4.7	23.6	28.6	13.0	6.2	5.0	3.3	3.1	2.1	3.4	4.9	100.0
1921–22	6.4	10.9	20.7	25.7	12.0	6.9	4.3	2.8	3.0	2.4	2.1	2.8	100.0
1922–23	2.5	13.4	27.6	23.3	11.4	5.9	4.7	3.0	2.7	2.3	1.6	1.6	100.0
1923–24	1.1	10.0	30.7	27.3	12.1	6.0	2.6	2.3	2.0	1.5	2.1	2.3	100.0
1924–25	.5	5.3	23.0	34.5	17.8	6.7	3.8	2.7	1.8	1.4	1.2	1.3	100.0
1925–26	1.1	11.1	34.3	23.5	12.4	5.6	2.7	2.0	1.8	1.5	1.9	2.1	100.0
1926–27	1.4	12.0	25.5	32.5	11.2	6.3	2.4	2.3	1.7	.9	1.7	2.1	100.0
1927–28	1.0	6.1	32.9	33.4	10.5	5.3	3.0	1.9	1.9	1.2	1.7	1.1	100.0
1928–29	1.1	7.2	31.1	35.3	11.6	5.3	2.1	1.2	1.4	1.0	1.5	1.2	100.0
1929–30	1.9	19.9	35.6	23.9	9.1	3.3	1.3	1.1	1.0	.8	1.0	1.1	100.0

Bureau of Agricultural Economics.

TABLE 107.—*Flaxseed: Commercial stocks in store, 1926–27 to 1930–31*

DOMESTIC FLAXSEED IN UNITED STATES [1]

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27					2, 684	2, 328	2, 089	2, 014	1, 834	1, 396	1, 445	909
1927–28	584	1, 583	5, 353	4, 703	4, 247	3, 542	2, 816	2, 178	1, 691	882	781	615
1928–29	317	704	2, 721	1, 343	1, 397	1, 142	780	681	547	398	434	370
1929–30	159	924	1, 179	610	917	867	740	696	589	519	433	314
1930–31	467	1, 903	2, 202	1, 431								

CANADIAN FLAXSEED IN UNITED STATES [2]

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
1926–27					14	14	17	17	17	57	11	13
1927–28	0	0	1	12	17	18	18	0	0	0	0	1
1928–29	1	1	0	0	0	0	0	0	0	0	0	0
1929–30	0	0	0	0	0	0	0	0	0	0	0	0
1930–31	0	0	0	1								

Bureau of Agricultural Economics. Compiled from weekly reports to the grain, hay, and feed market news service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes flaxseed in store in public and private elevators in 39 important markets and also the flaxseed afloat in vessels or barges in the harbors of lake and seaboard ports. Flaxseed in transit either by rail or water, mill stocks, or small private stocks of flaxseed intended only for local purposes, not included.

[2] Includes flaxseed stored at lake and seaboard ports, exclusive of flaxseed in transit on lakes and canals.

TABLE 108.—*Flaxseed: Receipts at Minneapolis, 1909–10 to 1930–31*

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Total
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1909–10	999	2, 219	1, 892	601	966	670	826	437	222	159	123	137	9, 251
1910–11	854	1, 530	1, 292	535	338	300	232	112	118	122	133	191	5, 757
1911–12	563	1, 212	1, 570	1, 716	531	459	397	468	571	440	487	160	8, 574
1912–13	700	1, 657	1, 520	2, 245	1, 450	1, 246	1, 057	742	518	514	432	281	12, 362
1913–14	756	1, 686	1, 505	1, 131	711	478	592	270	139	165	233	117	7, 783
1914–15	901	1, 890	1, 247	1, 016	599	443	384	142	77	146	239	115	7, 199
1915–16	347	1, 038	1, 506	1, 113	319	399	810	486	440	363	441	199	7, 461
1916–17	316	2, 380	1, 694	1, 045	544	442	441	384	263	565	325	92	8, 491
1917–18	265	980	1, 112	614	533	553	527	283	349	648	208	94	6, 166
1918–19	536	915	857	788	558	473	829	439	436	942	642	196	7, 611
1919–20	753	570	568	492	344	368	409	159	295	522	554	297	5, 331
1920–21	580	1, 444	861	699	298	269	364	434	578	572	338	289	6, 726
1921–22	500	1, 144	375	354	308	200	254	196	300	220	157	288	4, 296
1922–23	909	1, 121	580	577	447	249	319	476	401	481	359	1, 019	6, 938
1923–24	2, 654	1, 953	1, 308	877	358	250	229	210	296	296	264	269	8, 964
1924–25	2, 265	3, 475	2, 781	1, 375	1, 244	750	671	374	402	442	286	1, 094	15, 159
1925–26	3, 331	2, 745	1, 107	722	375	276	320	357	431	360	294	830	11, 148
1926–27	1, 539	2, 905	1, 103	669	415	318	273	169	257	277	145	441	8, 511
1927–28	4, 465	3, 894	1, 065	490	716	495	471	311	439	457	143	652	13, 598
1928–29	3, 454	3, 690	1, 278	601	373	328	328	255	244	330	180	1, 249	12, 310
1929–30 [1]	2, 939	1, 759	624	403	180	116	133	142	390	313	162	2, 436	9, 597
1930–31 [1]	2, 295	1, 213	912	636									

Bureau of Agricultural Economics. Compiled from annual reports of the Minneapolis Chamber of Commerce.

[1] Beginning January, 1930, figures are from the Minneapolis Daily Market Record, and are subject to revision.

TABLE 109.—*Linseed oil: Flaxseed used in production of oil, and quantity of oil produced, United States, 1919–20 to 1929–30*

Year beginning October	Flaxseed crushed					Oil produced				
	October–December	January–March	April–June	July–September	Total	October–December	January–March	April–June	July–September	Total
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1919–20	7,684	6,336	6,407	6,542	26,969	139,960	117,226	121,407	126,138	504,731
1920–21	6,341	6,343	6,332	5,812	24,828	120,502	118,787	118,887	107,716	465,892
1921–22	7,539	6,713	3,441	5,583	23,276	137,528	124,941	70,239	102,581	435,289
1922–23	8,602	8,292	8,689	8,223	33,806	158,753	155,148	178,267	154,588	646,756
1923–24	8,970	9,575	9,434	7,550	35,529	165,560	177,583	176,187	139,862	659,192
1924–25	11,530	12,516	9,128	7,822	40,996	211,954	229,544	169,980	146,306	757,784
1925–26	11,798	10,651	7,767	9,500	39,716	217,992	194,607	144,950	174,057	731,606
1926–27	11,085	11,037	8,963	9,051	40,136	206,496	202,162	167,232	169,274	745,164
1927–28	12,699	11,885	9,608	7,603	41,795	238,046	223,751	179,532	141,889	783,218
1928–29	11,191	10,839	9,962	10,321	42,313	206,273	202,353	187,019	191,977	787,622
1929–30 [1]	9,947	7,966	7,270	5,887	31,070	182,228	145,970	130,863	108,236	567,297

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census, "Animal and vegetable fats and oils."

[1] Subject to revision.

TABLE 110.—*Flaxseed: Estimated average price per bushel, received by producers, United States, 1909–1930*

Crop year	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909–10	123.0	131.3	146.4	162.0	182.0	193.0	193.5	201.7	202.5	189.5	196.6	214.8	148.6
1910–11	227.2	231.8	230.6	226.4	227.5	237.3	237.6	238.2	233.4	215.3	202.4	201.4	229.8
1911–12	204.3	207.8	196.4	184.6	189.0	187.4	187.6	186.2	193.0	201.7	186.8	168.9	195.8
1912–13	155.2	140.6	124.0	110.4	107.8	114.2	116.3	114.0	115.0	114.6	116.0	123.2	127.4
1913–14	125.2	120.6	119.3	122.0	126.0	130.2	132.6	133.8	135.8	136.4	143.4	145.0	123.9
1914–15	133.4	123.0	122.4	130.4	149.2	160.8	162.8	168.6	169.6	161.0	148.6	144.0	131.6
1915–16	145.8	155.5	168.4	180.0	198.4	206.7	202.3	197.0	184.2	169.8	170.6	184.2	169.6
1916–17	194.7	217.0	241.6	249.6	252.2	253.4	259.6	283.4	299.7	288.4	274.8	287.2	233.8
1917–18	305.6	302.2	296.2	303.7	318.8	338.2	364.8	376.5	368.4	356.4	379.9	395.8	315.9
1918–19	381.0	357.4	337.0	333.9	318.9	318.8	338.0	355.0	375.4	416.7	492.4	529.0	374.2
1919–20	477.8	410.2	410.3	436.0	445.0	464.6	461.2	452.0	434.6	390.4	331.6	297.0	427.0
1920–21	285.0	259.9	208.4	170.2	160.0	153.4	146.5	134.2	135.7	145.8	154.0	163.4	217.6
1921–22	163.8	154.0	145.0	148.1	162.1	194.6	217.4	224.6	233.8	230.0	217.2	200.8	171.0
1922–23	189.1	199.4	211.0	217.8	229.9	245.4	261.6	279.5	273.1	248.4	228.8	210.4	209.5
1923–24	208.4	212.1	211.4	218.8	218.8	224.9	223.7	217.7	222.6	213.1	218.1	210.2	212.3
1924–25	201.2	210.8	222.7	235.8	271.8	275.3	267.8	244.7	251.8	246.8	227.6	229.5	220.7
1925–26	227.9	228.9	228.1	232.1	224.5	216.4	202.9	207.0	205.4	203.9	208.7	215.7	224.6
1926–27	211.3	197.5	195.5	196.4	193.0	195.7	195.1	196.1	205.7	204.7	198.4	203.7	205.8
1927–28	197.1	191.2	184.2	185.3	188.4	189.9	194.8	198.4	210.5	209.0	195.5	181.7	192.0
1928–29	181.6	198.1	198.1	205.4	211.1	218.4	219.2	216.4	214.7	217.0	233.2	259.5	206.7
1929–30	285.4	300.5	285.1	287.7	279.8	275.0	261.5	263.7	245.9	245.6	192.7	191.9	277.1
1930–31	168.1	152.2	133.6	137.6	------	------	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of flaxseed for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices on 1st of month and 1st of succeeding month, September, 1909–December, 1923.

TABLE 111.—*Flaxseed: International trade, average 1911–1913, annual 1926–1929*

Country	Calendar year									
	Average, 1911–1913		1926		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
Argentina	1	25,562	1	65,866	0	74,585	0	76,547	0	63,505
British India	[1] 325	[1] 14,409	823	7,455	968	8,670	632	6,835	876	10,005
Canada	89	10,645	810	2,653	354	2,185	300	2,950	1,374	850
Uruguay	0	994	0	2,093	0	2,274	0	2,379	0	[2] 2,178
Russia	80	5,739	(2)	[2] 1,833	[2] 0	[2] 94	------	------	------	------
Lithuania	(3)	(3)	0	1,014	0	985	0	275	0	971
Latvia	(3)	(3)	324	672	512	577	706	379	672	598
Morocco	0	338	0	296	0	476	0	379	0	[2] 359
Eritrea [2]	0	0	0	258	0	178	0	107	0	20
China	0	648	0	155	0	221	0	10	0	1
Estonia	(3)	(3)	0	196	24	73	76	12	42	113
Tunis	0	39	0	31	0	46	0	64	0	[2] 39
Rumania	19	120	0	100	0	107	0	[2] 6	0	------
PRINCIPAL IMPORTING COUNTRIES										
United States	7,298	101	22,550	0	21,821	0	17,579	0	24,243	0
United Kingdom	15,908	0	14,324	0	14,104	0	13,884	0	11,359	0
Netherlands	8,741	2,488	12,927	231	14,372	148	16,481	164	14,195	264
France	6,304	60	7,145	20	7,081	18	8,272	15	8,438	29
Germany	15,312	210	12,545	50	15,715	67	17,439	67	12,439	148
Belgium	9,313	5,965	3,662	300	3,937	219	5,008	326	4,492	373
Italy	1,698	1	2,272	1	2,878	0	2,588	0	2,324	2
Sweden	911	7	1,547	0	1,467	0	1,652	0	1,384	0
Australia [2]	103	0	801	0	825	0	797	0	1,498	0
Denmark	1	0	916	0	557	0	857	0	576	0
Czechoslovakia	(3)	(3)	761	11	930	2	956	7	1,112	19
Norway	445	0	613	0	572	0	648	0	578	0
Spain	0	0	613	0	523	14	918	0	[2] 748	0
Poland	(3)	(3)	244	56	552	61	851	317	818	573
Japan	[4] 27	[4] 27	288	1	363	0	681	0	626	2
Finland	110	0	165	0	197	0	241	0	314	0
Hungary	(3)	(3)	82	10	101	12	118	25	126	78
Austria	[5] 1,913	[5] 41	10	0	13	0	14	0	[2] 17	0
Total, 31 countries	68,596	67,394	83,423	83,302	87,866	91,012	90,698	90,864	88,251	80,127

Bureau of Agricultural Economics. Official sources except where otherwise noted.

*Preliminary.
[1] 2-year average.
[2] International Yearbook of Agricultural Statistics.
[3] Figures for pre-war years are included in the countries of the pre-war boundaries.
[4] 1 year only.
[5] Average for Austria-Hungary.

TABLE 112.—*Flaxseed, No. 1: Average price per bushel, Minneapolis, 1909–10 to 1930–31*

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909–10	141	157	175	193	218	218	225	238	222	204	234	247	206
1910–11	266	262	261	242	260	263	260	256	247	224	210	234	249
1911–12	247	235	204	206	215	206	206	215	223	225	197	186	214
1912–13	176	160	135	125	129	134	126	129	130	131	138	147	138
1913–14	145	138	135	144	149	153	158	154	156	159	168	164	152
1914–15	151	133	145	154	183	186	191	193	195	176	167	167	170
1915–16	170	186	199	207	231	232	227	213	196	180	196	215	204
1916–17	211	254	278	284	289	281	290	318	333	311	301	346	291
1917–18	338	316	329	340	360	374	408	409	393	386	440	439	378
1918–19	409	359	377	354	341	345	375	388	412	486	594	587	419
1919–20	492	432	483	499	512	509	502	468	453	392	348	328	452
1920–21	323	283	227	206	196	182	178	158	184	186	189	201	209
1921–22	203	181	181	189	213	246	257	270	280	250	259	229	219
1922–23	228	238	248	262	280	304	307	340	294	280	270	234	258
1923–24	238	248	242	246	250	258	249	247	246	244	247	244	244
1924–25	226	240	258	284	315	312	297	279	280	268	249	254	263
1925–26	259	258	256	261	250	243	232	234	230	233	244	238	252
1926–27	233	221	222	224	223	225	222	224	234	225	223	222	224
1927–28	221	213	213	215	224	227	233	236	246	238	221	205	220
1928–29	209	228	235	239	245	255	249	245	245	248	276	279	233
1929–30	323	332	324	322	308	305	292	292	268	271	232	200	292
1930–31	190	180	165	161	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. The figures shown for 1909–1920 are averages of daily closing prices compiled from annual reports of the Minneapolis Chamber of Commerce; 1921 to date are averages of daily prices weighted by car-lot sales, compiled from Minneapolis Daily Market Record. Data 1899–1908 available in 1924 Yearbook, p. 646, Table 125.

TABLE 113.—*Linseed oil, raw: Average car-lot price per gallon in barrels, New York, 1921–22 to 1930–31*

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	74	68	67	67	72	82	82	84	90	84	89	87	79
1922–23	88	89	88	89	89	95	102	116	115	112	104	97	99
1923–24	90	94	92	92	92	91	93	90	94	94	98	102	94
1924–25	102	102	108	110	117	116	111	104	105	106	98	102	107
1925–26	103	[1] 99	96	95	87	85	80	81	81	84	89	90	89
1926–27	83	81	81	80	79	78	77	81	84	84	80	80	81
1927–28	77	74	73	72	74	74	74	74	78	77	75	73	75
1928–29	74	76	77	75	75	76	76	76	77	79	92	96	79
1929–30	116	118	111	110	105	105	105	106	105	105	104	97	107
1930–31	78	74	70	68	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Oil, Paint, and Drug Reporter, average of weekly ranges. Data for 1910–11 to 1920–21 are available in the 1930 Yearbook, p. 666, Table 103.

[1] Beginning October, 1925, prices are quoted on pound basis and have been converted to price per gallon by multiplying by 7.5.

TABLE 114.—*Linseed oil: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year									
	Average 1909-1913		1926		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Netherlands	457	73, 634	914	164, 911	579	150, 621	1, 187	155, 926	1, 320	172, 702
Belgium	10, 233	26, 790	4, 054	15, 114	759	21, 009	2, 123	24, 453	2, 944	29, 695
Sweden	933	5	905	1, 019	560	1, 189	580	1, 436	912	1, 751
PRINCIPAL IMPORTING COUNTRIES:										
United Kingdom	58, 018	58, 013	31, 924	51, 336	47, 815	44, 628	50, 165	49, 327	69, 418	44, 925
Germany	5, 231	4, 377	41, 826	6, 701	44, 057	5, 525	29, 188	10, 342	42, 216	14, 277
United States	2, 605	4, 105	15, 041	2, 567	946	2, 525	173	1, 965	9, 961	2, 208
France	3, 382	10, 931	15, 480	4, 121	5, 666	4, 400	7, 033	4, 829	3, 546	5, 665
Switzerland	7, 825	16	13, 033	25	14, 234	4	14, 771	73	13, 341	27
Brazil	8, 726	0	10, 285	0	8, 666	0	10, 204	0	------	0
Austria	[1] 16, 367	[1] 6, 542	8, 807	437	8, 956	591	10, 455	510	[2] 9, 148	[2] 363
Australia [2]	12, 252	0	5, 802	36	4, 575	10	5, 186	19	3, 031	18
Finland	812	0	5, 154	0	5, 954	0	6, 507	0	4, 717	0
Union of South Africa	3, 449	0	4, 804	0	4, 259	0	5, 082	0	5, 014	0
Egypt	3, 647	0	5, 211	4	4, 825	2	5, 054	1	4, 686	0
Dutch East Indies	[3] 3, 199	0	4, 683	0	5, 034	0	5, 505	0	5, 529	0
New Zealand	4, 188	0	5, 216	5	2, 869	0	3, 667	0	3, 521	0
Hungary	(4)	(4)	3, 871	16	6, 398	15	5, 700	1	1, 296	0
Norway	1, 609	[2] 31	3, 591	27	3, 148	17	3, 191	28	4, 304	[2] 168
Italy	1, 042	165	1, 604	400	4, 227	427	7, 446	358	3, 455	373
Chile	2, 854	15	2, 802	0	2, 639	------	2, 533	------	3, 474	------
British India	3, 430	1, 967	2, 168	414	1, 885	547	2, 392	576	1, 874	1, 259
Yugoslavia	(1)	(4)	57	188	1, 788	7	1, 633	31	1, 080	4
Czechoslovakia	(4)	(4)	2, 227	6	1, 098	40	811	11	675	1, 155
Canada	2, 279	0	937	56	738	53	734	53	1, 342	18
Denmark	------	------	1, 675	30	1, 972	314	2, 379	1, 197	2, 272	441
Philippine Islands	809	0	952	0	1, 155	0	1, 560	0	1, 636	0
Greece	246	0	312	0	280	0	453	0	301	0
Tunis	[2] 427	0	638	0	629	0	[2] 792	0	[2] 733	0
Argentina	886	[5] 2	715	391	587	238	653	128	746	65
Total, 29 countries	154, 906	186, 593	194, 688	247, 804	186, 298	232, 162	187, 157	251, 264	202, 492	275, 114

Bureau of Agricultural Economics. Official sources except where otherwise noted. Conversions made on the basis of 7.5 pounds to the gallon.

*Preliminary.
[1] Average for Austria-Hungary.
[2] International Yearbook of Agricultural Statistics.
[3] 2-year average.
[4] Figures for pre-war years are included in the countries of the pre-war boundaries.
[5] 4-year average.

TABLE 115.—*Linseed meal: Average wholesale price per ton, Minneapolis, 1921–22 to 1930–31*

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	42. 84	39. 08	41. 38	47. 00	48. 00	50. 86	55. 81	54. 38	53. 23	51. 00	48. 28	46. 44	48. 19
1922–23	43. 32	50. 46	53. 65	54. 88	57. 62	55. 23	49. 19	47. 00	45. 81	41. 88	43. 84	49. 28	49. 35
1923–24	52. 21	52. 78	50. 92	49. 76	49. 31	45. 74	45. 10	43. 20	42. 58	44. 44	47. 16	48. 73	47. 66
1924–25	48. 08	50. 00	48. 86	50. 58	51. 31	49. 91	45. 08	43. 68	45. 96	47. 63	47. 98	49. 08	48. 18
1925–26	47. 78	46. 96	47. 35	48. 72	50. 09	52. 70	50. 37	52. 44	53. 60	50. 69	50. 86	49. 54	50. 09
1926–27	47. 83	46. 56	46. 11	46. 91	47. 76	48. 12	51. 31	51. 82	50. 84	49. 12	48. 00	48. 72	48. 59
1927–28	49. 50	48. 46	48. 00	48. 00	50. 92	52. 00	53. 30	54. 06	57. 44	55. 33	52. 82	49. 17	51. 58
1928–29	49. 75	57. 33	59. 00	61. 43	60. 85	63. 29	61. 29	58. 52	58. 99	55. 39	56. 31	56. 31	58. 20
1929–30	59. 57	60. 00	59. 31	58. 66	57. 66	55. 80	54. 01	58. 56	52. 41	48. 48	46. 44	45. 69	54. 72
1930–31	45. 75	43. 83	42. 45	42. 06	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Minneapolis Daily Market Record. Prices are simple averages of daily quotations. Data for 1909–10 to 1920–21 are available in the 1930 Yearbook, p. 667, Table 104.

TABLE 116.—*Rice, rough: Acreage, production, value, exports, etc., United States, 1909–1930*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Foreign trade, mostly cleaned rice but including rice bran, meal, and broken rice, year beginning July 1 [1]: Domestic exports	Shipments from United States to Alaska, Hawaii, and Porto Rico	Imports	Net balances [2]
	1,000 acres	*Bushels of 45 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	*610*	*35.8*	*21,839*						
1909	610	33.8	20,607	79.5	16,392	964	4,276	8,114	−2,581
1910	723	33.9	24,510	67.8	16,624	1,082	4,606	7,516	−1,605
1911	696	32.9	22,934	79.7	18,274	1,420	4,890	6,842	−157
1912	723	34.7	25,054	93.5	23,423	1,401	4,806	7,996	−1,332
1913	827	31.1	25,744	85.8	22,090	807	5,244	10,447	−3,756
1914	694	34.1	23,649	92.4	21,849	2,789	4,640	9,979	−419
1915	803	36.1	28,947	90.6	26,212	4,391	5,191	9,516	+2,651
1916	869	47.0	40,861	88.9	36,311	6,529	5,818	7,778	+6,167
1917	981	35.4	34,739	189.6	65,879	7,069	4,878	16,418	−1,148
1918	1,119	34.5	38,606	191.8	74,042	6,953	5,995	13,094	+7,638
1919	*911*	*38.8*	*35,331*						
1919	1,063	39.5	41,985	266.6	111,913	17,402	5,547	6,477	+19,948
1920	1,336	39.0	52,066	119.1	62,036	15,871	6,614	3,485	+21,217
1921	921	40.8	37,612	95.2	35,802	19,494	7,179	2,650	+25,952
1922	1,055	39.2	41,405	93.1	38,562	13,344	8,290	2,503	+20,308
1923	895	37.7	33,717	110.2	37,150	8,199	9,094	1,376	+16,416
1924	*744*	*39.7*	*29,526*						
1924	850	37.9	32,206	138.6	44,644	4,033	8,152	2,076	+10,687
1925	883	37.7	33,249	153.8	51,142	1,734	8,049	4,747	+5,535
1926	1,034	41.1	42,477	109.6	46,544	10,957	8,743	2,568	+17,587
1927	1,003	44.6	44,754	92.9	41,598	11,152	9,183	1,588	+19,035
1928	956	45.4	43,440	88.5	38,456	14,137	10,131	1,325	+23,403
1929	868	46.6	40,462	97.7	39,536	10,401	10,342	1,124	+19,773
1930 [3]	960	43.1	41,367	76.4	31,623				

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, p. 819, for data for earlier years.

[1] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1930, and official records of the Bureau of Foreign and Domestic Commerce.

[2] The difference between the total exports (domestic exports plus reexports plus shipments to Alaska, Hawaii, and Porto Rico) and total imports. Net exports indicated by +; net imports indicated by −.

[3] Preliminary.

TABLE 117.—*Rice, in terms of cleaned rice: World production, 1909–10 to 1930–31*

Crop year	Estimated world production, exclusive of China	Production in selected countries [1]							
		India	Japan	Indo-China	Java and Madura [2]	Siam [3]	Chosen	Philippines	United States
	1,000,000 pounds	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*
1909–10	107,000	63,869	16,474		5,723	3,734	2,343	1,164	572
1910–11	106,000	64,552	14,650		5,738	3,466	3,269	1,267	681
1911–12	109,000	63,943	16,246		6,170	4,533	3,634	717	637
1912–13	109,000	63,802	15,778	6,614	5,842	4,561	3,413	1,512	696
1913–14	113,000	64,555	15,789	8,051	6,440	4,994	3,804	1,404	715
1914–15	113,000	61,109	17,909	9,521	6,339	4,708	4,439	1,100	657
1915–16	124,000	73,315	17,569	7,921	6,451	4,786	4,036	1,289	804
1916–17	129,000	78,521	18,363	6,733	6,409	5,011	4,377	1,745	1,135
1917–18	132,000	80,559	17,143	6,313	6,742	5,133	4,261	2,210	965
1918–19	105,000	54,466	17,184	6,302	6,831	4,642	4,765	2,085	1,072
1919–20	123,000	71,734	19,107	6,532	7,435	3,114	3,974	2,243	1,166
1920–21	117,000	61,949	19,857	6,284	6,250	5,868	4,639	2,560	1,446
1921–22	127,000	74,240	17,335	7,931	5,625	5,806	4,500	2,681	1,045
1922–23	133,000	75,495	19,067	7,629	6,864	5,954	4,717	2,703	1,150
1923–24	118,000	63,164	17,418	7,206	6,832	6,034	4,767	2,566	937
1924–25	127,000	69,601	17,960	7,801	7,077	6,779	4,153	2,818	895
1925–26	127,000	68,851	18,756	7,951	6,677	5,752	4,641	2,949	924
1926–27	126,000	66,483	17,465	8,255	7,108	7,169	4,807	3,083	1,180
1927–28	127,000	63,244	19,510	8,833	7,272	6,261	5,435	3,082	1,243
1928–29 [4]	130,000	71,989	18,945	7,826	7,006	5,325	4,245	3,073	1,207
1929–30 [4]	127,000	69,102	18,763	8,045	6,853	5,315	4,304		1,124
1930–31 [4]			20,516		7,275		6,062		1,149

Bureau of Agricultural Economics. Production figures are for the harvesting season which begins in the spring, extends through the calendar year in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere. Estimates of world rice production for the period 1900–1901 to 1909–1910 appear in Agriculture Yearbook, 1924, p. 653.

[1] China is an important producing country, but official statistics are not available.
[2] Irrigated rice.
[3] Estimated figures obtained by multiplying acreage under rice as classified for revenue purposes up to 1912–13, and acreage as reported by the Department of Land and Agriculture from 1912–13 on by an average yield for the years 1920–21 to 1923–24, for which years official estimates have been published of acreage, yield, and total production.
[4] Preliminary.

TABLE 118.—*Rice, rough: Acreage and production, by States, average 1924–1928, annual 1927–1930*

State and division	Acreage					Production				
	Average, 1924–1928	1927	1928	1929	1930 [1]	Average, 1924–1928	1927	1928	1929	1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Missouri	6	3	10	1	1	287	75	400	35	45
Arkansas	175	175	164	156	172	8,097	7,700	7,823	7,956	7,912
Louisiana	472	500	487	472	491	16,944	20,000	18,896	18,833	17,676
Texas	160	165	163	144	186	6,952	8,019	8,150	7,416	8,463
United States except California	813	843	824	773	850	32,280	35,794	35,269	34,240	34,096
California	127	160	132	95	110	6,856	8,960	8,171	6,222	7,271
United States	940	1,003	956	868	960	39,137	44,754	43,440	40,462	41,367

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 119.—*Rice: Acreage, yield per acre, and production in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1928–29 to 1930–31*

Country	Acreage					Yield per acre					Production, in terms of cleaned rice				
	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1928–29	1929–30	1930–31*
NORTHERN HEMISPHERE	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*
United States	716	921	956	868	960	922	1,075	1,263	1,295	1,197	660	990	1,207	1,124	1,149
Mexico	[1] 66	[2] 95	112	90		[1] 515	[2] 779	1,009	1,033		[1] 34	[2] 74	113	93	
Hawaii	[1] 9	[3] 6	3								[1] 26	[1] 18	10		
Central America, South America, and West Indies:															
Guatemala		6	3	3							[3] 2	3	2	2	
Salvador		[2] 13									[1] 9	[2] 17			
Costa Rica	[1] 7	[4] 17	16	14			[3] 294	125				[3] 5	2		
Colombia	[5] 15	[3] 42	46			[5] 1,133	[3] 500	478			[5] 17	[3] 21	22		
Ecuador												[3] 41			
British Guiana	36	45	56	63		1,500	1,178	1,446	1,460		54	53	81	92	
Dutch Guiana											2	14	18	24	
Porto Rico	[1] 16					[1] 250					[1] 4				
Trinidad and Tobago	[4] 12	[2] 8	7	9								[2] 3		14	
Europe:															
Spain	94	115	121	119	120	3,191	3,270	3,264	3,471	3,617	300	376	395	413	434
Portugal	[5] 17	18	30	35		[5] 1,353	1,222	900	857		[5] 23	22	27	30	
Italy	358	316	333	339	346	1,804	2,316	2,580	2,705	2,595	646	732	859	917	898
Yugoslavia	[6] 5	4	4	4	4						[6] 3	3	3	3	
Bulgaria	7	11	18	22	18			1,278	1,273	1,556	9	14	23	28	28
French West Africa:															
French Guinea		[3] 2,008	1,977				[3] 487	551				[4] 978	1,089		
French Senegal		119	111	77			546	532	597			65	59	46	
Upper Volta		[2] 44		12			[2] 136		167			[2] 6	3	2	
Sierra Leone	[7] 250	390	400			[7] 828	797	932			[7] 207	311	373		
Egypt	257	192	264			2,132	1,536	1,731			548	295	457		
Asia:															
Turkey [8]	[1] 153					[1] 1,118					[1] 171				
India	67,004	81,400	83,020	79,906		957	863	867	865		64,144	70,270	71,989	69,102	
Andaman and Nicobar		3	4	4								3	2	4	
British North Borneo	[7] 64	62	71	77		[7] 594	677	577	597		[7] 38	42	41	46	
Brunei		[2] 3	4	5								[4] 2	3	2	
French Establishments in India	40	45	47	48		650	644	574	729		26	29	27	35	

Japanese Empire—															
Japan	7,300	7,705	7,822	7,848	7,940	2,163	2,350	2,422	2,391	2,584	15,787	18,107	18,945	18,763	20,516
Chosen (Korea)	2,905	3,824	3,720	4,000	3,970	1,134	1,191	1,141	1,076	1,527	3,293	4,556	4,245	4,304	6,062
Taiwan (Formosa)	1,193	1,262	1,447	1,403	1,517	1,184	1,384	1,475	1,451		1,413	1,747	2,135	2,036	
Kwantung	1	3	2	2							1	3	3	4	
French Indo-China	[3] 8,550	11,949	13,608	13,603		[3] 858	645	575	591		[3] 7,332	7,704	7,826	8,045	
Siam	4,555	5,964	5,895	6,041		935	1,017	903	880		4,258	6,065	5,325	5,315	
Federated Malay States	[3] 124	197		130		[3] 637	629				[3] 79	124	106		
Unfederated Malay States		407	439				698	547				284	240		
Straits Settlements	93	72		71			1,042		817			75	79	58	
Philippine Islands	2,817	4,229	4,387			431	649	700			1,213	2,744	3,073		
Ceylon	695	799	834	800		587	589	638	798		408	471	532	638	
SOUTHERN HEMISPHERE															
Brazil		[4] 1,029	1,508				[4] 1,004	955			[1] 90	[4] 1,033	1,440		
Argentina	[3] 8	16	7				1,188				[3] 8	19	9		
Belgian Congo		27	38				222	211				6	8		
Madagascar	[2] 1,009	[4] 1,298	1,273	1,383		[2] 888	1,018	773	605		[2] 896	[4] 1,322	984	837	
Java and Madura:															
Irrigated	5,953	7,135	7,543	7,382		1,005	927	929	928		5,983	6,615	7,006	6,853	7,275
Nonirrigated	[9] 950	879	1,173	1,077		[9] 474	501	564	552		[9] 450	440	662	595	
Total, Java and Madura	6,903	8,014	8,716	8,459		932	880	880	880		6,433	7,055	7,668	7,448	
Fiji Islands	[2] 12	11	12								[2] 23	7	19		
Total, countries reporting acreage and production, all periods	11,380	12,892	12,970	13,196	13,354						20,695	24,775	25,674	25,549	29,087
Estimated world total, exclusive of China											109,000	126,000	130,000	127,000	

Bureau of Agricultural Economics. Official Sources and International Institute of Agriculture. Yields have not been calculated when total acreage is below 15,000 acres. Acreage and production figures are for the harvesting season which begins in the spring, extends through the calendar year in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

* Preliminary.
[1] 1 year only.
[2] 3-year average.
[3] 2-year average.
[4] 4-year average.
[5] Year 1915–16.
[6] Pre-war average.
[7] Year 1914–15.
[8] European Turkey included.
[9] Rough estimate for nonirrigated rice.

TABLE 120.—*Rice, rough: Yield per acre, average 1919–1928 and annual 1925–1930, and estimated price per bushel December 1, average 1924–1928 and annual 1925–1930, by States*

State	Yield per acre							Estimated price per bushel Dec. 1						
	Average 1919–1928	1925	1926	1927	1928	1929	1930	Average, 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Missouri	[1]48.4	75.0	61.0	25.0	40.0	35.0	45.0	114	140	110	90	90	95	85
Arkansas	46.6	43.0	53.0	44.0	47.7	51.0	46.0	113	150	100	90	86	92	73
Louisiana	35.6	33.3	32.5	40.0	38.8	39.9	36.0	114	153	105	87	90	98	75
Texas	38.9	38.0	41.5	48.6	50.0	51.5	45.5	112	149	110	86	88	97	77
California	54.0	46.6	53.6	56.0	61.9	65.5	66.1	134	170	131	115	88	105	83
United States	40.5	37.9	41.3	44.6	45.4	46.6	43.1	116.7	[2]153.8	[2]109.6	92.9	88.5	97.7	76.4

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 7-year average.
[2] Includes South Carolina, Georgia, and Mississippi.

TABLE 121.—*Rice, rough: Receipts at mills in Texas, Louisiana, Arkansas, and Tennessee, by months, 1914–15 to 1930–31*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
	1,000 bbls.	*1,000 bbls.*	*1,000 bbls.*	*1,000 bbls.*	*1,000 bbls.*	*1,000 bbls.*	*1,000 bbls.*	*1,000 bbls.*	*1,000 bbls.*	*1,000 bbls.*	*1,000 bbls.*	*1,000 bbls.*
1914–15	232	554	990	1,111	952	565	539	219	91	43	49	9
1915–16	135	710	1,178	1,443	574	780	605	376	171	69	9	2
1916–17	305	850	1,651	1,828	970	510	719	1,038	327	35	20	23
1917–18	168	686	1,539	1,467	556	604	850	719	286	63	56	6
1918–19	188	1,045	978	1,422	1,388	957	387	309	310	222	71	22
1919–20	135	772	1,327	1,468	1,318	912	368	277	226	122	147	59
1920–21	260	651	1,344	2,234	1,055	647	473	825	973	1,144	439	385
1921–22	614	768	1,178	856	885	967	993	1,302	309	91	45	21
1922–23	340	909	1,913	1,780	1,272	952	392	396	529	137	185	104
1923–24	177	394	1,512	1,911	966	1,076	580	370	80	14	9	6
1924–25	298	949	2,182	1,905	973	448	197	43	34	11	45	8
1925–26	457	853	925	1,131	1,672	1,019	477	210	194	119	106	74
1926–27	188	1,147	1,681	1,253	1,053	818	648	621	372	396	430	147
1927–28	530	1,167	1,719	1,266	831	853	805	942	620	352	130	17
1928–29	180	1,197	2,113	1,936	947	621	592	439	429	232	191	126
1929–30	584	1,388	2,330	1,416	797	870	961	284	146	172	48	21
1930–31	508	1,084	2,063	1,257	844							

Bureau of Agricultural Economics. Compiled from monthly reports of the Rice Miller's Association.

Table 122.—*Rice, including flour, meal, and broken rice: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year									
	Average, 1909–1913		1926		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*
British India	278	5,338	190	5,271	148	5,005	553	4,024	194	4,600
Siam [1]	0	1,929	4	2,906	0	3,820	0	3,289	-------	-------
Indo-China	0	2,288	0	3,503	0	3,619	0	3,885	0	[2] 2,921
Italy	4	142	0	401	2	579	6	424	6	388
United States	210	16	117	117	48	310	37	379	31	386
Madagascar	0	[2] 14	0	49	0	23	0	25	0	16
Spain	5	18	0	142	0	118	0	131	0	[3] 86
Brazil	25	0	10	17	0	37	5	2	2	15
PRINCIPAL IMPORTING COUNTRIES										
China	705	0	2,493	4	2,812	12	1,688	4	1,443	4
British Malaya	[2] 2,000	[2] 1,299	1,987	661	2,185	693	2,091	659	2,079	545
Japan	656	62	768	14	1,300	12	623	9	401	8
Dutch East Indies	1,178	132	1,390	96	1,037	33	1,289	30	[2] 1,621	[2] 25
Ceylon	822	0	1,030	0	1,051	0	1,091	0	1,100	0
Germany	914	397	766	344	757	294	883	280	658	256
France	518	79	478	105	486	170	631	256	562	215
Cuba	262	0	477	0	436	0	513	0	[2] 460	0
United Kingdom	769	91	244	18	267	17	280	14	258	12
Netherlands	779	476	330	285	262	203	225	187	246	211
Philippine Islands	413	0	155	1	28	2	96	2	232	1
Mauritius	133	[3] 1	117	0	131	0	141	0	[2] 121	0
Argentina	93	6	127	0	154	0	117	0	[2] 146	0
Russia	250	6	[2] 83	0	[2] 149	0	[2] 124	0	[2] 103	0
Czechoslovakia	(4)	(4)	107	0	120	0	116	0	107	0
Belgium	181	100	83	4	100	4	102	3	87	5
Egypt	99	54	97	40	32	83	31	168	36	163
Austria	[5] 183	0	54	0	59	0	62	0	[2] 63	0
Yugoslavia	(4)	(4)	47	0	54	0	71	0	56	1
Canada	32	2	39	2	43	1	47	0	42	1
Hungary	(4)	(4)	12	4	7	5	5	3	5	3
Total, 29 countries	10,509	12,450	11,205	13,984	11,668	15,040	10,827	13,774	10,059	9,862

Bureau of Agricultural Economics. Official sources except where otherwise noted. Mostly cleaned rice. Under rice is included paddy, unhulled, rough, cleaned, polished, broken, and cargo rice, in addition to rice flour and meal. Rice bran is not included. Rough rice, or paddy, where specifically reported, has been reduced to terms of cleaned rice at the ratio of 162 pounds of rough or unhulled to 100 pounds of cleaned. "Rice, other than whole or cleaned rice," in the returns of the United Kingdom is not considered paddy, since the chief sources of supply indicate that it is practically all hulled rice. Cargo rice, a mixture of hulled and unhulled, is included without being reduced to terms of cleaned. Broken rice and rice flour and meal are taken without being reduced to terms of whole cleaned rice.

*Preliminary.
[1] Fiscal year Apr. 1–Mar. 31.
[2] International Yearbook of Agricultural Statistics.
[3] 2-year average.
[4] Figures for pre-war years are included in the countries of the pre-war boundaries.
[5] Average for Austria-Hungary.

TABLE 123.—*Rice, Blue Rose, clean:*[1] *Average wholesale price per 100 pounds, New Orleans, 1914–15 to 1930–31*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1914–15			3.62	3.06	3.16	3.56	3.75	3.50	4.10	4.06	3.47	3.88	
1915–16	3.88	3.38	3.06	2.87	2.97	2.75	3.06	3.38	3.56	3.68	3.81	3.40	3.32
1916–17	3.40	3.31	3.00	3.31	3.16	3.18	3.31	3.87	4.94	6.18	6.13	6.25	4.17
1917–18	4.75	6.81	6.32	6.56	5.94	6.41	6.64	7.56	8.19	8.94	8.90	8.94	7.15
1918–19	7.88	6.75	6.56	6.44	6.06	5.94	5.94	5.83	5.63	5.25	8.00	10.82	6.76
1919–20		9.00	8.44	8.44	9.25	9.81	10.19	10.38	10.12	9.50	9.19	8.00	
1920–21	7.25	6.25	5.38	4.62	3.44	3.00	2.50	2.38	2.25	2.40	2.56	3.06	3.76
1921–22	3.19	3.50	3.78	3.69	3.12	3.10	3.18	3.44	3.56	3.60	4.31	4.38	3.57
1922–23	4.10	4.25	3.62	3.82	4.00	4.06	3.94	3.91	4.00	3.56	3.75	3.94	3.91
1923–24	3.78	4.00	4.88	4.66	4.38	4.62	4.69	5.06	5.06	5.88	6.12	6.19	4.94
1924–25	5.88	5.69	5.12	5.50	6.10	6.30	6.50	6.38	6.34	6.50	6.81	6.88	6.17
1925–26	6.62	6.31	5.69	6.34	6.41	6.31	6.59	6.25	6.19	5.60	5.94	5.94	6.18
1926–27	4.94	5.62	4.81	4.44	4.38	4.50	4.19	4.34	4.06	4.12	4.52	4.22	4.51
1927–28	4.12	4.12	3.84	3.62	3.69	3.75	3.66	3.62	3.50	4.12	4.28	4.12	3.87
1928–29	4.12		3.91	3.81	3.94	4.12	3.88	3.88	3.88	3.75	3.81	3.94	
1929–30	4.25	3.72	3.78	3.88	3.84								
1930–31													

Bureau of Agricultural Economics. Compiled from annual reports of the New Orleans Board of Trade.

[1] The term "clean" is equivalent to "milled."

TABLE 124.—*Buckwheat: Acreage, production, value, exports, etc., United States, 1909–1930*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Foreign trade, including flour, year beginning July 1[1]		
						Domestic exports	Imports	Net balance[2]
	1,000 acres	*Bushels of 48 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	*878*	*16.9*	*14,849*					
1909	878	20.5	17,983	70.2	12,628	158	11	+147
1910	860	20.5	17,598	66.1	11,636		92	−92
1911	833	21.1	17,549	72.6	12,735		21	−21
1912	841	22.9	19,249	66.1	12,720	1	64	−63
1913	805	17.2	13,833	75.5	10,445	1	206	−205
1914	792	21.3	16,881	76.4	12,892	414	259	+155
1915	769	19.6	15,056	78.7	11,843	515	402	+113
1916	828	14.1	11,662	112.7	13,147	260	266	−6
1917	924	17.3	16,022	160.0	25,631	6	510	−504
1918	1,027	16.5	16,905	166.5	28,142	119	413	−294
1919	*743*	*17.1*	*12,690*					
1919	700	20.6	14,399	146.1	21,032	245	160	+85
1920	701	18.7	13,142	128.3	16,863	399	336	+63
1921	680	20.9	14,207	81.2	11,540	485	113	+372
1922	764	19.1	14,564	88.5	12,889	172	286	−114
1923	739	18.9	13,965	93.3	13,029	92	322	−230
1924	*717*	*16.8*	*12,004*					
1924	745	17.9	13,357	102.6	13,708	191	546	−355
1925	747	18.7	13,994	88.8	12,423	79	88	−9
1926	694	18.3	12,676	88.2	11,183	66	86	−20
1927	810	19.5	15,755	83.5	13,155	554	74	+480
1928	749	17.6	13,148	87.5	11,511	229	79	+150
1929	729	15.7	11,474	97.7	11,210	22	171	−149
1930[3]	658	13.6	8,975	84.5	7,588			

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, p. 825, for data for earlier years.

[1] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929 and official records of the Bureau of Foreign and Domestic Commerce. Buckwheat and buckwheat flour—imports for consumption, 1909–1929. Buckwheat flour converted to terms of grain on the basis that 1 barrel of flour is the product of 7 bushels of grain.

[2] The difference between total exports (domestic exports plus reexports) and total imports. Net exports indicated by +; net imports indicated by −.

[3] Preliminary.

TABLE 125.—*Buckwheat: Acreage harvested and production, by States, average 1924–1928, annual 1927–1930*

State and division	Acreage harvested: Average, 1924–1928	1927	1928	1929	1930 [1]	Production: Average, 1924–1928	1927	1928	1929	1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	14	14	13	12	10	328	322	299	336	230
Vermont	2	2	2	2	2	56	52	48	50	40
New York	209	201	192	198	210	4,098	4,221	3,475	3,168	3,465
New Jersey	2	1	1	1	1	39	21	20	18	18
Pennsylvania	201	210	195	199	199	4,179	4,935	3,802	3,383	2,488
North Atlantic	428	428	403	412	422	8,700	9,551	7,644	6,955	6,241
Ohio	29	28	35	38	27	538	588	700	673	432
Indiana	17	15	15	15	10	258	255	225	218	135
Illinois	5	6	5	5	4	77	97	70	75	48
Michigan	51	53	48	45	22	717	689	720	405	143
Wisconsin	25	23	25	21	20	380	382	412	304	270
Minnesota	80	126	88	70	56	1,100	1,764	1,074	812	532
Iowa	7	15	6	8	4	110	195	87	96	52
Missouri	1	1	1	1	1	15	20	13	15	15
North Dakota	9	11	10	5	5	115	160	145	30	20
South Dakota	13	18	19	16	8	192	279	276	152	56
Nebraska	1	1	1	1	1	13	15	10	11	8
North Central	238	297	253	225	158	3,515	4,444	3,732	2,791	1,711
Delaware	2	2	2	2	2	40	37	34	36	20
Maryland	7	8	7	7	7	153	176	133	126	91
Virginia	16	14	17	15	15	301	294	326	292	192
West Virginia	36	39	40	40	30	696	858	800	760	390
North Carolina	10	10	10	11	8	186	200	190	220	120
South Atlantic	72	73	76	75	62	1,377	1,565	1,483	1,434	813
Kentucky	9	9	14	14	13	141	144	238	252	162
Tennessee	3	3	3	3	3	53	51	51	42	48
South Central	12	12	17	17	16	194	195	289	294	210
United States	749	810	749	729	658	13,786	15,755	13,148	11,474	8,975

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 126.—*Buckwheat: Yield per acre, average 1919–1928 and annual 1925–1930, and estimated price per bushel December 1, average 1924–1928, and annual 1925–1930, by States*

State and division	Yield per acre							Estimated price per bushel Dec. 1						
	Average 1919–1928	1925	1926	1927	1928	1929	1930	Average 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	24.7	26.0	23.0	23.0	23.0	28.0	23.0	92	100	83	90	90	90	80
Vermont	22.4	22.0	23.0	26.0	24.0	25.0	20.0	96	90	85	96	105	110	85
New York	20.2	19.0	18.9	21.0	18.1	16.0	16.5	90	86	89	84	90	100	80
New Jersey	19.9	21.0	18.0	21.0	20.0	18.0	18.0	99	100	100	84	92	105	94
Pennsylvania	20.9	23.0	19.0	23.5	19.5	17.0	12.5	91	91	89	85	89	100	89
North Atlantic	20.6	21.0	19.1	22.3	19.0	16.9	14.8	90.8	89.0	88.7	84.8	89.6	99.6	83.7
Ohio	20.3	19.7	17.5	21.0	20.0	17.7	16.0	91	86	95	86	87	92	89
Indiana	16.3	13.2	16.0	17.0	15.0	14.5	13.5	91	85	95	85	85	95	89
Illinois	15.4	14.0	13.0	16.2	14.0	15.0	12.0	97	100	92	85	90	98	85
Michigan	14.4	13.7	15.3	13.0	15.0	9.0	6.5	85	90	80	80	79	85	83
Wisconsin	15.3	16.0	15.0	16.6	16.5	14.5	13.5	87	79	87	82	83	93	82
Minnesota	14.7	14.0	17.0	14.0	12.2	11.6	9.5	80	75	75	70	76	84	65
Iowa	15.3	17.5	18.0	13.0	14.5	12.0	13.0	90	90	82	85	90	95	89
Missouri	14.6	14.0	15.0	20.0	13.0	15.0	15.0	93	90	85	90	95	100	90
North Dakota	[1] 12.8	12.0	15.0	14.5	14.5	6.0	4.0	66	60	80	64	68	73	65
South Dakota	14.4	12.0	14.0	15.5	14.5	9.5	7.0	78	70	80	64	67	74	70
Nebraska	14.7	14.0	11.0	15.3	9.6	11.2	8.0	92	100	90	85	85	85	75
North Central	15.4	14.7	16.0	15.0	14.8	12.4	10.8	84.2	82.0	82.6	76.1	79.6	88.1	78.8
Delaware	17.1	16.0	16.0	18.5	17.0	18.0	10.0	95	92	90	95	95	100	95
Maryland	20.8	24.0	20.2	22.0	19.0	18.0	13.0	100	100	100	93	95	100	95
Virginia	19.6	16.0	22.0	21.0	19.2	19.5	12.8	100	110	95	93	95	99	98
West Virginia	20.0	18.0	19.0	22.0	20.0	19.0	13.0	101	100	100	97	97	110	106
North Carolina	18.9	14.0	22.0	20.0	19.0	20.0	15.0	106	110	100	100	100	107	98
South Atlantic	19.6	17.5	20.1	21.4	19.5	19.1	13.1	101.0	102.8	98.6	96.1	96.7	106.1	101.4
Kentucky	15.8	12.5	17.0	16.0	17.0	18.0	12.5	95	100	84	86	86	102	90
Tennessee	17.2	15.0	20.0	17.0	17.0	14.0	16.0	106	115	100	90	100	110	100
South Central	16.2	13.3	17.8	16.2	17.0	17.3	13.1	98.2	105.3	88.8	87.2	88.6	103.1	92.4
United States	19.0	18.7	18.3	19.5	17.6	15.7	13.6	90.1	88.8	88.2	83.5	87.5	97.7	84.5

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 5-year average.

TABLE 127.—*Buckwheat: Estimated average price per bushel, received by producers, United States, 1921–1930*

Crop year	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	110.2	95.0	82.6	82.4	84.4	85.6	89.2	93.0	95.4	100.0	99.2	91.0	89.1
1922–23	85.2	82.2	84.4	89.0	88.5	88.6	92.6	95.0	98.4	102.3	101.4	99.4	89.9
1923–24	96.6	94.2	93.4	94.7	92.7	92.5	94.7	93.6	97.0	96.5	104.5	123.9	96.3
1924–25	118.8	107.1	106.8	104.6	107.0	112.2	112.4	104.1	113.3	112.3	115.7	110.0	108.6
1925–26	101.2	87.6	86.7	87.9	85.7	80.9	81.7	82.5	85.0	90.1	89.9	93.7	87.5
1926–27	90.4	86.5	83.6	83.5	83.6	84.6	86.0	85.1	88.1	98.8	101.0	98.1	87.0
1927–28	92.3	82.9	79.4	81.0	82.0	85.2	90.2	94.8	102.3	109.0	108.0	98.1	87.6
1928–29	92.6	84.5	84.8	88.7	91.2	94.3	94.1	96.4	96.5	94.7	100.4	99.6	90.7
1929–30	96.6	95.8	95.6	95.9	97.3	95.8	94.9	94.8	95.7	100.0	98.3	97.4	96.3
1930–31	97.1	90.7	82.8	80.0									

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of buckwheat for each State; yearly price obtained by weighting monthly prices by average monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, September, 1909–December, 1923.

TABLE 128.—*Sorghums [1] for grain, forage, and all purposes: Acreage, production, value, United States, 1919–1930*

Year	For grain			For forage			For all purposes			Price per bushel received by producers Dec. 1 [2]	Farm value Dec. 1
	Acreage	Yield per acre	Production	Acreage	Yield per acre	Production	Acreage	Equivalent yield per acre	Equivalent production on total acreage		
	1,000 acres	*Bushels*	*1,000 bushels*	*1,000 acres*	*Tons*	*1,000 tons*	*1,000 acres*	*Bushels*	*1,000 bushels*	*Cents*	*1,000 dollars*
1919	3,775	28.0	105,858	2,666	2.10	5,603	6,441	24.5	157,805	128.1	202,094
1920	4,232	28.6	120,848	2,562	2.16	5,539	6,794	25.7	174,790	93.7	163,860
1921	3,920	25.9	101,506	2,465	1.99	4,900	6,385	23.1	147,609	39.0	57,576
1922	3,566	19.1	68,154	2,212	1.63	3,601	5,778	17.0	98,158	88.1	86,517
1923	4,403	19.2	84,505	2,258	1.72	3,895	6,661	17.4	116,109	95.0	110,258
1924	3,778	21.1	79,890	2,311	1.80	4,157	6,089	19.2	117,057	85.2	99,765
1925	4,076	18.3	74,467	2,564	1.61	4,118	6,640	16.0	106,434	75.4	80,251
1926	4,367	22.9	100,044	2,323	1.75	4,061	6,690	20.6	137,515	53.9	74,065
1927	4,394	22.8	100,364	2,329	2.06	4,800	6,723	20.4	137,358	61.6	84,614
1928	4,311	23.0	99,282	2,186	2.16	4,718	6,497	21.9	142,513	62.0	88,429
1929	3,403	18.7	63,484	2,518	1.81	4,560	5,921	17.0	100,845	71.0	71,617
1930 [3]	3,427	16.0	54,845	2,753	1.55	4,274	6,180	14.0	86,622	64.1	55,486

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Kafirs, milo, feterita, durra, etc.
[2] From 1919 to 1924, Nov. 15 price.
[3] Preliminary.

TABLE 129.—*Sorghums: [1] Acreage and production, by States, average 1924–1928, annual 1927–1930*

State	Acreage for all purposes					Production for all purposes				
	Average, 1924–1928	1927	1928	1929	1930 [2]	Average, 1924–1928	1927	1928	1929	1930 [2]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Missouri	95	113	99	89	95	1,820	2,712	2,178	1,513	1,710
Nebraska	24	30	24	22	17	435	705	485	376	340
Kansas	1,391	1,547	1,284	1,091	1,100	25,896	32,487	28,633	19,638	14,300
Oklahoma	1,722	1,744	1,709	1,384	1,451	30,145	34,880	30,762	20,483	13,059
Texas	2,708	2,654	2,760	2,760	2,926	59,680	55,734	69,000	46,920	46,816
Colorado	249	284	256	205	211	2,247	2,840	2,688	2,255	2,848
New Mexico	189	171	188	203	206	3,477	2,394	3,384	4,466	1,689
Arizona	44	50	52	52	59	1,164	1,550	1,508	1,560	2,065
California	105	130	125	115	115	3,311	4,056	3,875	3,634	3,795
United States	6,528	6,723	6,497	5,921	6,180	128,175	137,358	142,513	100,845	86,622

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Kafirs, milo, feterita, durra, etc. [2] Preliminay

TABLE 130.—*Sorghums:*[1] *Yield per acre, average 1919–1928 and annual 1925–1930, and estimated price per bushel December 1, average 1924–1928, and annual 1925–1930, by States*

State	Yield per acre							Estimated price per bushel Dec. 1						
	Average, 1919–1928	1925	1926	1927	1928	1929	1930	Average, 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Missouri	21.1	15.0	18.0	24.0	22.0	17.0	18.0	90	100	80	75	80	100	80
Nebraska	19.3	15.0	10.6	23.5	20.2	17.1	20.0	82	75	80	80	85	100	80
Kansas	19.0	16.0	15.0	21.0	22.3	18.0	13.0	66	71	60	60	61	70	65
Oklahoma	17.5	12.5	19.0	20.0	18.0	14.8	9.0	62	75	45	50	62	65	60
Texas	23.8	18.0	25.0	21.0	25.0	17.0	16.0	69	76	55	65	60	70	65
Colorado	12.0	11.0	5.0	10.0	10.5	11.0	13.5	69	71	60	65	60	80	50
New Mexico	18.6	18.0	21.0	14.0	18.0	22.0	8.2	69	65	40	80	60	65	45
Arizona	26.9	20.0	31.0	31.0	29.0	30.0	35.0	82	66	60	75	80	95	70
California	30.7	34.0	32.0	31.2	31.0	31.6	33.0	103	107	84	97	90	100	70
United States	20.6	16.0	20.6	20.4	21.9	17.0	14.0	67.6	75.4	53.9	61.6	62.0	71.0	64.1

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Kafirs, milo, feterita, durra, etc.

TABLE 131.—*Grain sorghums:*[1] *Receipts at Kansas City, by months, 1909–10 to 1929–30*

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1909–10	106	50	125	150	161	45	32	20	12	8	5	4	718
1910–11	107	287	224	179	86	52	71	56	30	42	19	62	1,215
1911–12	202	323	255	410	191	198	186	121	75	46	62	103	2,172
1912–13	446	645	610	333	111	151	129	223	90	11	33	26	2,808
1913–14	22	53	133	72	25	15	16	15	3	1	9	42	406
1914–15	311	719	661	618	189	486	252	186	206	204	112	130	4,074
1915–16	367	1,116	1,200	936	866	682	625	256	202	104	85	24	6,463
1916–17	79	199	192	274	72	45	38	9	8	8	6	6	936
1917–18	88	278	464	385	506	322	98	107	40	29	9	7	2,333
1918–19	51	163	153	168	384	329	375	95	160	65	87	80	2,110
1919–20	22	233	745	721	741	449	540	817	768	235	160	123	5,554
1920–21	112	654	980	463	569	287	301	644	234	293	120	209	4,866
1921–22	263	350	471	537	392	312	199	212	150	84	35	120	3,125
1922–23	168	444	420	233	169	139	76	50	69	35	19	18	1,840
1923–24	195	350	465	579	398	340	274	262	250	106	63	103	3,385
1924–25	647	1,152	683	636	497	320	301	440	221	183	68	24	5,172
1925–26	279	629	416	290	261	211	290	469	162	94	136	97	3,334
1926–27	397	493	626	442	293	216	192	241	249	285	79	112	3,625
1927–28	410	905	696	519	592	392	323	343	224	87	51	236	4,778
1928–29	449	675	856	525	705	426	394	668	207	196	97	182	5,380
1929–30	294	626											

Bureau of Agricultural Economics. Compiled from annual statistical reports of Kansas City Board of Trade.

[1] Includes kafir corn, milo maize, and feterita. Quoted as kafir in Table 117, 1927 Yearbook.

TABLE 132.—*Grain sorghums: Classification of receipts graded by licensed inspectors, all inspection points*

TOTAL OF ALL CLASSES AND SUBCLASSES UNDER EACH GRADE, 1925-26 TO 1929-30

	Grade					
	No. 1	No. 2	No. 3	No. 4	Sample	Total
Year beginning July—	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1925-26	312	4,158	5,796	1,639	495	12,400
1926-27	878	7,180	6,674	1,792	691	17,215
1927-28	1,175	9,885	8,125	3,143	965	23,293
1928-29	866	7,247	5,400	6,794	3,969	24,276
1929-30	557	5,495	4,043	3,664	1,722	15,481

TOTAL INSPECTIONS, BY GRADE AND CLASS, JULY 1, 1929, TO JUNE 30, 1930

	No. 1	No. 2	No. 3	No. 4	Sample	Total
Kafir	278	3,349	1,620	1,664	645	7,556
Milo	258	1,776	1,990	1,368	695	6,087
Durra	1	1	0	1	0	3
Feterita	3	9	13	2	2	29
Darso	0	1	6	8	6	21
Freed sorgo	0	0	0	0	0	0
Brown kaoliang	0	0	0	0	1	1
White hegari	0	0	0	0	0	0
Schrock kafir	2	1	1	4	3	11
Shallu	0	0	0	0	0	0
Mixed	15	358	413	617	370	1,773

Bureau of Agricultural Economics.

TABLE 133.—*Kafir, No. 2 White: Weighted average price*[1] *per bushel of reported cash sales, Kansas City, 1921-22 to 1930-31*

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921-22	48	50	50	72	74	67	72	77	93	96	111	102	76
1922-23	100	91	89	90	93	96	99	94	84	83	(2)	(2)	------
1923-24	(2)	71	(2)	68	67	73	62	85	94	(2)	113	89	------
1924-25	88	98	109	103	93	92	97	105	113	116	107	100	101
1925-26	82	77	77	72	68	70	69	70	79	76	74	71	73
1926-27	64	64	63	63	65	69	79	102	110	97	(2)	70	------
1927-28	69	71	74	81	88	90	92	91	92	83	89	83	82
1928-29	78	74	75	80	71	71	71	74	89	90	105	81	77
1929-30	77	73	76	72	77	91	91	94	92	101	98	(2)	------
1930-31	63	61	------	------	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Kansas City Grain Market Review, formerly Daily Price Current. Quoted per 100 pounds; converted to bushels of 56 pounds. Data for 1909-1920 available in 1930 Yearbook, Table 123.

[1] Average of daily prices weighted by car-lot sales. [2] No quotations.

STATISTICS OF COTTON, SUGAR, AND TOBACCO

TABLE 134.—*Cotton: Acreage, production, value, exports, etc., United States, 1849, 1859, 1866–1930*

Year	Acreage harvested	Average yield per acre	Production [1]	Price per pound received by producers, Dec. 1	Farm value Dec. 1	Average price per pound, New York [2]	Domestic exports, year beginning Aug. 1 [3, 4, 5]	Imports, year beginning Aug. 1 [4, 6]	Net exports, year beginning Aug. 1 [3, 4, 5, 7]
	1,000 acres	*Lbs.*	*1,000 bales*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bales*	*1,000 bales*	*1,000 bales*
1849			*2,469*			12.34	[8] 1,271	[8] 1	[8] 1,270
1859			*5,387*			11.00	[8] 3,535	[8, 9] 4	[8] 3,531
1866	7,599	129.0	1,750			31.59	[8] 1,323	[8] 2	[8] 1,324
1867	7,828	189.8	2,340			24.85	1,511	2	1,510
1868	6,799	192.2	2,380			29.01	1,288	[9] 6	1,284
1869			*3,012*			23.98			
1869	7,743	196.9	*3,012*			23.98	1,980	4	1,977
1870	8,885	198.9	3,800			16.95	2,894	3	2,893
1871	7,558	148.2	2,553			20.48	1,851	7	1,844
1872	8,483	188.7	3,920			18.15	2,437	11	2,426
1873	9,510	179.7	3,683			17.00	2,706	5	2,702
1874	11,764	147.5	3,941			15.00	2,523	5	2,520
1875	11,934	190.6	5,123			13.00	3,003	5	2,999
1876	11,677	167.8	4,438	9.0	174,724	11,73	2,869	6	2,864
1877	12,133	163.8	4,370			11.28	3,198	7	3,194
1878	12,344	191.2	5,244	8.2	192,515	10.83	3,265	6	3,259
1879	*14,480*	181.0	*5,755*	10.3	269,305	12.02	3,711	7	3,705
1880	15,951	184.5	6,343	9.8	289,083	11.34	4,409	9	4,403
1881	16,711	149.8	5,456			12.16	3,430	9	3,426
1882	16,277	185.7	6,957	9.1	275,513	10,63	4,582	9	4,577
1883	16,778	164.8	5,701	9.1	250,977	10.64	3,745	15	3,734
1884	17,440	153.8	5,682	9.2	246,575	10.54	3,740	10	3,733
1885	18,301	164.4	6,575	8.4	251,775	9.44	4,193	11	4,185
1886	18,455	169.5	6,446	8.1	251,856	10.25	4,274	9	4,266
1887	18,641	182.7	7,020	8.5	290,901	10.27	4,557	11	4,547
1888	19,059	180.4	6,941	8.5	292,139	10.71	4,720	17	4,704
1889	*20,175*	159.7	*7,473*	8.5	275,249	11.27	4,934	19	4,915
1890	19,512	187.0	8,674	8.6	313,360	9.48	5,859	45	5,815
1891	19,059	179.4	9,018	7.2	247,633	7.68	5,888	61	5,827
1892	15,911	209.2	6,664	8.3	277,194	8.45	4,456	90	4,367
1893	19,525	149.9	7,493	7.0	204,983	7.75	5,309	58	5,253
1894	23,688	195.3	9,476	4.6	212,335	6.38	7,010	104	6,908
1895	20,185	155.6	7,161	7.6	238,503	8.10	4,710	115	4,598
1896	23,273	184.9	8,533	6.7	286,169	7.71	6,172	119	6,055
1897	24,320	182.7	10,898	6.7	296,816	6.40	7,757	102	7,656
1898	24,967	220.6	11,189	5.7	315,449	6.00	7,662	105	7,557
1899	*24,275*		*9,345*						
1899	24,327	183.8	*9,345*	7.0	326,215	8.36	6,228	140	6,091
1900	24,933	194.4	*10,123*	9.2	463,310	9.38	6,800	109	6,692
1901	26,774	170.0	*9,510*	7.0	334,088	8.73	6,949	202	6,750
1902	27,175	187.3	*10,631*	7.6	403,718	9.96	7,084	151	6,936
1903	27,052	174.3	*9,851*	10.5	516,763	12.84	6,207	103	6,107
1904	31,215	205.9	*13,438*	9.0	603,438	9.09	8,908	129	8,781
1905	27,110	186.6	*10,575*	10.8	569,791	11.30	7,118	144	6,980
1906	31,374	202.5	*13,274*	9.6	635,534	11.24	8,943	227	8,741
1907	29,660	179.1	*11,107*	10.4	575,226	11.53	7,666	153	7,518
1908	32,444	194.9	*13,242*	8.7	575,092	10.23	8,955	181	8,778
1909	*32,044*		*10,005*						
1909	30,938	154.3	*10,005*	13.9	697,681	14.66	6,353	170	6,194

Bureau of Agricultural Economics; italic figures are census returns; other acreage, yield, and production figures are estimates by the crop-reporting board; acreage revised on census basis.

[1] 500-pound gross weight bales, from 1899–1930.

[2] Compiled from Cotton Fluctuation, 1849–1888, and are averages for crop year beginning September. From New York Commercial and Financial Chronicle, 1889–1899, and from reports of New York Cotton Exchange since 1900. Since 1889 the averages are for crop year beginning August.

[3] Excluding linters from 1914 to 1920.

[4] Compiled from Commerce and Navigation of the United States, 1849–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June and July, 1919–1930, and January 1927 and 1930.

[5] Bales of 500 pounds gross weight.

[6] Bales of 478 pounds net, which are equivalent to bales of 500 pounds gross weight.

[7] Total exports (domestic plus foreign) minus imports.

[8] Year beginning July 1.

[9] Estimated from value of imports. Average import price per pound calculated by assuming that the percentage change in import price from the previous year is equal to the percentage change in the export prices.

TABLE 134.—*Cotton: Acreage, production, value, exports, etc., United States, 1849 1859, 1866–1930*—Continued

Year	Acreage harvested	Average yield per acre	Production	Price per pound received by producers, Dec. 1	Farm value Dec. 1	Average price per pound, New York	Domestic exports, year beginning Aug. 1	Imports, year beginning Aug. 1	Net exports, year beginning Aug. 1
1910	32, 403	170. 7	*11, 609*	14. 1	820, 407	14. 87	8, 027	245	7, 787
1911	36, 045	207. 7	*15, 693*	8. 8	687, 888	10. 85	11, 116	233	10, 885
1912	34, 283	190. 9	*13, 703*	11. 9	817, 055	12. 29	9, 146	249	8, 899
1913	37, 089	182. 0	*14, 156*	12. 2	862, 708	13. 21	9, 508	273	9, 251
1914	36, 832	209. 2	*16, 135*	6. 8	549, 036	[10] 8. 89	8, 702	400	8, 322
1915	31, 412	170. 3	*11, 192*	11. 3	631, 460	11. 98	6, 113	458	5, 673
1916	34, 985	156. 6	*11, 450*	19. 6	1, 122, 295	19. 28	5, 525	311	5, 219
1917	33, 841	159. 7	*11, 302*	27. 7	1, 566, 198	29. 68	4, 402	231	4, 175
1918	36, 008	159. 6	*12, 041*	27. 6	1, 663, 633	31. 01	5, 774	211	5, 568
1919	*33, 740*	----------	*11, 421*	----------		----------	----------	----------	----------
1919	33, 566	161. 5	*11, 421*	35. 6	2, 034, 558	38. 29	6, 707	732	5, 993
1920	35, 878	178. 4	*13, 440*	13. 9	933, 658	17. 89	5, 973	237	5, 753
1921	30, 509	124. 5	*7, 954*	16. 2	643, 933	18. 92	6, 348	380	5, 980
1922	33, 036	141. 2	[11] *9, 755*	23. 8	1, 160, 968	26. 24	5, 007	492	4, 536
1923	37, 123	130. 6	*10, 140*	31. 0	1, 571, 829	31. 11	5, 815	306	5, 530
1924	*39, 204*	----------	*13, 628*	----------		----------	----------	----------	----------
1924	41, 360	157. 4	*13, 628*	22. 6	1, 540, 884	24. 74	8, 240	328	7, 923
1925	46, 053	167. 2	*16, 104*	18. 2	1, 464, 032	20. 53	8, 267	340	7, 939
1926	47, 087	182. 6	*17, 977*	10. 9	982, 736	15. 15	11, 299	419	10, 900
1927	40, 138	154. 5	*12, 955*	19. 6	1, 269, 885	20. 42	7, 859	354	7, 524
1928	45, 341	152. 9	*14, 478*	18. 0	1, 301, 796	19. 73	8, 419	479	7, 957
1929	45, 793	155. 0	*14, 828*	16. 4	1, 217, 829	16. 60	7, 035	395	6, 650
1930 [12]	45, 218	150. 8	14, 243	9. 5	674, 044	----------	----------	----------	----------

[10] Average for nine months only. Exchange closed August–Nov. 17, on account of war.
[11] Cotton ginned in the United States. Prior census reports include undetermined quantities Lower California cotton ginned in the United States. In later years no Lower California cotton ginned in the United States.
[12] Preliminary.

TABLE 135.—*Cotton: Acreage in cultivation and acreage abandoned, by States, averages, and annual 1925–1930*

State	Acreage in cultivation June 25							Acreage abandoned after June 25						
	Average, 1924–1928	1925	1926	1927	1928 [1]	1929 [1]	1930 [1] [2]	Av. 1919–1928	1925	1926	1927	1928 [3]	1929 [3]	1930 [3]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
Missouri	440	542	472	305	355	348	377	5. 1	4. 0	8. 0	4. 5	6. 0	2. 0	2. 0
Virginia	90	101	95	65	81	89	90	2. 1	1. 0	2. 0	2. 0	2. 0	1. 3	2. 0
North Carolina	1, 958	2, 037	2, 015	1, 749	1, 892	1, 916	1, 644	1. 6	1. 0	1. 5	1. 2	1. 7	2. 0	0. 8
South Carolina	2, 571	2, 708	2, 716	2, 454	2, 485	2, 273	2, 211	2. 6	2. 0	2. 5	4. 0	5. 0	2. 5	0. 8
Georgia	3, 634	3, 662	4, 025	3, 501	3, 883	3, 818	3, 946	3. 8	2. 0	1. 5	2. 5	4. 0	1. 7	1. 1
Florida	92	103	108	67	101	96	105	5. 6	1. 5	3. 0	4. 0	6. 0	1. 8	2. 0
Tennessee	1, 103	1, 191	1, 178	985	1, 145	1, 147	1, 252	2. 6	1. 5	3. 0	2. 0	3. 3	1. 0	2. 0
Alabama	3, 442	3, 539	3, 699	3, 214	3, 643	3, 727	3, 820	2. 0	1. 0	1. 3	1. 5	3. 0	1. 0	0. 5
Mississippi	3, 586	3, 501	3, 809	3, 408	4, 154	4, 229	4, 296	3. 0	1. 0	1. 5	2. 0	3. 0	1. 5	1. 1
Arkansas	3, 566	3, 814	3, 867	3, 142	3, 834	3, 933	3, 985	2. 6	2. 0	2. 0	3. 0	4. 0	1. 9	2. 2
Louisiana	1, 845	1, 903	2, 019	1, 585	2, 052	2, 135	2, 125	3. 7	1. 5	2. 0	2. 7	3. 0	1. 0	1. 5
Oklahoma	4, 606	5, 320	5, 083	4, 187	4, 420	4, 430	4, 165	6. 7	2. 0	8. 0	14. 0	4. 0	3. 5	2. 5
Texas	18, 233	19, 139	19, 140	16, 850	18, 330	18, 229	17, 536	3. 9	8. 0	4. 0	4. 0	3. 2	4. 0	3. 2
New Mexico	122	138	125	100	123	132	134	[4] 11. 9	23. 0	4. 0	5. 0	5. 0	1. 5	5. 0
Arizona	171	162	168	140	202	227	212	2. 0	0	0. 6	0. 7	1. 0	0. 5	0
California	164	171	167	130	223	319	273	1. 4	1. 0	3. 0	1. 5	2. 2	3. 1	1. 0
All other	39	59	44	23	23	19	20	[4] 5. 2	3. 4	2. 3	5. 0	5. 0	0	1. 5
United States	45, 662	48, 090	48, 730	41, 905	46, 946	47, 067	46, 191	3. 6	4. 2	3. 4	4. 2	3. 4	2. 7	2. 1

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] In cultivation July 1. [2] Preliminary. [3] Abandoned after July 1. [4] 7-year average.

TABLE 136.—*Cotton: Acreage harvested, by States, 1918–1930*

State	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930[1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Missouri	148	125	136	103	198	355	493	520	434	291	334	341	369
Virginia	44	42	42	34	55	74	102	100	93	64	79	88	83
North Carolina	1, 600	1, 490	1, 587	1, 403	1, 625	1, 679	2, 005	2, 017	1, 985	1, 728	1, 860	1, 878	1, 631
South Carolina	3, 001	2, 835	2, 964	2, 571	1, 912	1, 965	2, 404	2, 654	2, 648	2, 356	2, 361	2, 216	2, 193
Georgia	5, 341	5, 220	4, 900	4, 172	3, 418	3, 421	3, 046	3, 589	3, 965	3, 413	3, 728	3, 753	3, 903
Florida	167	103	100	65	118	147	80	101	105	64	95	91	103
Tennessee	902	758	840	634	985	1, 172	996	1, 173	1, 143	965	1, 107	1, 136	1, 227
Alabama	2, 570	2, 791	2, 858	2, 235	2, 771	3, 079	3, 055	3, 504	3, 651	3, 166	3, 534	3, 690	3, 801
Mississippi	3, 138	2, 848	2, 950	2, 628	3, 014	3, 170	2, 981	3, 466	3, 752	3, 340	4, 029	4, 166	4, 249
Arkansas	2, 991	2, 725	2, 980	2, 382	2, 799	3, 026	3, 094	3, 738	3, 790	3, 048	3, 681	3, 858	3, 897
Louisiana	1, 683	1, 527	1, 470	1, 168	1, 140	1, 405	1, 616	1, 874	1, 979	1, 542	1, 990	2, 114	2, 093
Oklahoma	2, 998	2, 424	2, 749	2, 206	2, 915	3, 197	3, 861	5, 214	4, 676	3, 601	4, 243	4, 275	4, 061
Texas	11, 233	10, 476	11, 898	10, 745	11, 874	14, 150	17, 175	17, 608	18, 374	16, 176	17, 743	17, 500	16, 975
New Mexico	------	------	------	------	28	60	101	107	120	95	117	130	127
Arizona	95	107	230	90	101	127	180	162	167	139	200	226	212
California	85	85	150	55	67	83	130	169	162	128	218	309	270
All other	12	10	24	18	16	13	41	57	43	22	22	19	19
United States	36, 008	33, 566	35, 878	30, 509	33, 036	37, 123	41, 360	46, 053	47, 087	40, 138	45, 341	45, 793	45, 218
Lower California (old Mexico)	88	100	125	85	135	150	137	150	130	110	160	147	100

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 137.—*Cotton: Yield per acre and estimated price per pound, December 1, by States, averages, and annual 1925–1930*

State	Yield per acre							Estimated price per pound						
	Av., 1919–1928	1925	1926	1927	1928	1929	1930	Av., 1924–1928	1925	1926	1927	1928	1929	1930
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Missouri	249	275	240	188	210	308	207	16. 7	12. 0	10. 0	20. 5	18. 0	16. 7	9. 5
Virginia	246	250	264	230	265	258	228	18. 3	19. 0	11. 4	20. 0	18. 2	17. 0	9. 6
North Carolina	255	261	292	238	215	190	233	18. 2	19. 0	11. 5	19. 5	18. 5	16. 7	9. 9
South Carolina	175	160	182	148	147	179	227	18. 1	18. 8	11. 7	19. 6	18. 4	16. 4	9. 9
Georgia	134	155	180	154	132	171	199	18. 0	19. 0	11. 1	19. 4	18. 2	15. 8	9. 3
Florida	106	180	145	126	97	145	232	17. 7	18. 8	10. 2	19. 1	17. 9	16. 7	8. 8
Tennessee	182	210	188	178	185	217	156	17. 3	16. 2	10. 0	19. 0	18. 0	16. 5	9. 1
Alabama	146	185	196	180	150	174	188	17. 9	18. 9	10. 7	19. 0	18. 2	16. 1	9. 0
Mississippi	176	275	241	194	175	220	169	18. 8	19. 5	11. 6	20. 5	18. 5	17. 2	10. 0
Arkansas	167	205	195	157	162	178	112	17. 7	16. 1	11. 0	20. 2	18. 2	16. 7	9. 2
Louisiana	152	232	200	170	166	183	162	17. 7	18. 1	11. 0	19. 2	17. 9	16. 6	9. 3
Oklahoma	153	155	181	138	136	128	106	17. 2	17. 0	9. 7	19. 8	17. 2	15. 7	8. 8
Texas	135	113	147	129	138	108	116	17. 7	18. 5	10. 8	19. 3	17. 5	16. 0	9. 4
New Mexico	[1] 288	298	299	352	360	333	377	19. 3	20. 0	12. 3	19. 8	19. 5	17. 7	10. 2
Arizona	291	350	349	315	357	324	361	22. 1	21. 5	13. 3	25. 6	23. 5	22. 5	11. 8
California	293	340	387	340	378	402	443	20. 1	22. 0	14. 0	21. 0	19. 5	18. 0	10. 7
United States	155. 1	167. 2	182. 6	154. 5	152. 9	155. 0	150. 8	17. 9	18. 2	10. 9	19. 6	18. 0	16. 4	9. 5

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 7-year average.

TABLE 138.—*Cotton: Production of lint in 500-pound gross-weight bales, by States, and linters, United States, 1918–1930*

State	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930 [1]
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
Missouri	62	64	79	70	[2] 149	[2] 127	[2] 193	[2] 299	218	115	147	220	160
Virginia	25	23	21	16	27	51	39	53	51	31	44	48	42
North Carolina	898	830	925	776	852	1,020	825	1,102	1,213	861	836	747	795
South Carolina	1,570	1,426	1,623	755	493	770	807	889	1,008	730	726	830	1,040
Georgia	2,122	1,660	1,415	787	715	588	[2] 1,002	1,164	1,496	1,100	1,030	1,343	1,625
Florida	29	16	18	11	25	12	[2] 22	38	32	[2] 17	19	29	50
Tennessee	330	310	325	302	391	[2] 226	[2] 354	[2] 515	[2] 451	[2] 359	[2] 428	[2] 515	400
Alabama	801	713	663	580	824	587	[2] 985	1,357	1,498	[2] 1,191	1,109	1,342	1,495
Mississippi	1,226	961	895	813	989	604	1,099	1,991	1,888	1,355	1,475	1,915	1,500
Arkansas	987	884	1,214	797	[2] 1,011	[2] 622	[2] 1,094	[2] 1,600	1,548	1,000	1,246	1,435	910
Louisiana	588	298	388	279	343	368	493	910	829	548	691	809	710
Oklahoma	577	1,016	1,336	481	627	656	1,511	1,691	1,773	1,037	1,205	1,143	900
Texas	2,697	3,099	4,345	2,198	3,222	[2] 4,340	[2] 4,949	[2] 4,163	[2] 5,628	[2] 4,352	[2] 5,106	[2] 3,940	4,100
New Mexico	------	------	10	6	12	[2] 30	[2] 57	[2] 66	[2] 75	[2] 70	[2] 88	[2] 90	100
Arizona	56	60	103	45	47	78	108	119	[2] 122	[2] 91	[2] 149	153	160
California	67	56	75	34	21	54	77	122	131	91	172	260	250
All other	6	5	3	3	7	[2] 8	[2] 14	[2] 26	[2] 17	[2] 7	[2] 7	[2] 9	6
United States	12,041	11,421	13,440	7,954	9,755	10,140	13,628	16,104	17,977	12,955	14,478	14,828	14,243
Linters, total U. S.[3]	930	608	440	398	608	669	897	1,115	1,158	1,016	1,282	1,241	------

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census.

[1] Preliminary estimate of the Department of Agriculture.
[2] Slight differences from census figures on ginnings are due to ginnings in one State of cotton grown in another.
[3] Year beginning Aug. 1.

TABLE 139.—*Cotton: Acreage and yield of lint per acre in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1927–28 to 1930–31*

Country	Acreage						Yield of lint per acre					
	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1927–28	1928–29	1929–30	1930–31*	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1927–28	1928–29	1929–30	1930–31*
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
United States	34,152	37,616	40,138	45,341	45,793	45,218	182	146	155	153	155	151
India	22,503	23,818	24,761	27,053	25,692	22,964	76	91	96	86	82	83
Egypt	1,743	1,768	1,574	1,805	1,912	2,162	399	368	383	443	431	375
China	------	4,498	4,192	4,265	5,490	------	------	215	214	207	171	------
Brazil	[1] 887	1,475	1,297	1,273	------	------	[1] 209	184	180	197	------	------
Russia (Asiatic)	1,569	741	1,851	2,257	2,595	3,840	276	197	282	265	241	230
Mexico	253	330	326	502	492	393	353	267	263	265	239	206
Chosen (Korea)	146	405	503	503	456	463	67	128	127	142	146	157
Uganda	58	420	533	699	673	725	169	122	104	117	71	------
Peru	[2] 163	282	316	283	284	------	------	343	372	354	380	------
Anglo Egyptian Sudan	44	134	239	268	369	398	158	163	222	253	184	205
Argentina	5	156	210	256	332	------	214	188	231	247	216	------
Total above countries excluding China, reporting 1927–28 to 1929–30	------	------	70,451	78,967	78,598	------	------	------	------	------	------	------
Estimated world total, excluding China	62,500	69,000	73,900	82,400	81,900	82,300	------	------	------	------	------	------

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Data for crop year as given at the head of the table are for crops harvested between Aug. 1 and July 31. This applies to both Northern and Southern Hemispheres. For the United States prior to 1914 the figures apply to the harvest year beginning Sept. 1.

* Preliminary.
[1] Average for three years.
[2] Average 1914–15 to 1918–19.

TABLE 140.—*Cotton: Production of lint in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1926–27 to 1930–31*

Country	Year beginning August						
	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1926–27	1927–28	1928–29	1929–30	1930–31*
NORTH AMERICA	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]
United States [2]	13, 033, 000	11, 516, 000	17, 977, 000	12, 955, 000	14, 478, 000	14, 828, 000	14, 243, 000
Mexico	187, 000	184, 152	359, 820	179, 238	278, 460	246, 029	169, 000
Total North American countries reporting 1926–27 to 1929–30			18, 336, 820	13, 134, 238	14, 756, 460	15, 074, 029	
SOUTH AND CENTRAL AMERICA AND WEST INDIES							
Venezuela		37, 093	32, 000	32, 000	32, 285		
Colombia		[3] 12, 717	24, 906	11, 207	9, 501		
Peru	110, 000	202, 591	246, 168	245, 615	[4] 210, 000	[4] 210, 000	
Ecuador	[5] 297	7, 320	[4] 6, 340	[4] 5, 826	[4] 5, 097	[4] 6, 778	
Brazil	387, 000	567, 931	512, 395	487, 041	525, 234	549, 997	
Paraguay	[6] 92	9, 686	8, 485		[4] 40, 000		
Argentina	2, 314	61, 105	60, 424	101, 467	132, 368	[4] 150, 000	
Guatemala	[7] 75	857	[4] 260				
Haiti [5]	9, 268	18, 445	22, 604	20, 419	21, 929		
Dominican Republic [5]	[8] 1, 163	515	414	273	76		
Porto Rico	[9] 1, 319	1, 356	1, 303	960	1, 335		
Salvador [5]		[7] 6, 529	229	189	161		
British West Indies	6, 058	4, 451	3, 700	4, 225	4, 200	4, 000	
Total South and Central American countries and West Indies reporting 1926–27 to 1929–30			829, 027	844, 174	876, 899	920, 785	
EUROPE							
Italy	5, 212	[8] 4, 707				3, 281	
Yugoslavia	922	333	385	190	218	585	
Greece	12, 614	10, 746	17, 759	12, 571	14, 875	12, 022	25, 000
Bulgaria	842	1, 344	2, 309	3, 457	3, 214	4, 535	4, 000
Malta	433	377	424	287	453	317	
Spain		[3] 698	3, 344	2, 553	3, 189	4, 674	9, 000
Total European countries reporting 1926–27 to 1929–30			24, 221	19, 058	21, 949	22, 133	
AFRICA							
Algeria	[8] 1, 370	1, 917	7, 939	3, 715	5, 548	6, 901	7, 000
Morocco (French)		[7] 275	738	369	351	369	
French West Africa:							
Dahomey	[5] 664	2, 939	4, 718	3, 920		8, 025	
Ivory Coast [5]	[7] 212	2, 498	6, 730	5, 713	7, 145		
French Guinea	[5] [9] 167	707	2, 315	2, 306	1, 845		
Senegal		1, 677	2, 629	2, 306	4, 243	323	
French Sudan		[3] 4, 843	5, 258	12, 222	12, 822	12, 822	
Upper Volta		[3] 7, 124	2, 906	3, 874	2, 168	2, 675	
French Togo	[7] 2, 463	4, 866	7, 661	7, 084	9, 431		
Nigeria	8, 702	24, 185	22, 982	17, 498	26, 817	36, 492	
French Equatorial Africa		[3] 1, 170					
Egypt	1, 453, 000	1, 360, 600	1, 586, 000	1, 261, 000	1, 672, 000	1, 725, 000	1, 697, 000
Anglo-Egyptian Sudan	14, 455	45, 836	131, 007	110, 573	141, 747	142, 191	170, 649
Italian Somaliland	[5] 510	1, 576	2, 767	3, 828	7, 034	5, 083	
Eritrea	[5] 948	1, 373	2, 767	1, 384	1, 061	1, 153	
Gold Coast	104	[3] 544	84	84	[4] 196		
Belgian Congo		11, 459	22, 539	27, 557	44, 390		
Kenya	552	1, 347	1, 031	1, 039	1, 660		
Uganda	20, 338	107, 419	110, 231	115, 886	170, 757	100, 417	
Tanganyika	[3] [5] 7, 971	11, 122	20, 318	133, 60	27, 576	23, 251	18, 400

* Preliminary.
[1] Bales of 478 pounds net.
[2] Linters not included. Production of linters during this period has been: Average 1909–10 to 1913–14, 502,711 bales; 1926–27, 1,157,861 bales; 1927–28, 1,016,375 bales; 1928–29, 1,282,061 bales; 1929–30, 1,241,355 bales.
[3] Average for four years.
[4] From an unofficial source.
[5] Exports.
[6] For season 1915–16.
[7] Average for two years.
[8] Average for three years.
[9] For one year only.

TABLE 140.—*Cotton: Production of lint in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1926–27 to 1930–31*—Continued

Country	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1926–27	1927–28	1928–29	1929–30	1930–31*
	Year beginning August						
AFRICA—continued	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]
Nyasaland	4, 603	4, 751	4, 165	2, 336	3, 740	5, 098	
Northern Rhodesia	8, 307	274	80	44	52		
Southern Rhodesia		[3] 2, 588	461	72	213	1, 506	
Mozambique	[5] 388	2, 645	11, 952	11, 956	12, 505	[4] 7, 192	
Union of South Africa	76	9, 150	8, 571	9, 216	8, 179	12, 029	12, 000
Total African countries reporting 1926–27 to 1929–30			1, 920, 691	1, 569, 595	2, 096, 761	2, 082, 502	
ASIA							
Cyprus	1, 983	1, 994	3, 598	1, 766	1, 796	2, 946	
Turkey, Asiatic	[9] 102, 116	60, 114	97, 000	179, 412			
Syria and Lebanon		7, 301	8, 117	9, 582	4, 312	14, 371	
Russia, Asiatic	904, 900	305, 968	830, 000	1, 090, 000	1, 250, 000	1, 310, 000	[10] 1,850,000
Iraq		1, 071	2, 929	1, 508	4, 287	3, 851	
Persia	[4 8] 136,000	[7] 71, 402	84, 610	75, 007	91, 735		
India	3, 585, 000	4, 522, 600	4, 205, 000	4, 990, 000	4, 863, 000	4, 402, 000	3, 977, 000
China [11]	694, 600	2, 021, 000	1, 742, 000	1, 875, 065	1, 844, 288	1, 960, 000	
Japanese Empire:							
Japan	4, 704	2, 599	1, 123	1, 100	943		
Chosen (Korea)	20, 392	108, 580	142, 694	133, 238	149, 878	139, 451	152, 200
French Indo-China	[5] 13, 800	[12] 9, 279	[12] 3, 285	[13] 4, 536	[13] 5, 576	[14] 4, 654	
Dutch East Indies [5 15]	[7] 18, 242	6, 649	4, 388	5, 500	4, 262	4, 061	
Siam	[5] 3, 653	4, 135	2, 747	2, 885	2, 756		
Total Asiatic countries reporting 1926–27 to 1929–30			6, 942, 011	8, 111, 195	8, 127, 399	7, 841, 334	
OCEANIA							
Australia	73	7, 920	4, 431	7, 714	5, 268	[4] 5, 050	
New Hebrides	[3] 547	2, 436	[5] 2, 348	[5] 2, 582	[5] 1, 542		
Total Oceania reporting 1926–27 to 1929–30							
Total all countries reporting 1926–27 to 1929–30			28, 057, 201	23, 685, 974	25, 884, 736	25, 945, 833	
Estimated world total, including China	20, 900, 000	21, 500, 000	28, 400, 000	24, 000, 000	26, 100, 000	26, 300, 000	26, 400, 000

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture except as otherwise stated. Data for crop year as given at the head of the table are for crops harvested between Aug. 1 and July 31. For the United States prior to 1914 the figures apply to the year beginning Sept. 1.

[1] Bales of 478 pounds net.
[3] Average for 4 years.
[4] From an unofficial source.
[5] Exports.
[7] Average for 2 years.
[8] Average for 3 years.
[9] For one year only.
[10] Approximate, mid point of range of reports.
[11] The Chinese Mill Oweners' Association. The figures represent the crop in the most important Provinces where the commercial crop is grown. The average 1909–10 to 1913–14 is the commercial crop of China as estimated by the United States Bureau of the Census.
[12] Annam, Cambodia, and Cochin-China only.
[13] Annam, Cambodia, Cochin-China, and Laos.
[14] Annam, Cochin-China and Laos.
[15] Includes Java and Madura and the outer possessions.

TABLE 141.—*Cotton: World production of lint, 1909–10 to 1930–31*

Crop year	Estimated world total excluding China	Estimated world total including China	Production in selected countries						Estimated world total commercial crop[2]
			United States	India	Egypt	China[1]	Brazil	Russia (Asiatic)	
	1,000 bales[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[4]
1909–10	16,900	----------	10,005	3,998	1,036	----------	324	----------	[5] 16,241
1910–11	18,400	----------	11,609	3,254	1,555	----------	357	----------	[5] 18,027
1911–12	21,900	----------	15,693	2,730	1,530	----------	360	----------	[5] 21,269
1912–13	21,100	----------	13,703	3,702	1,554	----------	418	----------	[5] 20,976
1913–14	22,200	----------	14,156	4,239	1,588	----------	477	----------	[5] 21,618
1914–15	24,200	----------	16,135	4,359	1,337	----------	465	1,270	[5] 23,768
1915–16	17,800	----------	11,192	3,128	989	----------	339	1,512	[5] 17,649
1916–17	18,366	19,900	11,450	3,759	1,048	1,534	337	1,199	[5] 18,092
1917–18	17,608	19,700	11,302	3,393	1,304	2,092	414	634	[3] 18,140
1918–19	17,841	20,900	12,041	3,328	999	3,059	406	161	[3] 18,755
1919–20	18,782	21,300	11,421	4,853	1,155	2,518	461	81	[3] 20,220
1920–21	19,217	21,100	13,440	3,013	1,251	1,883	476	58	[3] 19,665
1921–22	13,886	15,400	7,954	3,753	902	1,514	504	43	[3] 15,334
1922–23	16,982	19,300	9,755	4,247	1,391	2,318	553	55	17,926
1923–24	17,707	19,700	10,140	4,320	1,353	1,993	576	196	19,036
1924–25	22,622	24,800	13,628	5,095	1,507	2,178	605	453	23,836
1925–26	25,798	27,900	16,104	5,201	1,629	2,192	602	782	26,678
1926–27	26,658	28,400	17,977	4,205	1,586	1,742	512	830	27,819
1927–28	22,125	24,000	12,955	4,990	1,261	1,875	487	1,090	23,426
1928–29	24,256	26,100	14,478	4,863	1,672	1,844	525	1,250	25,628
1929–30	24,340	26,300	14,828	4,402	1,725	1,960	550	1,310	26,673
1930–31[6]	----------	26,400	14,243	3,977	1,697	----------	----------	[7] 1,850	----------

Bureau of Agricultural Economics. Compiled from official sources and International Institute of Agriculture unless otherwise stated. The crop year is from Aug. 1 to July 31. For the United States prior to 1914 the figures apply to the year beginning Sept. 1.

[1] Chinese Cotton Mill Owners' Association. Figures represent the crop in the most important cotton-producing Provinces where the commercial crop is grown. Most of the cotton produced in other Provinces is used for home hand-loom consumption.

[2] Figures as reported by the U. S. Bureau of the Census, including the cotton destined to enter commercial channels for factory purposes. Estimates of the commercial crop in China are included.

[3] Bales of 478 pounds net.

[4] American in running bales and foreign cotton in bales of 478 pounds net.

[5] Bales of 500 pounds net.

[6] Preliminary.

[7] Approximate, mid-point of range of reports.

TABLE 142.—*Cotton ginned to specified dates and total, by seasons, United States, 1909–10 to 1930–31*

Season beginning August	Cotton ginned to—										
	Sept. 1	Sept. 25	Oct. 1	Oct. 18	Nov. 1	Nov. 14	Dec. 1	Dec. 13	Jan. 1	Jan. 16	Total ginned[1]
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
1909–10	388	2,568	----------	5,531	7,018	8,112	8,877	9,358	9,647	9,788	10,073
1910–11	353	2,312	----------	5,424	7,346	8,780	10,140	10,695	11,085	11,253	11,568
1911–12	771	3,677	----------	7,759	9,971	11,313	12,817	13,771	14,317	14,516	15,553
1912–13	731	3,007	----------	6,874	8,869	10,300	11,855	12,439	12,907	13,089	13,489
1913–14	799	3,247	----------	6,974	8,830	10,445	12,088	12,927	13,348	13,582	13,983
1914–15	480	3,394	----------	7,620	9,827	11,668	13,073	13,972	14,443	14,916	15,906
1915–16	464	2,904	----------	5,709	7,379	8,771	9,704	10,306	10,637	10,752	11,068
1916–17	851	4,082	----------	7,303	8,624	9,615	10,352	10,839	11,039	11,138	11,364
1917–18	615	2,512	----------	5,574	7,185	8,571	9,714	10,132	10,435	10,571	11,248
1918–19	1,038	3,771	----------	6,811	7,777	8,706	9,571	10,281	10,774	11,049	11,906
1919–20	143	1,835	----------	4,929	6,305	7,604	8,844	9,397	10,009	10,307	11,326
1920–21	352	2,250	----------	5,755	7,509	8,915	10,141	10,876	11,555	12,015	13,271
1921–22	486	2,920	----------	5,497	6,646	7,274	7,640	7,791	7,882	7,912	7,978
1922–23	806	3,866	----------	6,978	8,139	8,870	9,320	9,489	9,597	9,648	9,729
1923–24	1,143	3,232	----------	6,409	7,556	8,369	9,243	9,549	9,805	9,944	10,171
1924–25	947	[2] 2,666	4,528	7,616	9,716	11,162	12,238	12,792	----------	13,307	13,639
1925–26	1,886	[2] 4,282	7,126	9,519	11,207	12,260	13,871	14,832	----------	15,500	16,123
1926–27	697	[2] 2,509	5,643	8,728	11,254	12,956	14,644	15,541	----------	16,616	17,755
1927–28	1,534	[2] 3,505	5,945	8,118	9,921	10,895	11,738	12,073	----------	12,501	12,783
1928–29	957	[2] 2,501	4,961	8,151	10,162	11,321	12,560	13,144	----------	13,889	14,297
1929–30	1,568	[2] 3,352	5,903	9,095	10,892	11,890	12,853	13,457	----------	14,177	14,548
1930–31[3]	1,879	[2] 3,734	6,304	9,256	10,866	11,964	12,837	13,258	----------	13,592	----------

Bureau of Agricultural Economics. Compiled from reports of Bureau of the Census; quantities are given in running bales, except that round bales are counted as half bales. Linters not included.

[1] Includes cotton ginned after Jan. 16 and estimated quantities not ginned on Mar. 1.

[2] Sept. 16.

[3] Preliminary.

TABLE 143.—*Cotton: Estimated monthly marketings by farmers, 1916–17 to 1929–30*

Crop year	Percentage of year's sales [1]												
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Season
1916–17	3.9	14.6	23.0	21.6	15.0	6.4	4.0	3.9	3.0	2.5	1.6	0.5	100.0
1917–18	2.5	11.3	23.0	22.7	16.2	8.2	5.8	4.5	2.6	1.3	1.0	0.9	100.0
1918–19	3.3	10.9	18.1	16.4	13.6	5.4	4.4	4.6	4.6	7.5	6.8	4.4	100.0
1919–20	1.4	9.5	21.0	22.2	17.4	8.8	5.6	4.9	3.2	2.7	1.7	1.6	100.0
1920–21	3.1	10.0	16.2	15.7	11.0	6.4	5.6	6.0	6.7	6.9	6.8	5.6	100.0
1921–22	3.6	14.0	22.3	17.1	12.1	5.9	4.3	4.6	4.6	5.9	3.0	2.6	100.0
1922–23	5.2	16.8	25.3	19.8	12.8	5.9	4.4	3.7	2.0	1.0	1.5	1.6	100.0
1923–24	4.1	16.3	24.6	24.9	13.3	5.8	3.1	2.4	1.7	1.3	0.9	1.6	100.0
1924–25	3.3	15.2	25.2	22.3	14.5	7.0	5.3	3.4	1.6	1.0	0.6	0.6	100.0
1925–26	6.5	19.3	23.1	17.6	12.0	6.5	4.2	3.1	2.3	1.7	2.1	1.6	100.0
1926–27	2.7	15.2	22.0	19.5	12.5	6.3	5.8	5.0	3.8	3.1	2.5	1.6	100.0
1927–28	6.6	20.0	23.8	17.3	9.7	4.2	4.0	4.2	3.1	2.7	2.3	2.1	100.0
1928–29	4.6	15.6	24.8	20.8	12.8	5.4	4.0	4.8	1.8	1.6	1.9	1.9	100.0
1929–30	5.7	18.2	28.3	20.6	11.8	4.2	2.6	2.3	1.4	1.1	1.6	2.2	100.0

Bureau of Agricultural Economics.

[1] As reported by about 7,500 cotton growers, supplemented by records of State weighers, cooperative associations, and cotton dealers.

TABLE 144.—*Cotton: Consumption by domestic mills, 1919–20 to 1929–30, inclusive*

Month	Crop year										
	1919–20	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
August	497	484	467	526	492	357	451	500	634	526	559
September	491	458	485	494	486	438	483	571	628	492	546
October	556	401	494	534	543	534	544	568	614	616	640
November	491	333	528	579	533	495	544	584	627	611	541
December	512	295	511	529	464	534	576	603	539	533	453
January	592	367	527	610	578	594	582	603	586	668	576
February	516	395	472	567	509	551	565	590	573	595	494
March	576	438	520	624	486	583	636	693	581	632	508
April	567	409	444	577	479	597	578	618	525	632	532
May	541	441	495	621	414	532	516	630	577	669	473
June	555	462	509	542	350	494	519	660	510	570	405
July	526	410	458	463	347	484	462	570	440	547	379
Total	6,420	4,893	5,910	6,666	5,681	6,193	6,456	7,190	6,834	7,091	6,106

Bureau of the Census. Quantities are in running bales, round counted as half bales and foreign in 500-pound bales. Linters not included.

Table 145.—*Cotton: Supply and distribution, United States, 1913–14 to 1929–30*

Year beginning August	Supply					Distribution					
	Production	Carry-over from previous season		Imports	Total supply	Consumption		Exports	Stocks on hand at end of year		Total distribution[1]
		Foreign	Total			Foreign	Total		Foreign	Total	
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
1913–14	13, 983	83	1, 511	261	15, 755	194	5, 577	8, 655	73	1, 366	15, 598
1914–15	15, 906	73	1, 366	382	17, 654	222	5, 597	8, 323	145	3, 936	17, 856
1915–16	11, 068	145	3, 936	438	15, 442	317	6, 398	5, 896	212	3, 140	15, 434
1916–17	11, 364	212	3, 140	292	14, 796	318	6, 789	5, 303	143	2, 720	14, 812
1917–18	11, 248	143	2, 720	221	14, 189	184	6, 566	4, 288	111	3, 450	14, 304
1918–19	11, 906	111	3, 450	202	15, 558	176	5, 766	5, 592	83	4, 287	15, 645
1919–20	11, 326	83	4, 287	700	16, 313	417	6, 420	6, 545	284	3, 563	16, 528
1920–21	13, 271	284	3, 563	226	17, 060	216	4, 893	5, 745	174	6, 534	17, 172
1921–22	7, 978	174	6, 534	363	14, 875	297	5, 910	6, 184	167	2, 832	14, 926
1922–23	9, 729	167	2, 832	470	13, 031	344	6, 666	4, 823	196	2, 325	13, 814
1923–24	10, 171	196	2, 325	292	12, 788	328	5, 681	5, 656	116	1, 556	12, 893
1924–25	13, 639	116	1, 556	313	15, 508	276	6, 193	8, 005	106	1, 610	15, 808
1925–26	16, 123	106	1, 610	326	18, 059	280	6, 456	8, 051	129	3, 543	18, 050
1926–27	17, 755	129	3, 543	401	21, 699	309	7, 190	10, 927	99	3, 762	21, 879
1927–28	12, 783	99	3, 762	338	16, 883	299	6, 834	6, 540	111	2, 536	16, 910
1928–29	14, 297	111	2, 536	458	17, 291	313	7, 091	8, 044	182	2, 312	17, 447
1929–30	14, 548	182	2, 312	378	17, 238	302	6, 106	6, 690	209	4, 530	17, 326

Bureau of Agricultural Economics. Compiled from Bureau of Census Reports. Linters are excluded. Quantities are in running bales, round bales counted as half bales and foreign in 500-pound bales.

[1] Total distribution usually is greater than total supply due principally to the inclusion, in all distribution items, of the "city crop," which consists of rebaled samples and pickings from cotton damaged by fire and weather.

Table 146.—*Cotton: Mill consumption of American and other growths in the world, United States, and foreign countries 1913–14 to 1929–30*

Year beginning August[1]	World			United States			Foreign countries		
	All growths	American	Other growths	All growths	American	Other growths	All growths	American	Other growths
	1,000 bales[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]
1913–14	22, 200	13, 825	8, 375	5, 577	5, 383	194	16, 623	8, 442	8, 181
1914–15	20, 671	13, 249	7, 422	5, 597	5, 375	222	15, 074	7, 874	7, 200
1915–16	21, 978	13, 039	8, 939	6, 398	6, 081	317	15, 580	6, 958	8, 622
1916–17	21, 109	12, 561	8, 548	3, 789	6, 470	319	14, 320	6, 091	8, 229
1917–18	18, 516	10, 871	7, 645	6, 566	6, 382	184	11, 950	4, 489	7, 461
1918–19	16, 705	9, 909	6, 796	5, 766	5, 590	176	10, 939	4, 319	6, 620
1919–20	19, 300	11, 898	7, 402	6, 420	6, 003	417	12, 880	5, 895	6, 985
1920–21	16, 905	10, 268	6, 637	4, 893	4, 677	216	12, 012	5, 591	6, 421
1921–22	19, 990	12, 209	7, 781	5, 910	5, 613	297	14, 080	6, 596	7, 484
1922–23	21, 325	12, 446	8, 879	6, 666	6, 322	344	14, 659	6, 124	8, 535
1923–24	19, 982	10, 917	9, 065	5, 681	5, 353	328	14, 301	5, 564	8, 737
1924–25	22, 642	13, 311	9, 331	6, 193	5, 917	276	16, 449	7, 394	9, 055
1925–26	23, 930	14, 010	9, 920	6, 456	6, 176	280	17, 474	7, 834	9, 640
1926–27	25, 869	15, 748	10, 121	7, 190	6, 880	310	18, 679	8, 868	9, 811
1927–28	25, 285	15, 576	9, 709	6, 834	6, 535	299	18, 451	9, 041	9, 410
1928–29	25, 782	15, 226	10, 556	7, 091	6, 778	313	18, 691	8, 448	10, 243
1929–30	24, 946	13, 021	11, 925	6, 106	5, 803	303	18, 840	7, 218	11, 622

Compiled from reports of the Bureau of the Census, U. S. Department of Commerce, except consumption figures for American cotton in foreign countries which are from the 1930 Cotton Year Book of the New York Cotton Exchange. The consumption figures for Other Growths in the world and in foreign countries were obtained by deduction.

[1] Year beginning Aug. 1, except 1913 which is the year beginning Sept. 1.

[2] American in running bales and other growths in bales of 478 pounds net. Prior to 1919–20 the quantities given for world consumption of all growths were reported in bales of 500 pounds net and have been converted to equivalent 478 pound bales.

Table 147.—*Cotton: International trade, average 1909–10 to 1913–14, annual 1926–27 to 1929–30*

Country	Year beginning July									
	Average, 1909–10 to 1913–14		1926–27		1927–28		1928–29		1929–30*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
United States	232	8,840	400	11,281	367	7,890	476	8,520	413	7,097
British India	57	2,154	413	2,422	167	2,528	88	3,250	117	3,270
Egypt	0	1,444	0	1,595	0	1,377	0	1,645	0	1,394
Argentina	0	[1] 1	0	88	0	41	0	113	0	129
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	4,143	0	3,728	0	2,460	0	3,168	0	2,648	0
Japan	[1] 1,405	0	3,485	0	2,617	0	3,110	0	2,859	0
France	1,440	337	1,692	133	1,623	122	1,669	108	1,640	50
Germany	2,142	221	1,312	280	2,563	392	1,757	353	1,780	393
Italy	902	0	1,037	1	982	1	1,121	0	1,103	2
Czechoslovakia	(2)	(2)	540	2	629	2	566	1	518	1
Belgium	[3] 663	[3] 278	362	6	376	18	406	21	436	21
Canada	155	0	296	0	261	0	306	0	218	0
Poland	(2)	(2)	327	0	353	0	309	0	228	0
Austria	[1, 4] 906	[1, 4] 12	142	2	175	0	147	1	[5] 118	[5] 0
Switzerland	[1] 113	0	157	0	134	0	139	0	136	0
Netherlands	[1] 277	[1] 145	186	3	193	1	208	2	214	1
Sweden	[1] 93	[1] 1	114	0	111	0	101	0	105	0
Finland	[1] 37	0	41	0	46	0	38	0	30	0
Denmark	[1] 26	0	15	0	24	0	20	0	27	0
Norway	[1] 18	0	11	0	9	0	7	0	9	0
Estonia	(2)	(2)	24	0	26	0	24	0	28	0
Hungary	(2)	(2)	28	0	33	0	46	0	60	0
Total, 22 countries	12,609	13,433	14,810	15,813	13,149	12,372	13,706	14,014	12,687	12,358

Bureau of Agricultural Economics. Official sources except where otherwise noted.

Bales of 500 pounds gross weight or 478 pounds net. The figures for cotton refer to ginned and unginned cotton and linters, but not to mill waste, cotton batting, scarto (Egyptian and Sudan). Wherever unginned cotton has been separately stated in the original reports it has been reduced to ginned cotton in this statement at the ratio of 3 pounds unginned to 1 pound ginned. Wherever linters are stated separately, they have been excluded from these figures.

* Preliminary.
[1] Calendar year.
[2] Figures for pre-war years are included in the countries of the pre-war boundaries.
[3] 3-year average.
[4] Average for Austria-Hungary.
[5] International Crop Report and Agricultural Statistics.

Table 148. *Cotton: Estimated average price per pound, received by producers, United States, 1909–10 to 1930–31*

Crop year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909–10	11.5	12.2	13.2	13.8	14.2	14.3	14.0	14.0	14.0	14.1	14.0	14.1	13.6
1910–11	14.4	13.8	13.6	14.0	14.2	14.4	14.1	13.9	14.0	14.4	14.5	13.8	14.0
1911–12	12.5	11.0	9.6	8.8	8.6	8.7	9.4	10.0	10.5	11.0	11.1	11.6	9.6
1912–13	11.6	11.2	11.0	11.4	12.0	12.0	11.8	11.8	11.7	11.6	11.6	11.6	11.5
1913–14	11.6	12.6	13.2	12.6	12.0	11.8	12.2	12.2	12.0	12.3	12.4	12.4	12.5
1914–15	10.6	8.2	7.0	6.6	6.7	7.0	7.4	7.8	8.6	8.8	8.6	8.4	7.4
1915–16	8.3	9.8	11.4	11.4	11.4	11.4	11.3	11.3	11.5	11.8	12.4	12.6	11.2
1916–17	13.6	15.0	16.8	18.8	18.4	17.0	16.4	17.0	18.4	19.6	22.4	24.5	17.3
1917–18	23.8	23.4	25.3	27.5	28.3	29.3	30.0	31.0	30.2	28.0	28.0	28.2	27.1
1918–19	30.0	32.0	30.6	28.4	28.2	26.8	24.4	24.2	25.2	27.8	30.3	31.8	28.8
1919–20	31.4	30.8	33.9	36.0	35.8	36.0	36.2	36.8	37.5	37.4	37.3	37.1	35.2
1920–21	34.0	28.3	22.4	16.6	12.7	11.6	11.0	9.8	9.4	9.6	9.7	9.7	15.8
1921–22	11.2	16.2	18.8	17.0	16.2	15.9	15.7	16.0	16.0	17.3	19.6	20.6	17.0
1922–23	20.9	20.6	21.2	23.1	24.2	25.2	26.8	28.0	27.6	26.2	25.9	24.8	22.8
1923–24	23.8	25.6	28.0	29.9	32.1	32.5	31.4	27.7	28.7	28.1	27.8	27.3	28.7
1924–25	27.8	22.2	23.1	22.5	22.2	22.7	23.0	24.5	23.7	23.0	23.0	23.4	22.9
1925–26	23.4	22.5	21.5	18.1	17.4	17.4	17.6	16.5	16.6	16.0	16.1	15.4	19.6
1926–27	16.1	16.8	11.7	11.0	10.0	10.6	11.5	12.5	12.3	13.9	14.8	15.5	12.5
1927–28	17.1	22.5	21.0	20.0	18.7	18.6	17.0	17.8	18.7	20.1	19.7	21.0	20.2
1928–29	18.8	17.6	18.1	17.8	18.0	17.9	18.0	18.8	18.5	18.0	17.9	17.8	18.0
1929–30	18.0	13.2	17.5	16.2	16.0	15.8	14.8	13.8	14.7	14.5	14.0	11.9	16.8
1930–31	11.4	9.9	9.2	9.6	8.7								

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of cotton for each State; yearly price obtained by weighting monthly prices by bales marketed monthly. Mean of prices reported on 1st of month and 1st of succeeding month, August, 1909–December, 1923.

TABLE 149.—*Cotton, Middling: Average spot price per pound at 10 markets in stated years*

Market and crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Norfolk:													
1929-30	18.74	18.71	18.15	17.31	17.09	16.95	15.61	15.27	15.79	18.72	13.86	12.94	16.34
1930-31	11.93	10.80	10.28	10.61	9.67	-----	-----	-----	-----	-----	-----	-----	-----
Augusta:													
1929-30	18.22	18.09	17.92	16.98	16.90	16.79	15.58	15.16	15.29	14.83	13.39	12.54	15.97
1930-31	11.28	10.19	9.91	10.22	9.25	-----	-----	-----	-----	-----	-----	-----	-----
Savannah:													
1929-30	18.10	18.24	17.92	16.98	17.08	16.89	15.22	14.89	15.46	15.37	13.40	12.15	15.98
1930-31	11.11	10.30	10.06	10.36	9.43	-----	-----	-----	-----	-----	-----	-----	-----
Montgomery:													
1929-30	17.65	17.61	17.24	16.34	16.26	16.23	14.82	14.42	15.06	14.66	12.81	11.84	15.41
1930-31	10.72	9.72	9.47	9.90	8.90	-----	-----	-----	-----	-----	-----	-----	-----
Memphis:													
1929-30	17.77	17.51	17.05	16.29	16.31	16.30	14.82	14.48	15.09	14.69	12.84	12.04	15.43
1930-31	10.88	9.78	9.34	9.59	8.71	-----	-----	-----	-----	-----	-----	-----	-----
Little Rock:													
1929-30	17.68	17.50	17.00	16.22	16.17	16.16	14.57	14.29	15.07	14.72	12.77	11.84	15.33
1930-31	10.78	9.70	9.29	9.47	8.59	-----	-----	-----	-----	-----	-----	-----	-----
Dallas:													
1929-30	17.50	17.46	16.99	16.08	15.88	15.93	14.61	14.27	15.17	15.14	13.01	11.78	15.32
1930-31	10.64	9.71	9.41	9.63	8.72	-----	-----	-----	-----	-----	-----	-----	-----
Houston:													
1929-30	18.04	18.30	17.86	17.00	16.77	16.70	15.25	14.78	15.56	15.16	13.14	13.11	15.89
1930-31	11.24	10.33	9.99	10.22	9.31	-----	-----	-----	-----	-----	-----	-----	-----
Galveston:													
1929-30	18.08	18.27	17.98	17.09	16.88	16.83	15.37	14.92	15.68	15.32	13.35	12.25	16.00
1930-31	11.28	10.37	10.09	10.30	9.34	-----	-----	-----	-----	-----	-----	-----	-----
New Orleans:													
1909-10	12.28	12.66	13.48	14.40	14.96	15.23	14.88	14.74	14.64	14.89	14.85	14.93	14.33
1910-11	14.92	13.49	14.21	14.50	14.85	14.95	14.62	14.54	14.70	15.48	15.26	14.30	14.65
1911-12	11.96	11.29	9.61	9.35	9.17	9.53	10.31	10.65	11.61	11.72	12.07	12.93	10.85
1912-13	12.07	11.37	10.95	12.15	12.81	12.58	12.61	12.45	12.44	12.29	12.44	12.34	12.20
1913-14	12.02	13.11	13.73	13.26	12.98	12.93	12.90	12.95	13.11	13.36	13.79	13.34	13.12
1914-15	(1)	[2] 8.42	7.02	7.43	7.18	7.87	8.01	8.34	9.43	9.04	9.12	8.71	-----
1915-16	8.94	10.40	11.95	11.50	11.89	12.04	11.45	11.73	11.88	12.61	12.80	13.03	11.68
1916-17	14.26	15.27	17.24	19.45	18.34	17.33	17.14	17.94	19.51	20.06	24.18	25.41	18.84
1917-18	25.07	21.68	26.76	28.07	29.07	31.07	30.91	32.76	33.05	28.90	30.71	29.50	28.96
1918-19	30.23	33.22	31.18	29.75	29.44	28.84	26.97	26.84	26.70	29.22	32.09	33.93	29.87
1919-20	31.38	30.38	35.28	39.58	39.89	40.28	39.39	40.69	41.41	40.31	40.49	39.41	38.21
1920-21	34.03	27.48	20.95	17.65	14.59	14.53	12.85	11.08	11.17	11.80	11.03	11.49	16.55
1921-22	12.78	19.35	18.99	17.27	17.16	16.53	16.36	16.74	16.80	19.31	21.68	22.01	17.92
1922-23	21.55	20.74	22.05	25.34	25.48	27.51	28.78	30.43	28.42	26.63	28.61	25.73	25.94
1923-24	24.22	27.71	29.18	33.68	34.88	33.93	31.90	28.74	30.41	30.70	29.43	29.23	30.33
1924-25	26.65	22.79	23.48	23.95	23.66	23.66	24.61	25.52	24.52	23.54	24.07	24.05	24.21
1925-26	23.07	23.09	20.86	19.82	19.27	20.26	19.83	18.35	18.11	18.06	17.54	18.24	19.71
1926-27	18.01	16.14	12.68	12.52	12.22	13.17	13.82	14.10	14.42	15.68	16.47	17.63	14.74
1927-28	19.36	21.53	20.73	19.99	19.26	18.72	17.90	18.94	20.07	20.77	21.10	21.45	19.98
1928-29	19.00	17.94	18.79	19.00	19.36	19.14	19.07	19.97	19.23	18.74	18.81	18.73	18.98
1929-30	18.57	18.45	18.08	17.19	17.04	16.84	15.25	14.87	15.79	15.60	13.56	12.65	16.16
1930-31	11.56	10.58	10.40	10.63	9.65	-----	-----	-----	-----	-----	-----	-----	-----
10 markets combined:													
1915-16	[3] 8.80	10.29	11.99	11.49	11.97	12.10	11.54	11.78	11.94	12.67	12.89	13.11	11.72
1916-17	14.32	15.31	17.38	19.54	18.44	17.70	[4] 16.54	18.29	19.72	20.15	24.33	25.45	18.96
1917-18	25.26	22.08	26.86	28.21	29.19	31.05	30.97	32.84	32.87	29.32	30.10	29.44	29.02
1918-19	31.05	33.38	31.11	29.27	29.22	28.51	26.55	26.40	26.84	29.21	31.84	33.80	29.76
1919-20	31.50	30.30	35.44	39.59	39.70	40.46	39.49	40.68	41.74	41.01	40.58	39.58	38.34
1920-21	34.78	28.24	21.38	17.83	14.63	14.42	12.93	11.19	11.01	11.55	10.77	11.13	16.66
1921-22	12.53	19.50	19.25	17.43	17.47	17.04	16.73	17.12	16.92	19.22	21.58	22.27	18.09
1922-23	21.53	20.72	22.11	25.20	25.40	27.39	28.62	30.21	28.28	26.47	28.20	25.87	25.83
1923-24	24.22	27.67	28.90	33.30	34.39	33.69	31.73	28.54	30.25	30.32	29.37	29.32	30.14
1924-25	27.16	22.74	23.29	23.63	23.40	23.53	24.51	25.51	24.56	23.61	24.19	24.55	24.22
1925-26	23.35	23.23	20.95	19.92	19.31	20.04	19.63	18.33	18.05	17.95	17.52	17.92	19.68
1926-27	17.65	15.96	12.40	12.17	11.81	12.72	13.45	13.74	14.08	15.38	16.10	17.34	14.40
1927-28	19.16	21.19	20.35	19.74	18.99	18.44	17.60	18.76	19.76	20.54	20.82	21.25	19.72
1928-29	18.72	17.72	18.46	18.70	19.07	18.88	18.86	19.78	18.95	18.23	18.36	18.29	18.67
1929-30	18.04	18.01	17.62	16.75	16.64	16.56	15.11	14.74	15.40	15.12	13.21	12.21	15.79
1930-31	11.14	10.15	9.82	10.09	9.16	-----	-----	-----	-----	-----	-----	-----	-----

Bureau of Agricultural Economics. Prior to Aug. 16, 1915, compiled from quotations in Market Reports of the New York Cotton Exchange, except Sept. 23 to Nov. 16, 1914, when the exchange was closed, quotations for which time were taken from the New York Commercial and Financial Chronicle, from Aug. 16, 1915, compiled from daily reports to the bureau from the cotton exchanges of the various markets. Prices 1900-01 to 1908-09 for New Orleans and 1914-15 to 1926-27 for other markets are available in 1924 Yearbook, p. 756, Table 313, p. 757, Table 314, and 1927 Yearbook, Table 254, p. 920.

[1] Market closed.
[2] No quotations prior to Sept. 23. Average for 7 days' business.
[3] Does not include New Orleans.
[4] Does not include Savannah.

TABLE 150.—*Cotton: Average monthly premiums*[1] *for staple lengths for Middling spot cotton at New Orleans, 1923–24 to 1929–30*

[Points]

Crop year and staple length	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Av.
1923–24													
15/16 inch	40	40	40	45	60	60	60	60	60	60	65	65	55
1 inch	60	60	60	60	60	75	80	80	80	85	90	95	74
1 1/16 inches	50	50	100	100	100	100	100	100	100	100	100	100	92
1 1/8 inches	100	100	175	175	175	205	175	175	175	175	175	175	163
1 3/16 inches	150	150	275	275	275	325	275	275	275	275	275	275	258
1 1/4 inches	225	225	500	420	400	420	400	400	400	400	400	400	380
1924–25													
15/16 inch	60	60	65	65	65	65	65	65	65	70	75	75	66
1 inch	112	112	112	125	125	110	120	100	90	110	120	110	112
1 1/16 inches	100	106	125	125	125	160	175	175	250	250	250	250	174
1 1/8 inches	175	175	175	225	250	360	400	400	550	530	550	550	362
1 3/16 inches	275	281	300	375	400	530	650	650	800	800	800	800	555
1 1/4 inches	400	412	450	525	550	820	1,000	1,000	1,150	1,150	1,150	1,150	813
1925–26													
15/16 inch	75	75	75	75	85	100	90	80	80	75	75	75	80
1 inch	100	100	100	105	115	125	120	110	100	100	100	100	106
1 1/16 inches	250	194	175	231	250	250	250	200	200	200	200	200	217
1 1/8 inches	550	287	300	375	400	400	400	350	350	350	350	350	372
1 3/16 inches	800	625	575	537	600	600	600	550	550	550	550	550	591
1 1/4 inches	1,150	887	800	850	900	900	900	900	900	900	900	900	907
1926–27													
15/16 inch	40	65	65	65	65	65	65	65	65	65	65	65	58
1 inch	75	110	110	100	100	100	100	100	100	100	100	100	100
1 1/16 inches	200	200	105	138	150	150	150	150	150	200	200	200	166
1 1/8 inches	350	350	235	238	250	250	250	250	250	300	300	300	277
1 3/16 inches	550	550	410	450	450	450	450	450	450	500	513	590	484
1 1/4 inches	900	900	670	800	840	875	900	900	900	900	900	900	730
1927–28													
15/16 inch	40	40	40	40	50	40	35	35	25	20	20	20	34
1 inch	75	75	75	75	100	100	100	100	75	60	60	60	80
1 1/16 inches	163	169	250	238	200	200	200	200	175	175	170	150	191
1 1/8 inches	244	263	350	338	300	300	300	300	250	250	245	225	280
1 3/16 inches	525	513	550	513	400	400	400	400	350	350	340	300	420
1 1/4 inches	788	788	850	800	650	650	650	650	550	550	535	475	661
1928–29													
15/16 inch	20	20	30	29	20	15	19	25	25	37	40	40	27
1 inch	60	60	84	95	85	75	75	75	92	104	118	125	87
1 1/16 inches	150	150	150	150	150	150	150	150	150	165	200	225	162
1 1/8 inches	225	206	200	200	200	200	200	200	200	230	275	300	220
1 3/16 inches	300	300	300	300	300	300	300	300	300	345	400	425	323
1 1/4 inches	475	494	488	450	450	450	450	450	450	540	675	750	510
1929–30													
15/16 inch	40	31	30	30	40	49	50	50	50	50	50	50	43
1 inch	125	102	100	100	100	100	100	100	100	100	100	100	102
1 1/16 inches	225	175	175	175	175	175	175	175	175	175	175	175	179
1 1/8 inches	300	225	225	225	225	225	225	225	225	225	225	225	231
1 3/16 inches	425	325	325	325	350	350	350	350	350	350	350	350	350
1 1/4 inches	680	600	575	580	600	600	600	600	600	600	600	600	603

Bureau of Agricultural Economics. Based on weekly quotations for middling 7/8-inch staple. See Table 268, p. 852, 1928 Year Book for data for earlier years.

[1] Premiums are stated in points or hundredths of a cent per pound.

TABLE 151.—*Cotton: Average monthly premiums and discounts for grades above and below Middling for the 10 designated spot markets, 1926–27 to 1929–30*

Month and crop year	Grade [1]								
	Middling fair	Strict Good Middling	Good Middling	Strict Middling	Middling (average price) [2]	Strict Low Middling	Low Middling	Strict Good Ordinary [3]	Good Ordinary [3]
August:	*On* [4]	*On*	*On*	*On*		*Off* [4]	*Off*	*Off*	*Off*
1926–27	104	84	62	44	17.65	128	335	546	691
1927–28	130	106	76	51	19.16	103	213	333	448
1928–29	84	60	39	26	18.72	44	98	164	234
1929–30	80	62	48	32	18.04	75	160	250	340
September:									
1926–27	109	87	64	45	15.96	121	317	517	658
1927–28	125	102	73	49	21.19	100	211	333	447
1928–29	83	59	39	25	17.72	67	138	209	285
1929–30	72	55	40	25	18.01	75	159	252	342
October:									
1926–27	111	88	65	43	12.40	102	260	419	546
1927–28	124	101	68	48	20.35	82	187	307	417
1928–29	83	62	41	26	18.46	79	159	237	321
1929–30	74	56	42	26	17.62	77	165	266	359
November:									
1926–27	125	102	78	53	12.17	99	232	344	483
1927–28	105	83	60	41	19.74	48	124	221	314
1928–29	81	61	41	26	18.70	81	161	242	327
1929–30	78	60	46	30	16.75	78	170	278	375
December:									
1926–27	134	110	86	61	11.81	99	228	358	472
1927–28	94	69	45	30	18.99	36	85	162	241
1928–29	78	58	39	25	19.07	79	157	238	322
1929–30	83	67	52	37	16.64	75	173	280	378
January:									
1926–27	136	112	88	62	12.72	101	230	360	475
1927–28	93	68	44	29	18.44	35	80	150	227
1928–29	77	57	39	25	18.87	78	162	247	336
1929–30	103	85	69	49	16.56	75	170	280	378
February:									
1926–27	139	115	91	65	13.45	102	225	350	464
1927–28	91	65	40	25	17.60	34	74	146	220
1928–29	78	58	39	26	18.86	78	162	250	340
1929–30	107	89	72	50	15.11	75	170	280	378
March:									
1926–27	139	115	91	65	13.74	96	204	330	444
1927–28	91	65	40	25	18.76	33	73	138	213
1928–29	79	59	41	28	19.77	77	161	250	340
1929–30	105	88	72	50	14.74	73	174	282	384
April:									
1926–27	139	115	91	65	14.08	99	204	329	442
1927–28	90	64	39	25	19.77	33	73	138	213
1928–29	80	60	42	29	18.94	76	161	250	340
1929–30	100	86	72	50	15.40	72	178	290	395
May:									
1926–27	139	115	91	65	15.38	98	206	331	444
1927–28	89	64	40	25	20.53	33	77	143	218
1928–29	80	61	43	30	18.24	75	160	250	340
1929–30	101	86	71	49	15.12	72	173	290	394
June:									
1926–27	139	115	89	63	16.10	98	208	333	445
1927–28	87	63	40	26	20.82	34	80	147	222
1928–29	83	64	49	35	18.36	74	160	250	340
1929–30	101	86	71	49	13.21	72	175	293	395
July:									
1926–27	139	115	86	60	17.34	100	210	333	446
1927–28	85	61	39	26	21.25	37	86	153	227
1928–29	84	65	51	38	18.29	73	160	250	340
1929–30	101	86	71	50	12.21	71	175	293	395
Average:									
1926–27	129	106	82	58	14.40	104	238	379	501
1927–28	100	76	50	33	19.72	51	114	198	284
1928–29	81	60	42	28	18.67	73	153	236	322
1929–30	92	76	61	41	15.79	74	170	278	376

Bureau of Agricultural Economics.

[1] White standards.
[2] Based on 7/8-inch staple.
[3] These grades are not deliverable on future contracts.
[4] The differences are stated in terms of points or hundredths of a cent per pound. By "On" is meant that the stated number of points is to be added to the price of Middling and by "Off" is meant that the stated number of points is to be subtracted from the price of Middling.

TABLE 152.—*Cotton: Average spot price per pound in specified foreign markets, 1912–13 to 1930–31*

Market description and crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
Liverpool, American Middling:[1]	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1912–13	13.83	13.55	12.59	13.82	14.31	14.06	13.97	13.97	14.00	13.58	13.67	13.61	13.75
1913–14	13.38	15.10	15.55	14.94	14.54	14.34	14.25	14.28	15.02	15.20	15.71	14.74	14.75
1914–15	13.23	12.22	10.53	9.25	8.93	9.77	10.06	10.46	11.37	10.42	10.47	10.32	10.50
1915–16	10.79	12.24	13.90	13.74	15.03	15.99	15.61	15.48	15.47	16.77	16.47	15.94	14.79
1916–17	17.54	18.99	20.69	23.05	22.16	21.76	21.34	24.07	25.23	26.17	34.07	37.65	24.39
1917–18	38.21	35.96	34.85	43.38	44.25	46.16	45.88	47.19	46.52	42.28	43.89	43.09	42.64
1918–19	45.26	48.44	46.46	43.97	42.30	37.66	34.53	30.39	33.24	35.70	38.25	38.33	39.54
1919–20	34.06	32.20	38.06	41.90	40.92	43.61	41.61	45.16	44.17	42.51	44.48	41.83	40.88
1920–21	38.31	31.33	24.41	19.18	14.74	15.32	12.71	11.78	12.07	12.53	11.66	11.94	18.00
1921–22	13.34	20.70	20.85	18.46	18.84	18.12	17.75	19.21	18.89	21.42	23.46	24.98	19.67
1922–23	24.90	23.98	24.55	27.96	28.26	30.64	30.93	31.42	30.29	28.43	31.53	29.28	28.51
1923–24	28.18	31.99	31.96	35.74	36.00	34.33	32.53	29.77	33.15	32.00	30.74	30.38	31.90
1924–25	31.62	25.06	26.13	26.09	25.73	25.90	27.17	27.95	26.85	25.83	27.34	27.76	26.12
1925–26	26.28	26.25	23.17	21.51	20.51	21.68	21.40	20.32	20.31	20.73	19.98	19.76	21.82
1926–27	19.69	19.35	14.51	14.08	13.34	14.55	15.56	15.65	16.24	17.90	18.55	19.42	16.57
1927–28	21.10	24.17	23.36	22.73	21.98	21.68	20.53	21.80	22.75	23.52	23.82	24.44	22.66
1928–29	21.39	20.87	21.85	21.62	21.57	21.39	21.09	22.33	21.56	20.66	20.88	21.09	21.36
1929–30	21.01	20.95	20.47	19.61	19.22	18.97	17.36	16.83	17.67	17.47	16.16	15.47	18.43
1930–31	14.08	12.64	11.80	12.05	11.03	11.11	------	------	------	------	------	------	------
Liverpool, Egyptian uppers, good:[2]													
1912–13	20.2	19.1	18.3	18.9	19.3	19.9	20.1	20.2	20.3	20.2	19.7	19.0	19.6
1913–14	18.8	20.0	20.2	20.0	19.5	18.9	17.9	17.3	17.9	18.1	18.2	17.6	18.7
1914–15	16.5	16.1	13.5	12.6	12.2	12.2	12.8	14.0	15.5	14.5	14.4	13.8	14.0
1915–16	14.1	15.4	18.1	17.9	18.6	21.9	22.5	22.4	21.6	22.4	23.5	23.7	20.2
1916–17	23.7	27.2	31.2	39.5	39.6	39.7	41.9	44.5	50.5	52.0	55.4	60.3	42.1
1917–18	60.9	52.0	46.7	51.6	54.4	53.8	51.5	54.9	56.3	54.0	52.6	54.4	53.6
1918–19	55.8	55.4	54.3	51.7	50.4	50.3	50.0	49.3	48.3	48.3	58.4	46.4	50.7
1919–20	48.8	48.8	53.4	67.0	76.3	94.0	105.0	108.7	107.6	97.1	81.3	71.6	80.0
1920–21	68.6	53.4	37.0	29.4	23.4	24.6	20.8	19.6	21.5	18.8	18.8	18.0	29.5
1921–22	18.6	29.3	33.3	28.3	29.4	28.8	27.4	28.4	26.8	28.1	29.7	29.4	28.1
1922–23	28.1	27.4	27.3	30.7	31.2	31.9	32.5	33.9	33.0	30.4	31.9	31.0	30.8
1923–24	31.5	33.4	33.5	39.6	41.5	39.7	39.0	37.5	41.2	43.9	43.3	43.6	39.0
1924–25	45.6	35.5	34.3	35.4	37.5	40.3	41.3	45.1	43.6	42.1	41.6	41.4	40.0
1925–26	39.5	37.1	35.0	32.6	30.8	29.9	28.5	26.2	25.9	27.3	26.2	25.2	30.3
1926–27	26.0	28.0	23.8	22.2	19.4	21.8	24.3	23.5	23.3	26.7	28.3	30.2	24.4
1927–28	32.0	33.2	31.8	31.3	29.9	28.3	27.6	30.0	32.7	33.3	31.3	30.4	31.8
1928–29	27.1	25.1	25.9	25.6	25.5	25.5	25.0	26.7	25.7	24.0	23.5	23.7	25.3
1929–30	23.6	24.2	23.0	22.3	22.0	22.0	21.4	21.3	21.8	21.6	20.5	20.8	22.0
1930–31	19.1	18.0	14.5	14.0	13.0	13.4	------	------	------	------	------	------	------
Liverpool, No. 1 oomras, fully good:[2]													
1912–13	12.2	11.9	11.6	12.1	12.5	12.7	12.8	12.7	12.5	12.2	11.9	11.8	12.2
1913–14	11.6	12.9	12.9	12.8	12.5	12.0	11.5	11.5	11.5	11.4	11.0	10.6	11.8
1914–15	9.7	9.1	8.8	7.9	7.7	8.5	8.4	8.5	9.2	8.9	9.1	8.9	8.7
1915–16	9.1	9.7	10.9	10.7	11.9	12.6	12.4	12.1	11.9	13.0	12.8	12.9	10.7
1916–17	14.2	15.0	15.8	17.6	16.6	16.9	17.3	20.2	21.0	22.1	31.2	33.4	20.1
1917–18	34.2	31.9	36.9	37.6	37.2	38.2	37.6	38.2	38.2	35.2	36.8	36.8	36.6
1918–19	37.8	44.1	42.4	37.5	34.3	35.3	32.6	27.7	28.9	30.1	32.4	32.2	34.6
1919–20	30.7	29.0	30.5	32.1	32.0	32.6	30.0	32.3	31.8	30.2	29.1	26.1	30.5
1920–21	23.8	21.6	18.5	15.7	12.0	11.9	10.6	9.2	9.4	9.8	9.2	9.3	13.4
1921–22	10.5	16.0	16.9	15.3	15.4	15.3	14.9	15.4	16.0	15.7	18.9	19.7	15.8
1922–23	19.8	18.9	18.8	20.6	20.5	21.9	22.2	21.7	20.7	19.4	20.8	20.2	20.5
1923–24	19.6	21.8	22.0	25.9	27.7	26.1	25.2	22.4	24.0	22.9	22.6	22.0	23.5
1924–25	23.4	19.7	22.3	23.3	23.5	22.6	23.5	23.2	22.2	21.2	21.6	22.0	22.4
1925–26	21.5	22.0	19.9	18.1	16.8	17.4	16.8	15.4	15.1	15.6	15.0	15.2	17.4
1926–27	15.5	15.4	12.5	12.1	11.5	12.5	13.3	13.4	13.9	15.4	16.2	17.0	14.1
1927–28	17.9	20.1	19.3	17.7	17.6	17.4	16.5	17.5	17.9	18.3	18.6	18.5	18.1
1928–29	16.0	14.7	15.7	15.9	16.4	17.1	15.8	16.9	15.5	14.8	15.1	15.3	15.8
1929–30	15.1	15.0	14.7	13.9	13.7	13.2	11.5	10.8	11.0	10.8	9.6	8.7	12.3
1930–31	7.8	7.8	7.7	8.2	7.4	7.4	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Conversions at monthly average rate of exchange as given in Federal Reserve Bulletins to December, 1925, inclusive; subsequently at par.

[1] International Yearbook of Agricultural Statistics, 1921, p. 443. London Economist, 1922 to August, 1927. Subsequently from London Cotton Association Daily Report. Average of weekly quotations.
[2] London Economist, average of weekly quotations to August, 1927, inclusive. Subsequently from Liverpool Cotton Association Daily Report.

TABLE 153.—*Cottonseed: Estimated production and estimated price per ton, December 1, by States, 1923–1930*

State	Production, year beginning August [1]								Estimated price per ton							
	1923	1924	1925	1926	1927	1928	1929	1930	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Missouri	57	86	133	97	51	65	98	71	38. 60	32. 40	36. 00	16. 80	36. 90	35. 00	31. 00	22. 00
Virginia	22	17	23	23	14	19	21	19	43. 30	36. 30	35. 00	26. 00	42. 00	41. 00	30. 00	20. 00
North Carolina	452	366	488	539	382	371	331	352	44. 60	35. 00	33. 00	22. 00	37. 00	40. 00	29. 00	22. 00
South Carolina	341	357	394	448	324	322	368	461	48. 00	36. 10	32. 00	21. 00	39. 50	39. 00	28. 00	22. 00
Georgia	261	445	516	664	488	457	596	721	47. 90	34. 10	33. 00	21. 00	38. 50	37. 00	28. 00	21. 00
Florida	6	10	17	14	8	9	13	22	43. 20	32. 10	34. 00	19. 00	30. 50	36. 00	30. 00	22. 00
Tennessee	101	157	229	200	159	190	229	178	49. 70	35. 20	25. 50	19. 00	37. 00	38. 00	29. 00	21. 75
Alabama	260	438	602	665	529	492	596	664	47. 60	34. 30	29. 00	19. 00	37. 00	38. 00	29. 00	20. 00
Mississippi	268	487	884	838	602	655	851	666	49. 30	35. 70	22. 00	21. 00	38. 50	39. 00	32. 50	23. 50
Arkansas	276	486	711	687	444	554	638	404	44. 40	33. 20	18. 30	17. 50	36. 50	37. 50	29. 00	21. 00
Louisiana	163	219	404	368	243	307	359	315	40. 70	29. 20	24. 50	18. 00	33. 00	32. 50	31. 00	20. 00
Oklahoma	291	671	751	787	461	536	508	400	37. 70	28. 60	26. 50	15. 40	37. 00	34. 00	31. 00	22. 00
Texas	1, 927	2, 197	1, 849	2, 499	1, 938	2, 274	1, 755	1, 826	40. 10	31. 10	28. 50	17. 50	36. 00	35. 00	32. 00	22. 00
New Mexico	14	25	30	33	31	39	40	44	40. 50	30. 00	28. 00	18. 00	30. 00	32. 00	28. 00	22. 00
Arizona	34	48	53	54	41	66	68	71	40. 70	21. 20	26. 60	18. 00	30. 00	30. 00	26. 00	20. 00
California	24	35	54	58	40	76	115	111	50. 00	40. 00	40. 00	20. 00	37. 50	31. 50	27. 00	21. 00
All other	4	6	11	8	4	3	4	3	48. 00	34. 00	36. 00	20. 00	37. 25	37. 33	29. 25	21. 48
United States	4, 502	6, 051	7, 150	7, 982	5, 759	6, 435	6, 590	6, 328	43. 00	32. 39	27. 27	18. 68	36. 80	36. 28	30. 33	21. 62

Bureau of Agricultural Economics.

[1] Compiled from reports of Bureau of the Census. Estimated production of lint, by States (December preliminary estimate for 1930), in rounded thousands of 500 pounds gross weight bales, adjusting for net weight and assuming 65 pounds of cottonseed for each 35 net pounds of lint.

TABLE 154.—*Cottonseed: Estimated average price per ton, received by producers, United States, 1910–11 to 1930–31*

Crop year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 51	July 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910–11	------	26. 23	26. 86	25. 36	25. 65	26. 35	25. 61	25. 49	26. 12	25. 46	23. 38	22. 70	25. 82
1911–12	20. 45	18. 09	16. 73	16. 69	16. 70	16. 57	16. 81	18. 21	18. 62	19. 21	19. 24	19. 04	17. 08
1912–13	18. 02	17. 61	18. 04	18. 57	21. 42	21. 98	22. 01	21. 55	21. 89	21. 88	21. 54	21. 37	19. 10
1913–14	20. 24	21. 07	22. 01	22. 46	23. 48	22. 70	23. 37	23. 60	24. 17	23. 56	23. 62	22. 78	22. 39
1914–15	20. 16	13. 88	15. 28	14. 01	17. 73	19. 14	23. 33	22. 32	22. 69	22. 07	20. 82	20. 05	16. 50
1915–16	20. 14	20. 98	33. 73	34. 01	35. 54	36. 85	36. 75	36. 56	38. 13	37. 91	35. 79	36. 06	32. 65
1916–17	35. 22	41. 13	47. 19	55. 82	56. 35	52. 53	51. 43	53. 18	55. 94	55. 61	57. 19	56. 90	49. 13
1917–18	56. 61	57. 58	65. 02	69. 38	68. 29	67. 51	66. 95	68. 27	68. 08	68. 16	66. 03	64. 11	66. 15
1918–19	61. 34	67. 90	65. 85	64. 97	65. 05	64. 93	64. 65	64. 00	64. 28	63. 83	63. 80	64. 24	65. 23
1919–20	66. 23	62. 13	66. 95	72. 65	69. 07	69. 88	69. 34	67. 18	68. 71	69. 88	66. 16	61. 64	67. 27
1920–21	43. 22	29. 96	28. 94	26. 00	19. 83	18. 96	19. 76	18. 92	17. 23	17. 28	17. 06	18. 75	22. 95
1921–22	22. 06	27. 19	31. 05	29. 15	28. 78	29. 24	30. 17	32. 72	40. 79	40. 21	37. 71	36. 92	29. 72
1922–23	32. 44	25. 37	31. 79	40. 18	42. 93	43. 35	45. 16	46. 32	47. 60	46. 58	43. 14	41. 42	34. 70
1923–24	37. 47	40. 88	40. 90	45. 92	45. 54	44. 37	43. 27	41. 34	40. 42	40. 53	39. 96	39. 07	42. 23
1924–25	38. 44	31. 74	31. 95	33. 57	35. 48	37. 50	37. 14	38. 21	37. 94	38. 61	36. 66	36. 41	34. 08
1925–26	36. 52	33. 48	32. 82	27. 64	27. 87	28. 40	29. 06	29. 47	31. 51	30. 84	31. 89	31. 31	30. 82
1926–27	29. 73	27. 38	20. 06	18. 66	18. 05	18. 55	22. 39	25. 43	25. 80	26. 05	26. 27	26. 59	21. 55
1927–28	25. 95	34. 41	36. 60	37. 51	37. 14	37. 40	37. 44	37. 77	39. 40	43. 00	41. 25	39. 27	35. 94
1928–29	36. 87	31. 02	34. 08	37. 17	37. 74	38. 05	38. 73	39. 36	38. 94	37. 78	35. 83	34. 84	35. 26
1929–30	32. 69	31. 03	31. 40	30. 75	30. 31	28. 95	28. 89	28. 63	29. 74	30. 61	29. 66	27. 35	30. 43
1930–31	23. 99	23. 89	20. 73	21. 26	21. 28	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Based upon returns from special-price reporters. Monthly prices weighted by production of cotton for each State; yearly price obtained by weighting montly prices by monthly reciepts at oil mills.

TABLE 155.—*Cottonseed and cottonseed products: Production in the United States 1909–10 to 1929–30*

Year beginning August	Cottonseed		Cottonseed products			Year beginning August	Cottonseed		Cottonseed products		
	Produced[1]	Crushed	Crude oil	Cake and meal	Hulls		Produced[1]	Crushed	Crude oil	Cake and meal	Hulls
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*		*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
1909-10	4, 462	3, 269	491	1, 326	1, 289	1920-21	5, 971	4, 069	655	1, 786	1, 250
1910-11	5, 175	4, 106	630	1, 792	1, 375	1921-22	3, 531	3, 008	465	1, 355	937
1911-12	6, 997	4, 921	756	2, 151	1, 642	1922-23	4, 336	3, 242	501	1, 487	944
1912-13	6, 104	4, 580	697	1, 999	1, 540	1923-24	4, 502	3, 308	490	1, 518	941
1913-14	6, 305	4, 848	725	2, 220	1, 400	1924-25	6, 051	4, 605	702	2, 126	1, 331
1914-15	7, 186	5, 780	860	2, 648	1, 677	1925-26	7, 150	5, 558	809	2, 597	1, 547
1915-16	4, 992	4, 202	627	1, 923	1, 220	1926-27	7, 989	6, 306	944	2, 840	1, 854
1916-17	5, 113	4, 479	704	2, 225	969	1927-28	5, 758	4, 654	738	2, 093	1, 320
1917-18	5, 040	4, 252	656	2, 068	996	1928-29	6, 435	5, 061	802	2, 282	1, 368
1918-19	5, 360	4, 479	663	2, 170	1, 137	1929-30	6, 590	5, 016	786	2, 232	1, 384
1919-20	5, 074	4, 013	606	1, 817	1, 143						

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census.

[1] Production of cottonseed relates to the preceding crop year.

TABLE 156.—*Cottonseed oil: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year									
	Average 1909–1913		1926		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	[1] 4, 715	292, 257	0	40, 901	0	67, 982	0	51, 702	0	26, 075
United Kingdom	44, 246	53, 920	24, 940	50, 082	17, 315	47, 044	16, 742	35, 797	23, 090	53, 715
Egypt	1, 927	3, 568	1	30, 532	0	31, 229	3	17, 579	0	26, 181
Peru	0	[2] [3] 158	0	10, 601	0	15, 596	0	11, 077	0	3, 047
Brazil	4, 680	[4] 12	25	97	16	0	0	21	-------	------
PRINCIPAL IMPORTING COUNTRIES										
Canada	21, 131	0	29, 939	0	54, 118	0	44, 324	0	38, 695	0
Netherlands	40, 141	392	20, 985	6, 472	24, 370	9, 838	8, 685	7, 264	7, 474	3, 815
Germany	51, 884	0	13, 298	164	25, 897	34	12, 984	20	13, 649	912
France	24, 666	2, 509	8, 189	28	7, 597	55	7, 142	2	8, 799	52
Norway	11, 284	0	6, 239	0	5, 582	0	2, 798	0	2, 649	0
Denmark	[3] 7, 081	0	8, 398	558	6, 131	609	6, 493	1, 224	7, 382	[2] 1, 369
Belgium	16, 884	8, 143	1, 984	7	3, 918	4	2, 026	51	1, 782	11
Argentina	7, 510	12	768	10	2, 461	210	946	17	[2] 1, 340	[2] 27
Sweden	5, 220	[1] 20	3, 490	432	3, 295	1, 097	2, 721	49	3, 071	473
Greece	--------	--------	1, 078	0	3, 315	0	1, 201	0	494	0
Australia [2]	1, 062	0	1, 489	0	1, 664	3	2, 967	0	2, 651	0
Czechoslovakia	([5])	([5])	312	0	130	0	281	0	328	29
Yugoslavia	([5])	([5])	614	0	647	0	368	0	181	0
Uruguay	[2] 3, 938	0	382	0	565	0	[2] 121	0	[2] 39	0
Italy	34, 498	6	233	1	59	1	327	0	358	5
Algeria	2, 728	1, 177	53	68	[2] 85	[2] 26	[2] 0	[2] 2	[2] 5	[2] 46
Total, 21 countries	283, 595	362, 174	122, 417	139, 953	157, 165	173, 728	110, 129	124, 805	111, 987	115, 757

Bureau of Agricultural Economics. Official sources except where otherwise noted.

*Preliminary.
[1] 3-year average.
[2] International Yearbook of Agricultural Statistics.
[3] 4-year average.
[4] 1 year only.
[5] Figures for pre-war years are included in the countries of the pre-war boundaries.

TABLE 157.—*Cottonseed oil, crude: Average price per pound, f. o. b. mills, 1921–22 to 1930–31* [1]

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	6.75	7.81	7.26	7.00	7.02	7.16	8.28	10.15	9.80	10.00	9.75	8.88	8.32
1922–23	8.50	6.46	7.34	8.30	8.52	9.84	9.92	10.45	10.25	9.88	9.75	9.00	9.02
1923–24	------	9.94	9.44	9.88	9.45	9.46	8.84	8.46	8.74	8.20	8.78	10.06	------
1924–25	11.30	8.34	9.03	8.85	9.69	9.48	9.20	9.95	10.00	9.34	9.75	------	------
1925–26	------	9.14	8.55	8.90	8.98	9.75	10.71	11.00	11.22	12.17	------	------	------
1926–27	10.88	8.19	7.44	6.64	6.36	6.94	8.20	7.73	7.33	7.74	8.04	------	------
1927–28	8.70	9.25	9.45	9.05	8.72	8.48	7.75	8.44	8.75	8.88	------	------	------
1928–29	------	8.16	8.14	8.24	8.38	8.63	9.12	9.00	8.37	7.94	------	------	------
1929–30	------	7.66	7.33	7.38	7.26	7.24	7.40	7.13	7.48	7.32	6.95	7.00	------
1930–31	6.76	6.48	6.14	6.35	6.12	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Oil, Paint, and Drug Reporter; prices, 1921–22 to 1927–28 are averages of weekly quotations; beginning 1928–29, averages of daily quotations.
Data for 1909–10 to 1920–21 are available in the 1930 Yearbook, p. 695, Table 149.

[1] Quoted as follows: 1921, as f. o. b. mills; 1922, southeastern, pounds; 1923–1927, southeastern, tanks; beginning August, 1928, immediate southeastern.

TABLE 158.—*Cottonseed oil, prime summer yellow: Average spot price per pound, in barrels, New York, 1921–22 to 1930–31*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	8.69	9.88	8.69	8.30	8.28	8.62	9.96	11.48	11.57	11.71	11.33	10.97	9.96
1922–23	9.96	8.54	8.88	9.51	9.81	10.77	10.90	11.78	11.76	11.60	11.48	10.35	10.44
1923–24	10.34	11.62	12.01	11.67	11.00	11.00	10.03	9.77	10.09	9.82	10.42	11.98	10.81
1924–25	13.83	10.54	11.00	10.86	11.41	11.10	10.69	11.10	11.08	10.51	10.75	11.38	11.19
1925–26	11.09	10.81	9.86	10.32	10.47	11.33	11.28	12.24	12.38	14.48	15.38	14.99	12.05
1926–27	12.99	11.42	8.82	8.20	8.22	8.50	9.31	9.39	8.78	9.09	9.19	9.57	9.46
1927–28	9.89	10.74	10.83	10.55	10.06	10.02	9.27	9.64	10.04	10.52	10.22	10.03	10.15
1928–29	9.44	10.03	9.84	9.69	10.21	10.33	10.88	10.74	10.11	9.75	9.64	9.62	10.02
1929–30	9.27	9.19	9.23	9.01	8.77	8.46	8.46	8.41	8.80	8.76	8.23	7.97	8.71
1930–31	8.34	8.20	7.60	7.57	7.28	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Oil, Paint, and Drug Reporter average of daily ranges. Data for 1890–91 to 1920–21 are available in 1924 Yearbook, p. 766, Table 323.

TABLE 159.—*Cottonseed meal, 41 per cent protein: Price per ton, Memphis, 1921–22 to 1930–31*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	------	38.20	35.70	35.00	36.30	37.10	39.30	45.10	47.60	49.25	47.50	44.75	------
1922–23	35.30	34.30	40.25	46.00	45.40	45.75	45.00	43.60	43.10	42.40	40.80	41.40	41.90
1923–24	43.20	42.90	44.90	47.40	45.00	43.60	41.00	39.60	39.50	39.50	40.25	43.60	42.50
1924–25	43.60	41.40	40.75	38.75	39.25	37.70	35.75	35.90	36.80	38.40	38.80	41.50	39.00
1925–26	44.10	36.90	34.40	34.10	34.00	32.60	31.10	31.00	31.90	30.70	31.00	31.10	33.60
1926–27	32.10	28.90	23.90	23.70	24.50	30.10	33.50	32.40	32.50	34.00	37.40	36.00	30.75
1927–28	(1)	37.40	37.70	39.60	41.40	40.40	45.10	49.30	55.50	61.50	(1)	41.50	------
1928–29	(1)	38.40	43.90	44.20	45.60	44.90	44.40	42.70	38.75	35.50	34.25	38.75	------
1929–30	(1)	41.00	39.30	37.80	37.00	35.40	33.50	33.60	36.75	38.00	35.50	33.60	------
1930–31	36.25	30.90	27.50	27.50	25.60	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from reports made to the bureau.

[1] Not reported.

TABLE 160.—*Cottonseed meal, 41 per cent protein, bagged: Average price per ton at 10 markets, 1930*

Market	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Boston	44.00	42.50	41.70	45.60	47.00	45.25	43.20	44.40	38.25	34.30	35.25	34.20
Philadelphia	43.40	41.10	40.90	44.50	45.70	43.00	41.10	43.40	38.40	35.30	35.40	34.00
Buffalo	42.10	40.00	40.00	42.40	44.10	41.90	40.00	42.40	37.60	33.50	33.70	32.40
Pittsburgh	42.10	40.00	39.50	42.10	43.80	41.90	39.60		37.25	34.00	33.80	32.40
Cincinnati	40.70	38.20	38.50	41.40	42.80	40.40	38.60	40.70	35.60	32.40	32.00	31.20
Chicago	40.00	37.75	38.10	41.00	42.40	40.00	37.60	40.10	35.60	32.00	32.00	30.40
Milwaukee	40.25	39.40	37.10	40.00	43.10	40.90	39.00	40.40		32.90	32.25	31.00
Minneapolis	43.10	40.40	39.80	42.40	44.00	42.40	39.40	40.60	36.90	33.75	33.70	32.50
Los Angeles	40.00	37.00	38.00	39.00	39.00	39.00	38.40	35.00	34.00	33.00	33.00	33.00
St. Louis	39.00	37.00	36.60	39.60	41.40	39.40	37.00	40.20	34.90	30.75	30.80	29.25

Bureau of Agricultural Economics. Compiled from reports made to the bureau.

TABLE 161.—*Sugar beets: Acreage, production, and value, United States,[1] 1911–1930*

Year	Acreage	Yield	Production	Price per ton	Value	Year	Acreage	Yield	Production	Price per ton	Value
	1,000 acres	*Short tons*	*1,000 short tons*	*Dollars*	*1,000 dollars*		*1,000 acres*	*Short tons*	*1,000 short tons*	*Dollars*	*1,000 dollars*
1911	474	10.7	5,062	5.50	27,841	1921	815	9.6	7,782	6.35	49,392
1912	555	10.2	5,648	5.82	32,871	1922	530	9.8	5,183	7.91	41,017
1913	580	10.1	5,886	5.69	33,491	1923	657	10.7	7,006	8.99	62,965
1914	483	11.6	5,585	5.45	30,438	1924	815	9.2	7,489	7.99	59,838
1915	611	10.7	6,511	5.67	36,950	1925	647	11.4	7,381	6.39	47,147
1916	665	9.4	6,228	6.12	38,139	1926	677	10.7	7,223	7.61	54,964
1917	665	9.0	5,980	7.39	44,192	1927	721	10.8	7,753	7.67	59,455
1918	594	10.0	5,949	10.00	59,494	1928	644	11.0	7,101	7.11	50,477
1919	692	9.3	6,421	11.74	75,420	1929	688	10.6	7,318	7.08	51,824
1920	872	9.8	8,538	11.63	99,324	1930[2]	799	11.5	9,175	7.15	65,561

Bureau of Agricultural Economics.

[1] Most years from 1911 to 1923 include a small unknown quantity of beets grown in Canada for Michigan factories.

[2] Preliminary.

TABLE 162.—*Sugar beets: Acreage, production, and value by States, 1926–1930*

State	Acreage (1,000 acres)					Production (1,000 short tons)					Average yield per acre (short tons)				
	1926	1927	1928	1929	1930[1]	1926	1927	1928	1929	1930[1]	1926	1927	1928	1929	1930
Ohio	35	37	38	20	30	340	325	266	174	277	9.7	8.8	7.0	8.7	9.2
Michigan	100	99	71	52	85	793	698	452	300	559	7.9	7.0	6.4	5.8	6.6
Wisconsin	17	11	8	8	13	158	90	74	56	111	9.3	8.2	9.2	7.0	8.5
Nebraska	79	82	86	92	81	923	1,036	1,021	1,054	1,132	11.7	12.6	11.9	11.5	14.0
Montana	32	32	28	38	45	348	364	258	386	564	10.9	11.4	9.2	10.2	12.5
Idaho	18	29	27	48	48	108	381	297	492	436	6.0	13.1	11.0	10.2	9.1
Wyoming	36	37	44	47	46	388	431	462	487	621	10.5	11.6	10.5	10.4	13.5
Colorado	211	218	179	210	243	2,912	2,774	2,394	2,612	3,299	13.8	12.7	13.4	12.4	13.6
Utah	51	55	51	45	48	415	677	637	565	557	8.1	12.3	12.5	12.6	11.6
California	46	59	49	46	66	369	476	638	545	771	8.0	8.1	13.0	11.8	11.7
Other States[2]	52	62	63	82	94	469	501	602	647	848	9.0	8.1	9.6	7.9	9.0
United States	677	721	644	688	799	7,223	7,753	7,101	7,318	9,175	10.7	10.8	11.0	10.6	11.5
Canada for United States factories	10	11	2	6	3	77	69	10	48	21	7.7	6.3	5.0	8.0	7.0

[1] Preliminary.

TABLE 162.—*Sugar beets: Acreage, production, and value by States, 1926–1930*—Continued

State	Price per ton received by producers (dollars)					Value (1,000 dollars)				
	1926	1927	1928	1929	1930	1926	1927	1928	1929	1930
Ohio	7.00	7.00	7.13	7.55		2,383	2,272	1,897	1,314	
Michigan	7.00	7.16	7.22	7.94		5,552	4,996	3,263	2,381	
Wisconsin	7.24	7.00	7.35	7.29		1,141	633	543	408	
Nebraska	7.88	7.96	6.98	6.96		7,274	8,241	7,127	7,332	
Montana	8.09	8.22	7.36	7.29		2,814	2,996	1,897	2,815	
Idaho	6.91	7.50	7.44	7.17		744	2,854	2,210	3,530	
Wyoming	7.07	7.67	7.21	7.18		2,743	3,303	3,326	3,495	
Colorado	7.92	7.84	6.97	6.93		23,050	21,758	16,687	18,106	
Utah	6.97	7.03	7.03	7.05		2,894	4,761	4,478	3,986	
California	9.25	9.28	8.03	7.28		3,411	4,418	5,121	3,966	
Other States [2]	6.31	6.42	6.53	6.94		2,958	3,223	3,928	4,491	
United States	7.61	7.67	7.11	7.08	7.15	54,964	59,455	50,477	51,824	65,561

Bureau of Agricultural Economics.

[2] Includes Indiana, Illinois, Minnesota, Iowa, North Dakota, South Dakota, Kansas, New Mexico, and Washington.

TABLE 163.—*Beet sugar: Production, United States, 1911–1930*

Year [1]	Factories operating	Acreage from which beets were harvested [2]	Beets paid for by factories	Beets sliced	Sugar produced (chiefly refined)	Analysis of beets		Recovery of sucrose from beets [5]		Sugar produced per ton of beets	
						Purity coefficient [3]	Percentage of sucrose [4]	Paid for	Sliced	Paid for	Sliced
	Number	*1,000 acres*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Pounds*	*Pounds*
1911	66	474		5,062	600	82.21	15.89		11.84		237
1912	73	555		5,224	693	84.49	16.31		13.26		265
1913	71	580	5,886	5,659	733	83.22	15.78	12.45	12.96	249	259
1914	60	483	5,585	5,288	722	83.89	16.38	12.93	13.65	259	273
1915	67	611	6,511	6,150	874	84.38	16.49	13.42	14.21	268	284
1916	74	665	6,228	5,920	821	84.74	16.30	13.18	13.86	264	277
1917	91	665	5,980	5,626	765	83.89	16.28	12.79	13.60	256	272
1918	89	594	5,949	5,578	761	84.70	16.18	12.79	13.64	256	273
1919	89	692	6,421	5,888	726	82.84	14.48	11.31	12.34	226	247
1920	97	872	8,538	7,991	1,089	83.96	15.99	12.75	13.63	255	273
1921	92	815	7,782	7,414	1,020	83.09	15.77	13.11	13.76	262	275
1922	81	530	5,183	4,963	675	83.76	15.44	13.02	13.61	260	272
1923	89	657	7,006	6,585	881	83.43	15.30	12.57	13.37	251	267
1924	90	817	7,513	7,075	1,090	85.03	17.19	14.51	15.41	290	308
1925	88	653	7,423	6,993	913	82.84	14.86	12.30	13.06	246	261
1926	78	687	7,300	6,782	897	84.03	14.94	12.29	13.23	246	265
1927	83	732	7,821	7,443	1,093	84.60	16.11	13.98	14.68	280	294
1928	82	646	7,111	6,880	1,061	85.52	16.73	14.92	15.42	298	308
1929	79	694	7,366	7,117	1,018	84.46	15.64	13.74	14.22	276	286
1930 [6]		802	9,196		1,185		15.21	12.89		258	

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Year shown is that in which beets were grown. Sugar-making campaign extends into succeeding year.
[2] Including, in some years, a small acreage in Canada used by United States factories.
[3] Percentages of sucrose (pure sugar) in the total soluble solids of the beets.
[4] Based upon weight of beets sliced, except possibly in a very few factories.
[5] Sucrose actually extracted by factories (as percentage of weight of beets).
[6] Preliminary.

TABLE 164.—*Sugar: Production in continental United States, Hawaii, Porto Rico, and the Philippine Islands, 1909–10 to 1930–31*

Year beginning July	Total cane and beet sugar (refined) [1]	Beet sugar (chiefly refined)	Cane sugar (chiefly raw): Continental United States	Cane sugar (chiefly raw): Porto Rico	Cane sugar (chiefly raw): Hawaii	Cane sugar (chiefly raw): Philippine Islands [2]	Cane sugar (chiefly raw): Total
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1909–10	1, 765, 011	512, 469	331, 726	346, 786	517, 090	140, 783	1, 336, 385
1910–11	1, 856, 530	510, 172	355, 040	349, 840	566, 821	164, 658	1, 436, 359
1911–12	2, 036, 018	599, 500	360, 874	371, 076	595, 038	205, 046	1, 532, 034
1912–13	2, 057, 179	692, 556	162, 573	398, 004	546, 524	345, 077	1, 452, 178
1913–14	2, 304, 454	733, 401	300, 538	351, 666	612, 000	408, 339	1, 672, 543
1914–15	2, 282, 021	722, 054	246, 620	346, 490	646, 000	421, 192	1, 660, 302
1915–16	2, 404, 018	874, 220	138, 620	483, 590	592, 763	412, 274	1, 627, 247
1916–17	2, 590, 239	820, 657	310, 900	503, 081	644, 663	425, 266	1, 883, 910
1917–18	2, 411, 263	765, 207	245, 840	453, 794	576, 700	474, 745	1, 751, 079
1918–19	2, 399, 820	760, 950	284, 400	406, 002	600, 312	453, 346	1, 744, 060
1919–20	2, 259, 513	726, 451	122, 125	485, 071	555, 727	466, 912	1, 629, 835
1920–21	2, 779, 413	1, 089, 021	176, 114	489, 818	521, 579	608, 499	1, 796, 010
1921–22	2, 769, 970	1, 020, 489	327, 701	408, 325	592, 000	533, 189	1, 861, 215
1922–23	2, 260, 865	675, 000	295, 735	379, 172	537, 000	475, 325	1, 687, 232
1923–24	2, 604, 292	881, 000	164, 823	447, 570	691, 000	529, 091	1, 832, 484
1924–25	3, 252, 954	1, 090, 000	88, 483	660, 411	769, 000	779, 510	2, 297, 404
1925–26	2, 923, 225	913, 000	139, 381	603, 240	787, 246	607, 362	2, 137, 229
1926–27	3, 019, 707	897, 000	47, 166	629, 134	811, 333	766, 902	2, 254, 535
1927–28	3, 468, 969	1, 093, 000	70, 792	748, 677	896, 918	807, 814	2, 524, 201
1928–29	3, 463, 853	1, 061, 000	132, 053	586, 761	899, 101	933, 954	2, 551, 869
1929–30	3, 700, 358	1, 018, 000	199, 609	866, 110	[3] 913, 000	872, 000	2, 850, 719
1930–31	----------	1, 185, 000	207, 850	779, 047	----------	[4] 840, 000	----------

Bureau of Agricultural Economics. Cane sugar production 1910–10 to 1900–11 from Willett & Gray; subsequently from U. S. Department of Agriculture. Hawaiian production from Hawaiian Sugar Planters' Association. Figures for earlier years appear in previous issues of the Yearbook.

[1] Cane sugar, raw, converted to refined basis by multiplying by the following factors: Louisiana and other States, 0.932: Porto Rico, 0.9393; Hawaii, 0.9358; Philippine Islands, 0.95.
[2] Exports 1909–10 to 1911–12, production subsequently.
[3] Unofficial.
[4] Unofficial estimate of commercial crop.

TABLE 165.—*Cane sugar: Production in Louisiana, 1911–1930*

Year [1]	Factories operating	Cane used for sugar: Acreage	Cane used for sugar: Average yield per acre	Cane used for sugar: Production	Sugar produced: As made	Sugar produced: Equivalent refined [2]	Recovery of equivalent refined sugar from cane ground [3]	Sugar made per ton of cane	Molasses made: Total [4]	Molasses made: Per ton of sugar made	Molasses made: Per ton of cane used
	Number	*Acres*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Per cent*	*Pounds*	*Gallons*	*Gallons*	*Gallons*
1911	188	310, 000	19. 0	5, 887, 292	352, 874	328, 879	5. 59	120	35, 062, 525	99	6. 0
1912	126	197, 000	11. 0	2, 162, 574	153, 573	143, 130	6. 62	142	14, 302, 169	93	6. 6
1913	153	248, 000	17. 0	4, 214, 000	292, 698	272, 795	6. 47	139	24, 046, 320	82	5. 7
1914	149	213, 000	15. 0	3, 199, 000	242, 700	226, 200	7. 07	152	17, 177, 443	71	5. 4
1915	136	183, 000	11. 0	2, 018, 000	137, 500	128, 200	6. 35	135	12, 743, 000	93	6. 3
1916	150	221, 000	18. 0	4, 072, 000	303, 900	283, 200	6. 95	149	26, 154, 000	86	6. 4
1917	140	244, 000	15. 6	3, 813, 000	243, 600	227, 000	5. 95	128	30, 728, 000	126	8. 1
1918	134	231, 200	18. 0	4, 170, 000	280, 900	261, 800	6. 28	135	28, 049, 000	100	6. 7
1919	121	179, 900	10. 5	1, 883, 000	121, 000	112, 800	5. 99	129	12, 991, 000	107	6. 9
1920	122	182, 843	13. 6	2, 492, 524	169, 127	157, 626	6. 32	136	16, 856, 867	100	6. 8
1921	124	226, 366	18. 5	4, 180, 780	324, 431	302, 370	7. 23	155	25, 423, 341	78	6. 1
1922	112	241, 433	15. 6	3, 778, 110	295, 095	275, 029	7. 28	156	22, 718, 640	77	6. 0
1923	105	217, 259	11. 1	2, 386, 650	162, 023	151, 005	6. 33	136	15, 719, 400	97	6. 6
1924	82	163, 000	7. 6	1, 228, 000	88, 000	82, 000	6. 68	144	9, 590, 000	109	7. 8
1925	91	190, 000	14. 0	2, 645, 000	139, 000	130, 000	4. 91	105	17, 783, 000	128	6. 7
1926	54	128, 000	6. 8	864, 000	47, 000	44, 000	5. 09	109	6, 614, 000	141	7. 7
1927	46	73, 000	13. 4	962, 000	71, 000	66, 000	6. 86	147	6, 624, 000	93	6. 9
1928	55	115, 000	16. 2	1, 860, 000	132, 000	123, 000	6. 61	142	13, 535, 000	103	7. 3
1929	65	155, 000	18. 8	2, 918, 000	200, 000	186, 000	6. 37	137	19, 619, 000	98	6. 7
1930 [5]	-------	171, 000	17. 0	2, 907, 000	208, 000	194, 000	6. 67	143	17, 442, 000	84	6. 0

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Sugar campaign, usually not ended before February following season of growth of cane.
[2] 1 ton of sugar as made is assumed to be equivalent to 0.932 tons of refined as tentatively recommended by the joint committee on sugar statistics of the Department of Commerce and the Department of Agriculture.
[3] Based upon tonnage of cane used.
[4] Figures for molasses, 1911–1914, are as reported by the Louisiana Sugar Planters' Association. Figures for later years as reported by Division of Crop and Livestock Estimates. For sirup production see Table 175.
[5] Preliminary.

TABLE 166.—*Cane sugar: Production of Hawaii, 1913–14 to 1928–29*

Year beginning October	Total acreage in cane	Cane used for sugar			Sugar produced		Sugar made per short ton of cane	Recovery of equivalent refined sugar from cane ground [2]
		Acreage harvested	Average yield per acre	Production	As made	Equivalent refined [1]		
	Acres	*Acres*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Pounds*	*Per cent*
1913–14	----------	112, 700	43	4, 900, 000	612, 000	573, 000	250	11. 69
1914–15	239, 800	113, 200	46	5, 185, 000	646, 000	605, 000	249	11. 67
1915–16	246, 332	115, 419	42	4, 859, 424	592, 763	554, 708	244	11. 42
1916–17	245, 100	123, 900	42	5, 220, 000	644, 663	603, 276	247	11. 56
1917–18	276, 800	119, 800	41	4, 855, 000	576, 700	539. 676	238	11. 12
1918–19	239, 900	119, 700	40	4, 744, 000	600, 312	561, 772	253	11. 84
1919–20	247, 900	114, 100	39	4, 473, 000	555, 727	520, 049	248	11. 63
1920–21	236, 500	113, 100	41	4, 657, 000	521, 579	488, 094	224	10. 48
1921–22	229, 000	124, 000	41	5, 088, 000	592, 000	554, 000	233	10. 89
1922–23	235, 000	114, 000	40	4, 560, 000	537, 000	503, 000	235	11. 03
1923–24	232, 000	111, 000	51	5, 661, 000	691, 000	647, 000	244	11. 43
1924–25	241, 000	122, 000	52	6, 297, 000	769, 000	720, 000	244	11. 43
1925–26	237, 774	122, 309	53	6, 495, 686	787, 246	736, 705	242	11. 34
1926–27	234, 809	124, 542	56	6, 992, 082	811, 333	759, 245	232	10. 86
1927–28	240, 769	131, 534	59	7, 707, 330	896, 918	839, 336	233	10. 89
1928–29	239, 858	129, 131	58	7, 447, 494	899, 101	841, 379	241	11. 30

Bureau of Agricultural Economics. Estimates of the crop-reporting board prior to 1926. Since then data collected through the Hawaiian Sugar Planters' Association.

[1] 1 ton of sugar as made is assumed to be equivalent to 0.9358 tons of refined, as tentatively recommended by the joint committee on sugar statistics of the Department of Commerce and the Department of Agriculture.

[2] Based upon tonnage of cane used.

TABLE 167.—*Sugar beets: Acreage, yield per acre, and production in specified countries, 1928–1930*

Country	Acreage			Yield per acre			Production		
	1928	1929	1930*	1928	1929	1930*	1928	1929	1930*
	1,000 acres	*1,000 acres*	*1,000 acres*	*Short tons*	*Short tons*	*Short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Canada	51	43	52	8. 5	8. 5	9. 3	433	364	486
United States	644	688	799	11. 0	10. 6	11. 5	7, 101	7, 318	9, 175
United Kingdom	178	231	348	8. 8	9. 0	[1] 9. 7	1, 560	2, 088	[1] 3, 360
Sweden	106	72	97	11. 4	11. 7	13. 2	1, 208	845	1, 284
Denmark	113	74	84	12. 5	13. 5	14. 5	1, 414	1, 000	1, 218
Netherlands	162	136	142	15. 6	16. 7	14. 5	2, 523	2, 271	2, 055
Belgium	158	143	137	12. 8	12. 1	15. 6	2, 015	1, 731	2, 144
France	621	607	646	8. 9	9. 7	-------	5, 521	5, 910	-------
Spain	146	151	209	10. 8	13. 6	12. 1	1, 584	2, 050	2, 539
Italy	285	287	277	11. 1	11. 0	12. 0	3, 154	3, 152	3, 334
Germany	1, 123	1, 125	1, 193	10. 8	10. 9	12. 7	12, 137	12, 226	15, 111
Austria	75	75	82	10. 7	8. 9	10. 8	800	664	888
Czechoslovakia	635	608	614	10. 8	11. 3	11. 1	6, 863	6, 844	6, 811
Hungary	165	195	185	9. 6	9. 1	8. 6	1, 585	1, 771	1, 593
Yugoslavia	140	147	148	7. 3	8. 2	-------	1, 024	1, 210	-------
Rumania	141	122	113	8. 2	7. 3	6. 9	1, 163	893	775
Poland	579	590	464	9. 3	9. 3	-------	5, 404	5, 479	-------
Russia	1, 901	1, 935	2, 738	5. 4	3. 6	5. 6	10, 325	6, 889	15, 432
Other [2]	75	73	78	6. 2	7. 3	-------	467	534	-------
Total countries reporting for all years	7, 298	7, 302	8, 406	-------	-------	-------	53, 865	50, 106	66, 205
Total all countries reporting	7, 298	7, 302	8, 406	-------	-------	-------	66, 281	63, 239	-------

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture.

* Preliminary.

[1] England and Wales only.

[2] Includes Irish Free State, Switzerland, Bulgaria, Latvia, Finland and Australia but does not include acreage and production in minor producing countries for which no data are available.

TABLE 168.—*Sugar: Production in specified countries, average 1909–10 to 1913–14 and 1921–22 to 1925–26, and annual 1927–28 to 1930–31*

BEET SUGAR IN TERMS OF RAW SUGAR

Country	Average 1909–10 to 1913–14 [1]	Average 1921–22 to 1925–26	1927–28	1928–29	1929–30	1930–31*
NORTH AMERICA	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Canada	11,782	31,908	34,653	36,735	35,469	[2] 41,887
United States	655,000	984,600	1,175,000	1,141,000	1,094,000	1,274,000
Total	666,782	1,016,508	1,209,653	1,177,735	1,129,469	1,315,887
EUROPE						
England and Wales	3,084	24,385	222,271	240,851	359,530	452,000
Scotland	(3)	(3)	8,013	1,836	713	
Irish Free State	(3)	(3)	22,487	24,295	25,557	23,700
Sweden	153,739	175,564	160,298	177,318	133,884	187,391
Denmark	127,091	142,726	150,729	178,630	141,465	176,368
Netherlands	246,341	324,273	280,190	346,849	286,170	320,000
Belgium	278,837	346,094	296,234	303,213	273,430	275,575
France	807,887	624,498	956,389	999,249	1,004,000	1,105,000
Spain	115,727	199,414	215,420	237,476	244,018	306,260
Italy	208,675	308,261	312,311	432,908	475,213	447,044
Switzerland	3,784	6,698	7,578	7,738	4,940	5,000
Germany	2,340,268	1,557,556	1,846,499	2,054,218	2,187,694	2,567,108
Austria	79,528	53,192	121,258	118,300	132,918	151,015
Czechoslovakia	1,221,274	1,178,534	1,383,301	1,164,525	1,139,459	1,209,800
Hungary	175,783	139,801	205,801	242,574	272,083	244,293
Yugoslavia	41,459	63,482	86,250	131,338	130,689	98,000
Bulgaria	4,376	22,044	43,266	30,071	40,800	53,000
Rumania	88,245	76,698	146,842	160,744	90,642	132,000
Poland	702,626	421,338	658,033	823,714	1,009,597	793,656
Latvia	(3)	(4)	1,160	1,797	4,960	13,228
Finland	(3)	1,407	4,818	3,315	2,790	4,079
Russia, European	1,557,114	474,700	1,473,454	1,413,000	907,000	1,984,140
Turkey	(3)	(3)	----------	4,079	6,046	9,921
Total	8,155,838	6,140,665	8,602,602	9,098,038	8,873,598	10,558,578
ASIA						
Japan:						
Hokkaido	(5)	9,995	22,736	22,724	28,064	[2] 30,000
Chosen	(4)	625	648	709	733	[2] 1,000
Total	----------	10,620	23,384	23,433	28,797	31,000
OCEANIA						
Australia	1,030	3,021	2,634	2,400	2,361	[2] 2,200
World total, beet sugar [6]	8,823,650	7,170,814	9,838,273	10,301,606	10,034,225	11,907,665

CANE SUGAR (RAW)

Country	Average 1909–10 to 1913–14 [1]	Average 1921–22 to 1925–26	1927–28	1928–29	1929–30	1930–31*
NORTH AMERICA, CENTRAL AMERICA, AND WEST INDIES						
United States	302,150	203,224	70,792	132,053	199,609	207,850
Hawaii	567,495	675,249	896,918	899,101	[2] 913,000	----------
Porto Rico	361,974	499,751	748,677	586,761	866,110	[2] 840,000
Virgin Islands	5,482	5,535	[2] 11,829	[2] 4,251	[2] 7,800	[2] 2,000
Central America:						
Guatemala	8,998	21,733	17,801	28,319	[2] 39,000	[2] 37,000
Nicaragua	3,742	14,457	[2] 14,200	[2] 10,000	[2] 16,000	----------
Salvador	10,834	21,200	----------	23,148	[2] 27,600	----------
Mexico	163,388	179,150	205,028	201,831	[2] 218,000	[2] 224,000
West Indies (British):						
Antigua	12,919	13,340	[2] 22,188	[2] 12,258	[2] 20,776	[2] 19,000
Barbadoes	27,788	56,200	70,178	73,378	[2] 65,700	[2] 43,000
Jamaica	23,856	39,883	59,843	64,549	72,461	[2] 67,000
St. Christopher	13,252	13,985	21,776	15,371	[2] 20,945	[2] 18,000
Trinidad and Tobago	51,275	66,483	91,337	100,717	89,423	[2] 84,000
Cuba	2,287,052	4,908,638	4,526,879	5,775,179	5,231,490	[7] 3,360,000
Dominican Republic	104,664	281,846	405,885	396,575	403,490	[2] 408,800
Haiti	(4)	10,158	18,332	13,996	[2] 21,176	[2] 21,000

* Preliminary.

[1] Averages are for a 5-year period wherever available, otherwise for any year or years within this period. Figures for Europe are estimates of production in territory within present boundaries.

[2] Unofficial estimate.

[3] No sugar produced.

[4] Too small to report.

[5] Included with cane-sugar production in Japan.

[6] Exclusive of production in minor producing countries for which no statistics are available.

[7] Preliminary reports indicate that the crop will be limited to this amount, without restriction, the crop is expected to be equal to that of 1929–30.

TABLE 168.—*Sugar: Production in specified countries, average 1909–10 to 1913–14 and 1921–22 to 1925–26, and annual 1927–28 to 1930–31*—Continued

CANE SUGAR (RAW)—Continued

Country	Average 1909–10 to 1913–14	Average 1921–22 to 1925–26	1927–28	1928–29	1929–30	1930–31
NORTH AMERICA, CENTRAL AMERICA, AND WEST INDIES—continued	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
West Indies (French):						
Guadeloupe	40, 810	32, 674	[2] 37, 477	[2] 4, 500	[2] 27, 562	[2] 31, 000
Martinique	42, 782	33, 573	43, 028	[2] 42, 056	[2] 42, 038	[2] 42, 600
Total North American and Central American countries and West Indies reporting, all years	3, 446, 390	6, 366, 173	6, 351, 050	7, 451, 794	7, 325, 580	5, 405, 250
EUROPE AND ASIA						
Spain	17, 059	8, 738	12, 798	14, 949	[2] 21, 007	[2] 31, 000
India [8]	2, 649, 480	3, 247, 800	3, 603, 000	3, 035, 000	3, 098, 000	[2] 3, 192, 000
Formosa	192, 299	471, 748	639, 392	870, 077	893, 396	848, 200
Japan	75, 718	91, 569	105, 946	110, 532	106, 986	----------
Java [9]	1, 512, 569	2, 113, 004	2, 638, 547	3, 237, 869	3, 202, 048	[2] 3, 228, 880
Philippine Islands	294, 380	584, 895	807, 814	933, 954	([10])	([10])
Total European and Asiatic countries reporting, all years	4, 371, 407	5, 841, 290	6, 893, 737	7, 157, 895	7, 214, 451	7, 300, 080
SOUTH AMERICA						
Argentina	193, 853	288, 008	456, 933	412, 947	375, 310	[2] 420, 596
Brazil	332, 813	904, 456	922, 115	1, 066, 301	[2] 937, 000	[2] 772, 000
British Guiana	112, 297	112, 297	128, 388	130, 462	131, 324	[2] 129, 000
Dutch Guiana	13, 235	12, 469	17, 166	19, 883	14, 069	[2] 13, 000
Ecuador	6, 289	17, 603	[2] 22, 305	[2] 25, 370	[2] 21, 008	[2] 21, 500
Peru	202, 518	354, 567	415, 211	[2] 398, 741	[2] 465, 000	[2] 461, 000
Venezuela	3, 187	21, 423	[2] 22, 305	[2] 22, 000	[2] 25, 000	[2] 22, 000
Total South America	864, 192	1, 710, 823	1, 984, 423	2, 075, 704	1, 968, 711	1, 839, 096
AFRICA						
Egypt	67, 127	100, 264	100, 706	[2] 109, 824	[2] 101, 000	[2] 101, 000
Mauritius	233, 671	243, 069	240, 287	279, 360	262, 310	[2] 252, 000
Union of South Africa	88, 165	182, 420	247, 273	295, 934	298, 635	375, 000
Portuguese East Africa	26, 460	53, 219	87, 083	105, 645	104, 718	81, 570
Reunion	41, 653	52, 015	55, 084	42, 211	57, 142	55, 000
Madagascar	([4])	2, 168	3, 858	4, 894	5, 534	----------
Total African countries reporting all years	457, 076	630, 987	730, 433	832, 974	823, 805	864, 570
OCEANIA						
Australia	216, 331	411, 638	570, 185	602, 083	591, 172	[2] 569, 332
Fiji	84, 629	71, 984	105, 597	[2] 110, 525	[2] 98, 202	[2] 101, 000
Total Oceania	300, 960	483, 622	675, 782	712, 608	689, 374	670, 332
Total cane-sugar producing countries reporting all years	9, 440, 025	15, 032, 895	16, 635, 425	18, 230, 975	18, 021, 921	16, 079, 328
Estimated world total cane sugar [6]	10, 539, 000	16, 610, 000	18, 670, 000	20, 395, 000	20, 224, 000	17, 441, 000
Total world cane and beet sugar production in countries reporting all years	18, 263, 675	22, 203, 709	26, 473, 698	28, 532, 580	28, 056, 146	27, 986, 993
Estimated world total, cane and beet sugar [6]	19, 363, 000	23, 781, 000	28, 508, 000	30, 697, 000	30, 258, 000	29, 349, 000

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture except as otherwise stated. Figures are for the crop years 1909–10 to 1930–31 for the countries in which the sugar-harvesting season begins in the fall months and is completed during the following calendar year, except in certain cane-sugar producing countries where the season begins in May or June and is completed in the same calendar year. Production in these countries is for the calendar years 1909 to 1930.

[2] Unofficial estimate.
[4] Too small to report
[6] Exclusive of production in minor producing countries for which no statistiets are available.
[8] The figures quoted for India are for the production of gur, a low grade of sugar polarizing between 50° and 60°. This sugar is mostly consumed by the natives.
[9] All grades of sugar reduced to terms of head sugar, a grade of sugar which contains at least 96.5 per cent of sucrose.
[10] Figures for the total crop are not yet available. Trade reports place the 1929–30 commercial crop at 854,000 short tons and that of 1930–31 at 840,000 short tons.

TABLE 169.—*Sugar: Production, trade, and supply available for consumption in continental United States, 1909–10 to 1930–31*

IN TERMS OF RAW SUGAR

Year beginning July	Production [1]	Brought in from insular possessions [2]	Imports as sugar [3]	Domestic exports as sugar [4]	Exports in other forms [5]	Available for consumption [6] Total	Available for consumption [6] Per capita
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Pounds*
1909–10	882, 630	927, 752	1, 934, 754	72, 382	24, 351	3, 648, 403	79. 7
1910–11	903, 475	943, 701	1, 845, 279	36, 597	15, 966	3, 639, 891	78. 3
1911–12	1, 005, 337	1, 187, 663	1, 832, 424	50, 380	15, 160	3, 959, 883	83. 9
1912–13	907, 070	1, 026, 972	2, 266, 426	30, 963	19, 217	4, 150, 288	86. 6
1913–14	1, 088, 944	936, 376	2, 462, 252	37, 190	11, 892	4, 439, 489	91. 3
1914–15	1, 022, 828	1, 098, 314	2, 529, 963	302, 641	13, 585	4, 334, 878	87. 9
1915–16	1, 078, 407	1, 102, 057	2, 689, 067	882, 864	12, 213	3, 974, 453	79. 4
1916–17	1, 193, 107	1, 203, 938	2, 527, 984	676, 752	29, 211	4, 219, 066	83. 2
1917–18	1, 068, 437	975, 684	2, 344, 816	305, 429	46, 131	4, 037, 377	78. 5
1918–19	1, 102, 421	1, 073, 944	2, 799, 962	568, 566	36, 747	4, 371, 013	83. 8
1919–20	903, 060	975, 735	3, 812, 955	776, 502	98, 386	4, 816, 862	91. 1
1920–21	1, 346, 811	1, 076, 342	3, 228, 279	319, 589	89, 491	5, 242, 852	97. 6
1921–22	1, 424, 726	1, 340, 867	3, 940, 777	1, 085, 349	31, 397	5, 589, 624	102. 4
1922–23	1, 021, 360	1, 235, 049	4, 068, 205	412, 196	12, 568	5, 899, 849	106. 5
1923–24	1, 111, 898	1, 274, 870	3, 436, 955	152, 883	24, 617	5, 646, 223	100. 2
1924–25	1, 260, 000	1, 645, 319	3, 931, 282	273, 470	22, 436	6, 540, 695	114. 2
1925–26	1, 121, 000	1, 981, 482	3, 895, 947	325, 804	24, 998	6, 647, 627	114. 4
1926–27	1, 011, 000	1, 689, 347	3, 968, 880	124, 555	26, 303	6, 518, 486	110. 6
1927–28	1, 246, 000	2, 051, 659	3, 415, 830	115, 566	29, 833	6, 568, 090	110. 1
1928–29	1, 273, 000	1, 974, 899	4, 115, 601	139, 324	31, 894	7, 192, 282	119. 0
1929–30	1, 294, 000	2, 377, 808	2, 823, 175	87, 092	43, 320	6, 364, 571	104. 0
1930–31	1, 482, 000	----------	----------	----------	----------	----------	--------

IN TERMS OF REFINED SUGAR [8]

Year beginning July	Production [1]	Brought in from insular possessions [2]	Imports as sugar [3]	Domestic exports as sugar [4]	Exports in other forms [5]	Available for consumption [6] Total	Available for consumption [6] Per capita
1921–22	1, 325, 906	1, 260, 894	3, 686, 397	1, 009, 377	29, 182	5, 234, 638	95. 9
1922–23	950, 625	1, 161, 351	3, 805, 745	383, 439	11, 682	5, 522, 600	99. 7
1923–24	1, 034, 615	1, 198, 777	3, 214, 883	142, 217	22, 943	5, 283, 115	93. 7
1924–25	1, 172, 000	1, 547, 587	3, 674, 563	254, 391	20, 911	6, 118, 848	106. 8
1925–26	1, 043, 000	1, 859, 332	3, 634, 323	303, 073	23, 298	6, 210, 284	106. 8
1926–27	941, 000	1, 588, 981	3, 714, 054	115, 865	24, 514	6, 103, 656	103. 6
1927–28	1, 159, 000	1, 930, 732	3, 196, 443	107, 704	27, 805	6, 150, 666	103. 1
1928–29	1, 184, 000	1, 858, 331	3, 851, 311	129, 846	29, 726	6, 734, 070	111. 4
1929–30	1, 204, 000	2, 239, 160	2, 641, 711	81, 167	40, 375	5, 963, 329	97. 4
1930–31	1, 379, 000	----------	----------	----------	----------	----------	--------

Bureau of Agricultural Economics. Trade figures from the Bureau of Foreign and Domestic Commerce.

[1] Beet and cane sugar only.
[2] Duty free, from Hawaii, Porto Rico, and the Philippine Islands (Virgin Islands included 1917 and subsequently).
[3] No account taken of sugar imported in other forms. Imports from the Philippine Islands excluded, reexports deducted.
[4] Shipments to Hawaii and Porto Rico included. Direct exports to foreign countries from Hawaii and Porto Rico excluded.
[5] Sugar used in the manufacture of other commodities for export on which drawback was paid.
[6] No account taken of stocks at the beginning or end of year.
[7] Not available.
[8] Raw sugar converted to refined by multiplying by the following factors: Cuba and Hawaii, 0.9358; Porto Rico, 0.9393; Philippines, 0.95; all others (Santo Domingo, British West Indies, Louisiana, etc.), 0.932.

Table 170.—*Sugar, raw; cane, and beet: World production, 1909–10 to 1930–31*

Crop year [1]	Estimated world total	Estimated world total cane sugar	Estimated world total beet sugar	Production in selected countries							
				United States [2]	Cuba	India [3]	Java [4]	Germany [5]	Czechoslovakia	Poland [6]	France [7]
	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons
1909–10	16, 828	9, 670	7, 158	883	2, 021	2, 481	1, 369	2, 147	-------	-------	861
1910–11	18, 834	9, 870	8, 964	903	1, 661	2, 587	1, 411	2, 770	-------	-------	763
1911–12	17, 908	10, 622	7, 286	1, 005	2, 124	2, 745	1, 617	1, 552	-------	-------	540
1912–13	20, 542	10, 896	9, 646	907	2, 720	2, 862	1, 550	2, 902	-------	-------	1, 029
1913–14	21, 154	11, 640	9, 514	1, 089	2, 909	2, 573	1, 616	2, 886	-------	-------	841
1914–15	20, 875	11, 952	8, 923	1, 023	2, 922	2, 736	1, 549	2, 721	-------	376	355
1915–16	18, 885	12, 278	6, 607	1, 078	3, 398	2, 949	1, 454	1, 678	-------	239	159
1916–17	18, 592	13, 255	5, 337	1, 193	3, 422	3, 093	1, 797	1, 721	-------	293	217
1917–18	20, 293	14, 790	5, 503	1, 068	3, 890	3, 839	2, 009	1, 726	-------	263	235
1918–19	18, 604	14, 076	4, 528	1, 102	4, 491	2, 752	1, 960	1, 297	[8] 714	249	129
1919–20	17, 989	14, 338	3, 651	903	4, 184	3, 404	1, 473	774	553	106	182
1920–21	19, 546	14, 225	5, 321	1, 347	4, 406	2, 825	1, 681	1, 195	797	195	358
1921–22	20, 578	15, 095	5, 483	1, 425	4, 517	2, 928	1, 853	1, 434	731	170	326
1922–23	20, 860	15, 127	5, 733	1, 022	4, 083	3, 410	1, 994	1, 604	811	335	522
1923–24	22, 810	16, 306	6, 504	1, 112	4, 606	3, 715	1, 981	1, 263	1, 115	423	524
1924–25	26, 670	17, 712	8, 958	1, 260	5, 812	2, 852	2, 201	1, 724	1, 574	540	919
1925–26	27, 989	18, 813	9, 176	1, 120	5, 524	3, 334	2, 535	1, 763	1, 662	638	831
1926–27	26, 624	18, 125	8, 499	1, 011	5, 050	3, 659	2, 175	1, 834	1, 153	634	786
1927–28	28, 508	18, 670	9, 838	1, 246	4, 527	3, 603	2, 639	1, 846	1, 383	658	956
1928–29	30, 697	20, 395	10, 302	1, 273	5, 775	3, 035	3, 238	2, 054	1, 165	824	999
1929–30	30, 258	20, 224	10, 034	1, 294	5, 231	3, 093	3, 202	2, 188	1, 139	1, 010	1, 004
1930–31 [9]	29, 349	17, 441	11, 908	1, 482	[10] 3, 360	[11] 3, 192	3, 229	2, 567	1, 210	794	1, 105

Bureau of Agricultural Economics. Estimated world total sugar production for the period 1895–96 to 1908–09 in Agriculture Yearbook, 1924, p. 808.

[1] Figures are for the crop years 1909–10 to 1930–31 for the countries in which the sugar-production season begins in the fall months and is completed during the following calendar year, except in certain cane-sugar producing countries where the season begins in May or June and is completed in the same calendar year. Production in these countries is for the calendar years 1909 to 1930.

[2] Production of cane and beet sugar in terms of raw sugar.

[3] The figures quoted for India are for the production of gur, a low grade of sugar polarizing between 50° and 60°. This sugar is mostly consumed by the natives.

[4] All grades of sugar reduced to terms of head sugar, a grade of sugar which contains at least 96.5 per cent sucrose.

[5] Figures for 1909–10 to 1917–18 are for pre-war boundaries.

[6] Figures are incomplete through 1920–21; 1914–15 includes Prussian Poland only; 1915–16 to 1919–20 include Prussian Poland and Congress Poland; 1920–21 includes Prussian Poland, Congress Poland, and Galicia.

[7] Figures for 1909–10 to 1918–19 refer to pre-war boundaries, 1914–15 to 1918–19 are exclusive of invaded territory.

[8] Bohemia, Moravia, and Silesia only.

[9] Preliminary.

[10] Preliminary reports indicate that the crop will be limited to this amount; without restriction, the crop is expected to be equal to that of 1929–30.

[11] Unofficial estimate.

TABLE 171.—*Sugar: International trade, average for calendar years 1909–1913, and annual 1927–1929*

Country	Average 1909–1913		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Cuba	656	1,991,912	324	4,645,002	135	4,389,253	[1] 78	[1] 5,543,887
Dutch East Indies	3,606	1,409,616	3,000	2,202,130	3,772	2,827,302	[1] 3,825	[1] 2,658,744
Czechoslovakia	(2)	(2)	2,832	615,583	77	819,545	109	595,686
Philippine Islands	3,950	179,432	2,509	609,929	4,887	628,242	2,138	767,055
Netherlands	82,721	200,490	293,131	307,733	307,109	227,232	188,931	122,542
Peru	726	146,736	27	331,166	24	337,270	107	400,553
Dominican Republic	[3] 766	92,351	189	326,166	17	383,664	7	355,574
Mauritius [1]	2	226,166	3	251,313	3	241,695	2	306,259
Poland	(2)	(2)	64	222,966	38	204,675	11,087	328,309
Belgium	7,892	154,476	90,881	116,251	86,349	109,906	88,798	128,509
Germany	3,486	873,161	121,983	164,174	138,113	85,161	30,826	242,455
British Guiana	[4] 6,112	106,196	455	122,770	536	128,449	358	112,503
Australia	76,233	268	[1] 32	[1] 143,334	[1] 33	[1] 232,667	[1] 27	[1] 216,394
Hungary	[5] 3,942	[5] 848,830	327	74,045	594	78,013	862	133,851
Fiji	[6] 386	78,817	134	81,483	[1] 172	135,165	[1] 290	90,948
Trinidad and Tobago	522	43,755	1,618	46,822	2,056	83,006	[1] 1,607	[1] 91,282
Reunion	[6] 2	41,658	[1] 0	[1] 69,183	[1] 132	[1] 39,516	[1] 0	[1] 41,447
Jamaica	395	14,494	[1] 1,120	[1] 55,774	[1] 1,102	[1] 54,561	[1] 1,372	[1] 41,865
Union of South Africa	29,694	675	3,077	65,276	17,977	90,389	19,867	122,740
Taiwan	554	5,744	[1] 25,084	[1] 13,200	8,374	8,744	[1] 1,642	[1] 2,967
Russia	3,744	293,514	[1] 8,689	[1] 121,173	[1] 145	[1] 150,348	[1] 40,344	[1] 139,719
Madagascar	[1] 1,249	[1] 1,227	4,955	3,289	3,900	4,659	4,235	5,500
PRINCIPAL IMPORTING COUNTRIES								
United States	2,122,517	39,684	4,215,773	125,323	3,868,804	122,587	4,888,389	102,639
United Kingdom	1,853,605	32,603	1,892,705	94,915	2,150,189	83,825	2,351,404	186,766
British India	715,990	26,611	840,224	43,374	930,251	44,761	1,034,939	42,948
China	343,622	14,933	668,240	2,544	916,132	1,542	959,428	665
Canada	297,893	820	494,397	101,116	477,711	27,555	475,490	20,799
France	186,198	206,897	392,317	234,988	488,067	282,929	581,884	331,458
Japan	176,942	60,204	468,188	179,300	423,395	258,084	251,020	217,615
Switzerland	118,201	0	137,422	57	158,532	85	163,479	97
British Malaya	----------	----------	124,038	26,653	125,176	32,135	128,229	21,297
Austria	(2)	(2)	108,132	370	118,750	617	[1] 123,377	[1] 685
Chile	84,965	90	105,175	101	149,113	200	168,181	159
Irish Free State	(2)	(2)	81,506	0	90,115	0	88,518	0
Morocco	61,402	0	113,008	0	128,314	0	[1] 147,309	0
Finland	50,077	0	73,489	0	101,485	0	101,349	0
New Zealand	62,962	[4] 13,478	70,122	641	89,497	867	78,665	1,062
Norway	52,326	0	78,839	0	80,109	0	83,704	0
Persia [7]	109,352	[4] 557	79,754	8	84,399	9	----------	----------
Portugal	39,631	0	[1] 85,968	[1] 109	94,066	105	78,784	80
Italy	9,249	302	77,291	5,073	118,438	4	14,622	5
Denmark	21,814	22,536	12,632	11,920	43,603	605	43,964	626
Greece	11,718	0	66,460	0	67,072	0	69,765	0
Sweden	1,672	1	124,868	13	103,528	18	158,566	55
Egypt	43,020	8,086	57,119	6,367	77,881	5,704	107,974	7,256
Algeria	37,908	0	62,316	[1] 88	70,785	[1] 21	[1] 84,143	[1] 68
Argentina	51,690	72	853	69,044	1,246	37,775	[1] 1,979	10,033
Yugoslavia	(2)	(2)	6,768	1	16,108	0	3,102	14,655
Anglo-Egyptian Sudan	13,764	0	19,570	0	26,784	0	32,983	0
Total 49 countries	6,693,156	7,136,392	11,017,608	11,490,767	11,575,095	12,158,890	12,617,759	13,397,757

Bureau of Agricultural Economics. Official sources except where otherwise noted. The following kinds and grades have been included under the head of sugar: Brown, white, candied, caramel, chancaca (Peru), crystal cube, maple, muscovado, panela. The following have been excluded: "Candy" (meaning confectionery), confectionery, glucose, grape sugar, jaggery, molasses, and sirups.

* Preliminary.
1 International Yearbook of Agricultural Statistics.
2 Figures for pre-war years are included in the countries of the pre-war boundaries.
3 1 year only.
4 4-year average.
5 Average for Austria-Hungary.
6 3-year average.
7 Year ended Mar. 20.

TABLE 172.—*Sugar, raw (96° centrifugal): Average wholesale price per pound, New York, 1921–1930* [1]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average [2]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	5.4	5.3	6.1	5.4	4.9	4.2	4.4	4.7	4.3	4.2	4.1	3.7	4.7
1922	3.6	3.8	3.9	4.0	4.1	4.6	5.2	5.2	4.8	5.4	5.6	5.7	4.7
1923	5.3	6.2	7.3	7.8	7.9	7.4	6.9	6.1	7.0	7.6	7.3	7.3	7.0
1924	6.7	7.2	6.9	6.4	5.6	5.1	5.1	5.4	6.0	6.0	5.8	5.3	6.0
1925	4.6	4.6	4.7	4.5	4.3	4.4	4.3	4.4	4.3	3.9	4.0	4.1	4.3
1926	4.2	4.2	4.0	4.1	4.2	4.1	4.2	4.2	4.4	4.6	4.7	5.1	4.3
1927	5.1	4.9	4.8	4.8	4.8	4.6	4.5	4.5	4.8	4.7	4.7	4.6	4.7
1928	4.5	4.3	4.5	4.5	4.5	4.3	4.2	4.1	4.2	3.9	3.9	3.9	4.2
1929	3.8	3.7	3.7	3.7	3.6	3.5	3.8	3.8	4.0	4.0	3.8	3.8	3.8
1930	3.7	3.7	3.6	3.5	3.2	3.2	3.3	3.2	3.1	3.3	3.4	3.3	3.4

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics reports. Data for 1890–1920 are available in 1924 Yearbook, p. 810, Table 388.

[1] Quotations are on basis of duty paid.
[2] Derived from the figures upon which the monthly averages are based.

TABLE 173.—*Sugar, granulated: Average retail price per pound, United States, 1921–1930*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	9.7	8.9	9.7	9.7	8.4	7.8	7.1	7.5	7.3	6.9	6.7	6.5	8.0
1922	6.2	6.4	6.5	6.7	6.6	7.1	7.6	8.1	7.9	7.9	8.1	8.3	7.3
1923	8.3	8.7	10.2	10.6	11.2	11.1	10.5	9.6	9.6	10.6	10.3	10.4	10.1
1924	10.2	10.3	10.4	9.9	9.2	8.3	8.4	8.2	8.6	8.8	8.8	8.8	9.2
1925	8.1	7.7	7.7	7.5	7.2	7.2	7.1	7.0	7.0	6.8	6.6	6.7	7.2
1926	6.7	6.7	6.7	6.6	6.7	6.9	6.9	7.0	7.0	7.1	7.1	7.3	6.9
1927	7.5	7.5	7.4	7.3	7.3	7.3	7.4	7.3	7.2	7.2	7.2	7.1	7.3
1928	7.1	7.1	7.1	7.1	7.2	7.3	7.3	7.1	7.0	6.9	6.8	6.7	7.1
1929	6.7	6.6	6.5	6.4	6.4	6.4	6.4	6.6	6.7	6.7	6.7	6.6	6.6
1930	6.6	6.5	6.4	6.3	6.3	6.1	6.1	6.1	5.9	5.8	5.9	5.9	6.2

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics retail prices. Data for 1913–1920 available in 1930 Yearbook, p. 704, Table 162.

TABLE 174.—*Sorgo sirup: Acreage, production, and December 1 price, by States, 1927–1930*

State	Acreage				Average yield per acre				Production				Price per gallon received by producers			
	1927	1928	1929	1930 [1]	1927	1928	1929	1930	1927	1928	1929	1930 [1]	1927	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Gals.*	*Gals.*	*Gals.*	*Gals.*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Ohio	4	4	3	3	76	72	85	65	304	288	255	195	115	125	120	110
Indiana	2	2	2	2	80	96	90	65	160	192	180	130	110	115	110	110
Illinois	10	9	9	9	65	72	70	57	650	648	630	513	110	110	110	110
Wisconsin	2	2	2	2	55	64	70	50	110	128	140	100	135	140	140	140
Minnesota	2	2	2	2	70	84	80	80	140	168	160	160	110	120	120	100
Iowa	2	3	3	4	70	120	130	100	140	360	390	400	115	115	115	115
Missouri	22	22	21	22	79	85	75	62	1,738	1,870	1,575	1,364	100	100	105	100
Nebraska	2	2	2	2	80	83	90	80	160	166	180	160	105	105	100	100
Kansas	2	2	2	3	65	75	75	60	130	150	150	180	100	100	95	100
Virginia	10	12	10	14	92	86	81	50	920	1,032	810	700	95	95	95	95
West Virginia	6	7	7	7	89	88	90	59	534	616	630	413	110	110	110	115
North Carolina	22	20	20	30	92	86	94	82	2,024	1,720	1,880	2,460	90	90	85	80
South Carolina	26	18	19	28	71	72	68	65	1,846	1,296	1,292	1,820	75	80	80	75
Georgia	25	24	26	29	82	80	75	72	2,050	1,920	1,950	2,088	75	90	90	70
Kentucky	38	42	42	42	81	72	78	59	3,078	3,024	3,276	2,478	85	95	100	90
Tennessee	29	29	30	28	86	78	86	70	2,494	2,262	2,580	1,960	85	95	95	90
Alabama	35	30	28	39	82	75	70	65	2,870	2,250	1,960	2,535	80	90	85	70
Mississippi	30	30	32	27	85	80	87	71	2,550	2,400	2,784	1,917	70	80	75	60
Arkansas	44	40	41	43	80	70	57	46	3,520	2,800	2,337	1,978	85	90	95	85
Louisiana	1	1	1	1	110	80	89	55	110	80	89	55	75	75	70	70
Oklahoma	17	15	14	14	85	70	55	39	1,445	1,050	770	546	85	85	85	85
Texas	34	32	29	32	95	83	72	60	3,230	2,656	2,088	1,920	80	80	85	75
New Mexico	1	1	1	1	65	76	75	60	65	76	75	60	105	95	100	100
United States	366	349	346	384	82.7	77.8	75.7	62.8	30,268	27,152	26,181	24,132	85.0	91.7	92.2	82.5

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 175.—*Sugarcane sirup: Acreage, production, and December 1 price, by States, 1927–1930*

State	Acreage used for sirup				Average yield per acre				Production				Price per gallon received by producers			
	1927	1928	1929	1930 [1]	1927	1928	1929	1930	1927	1928	1929	1930 [1]	1927	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Gals.*	*Gals.*	*Gals.*	*Gals.*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
South Carolina	7	6	6	6	140	125	150	150	980	750	900	900	90	90	90	80
Georgia	34	29	33	31	150	140	160	150	5, 100	4, 060	5, 280	4, 650	75	75	75	60
Florida	9	8	9	9	183	180	190	170	1, 647	1, 440	1, 710	1, 530	85	85	85	65
Alabama	18	16	17	17	135	117	125	120	2, 430	1, 872	2, 125	2, 040	95	95	90	80
Mississippi	17	18	22	19	215	200	230	130	3, 655	3, 600	5, 060	2, 470	95	90	85	70
Arkansas	2	2	2	2	100	120	105	54	200	240	210	108	110	110	110	100
Louisiana	15	20	17	22	309	334	332	291	4, 787	6, 679	5, 773	6, 459	55	55	55	35
Texas	12	11	11	10	170	160	96	93	2, 040	1, 760	1, 056	930	110	110	105	95
United States	114	110	117	116	182. 8	185. 5	189. 0	164. 5	20, 839	20, 401	22, 114	19, 087	81. 5	77. 6	76. 7	58. 2

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 176.—*Maple sugar and sirup: Production in important States, 1917–1930* [1]

Year	Trees tapped	Sugar made	Sirup made	Total product in terms of sugar [2]	Average total product per tree		Average price received by producers	
					As sugar [2]	As sirup [2]	Per pound of sugar	Per gallon of sirup
	Thousand	*1,000 pounds*	*1,000 gallons*	*1,000 pounds*	*Pounds*	*Gallon*	*Cent*	*Dollars*
1917	17, 313	10, 525	4, 258	44, 589	2. 58	0. 32		
1918	19, 132	12, 944	4, 863	51, 848	2. 71	. 34		
1919	18, 799	9, 787	3, 804	40, 219	2. 14	. 27		
1920	18, 895	7, 324	3, 580	35, 964	1. 90	. 24		
1921	15, 114	4, 730	2, 386	23, 818	1. 58	. 20		
1922	16, 274	5, 147	3, 640	34, 267	2. 11	. 26		
1923	15, 291	4, 685	3, 605	33, 525	2. 19	. 27		
1924	15, 407	4, 078	3, 903	35, 302	2. 29	. 29	0. 26	2. 02
1925	15, 313	3, 236	3, 089	27, 946	1. 82	. 23	. 27	2. 10
1926	14, 712	3, 569	3, 737	33, 465	2. 27	. 28	. 29	2. 16
1927	14, 603	3, 133	3, 671	32, 501	2. 23	. 28	. 29	2. 09
1928	14, 388	2, 317	3, 007	26, 373	1. 83	. 23	. 29	2. 05
1929	14, 130	1, 706	2, 595	22, 466	1. 59	. 20	. 30	2. 07
1930	14, 421	2, 588	3, 977	34, 404	2. 39	. 30	. 30	2. 06

Bureau of Agricultural Economics.

[1] The data for 1917–1923 include 11 States: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, Pennsylvania, Ohio, Indiana, Michigan, and Wisconsin; data for 10 States, excluding Connecticut, are shown for 1924 and 1925; and data from 9 States excluding Indiana, are shown from 1926 to 1930. In 1919 the 9 States now included produced about 97 per cent of the maple sugar and about 92 per cent of the maple sirup, as reported by the Bureau of the Census.

[2] 1 gallon of sirup taken as equivalent to 8 pounds of sugar.

TABLE 177.—*Maple sugar and sirup: Production, by States, 1927–1930*

State	Trees tapped				Sugar made				Sirup made			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Thousand	*Thousand*	*Thousand*	*Thousand*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 gallons*	*1,000 gallons*	*1,000 gallons*	*1,000 gallons*
Maine	310	304	307	307	15	3	14	38	60	38	50	47
New Hampshire	822	806	766	774	289	274	231	315	164	137	177	183
Vermont	5, 665	5, 722	5, 665	5, 778	1, 694	1, 133	966	1, 239	1, 417	1, 038	1, 083	1, 398
Massachusetts	277	280	288	288	132	134	50	134	75	67	46	84
New York	3, 839	3, 647	3, 647	3, 720	733	549	334	686	1, 002	718	615	1, 123
Pennsylvania	626	607	565	565	148	67	43	87	139	157	85	224
Ohio	1, 666	1, 583	1, 425	1, 439	31	58	15	21	488	480	246	442
Michigan	828	869	886	930	72	70	40	49	172	208	163	297
Wisconsin	570	570	581	620	19	29	13	19	154	164	130	174
Total 9 States [1]	14, 603	14, 388	14, 130	14, 421	3, 133	2, 317	1, 706	2, 588	3, 671	3, 007	2, 595	3, 977

Bureau of Agricultural Economics.

[1] These 9 States produced about 97 per cent of the maple sugar and about 92 per cent of the maple syrup made in the United States in 1919 as reported by the Bureau of the Census.

TABLE 178.—*Tobacco, unmanufactured: Acreage, production, value, exports, etc.; United States, 1890–1930*

Year	Acreage	Average yield per acre	Production	Price per pound received by producers Dec. 1	Farm value, Dec. 1	Domestic exports, year beginning July 1 [1]	Imports, year beginning July 1 [1]	Net exports, year beginning July 1 [1] [2]
	Acres	*Lbs.*	*1,000 lbs.*	*Cts.*	*1,000 dolls.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1890	722,028	722.8	518,683	8.3	42,846	249,233	23,255	227,254
1891	738,216	747.4	551,777	8.5	47,074	255,432	21,989	234,587
1892	720,189	687.6	495,209	9.3	46,044	266,083	28,110	239,153
1893	702,952	687.1	483,024	8.1	39,155	290,685	19,663	272,983
1894	523,103	777.4	406,678	6.8	27,761	300,992	26,668	276,223
1895	633,950	775.4	491,544	7.2	35,574	295,539	32,925	266,317
1896	594,749	677.6	403,004	6.0	24,258	314,932	13,805	302,847
1897	[3] 945,604	646.0	610,860			263,020	10,477	254,907
1898	[3] 933,868	748.0	698,533			283,613	14,036	271,559
1899	*1,101,460*	*788.1*	*868,113*					
1899	1,101,500	728.5	802,397	7.1	57,273	344,656	19,620	326,939
1900	1,046,427	778.2	814,345	6.6	53,661	315,788	26,851	290,915
1901	1,039,199	788.0	818,953	7.1	58,283	301,007	29,429	273,770
1902	1,030,734	797.3	821,824	7.0	57,564	368,184	34,017	337,902
1903	1,037,735	786.3	815,972	6.8	55,515	311,972	31,163	286,335
1904	806,409	819.0	660,461	8.1	53,383	334,302	33,288	301,694
1905	776,112	815.6	633,034	8.5	53,519	312,227	41,126	273,912
1906	796,099	857.2	682,429	10.0	68,233	340,743	40,899	302,506
1907	820,800	850.5	698,126	10.2	71,411	330,813	35,005	297,657
1908	875,425	820.2	718,061	10.3	74,130	287,901	43,123	247,155
1909	*1,294,911*	*815.3*	*1,055,765*					
1909	1,294,900	814.8	1,055,133	10.1	106,374	357,196	46,838	313,085
1910	1,366,100	807.7	1,103,415	9.3	102,142	355,327	48,203	309,171
1911	1,013,000	893.7	905,109	9.4	85,210	379,845	54,740	327,199
1912	1,226,000	785.5	962,855	10.8	104,063	418,797	67,977	353,575
1913	1,216,100	784.3	953,734	12.8	122,481	449,750	61,175	391,196
1914	1,223,500	845.7	1,034,679	9.8	101,411	348,346	45,809	306,426
1915	1,369,900	775.4	1,062,237	9.1	96,281	443,293	48,078	400,624
1916	1,413,400	816.0	1,153,278	14.7	169,672	411,599	49,105	370,987
1917	1,517,800	823.1	1,249,276	24.0	300,449	289,171	86,991	211,962
1918	1,647,100	873.7	1,439,071	28.0	402,264	629,288	83,951	577,323
1919	*1,864,080*	*736.6*	*1,372,993*					
1919	1,951,000	751.1	1,465,481	39.0	570,868	648,038	94,005	570,858
1920	1,960,000	807.3	1,582,225	21.2	335,675	506,526	58,923	456,477
1921	1,427,000	749.6	1,069,693	19.9	212,728	463,389	65,225	403,492
1922	1,695,000	735.6	1,246,837	23.2	289,248	454,364	73,796	386,213
1923	1,877,000	807.2	1,515,110	19.9	301,096	597,630	52,380	550,404
1924	*1,537,843*	*719.4*	*1,106,340*					
1924	1,705,800	733.6	1,251,343	20.7	259,139	430,702	75,131	357,478
1925	1,757,300	783.3	1,376,628	18.2	250,774	537,240	68,281	470,651
1926	1,656,400	783.6	1,297,889	18.2	236,702	516,402	91,089	426,545
1927	1,584,900	764.7	1,211,909	21.2	256,882	489,996	79,112	413,299
1928	1,894,100	725.7	1,374,547	[4] 20.2	277,506	565,925	76,891	491,542
1929	2,040,300	747.3	1,524,677	[4] 18.5	282,764	600,126	61,041	543,397
1930 [5]	2,110,300	715.7	1,510,308	[4] 14.4	216,895			

Bureau of Agricultural Economics. Italic figures are census returns, other acreage, yield, and production figures are estimates of the crop-reporting board. See p. 970, 1927 Yearbook, for data for earlier years.

[1] Compiled from Commerce and Navigation of the United States, 1890–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States; June issues 1919–1926, January and June issues, 1927–1930, and official records of the Bureau of Foreign and Domestic Commerce.

[2] Total exports (domestic exports plus foreign) minus reexports.

[3] Revised on basis of 1899.

[4] Season average price; for 1930 based on sales to date.

[5] Preliminary.

TABLE 179.—*Tobacco: Acreage, yield and production, by types, 1929 and 1930*

Class and type	Type No.	Acreage 1929	Acreage 1930	Yield per acre 1929	Yield per acre 1930	Production 1929	Production 1930
		Acres	*Acres*	*Pounds*	*Pounds*	*1,000 pounds*	*1,000 pounds*
Types other than cigar	11–37	1,894,100	1,955,600	714.9	681.4	1,354,186	1,332,450
Class 1, flue cured	11–14	1,134,700	1,157,200	661.8	683.5	750,899	790,950
Old belt	11	436,000	424,000	655.5	586.1	285,800	248,500
Virginia	11	126,000	124,000	600	465	75,600	57,700
North Carolina	11	310,000	300,000	678	636	210,200	190,800
Eastern North Carolina belt	12	394,800	399,000	632	705	249,500	281,295
South Carolina belt	13	187,200	200,000	647.8	754.8	121,260	150,970
North Carolina	13	54,200	71,000	716	800	38,800	56,800
South Carolina	13	133,000	129,000	620	730	82,460	94,170
Georgia and Florida belt	14	116,700	134,200	808.4	821.0	94,339	110,185
Georgia	14	108,600	125,600	812	822	88,184	103,305
Florida	14	8,100	8,600	760	800	6,155	6,880
Class 2, fire cured	21–24	222,800	233,100	821.8	680.2	183,087	158,559
Virginia	21	30,000	34,600	760	509	22,800	17,600
Clarksville and Hopkinsville	22	127,500	127,500	817.7	741.4	104,260	94,530
Kentucky	22	56,500	58,500	840	690	47,460	40,365
Tennessee	22	71,000	69,000	800	785	56,800	54,165
Paducah	23	54,000	59,000	861.8	635.4	46,535	37,489
Kentucky	23	47,000	51,500	865	626	40,655	32,239
Tennessee	23	7,000	7,500	840	700	5,880	5,250
Henderson stemming (Kentucky)	24	11,300	12,000	840	745	9,492	8,940
Class 3A, air cured, light	31–32	462,400	488,400	777.1	662.9	359,316	323,756
Burley	31	429,400	454,400	779.1	672.5	334,566	305,566
Ohio	31	21,600	17,400	824	750	17,798	13,050
Indiana	31	14,400	12,000	766	670	11,040	8,040
Virginia	31	6,400	8,600	1,086	1,105	6,950	9,500
Missouri	31	4,500	5,200	900	900	4,050	4,680
West Virginia	31	8,500	7,200	775	680	6,588	4,896
North Carolina	31	5,000	9,000	820	700	4,100	6,300
Kentucky	31	319,000	324,000	760	620	242,440	200,880
Tennessee	31	50,000	71,000	832	820	41,600	58,220
Southern Maryland	32	33,000	34,000	750	535	24,750	18,190
Class 3B, air cured, dark	35–37	74,200	76,900	820.5	769.6	60,884	59,185
One sucker	35	35,100	37,100	836.0	805.4	29,344	29,880
Indiana	35	4,800	4,300	833	754	4,000	3,242
Kentucky	35	26,000	28,500	840	820	21,840	23,370
Tennessee	35	4,300	4,300	815	760	3,504	3,268
Green River (Kentucky)	36	33,000	33,000	830	785	27,390	25,905
Virginia sun-cured	37	6,100	6,800	680	500	4,150	3,400
Cigar types	41–65	143,200	152,900	1,174	1,156	168,171	176,814
Class 4, cigar filler	41–45	69,100	71,350	1,044	1,014	72,108	72,365
Pennsylvania seedleaf	41	38,100	38,950	1,284	964	48,920	37,548
Dutch	42–44	29,300	30,700	724	1,070	21,213	32,842
Ohio	42–44	29,200	30,600	724	1,070	21,141	32,742
Indiana	42–44	100	100	720	1,000	72	100
Georgia and Florida sun-grown	45	1,700	1,700	1,162	1,162	1,975	1,975
Georgia	45	800	800	1,175	1,175	940	940
Florida	45	900	900	1,150	1,150	1,035	1,035
Class 5, cigar binder	51–55	61,300	70,750	1,320	1,313	80,904	92,919
Connecticut Valley Broadleaf	51	8,300	12,450	1,453	1,469	12,058	18,284
Massachusetts	51	400	550	1,488	1,460	595	803
Connecticut	51	7,900	11,900	1,451	1,469	11,463	17,481
Connecticut Valley Havana seed	52	11,600	11,650	1,509	1,505	17,505	17,530
Massachusetts	52	6,100	6,150	1,510	1,491	9,211	9,170
Connecticut	52	5,500	5,500	1,508	1,520	8,294	8,360
New York and Pennsylvania Havana seed	53	1,400	1,350	1,011	985	1,416	1,330
New York	53	800	800	1,000	950	800	760
Pennsylvania	53	600	550	1,027	1,036	616	570
Southern Wisconsin	54	23,500	23,200	1,264	1,256	29,705	29,140
Northern Wisconsin	55	16,500	22,100	1,225	1,205	20,220	26,635
Wisconsin	55	15,000	19,800	1,228	1,200	18,420	23,760
Minnesota	55	1,500	2,300	1,200	1,250	1,800	2,875

TABLE 179.—*Tobacco: Acreage, yield, and production, by types, 1929 and 1930.*—Continued

Class and type	Type No.	Acreage		Yield per acre		Production	
		1929	1930	1929	1930	1929	1930
		Acres	*Acres*	*Pounds*	*Pounds*	*1,000 pounds*	*1,000 pounds*
Cigar types—Continued.							
Class 6, cigar wrapper	61–65	12,800	10,800	1,184	1,068	15,159	11,530
Connecticut Valley shade-grown	61	8,700	7,400	1,174	1,039	10,218	7,688
Massachusetts	61	1,500	1,400	1,196	1,017	1,794	1,424
Connecticut	61	7,200	6,000	1,170	1,044	8,424	6,264
Georgia and Florida shade-grown	62	3,900	3,400	1,186	1,130	4,626	3,842
Georgia	62	600	600	1,243	1,248	746	749
Florida	62	3,300	2,800	1,176	1,105	3,880	3,093
Connecticut Valley primed Havana, Connecticut	65	200		1,575		315	
Class 7, miscellaneous							
Eastern Ohio	70	2,000	800	971	730	1,942	584
Louisiana Perique	70	1,000	1,000	378	460	378	460
United States	All	2,040,300	2,110,300	747.3	715.7	1,524,677	1,510,308

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

NOTE.—1930 figures subject to revision on basis of later information.

TABLE 180.—*Tobacco: Acreage and production, by States, average 1924–1928, annual 1927–1930*

State	Acreage				Production			
	Average, 1924–1928	1928	1929	1930 [1]	Average, 1924–1928	1928	1929	1930 [1]
	Acres	*Acres*	*Acres*	*Acres*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Massachusetts	7,760	7,600	8,000	8,100	10,061	9,462	11,600	11,397
Connecticut	25,800	25,000	20,800	23,400	33,511	29,750	28,496	32,105
New York	1,360	800	800	800	1,570	1,020	800	760
Pennsylvania	38,200	37,000	38,700	39,500	50,856	49,580	49,536	38,118
Ohio	44,980	40,500	52,800	48,800	37,175	32,198	40,881	46,376
Indiana	15,760	13,700	19,300	16,400	13,531	11,234	15,112	11,382
Wisconsin	33,400	37,000	38,500	43,000	38,868	48,100	48,125	52,900
Minnesota		1,000	1,500	2,300		1,200	1,800	2,875
Missouri	4,600	4,000	4,500	5,200	4,377	4,400	4,050	4,680
Maryland	31,200	31,000	33,000	34,000	24,369	20,460	24,750	18,190
Virginia	191,360	180,800	168,500	174,000	127,153	104,864	109,500	88,200
West Virginia	7,660	6,800	8,500	7,200	6,053	5,100	6,588	4,896
North Carolina	599,200	728,000	764,000	779,000	407,697	499,408	502,600	535,195
South Carolina	105,400	148,000	133,000	129,000	66,469	82,288	82,460	94,170
Georgia	72,540	122,300	110,000	127,000	52,552	84,387	89,870	104,994
Florida	7,960	12,000	12,300	12,300	6,715	9,216	11,070	11,008
Kentucky	413,640	388,000	492,800	507,500	330,997	300,700	389,277	331,699
Tennessee	117,680	109,600	132,300	151,800	89,846	80,775	107,784	120,903
Louisiana	1,000	1,000	1,000	1,000	422	405	378	460
United States	1,719,760	1,894,100	2,040,300	2,110,300	1,302,463	1,374,547	1,524,677	1,510,308

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 181.—*Tobacco: Acreage, yield per acre, and production in specified countries, annual 1928–29 to 1930–31*

Country	Acreage			Yield per acre			Production		
	1928–29	1929–30	1930–31*	1928–29	1929–30	1930–31*	1928–29	1929–30	1930–31*
North America, Central America, and West Indies:	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Lbs.*	*Lbs.*	*Lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Canada	43	38	41	976	784	895	41,956	29,786	36,713
United States	1,894	2,040	2,110	726	747	716	1,374,547	1,524,677	1,510,308
Mexico	44	42	------	632	679	------	27,793	28,506	--------
Cuba	150	150	------	400	458	------	59,965	68,651	--------
Dominican Republic [1]	------	------	------	------	------	------	29,983	44,974	24,000
Porto Rico	40	39	43	533	631	623	21,326	24,600	26,786
Europe:									
Sweden	1	------	------	1,255	------	------	1,255	1,233	--------
Belgium	8	7	7	1,940	2,148	1,847	15,522	15,035	12,928
France	38	------	------	1,317	------	------	50,062	--------	--------
Spain	5	7	16	1,290	1,482	1,033	6,450	10,377	16,535
Italy	93	95	104	865	1,022	1,046	80,407	97,046	108,774
Germany	25	24	23	2,078	2,122	------	51,949	50,924	--------
Czechoslovakia	15	16	19	1,000	1,263	1,044	15,006	20,207	19,842
Hungary	56	55	59	1,035	1,196	1,196	57,982	65,802	70,547
Yugoslavia	26	38	------	498	800	------	12,944	30,406	--------
Greece	230	240	203	563	667	765	129,493	160,123	155,253
Bulgaria	55	94	78	632	769	677	34,750	72,262	52,826
Rumania	68	76	85	501	754	------	34,080	57,315	--------
Poland	9	16	------	1,590	1,227	------	14,308	19,638	--------
Russia	197	212	263	1,566	1,359	1,509	308,556	288,141	396,828
North Africa:									
Algeria	65	53	42	847	841	869	55,057	44,560	36,509
Tunis	2	1	1	782	925	------	1,564	925	--------
French West Africa [2]	47	------	------	235	------	------	11,023	--------	--------
Asia:									
Turkey	150	------	------	686	------	------	102,863	[3] 88,000	--------
Persia	------	------	------	------	------	------	26,000	--------	--------
Palestine	2	5	------	377	459	------	754	2,295	--------
Syria	6	9	------	534	715	------	3,205	6,437	--------
India	1,351	1,149	------	1,000	1,174	------	1,351,420	1,349,215	--------
Ceylon	13	14	------	692	------	------	8,995	--------	--------
Indo-China	29	31	------	557	651	------	16,142	20,166	--------
Japan	92	88	89	1,527	1,569	1,631	140,485	138,063	145,175
Chosen (Korea)	54	48	37	923	1,191	------	49,844	57,180	--------
Taiwan (Formosa)	2	2	------	1,655	1,663	------	3,310	3,326	--------
Siam	25	------	------	614	------	------	15,350	--------	--------
Philippine Islands	199	204	------	512	512	------	101,801	104,539	--------
South America:									
Colombia	18	------	------	1,086	------	------	19,553	--------	--------
Brazil	------	------	------	------	------	------	241,554	--------	--------
Uruguay	1	1	------	848	450	------	848	450	--------
Chile	8	------	------	1,734	------	------	13,868	--------	--------
Argentina	26	------	------	896	------	------	23,307	--------	--------
South Africa:									
Union of South Africa [4]	24	------	------	552	------	------	13,247	13,000	--------
Southern Rhodesia [5]	16	12	------	392	470	------	6,273	5,640	--------
Northern Rhodesia [5]	3	------	------	482	------	------	1,447	--------	--------
Nyasaland	36	52	------	403	266	------	14,519	13,822	--------
Madagascar	16	23	------	1,075	811	------	17,196	18,651	--------
Oceania:									
Dutch East Indies, Java, and Madura [6]	77	69	------	902	953	------	69,447	65,745	--------
Sumatra [7]	51	52	------	917	821	------	46,789	42,693	--------
Australia	2	------	------	394	------	------	789	--------	--------
Total, all countries reporting acreage or production, all years	2,942	3,133	3,220	------	------	------	2,311,520	2,535,653	2,613,024
Estimated world total, exclusive of China [8]	------	------	------	------	------	------	4,941,000	--------	--------

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture except as otherwise stated. Acreage and production figures are for the harvesting season which begins in the spring, extends through the calendar year in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere, except in the Dutch East Indies, where the harvest is largely completed within the calendar year.

* Preliminary.
[1] Export crop.
[2] French Guinea only.
[3] Unofficial estimate.
[4] European production only; native production insignificant.
[5] Cultivation by Europeans.
[6] Estate production only. Figures for native production not available. Total production of the islands is estimated on the basis of average yield of 311 pounds per acre for the native area, with the addition of the estate production, at 205,000,000 pounds in 1928–29 and 178,000,000 in 1929–30.
[7] Estate production only.
[8] No data are available for the total production of China, which is of considerable importance.

TABLE 182.—*Tobacco: Yield per acre and estimated price per pound, December 1 by States, averages, and annual 1925–1930*

State	Yield per acre							Estimated price per pound						
	Av., 1919–1928	1925	1926	1927	1928	1929	1930	Av., 1924–1928	1925	1926	1927	1928 [1]	1929 [1]	1930 [1]
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Massachusetts	1,344	1,243	1,448	1,223	1,245	1,450	1,407	29.5	16.0	35.0	35.7	34.1	42.6	30.7
Connecticut	1,341	1,352	1,340	1,223	1,190	1,370	1,372	32.1	19.0	35.6	36.6	37.2	48.0	39.0
New York	1,190	1,100	1,100	1,200	1,275	1,000	950	20.1	22.0	19.0	18.0	19.3	15.5	15.0
Pennsylvania	1,359	1,400	1,320	1,360	1,340	1,280	965	13.6	15.0	10.5	13.0	14.0	12.0	13.0
Ohio	869	974	846	819	795	774	950	17.0	15.0	10.1	18.4	22.0	16.2	12.3
Indiana	860	871	884	760	820	783	694	18.1	18.0	9.7	22.0	24.0	17.0	14.0
Wisconsin	1,187	1,375	1,150	1,070	1,300	1,250	1,230	14.8	16.5	13.8	16.0	14.6	15.0	15.0
Minnesota	-----	-----	-----	-----	1,200	1,200	1,250	-----	-----	-----	-----	12.0	14.0	13.4
Missouri	974	815	950	1,100	1,100	900	900	23.5	27.0	15.0	22.0	28.6	21.9	20.0
Maryland	773	823	840	818	660	750	535	24.0	19.0	23.7	23.0	27.3	27.2	23.0
Virginia	662	647	725	723	580	650	507	17.7	15.6	17.6	17.8	16.0	17.5	10.2
West Virginia	786	775	850	775	750	775	680	20.8	18.2	13.1	24.5	26.8	21.0	16.0
North Carolina	645	695	684	737	686	658	687	23.3	23.0	26.4	22.0	19.5	18.2	13.7
South Carolina	656	740	668	737	556	620	730	18.1	17.0	23.3	20.5	12.7	16.0	12.0
Georgia	658	720	770	725	690	817	827	19.6	15.0	24.0	19.4	13.2	18.7	10.3
Florida	933	832	968	935	768	900	895	34.1	31.0	37.8	34.8	29.1	31.2	25.6
Kentucky	816	810	842	697	775	790	654	18.0	16.0	10.6	21.4	25.0	17.5	14.3
Tennessee	758	726	781	780	737	815	796	17.7	17.0	10.5	21.4	21.2	18.6	16.1
Louisiana	441	504	400	400	405	378	460	49.0	55.0	45.0	45.0	45.0	40.0	30.0
United States	764.2	783.3	783.6	764.7	725.7	747.3	715.7	19.7	18.2	18.2	21.2	20.2	18.5	14.4

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Season average price; for 1930 based on sales to date.

TABLE 183.—*Tobacco: Production, stocks, supply, disappearance, and price, 1912–1930*

FLUE-CURED, TYPES 11–14

Year	Production [1]	Socks on hand July 1	Total supply	Disappearance, year beginning July 1 [1]	Average price per pound	Year	Production [1]	Stocks on hand July 1	Total supply	Disappearance, year beginning July 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*		*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1913	282.8	[2] 211.0	493.8	262.3	18.3	1922	408.8	440.7	849.5	410.8	29.0
1914	275.4	[2] 231.5	506.9	238.3	11.3	1923	592.9	438.7	1,031.6	555.0	22.3
1915	312.0	[2] 268.6	580.6	301.2	10.5	1924	436.8	476.6	913.4	451.1	22.5
1916	263.3	[2] 279.4	542.7	289.3	19.0	1925	576.3	462.3	1,038.6	583.2	20.0
1917	358.8	253.4	612.2	319.8	30.5	1926	564.5	455.4	1,019.9	553.4	25.6
1918	487.1	292.4	779.5	452.2	34.3	1927	715.9	466.5	1,182.4	617.4	21.3
1919	487.5	327.3	814.8	510.6	44.6	1928	740.8	565.0	1,305.8	715.8	17.7
1920	630.8	304.2	935.0	451.9	21.1	1929	750.9	590.0	1,340.9	741.6	17.9
1921	371.4	483.1	854.5	413.8	21.7	1930	[3] 791.0	599.3	1,390.3	--------	[3] 12.1

VIRGINIA FIRE-CURED, TYPE 21

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound	Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*		*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1912	49.5	34.6	84.1	50.4	7.8	1922	49.1	24.7	73.8	46.8	19.8
1913	58.4	33.7	92.1	57.9	7.0	1923	43.8	27.0	70.8	36.6	18.1
1914	37.0	34.2	71.2	42.5	7.3	1924	43.1	34.2	77.3	34.2	19.4
1915	54.6	28.7	83.3	44.5	8.0	1925	42.0	43.1	85.1	35.2	16.2
1916	53.8	38.8	92.6	47.4	10.4	1926	43.8	49.9	93.7	37.6	7.8
1917	51.5	45.2	96.7	54.9	17.0	1927	26.6	56.1	82.7	33.7	9.9
1918	60.2	41.8	102.0	67.8	17.7	1928	21.9	49.0	70.9	39.6	10.6
1919	36.6	34.2	70.8	40.0	25.0	1929	22.8	31.3	54.1	26.2	16.9
1920	45.6	30.8	76.4	41.8	9.1	1930	[3] 17.6	27.9	45.5	--------	[3] 9.5
1921	24.6	34.6	59.2	34.5	18.8						

[1] Green weight basis, i. e., farmers' sales weight. Disappearance includes consumption, exports, and losses.
[2] Estimated.
[3] Estimated January, 1931.

TABLE 183.—*Tobacco: Production, stocks, supply, disappearance, and price, 1912–1930*—Continued

KENTUCKY AND TENNESSEE FIRE-CURED, TYPES 22 AND 23

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound		Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound	
					Clarksville and Hopkinsville	Paducah						Clarksville and Hopkinsville	Paducah
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*	*Cents*		*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*	*Cents*
1912	141.2	91.1	232.3	120.7	7.8	6.2	1922	181.9	130.2	312.1	171.2	15.9	13.2
1913	139.0	111.6	250.6	108.8	9.0	7.7	1923	199.0	140.9	339.9	196.5	12.2	10.9
1914	133.7	141.8	275.5	125.7	7.5	6.1	1924	156.3	143.4	299.7	148.5	15.5	9.8
1915	157.0	149.8	306.8	184.4	6.5	6.0	1925	154.4	151.2	305.6	136.4	10.1	6.9
1916	176.8	122.4	299.2	171.2	10.8	9.8	1926	129.2	169.2	298.4	136.5	8.4	6.0
1917	190.4	128.0	318.4	121.3	14.8	14.0	1927	81.0	161.9	242.9	128.8	18.5	12.2
1918	153.0	197.1	350.1	208.1	22.6	21.0	1828	104.2	114.1	218.3	114.2	15.6	12.7
1919	233.7	142.0	375.7	196.4	19.8	15.4	1929	150.8	104.1	254.9	147.8	14.3	10.0
1920	180.5	179.3	359.8	204.1	11.6	9.5	1930	[3] 132.0	107.1	239.1		[3] 9.2	[3] 6.0
1921	132.9	155.7	288.6	158.4	16.7	13.0							

HENDERSON FIRE-CURED (HENDERSON STEMMING) TYPE 24

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound	Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*		*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1923	14.6	3.0	17.6	13.8	12.8	1927	4.2	7.2	11.4	6.8	9.7
1924	14.2	3.8	18.0	12.2	12.0	1928	6.0	4.6	10.6	9.9	12.0
1925	14.0	5.8	19.8	12.4	7.3	1929	9.5	.7	10.2	9.5	9.5
1926	9.9	7.4	17.3	10.1	7.4	1930	[3] 8.9	.7	9.6		[3] 8.0

BURLEY, TYPE 31

1912	196.1	215.3	411.4	186.2	11.0	1922	275.6	280.9	556.5	213.6	25.2
1913	176.8	225.2	402.0	198.3	12.3	1923	329.5	342.9	672.4	244.1	21.4
1914	224.7	203.7	428.4	178.6	8.1	1924	299.2	428.3	727.5	268.4	21.3
1915	217.3	249.8	467.1	267.8	9.5	1925	275.1	459.1	734.2	268.2	19.0
1916	257.0	199.3	456.3	248.7	15.5	1926	301.0	466.0	767.0	315.7	13.1
1917	251.5	207.6	459.1	269.0	26.5	1927	180.2	451.3	631.5	283.7	26.0
1918	312.0	190.1	502.1	272.2	32.6	1928	270.6	347.8	618.4	286.0	30.4
1919	277.6	229.9	507.5	239.7	33.2	1929	334.6	332.4	667.0	294.0	21.8
1920	315.3	267.8	583.1	258.7	13.4	1930	[3] 305.6	373.0	678.6		[3] 17.3
1921	220.8	324.4	545.2	264.3	22.4						

SOUTHERN MARYLAND,[4] TYPE 32

1912	22.0	9.4	31.4	23.9	8.1	1922	22.2	23.5	45.7	30.1	17.4
1913	21.0	7.5	28.5	18.9	9.1	1923	22.1	15.6	37.7	20.4	27.5
1914	20.4	9.6	30.0	8.2	8.0	1924	22.8	17.3	40.1	21.9	26.7
1915	18.2	21.8	40.0	27.5	8.5	1925	25.1	18.2	43.3	22.8	23.6
1916	23.4	12.5	35.9	15.7	15.6	1926	26.6	20.5	47.1	24.3	23.5
1917	25.9	20.2	46.1	21.7	20.0	1927	27.0	22.8	49.8	23.7	22.8
1918	32.7	24.4	57.1	28.9	30.0	1928	21.5	26.1	47.6	27.0	26.8
1919	26.0	28.2	54.2	26.6	24.4	1929	26.7	20.6	47.3	28.5	25.8
1920	36.9	27.6	64.5	35.7	18.6	1930	[3] 18.8	18.8	37.6		[3] 24.4
1921	20.3	28.8	49.1	25.6	19.0						

[1] Green weight basis, i. e., farmers' sales weight. Disappearance includes consumption, exports, and losses.
[3] Estimated January, 1931.
[4] Includes eastern Ohio.

TABLE 183.—*Tobacco: Production, stocks, supply, disappearance, and price, 1912–1930*—Continued

ONE SUCKER, TYPE 35

Year	Production	Stock on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1	Average price per pound	Year	Production	Stocks on hand Oct. 1	Total supply	Disappearance year beginning Oct. 1	Average price per pound
	Million Pounds	*Million Pounds*	*Million Pounds*	*Million Pounds*	*Cents*		*Million Pounds*	*Million Pounds*	*Million Pounds*	*Million Pounds*	*Cents*
1912	16.6	22.6	39.2	7.3	6.5	1922	50.4	36.4	86.8	53.0	12.2
1913	28.2	31.9	60.1	32.3	7.1	1923	54.1	33.8	87.9	46.1	10.1
1914	36.9	27.8	64.7	42.4	5.6	1924	39.1	41.8	80.9	38.5	11.2
1915	30.0	22.3	52.3	35.6	5.5	1925	35.5	42.4	77.9	28.0	8.3
1916	41.8	16.7	58.5	39.9	10.0	1926	30.8	49.9	80.7	39.0	5.7
1917	45.0	18.6	63.6	27.7	17.0	1927	13.1	41.7	54.8	27.9	10.6
1918	45.0	35.9	80.9	48.4	14.4	1928	20.1	26.9	47.0	25.6	12.2
1919	69.8	32.5	102.3	57.7	13.4	1929	29.3	21.4	50.7	25.6	10.5
1920	53.7	44.6	98.3	50.7	7.0	1930	[3] 29.9	25.1	55.0		[3] 7.2
1921	27.6	47.6	75.2	38.8	12.0						

GREEN RIVER, TYPE 36

1923	58.9	52.2	111.1	56.4	11.0	1927	18.1	48.4	66.5	26.4	9.1
1924	47.6	54.7	102.3	50.3	11.6	1928	18.9	40.1	59.0	28.2	11.6
1925	51.0	52.0	103.0	51.3	6.9	1929	27.4	30.8	58.2	34.4	10.7
1926	40.0	51.7	91.7	43.3	7.4	1930	[3] 25.9	23.8	49.7		[3] 10.2

VIRGINIA SUN-CURED, TYPE 37

1912	9.8	11.2	21.0	10.7	8.0	1922	8.2	8.3	16.5	8.2	14.3
1913	12.7	10.3	23.0	9.8	8.5	1923	5.6	8.3	13.9	7.6	13.2
1914	9.1	13.2	22.3	12.8	6.5	1924	5.6	6.3	11.9	7.7	14.6
1915	10.2	9.5	19.7	12.4	8.0	1925	5.7	4.2	9.9	5.7	16.4
1916	8.3	7.3	15.6	10.7	14.0	1926	7.2	4.2	11.4	5.5	9.4
1917	8.8	4.9	13.7	7.4	28.5	1927	5.5	5.9	11.4	6.3	13.1
1918	11.9	6.3	18.2	9.6	20.5	1928	5.0	5.1	10.1	4.6	10.1
1919	6.5	8.6	15.1	5.4	28.0	1929	4.2	5.5	9.7	5.8	13.2
1920	9.0	9.7	18.7	9.2	9.2	1930	[3] 3.4	3.9	7.3		[3] 7.0
1921	4.0	9.5	13.5	5.2	18.2						

PENNSYLVANIA CIGAR LEAF, TYPES 41 AND 53 [5]

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound	Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*		*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1912	64.1	118.8	182.9	55.6	8.5	1922	56.8	90.3	147.1	48.0	16.0
1913	46.7	127.3	174.0	61.0	7.5	1923	59.0	99.1	158.1	48.4	18.1
1914	48.0	113.0	161.0	55.5	7.5	1924	57.5	109.7	167.2	53.8	15.7
1915	42.4	105.5	147.9	68.6	9.2	1925	57.4	113.4	170.8	65.5	10.4
1916	49.1	79.3	128.4	51.9	14.2	1926	43.6	105.3	148.9	64.8	10.5
1917	58.1	76.5	134.6	49.5	21.0	1927	46.2	84.1	130.3	45.7	13.0
1918	64.8	85.1	149.9	58.2	14.0	1928	49.6	84.6	134.2	49.9	14.0
1919	56.8	91.7	148.5	60.7	18.0	1929	49.5	84.3	133.8	53.1	12.0
1920	64.9	87.8	152.7	69.6	12.0	1930	[3] 38.1	80.7	118.8		[3] 12.0
1921	61.3	83.1	144.4	54.1	14.4						

[1] Green weight basis, i. e., farmers' sales weight. Disappearance includes consumption, exports, and losses.
[3] Estimated January, 1931.
[5] Does not include New York Havana seed.

TABLE 183.—*Tobacco: Production, stocks, supply, disappearance, and price, 1912–1930*—Continued

OHIO CIGAR LEAF (MIAMI VALLEY), TYPES 42-44

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound	Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*		*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1912	53.5	89.6	143.1	59.0	8.0	1922	26.7	74.0	100.7	26.6	[3] 13.9
1913	37.4	84.1	121.5	53.0	11.0	1923	25.9	74.1	100.0	26.3	13.0
1914	54.1	68.5	122.6	48.3	9.1	1924	25.4	73.7	99.1	42.7	13.0
1915	54.3	74.3	128.6	68.7	9.0	1925	39.1	56.4	95.5	23.8	11.4
1916	58.2	59.9	118.1	53.7	12.0	1926	23.3	71.7	95.0	38.2	8.5
1917	61.7	64.4	126.1	59.4	24.0	1927	16.6	56.8	73.4	26.5	15.6
1918	53.0	66.7	119.7	50.4	16.0	1928	20.1	46.9	67.0	27.1	17.5
1919	41.4	69.3	110.7	30.9	20.0	1929	21.2	39.9	61.1	24.7	13.8
1920	37.3	79.8	117.1	38.8	16.0	1930	[3] 32.8	36.4	69.2		[3] 11.0
1921	28.8	78.3	107.1	33.1	13.0						

NEW ENGLAND BROADLEAF, TYPE 51

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound	Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
1922	14.4	31.8	46.2	12.5	30.0	1927	15.0	37.7	52.7	21.3	21.0
1923	20.2	33.7	53.9	14.1	29.0	1928	14.2	31.4	45.6	14.6	21.0
1924	22.8	39.8	62.6	17.9	20.0	1929	12.1	31.0	43.1	18.4	27.4
1925	25.3	44.7	70.0	26.2	18.9	1930	[3] 18.3	24.8	43.1		[3] 30.0
1926	17.5	43.8	61.3	23.6	25.0						

NEW ENGLAND HAVANA SEED, TYPES 52 AND 65

Year	Production [1]		Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound		Year	Production [1]		Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound	
	Primed Havana seed	Havana seed				Primed Havana seed	Havana seed		Primed Havana seed	Havana seed				Primed Havana seed	Havana seed
	Million lbs.	*Million lbs.*	*Million lbs.*	*Million lbs.*	*Million lbs.*	*Cents*	*Cents*		*Million lbs.*	*Million lbs.*	*Million lbs.*	*Million lbs.*	*Million lbs.*	*Cents*	*Cents*
1922	1.4	16.4	34.8	52.6	12.6	30.0	29.3	1927	.7	15.6	42.4	58.7	21.8	30.0	23.4
1923	1.1	22.1	40.0	63.2	18.4	26.0	26.0	1928	.6	17.5	36.9	55.0	23.6	30.0	24.0
1924	1.0	20.4	44.8	66.2	17.3	23.0	19.0	1929	.3	17.5	31.4	49.2	16.3	35.0	31.4
1925	.5	20.1	48.9	69.5	21.0	21.0	16.1	1930		[3] 17.5	32.9	50.4			[3] 22.9
1926	.5	15.5	48.5	64.5	22.1	35.0	26.0								

WISCONSIN CIGAR LEAF TYPES 54 AND 55

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound	Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*		*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1912	54.4	71.2	125.6	53.5	11.0	1922	45.6	120.6	166.2	49.0	13.5
1913	50.7	72.1	122.8	51.5	12.0	1923	48.1	117.2	165.3	55.3	12.0
1914	53.8	71.3	125.1	46.2	7.5	1924	35.7	110.0	145.7	47.5	9.0
1915	36.9	78.9	115.8	56.0	6.0	1925	44.0	98.2	142.2	49.0	13.8
1916	55.8	59.8	115.6	62.5	12.5	1926	33.4	93.2	126.6	43.5	13.8
1917	44.5	53.1	97.6	46.8	17.5	1927	33.2	83.1	116.3	43.8	16.0
1918	65.2	50.8	116.0	47.3	22.0	1928	49.3	72.5	121.8	35.1	14.5
1919	61.0	68.7	129.7	44.4	23.5	1929	49.9	86.7	136.6	51.3	15.0
1920	62.4	85.3	147.7	54.2	13.9	1930	[3] 55.8	85.3	141.1		[3] 13.6
1921	61.5	93.5	155.0	34.4	12.5						

Bureau of Agricultural Economics. Stocks prior to 1929 compiled from reports of the Bureau of the Census.

[1] Green weight basis, i. e., farmers' sales weight. Disappearance includes consumption, exports, and losses.

[3] Estimated January, 1931.

Table 184.—*Tobacco: Stocks in hands of dealers and manufacturers, first of each quarter, 1912–1930*

FLUE CURED TYPES 11, 12, 13, 14

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1912	--------	--------	--------	237, 189	1922	570, 154	516, 494	440, 697	446, 257
1913	--------	254, 160	--------	227, 987	1923	544, 405	490, 426	438, 667	463, 077
1914	--------	282, 341	--------	238, 372	1924	619, 840	582, 562	476, 626	510, 020
1915	--------	335, 725	--------	276, 772	1925	579, 462	543, 605	462, 311	513, 171
1916	--------	358, 238	--------	268, 130	1926	603, 090	548, 476	455, 371	492, 984
1917	332, 460	297, 701	253, 436	349, 936	1927	628, 574	556, 787	466, 476	580, 670
1918	428, 914	397, 511	292, 357	341, 500	1928	756, 535	678, 958	564, 989	661, 817
1919	427, 370	434, 517	327, 277	367, 977	1929	766, 370	703, 396	589, 978	669, 070
1920	448, 542	415, 332	304, 206	229, 703	1930	795, 484	707, 149	599, 262	687, 769
1921	523, 913	571, 148	483, 109	482, 740					

VIRGINIA FIRE CURED, TYPE 21

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912	--------	--------	--------	34, 593	1922	36, 527	39, 182	31, 429	24, 671
1913	--------	53, 857	--------	33, 730	1923	23, 258	44, 806	34, 523	26, 971
1914	--------	54, 046	--------	34, 248	1924	32, 677	41, 529	37, 828	34, 155
1915	--------	51, 244	--------	28, 656	1925	38, 453	55, 933	49, 468	43, 064
1916	--------	57, 562	--------	38, 756	1926	52, 242	64, 136	57, 707	49, 929
1917	46, 348	55, 027	48, 365	45, 236	1927	53, 065	73, 510	65, 052	56, 140
1918	45, 123	56, 571	43, 631	41, 810	1928	57, 000	64, 931	59, 409	49, 040
1919	46, 472	59, 591	42, 919	34, 221	1929	47, 633	49, 092	38, 216	31, 268
1920	37, 715	48, 531	34, 972	30, 809	1930	34, 997	40, 021	35, 625	27, 917
1921	32, 493	50, 180	41, 679	34, 615					

KENTUCKY AND TENNESSEE FIRE CURED, TYPES 22 AND 23

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912	--------	--------	--------	91, 097	1922	132, 099	202, 046	179, 415	130, 159
1913	--------	142, 932	--------	111, 639	1923	100, 148	168, 571	185, 349	140, 869
1914	--------	170, 831	--------	141, 793	1924	113, 753	160, 122	190, 312	143, 446
1915	--------	158, 725	--------	149, 834	1925	118, 557	197, 605	192, 687	151, 189
1916	--------	148, 133	--------	122, 368	1926	141, 311	183, 733	194, 054	169, 250
1917	97, 056	219, 286	210, 024	128, 011	1927	132, 340	198, 465	186, 791	161, 939
1918	117, 118	144, 957	222, 948	197, 107	1928	150, 328	168, 012	143, 883	114, 120
1919	158, 036	219, 181	203, 462	141, 978	1929	105, 902	140, 420	133, 719	104, 131
1920	118, 800	206, 428	200, 984	179, 253	1930	106, 860	158, 623	146, 855	107, 056
1921	138, 166	178, 847	190, 673	155, 731					

HENDERSON FIRE CURED (HENDERSON STEMMING), TYPE 24

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912	--------	--------	--------	1, 023	1922	8, 175	13, 695	7, 370	3, 892
1913	--------	13, 210	--------	7, 818	1923	5, 340	13, 236	8, 567	3, 020
1914	--------	9, 199	--------	1, 980	1924	4, 083	11, 627	5, 961	3, 812
1915	--------	11, 788	--------	2, 424	1925	5, 138	13, 595	8, 472	5, 837
1916	--------	12, 087	--------	4, 649	1926	7, 639	13, 785	10, 660	7, 361
1917	5, 236	19, 008	18, 432	16, 423	1927	6, 145	11, 190	9, 987	7, 242
1918	15, 481	25, 387	32, 138	22, 886	1928	7, 694	8, 390	5, 314	4, 583
1919	20, 112	26, 232	17, 592	7, 532	1929	3, 446	2, 859	1, 288	711
1920	5, 899	17, 023	17, 847	12, 132	1930	2, 794	5, 089	2, 291	736
1921	9, 815	13, 479	11, 376	7, 930					

BURLEY, TYPE 31

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912	--------	--------	--------	215, 307	1922	293, 606	395, 027	341, 425	280, 856
1913	--------	327, 078	--------	225, 199	1923	282, 731	463, 014	404, 989	342, 885
1914	--------	311, 289	--------	203, 672	1924	334, 126	542, 409	482, 201	428, 332
1915	--------	343, 739	--------	249, 804	1925	405, 643	562, 769	498, 045	459, 087
1916	--------	319, 436	--------	199, 321	1926	462, 805	578, 298	524, 215	466, 037
1917	188, 158	323, 191	274, 031	207, 594	1927	469, 811	586, 337	518, 363	451, 251
1918	177, 207	306, 637	247, 505	190, 137	1928	438, 267	475, 508	411, 095	347, 827
1919	139, 039	333, 912	287, 565	229, 891	1929	354, 772	465, 941	396, 541	332, 382
1920	227, 279	328, 136	320, 218	267, 789	1930	352, 803	506, 378	438, 659	373, 032
1921	237, 777	399, 002	371, 662	324, 351					

SOUTHERN MARYLAND, TYPE 32

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912	--------	--------	--------	6, 644	1922	14, 127	12, 528	11, 371	16, 944
1913	--------	3, 946	--------	6, 773	1923	10, 673	6, 080	5, 019	12, 575
1914	--------	4, 064	--------	7, 836	1924	6, 842	4, 780	7, 741	15, 232
1915	--------	9, 877	--------	17, 629	1925	11, 457	9, 072	8, 758	16, 678
1916	--------	6, 457	--------	10, 644	1926	14, 983	9, 876	8, 203	19, 349
1917	8, 689	9, 050	11, 092	18, 227	1927	18, 699	12, 447	12, 523	21, 899
1918	18, 445	15, 259	14, 249	19, 369	1928	15, 314	10, 848	12, 104	25, 132
1919	18, 627	17, 317	14, 586	21, 571	1929	20, 245	13, 134	13, 293	18, 982
1920	21, 256	16, 849	10, 050	18, 478	1930	15, 304	11, 960	9, 553	17, 167
1921	16, 549	14, 487	12, 435	19, 405					

TABLE 184.—*Tobacco: Stocks in hands of dealers and manufacturers, first of each quarter, 1912–1930*—Continued

ONE SUCKER, TYPE 35

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1912	--------	--------	--------	22,586	1922	52,435	52,310	45,938	36,354
1913	--------	36,983	--------	31,866	1923	43,584	56,226	42,135	33,804
1914	--------	44,193	--------	27,842	1924	41,413	64,360	55,202	41,764
1915	--------	37,294	--------	22,260	1925	43,342	59,207	52,535	42,429
1916	--------	29,690	--------	16,702	1926	43,275	63,291	57,136	49,924
1917	30,139	44,117	30,527	18,562	1927	46,601	59,143	48,245	41,668
1918	29,101	47,317	49,373	35,901	1928	38,813	39,815	32,399	26,882
1919	34,318	73,834	45,835	32,520	1929	28,067	37,666	26,496	21,374
1920	41,834	64,318	46,984	44,589	1930	29,852	38,218	30,283	25,123
1921	41,620	56,165	52,761	47,635					

GREEN RIVER, TYPE 36

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912	--------	--------	--------	42,876	1922	50,525	54,479	45,806	39,110
1913	--------	64,999	--------	50,389	1923	45,099	70,227	64,041	52,243
1914	--------	59,656	--------	48,156	1924	55,742	67,571	62,121	54,676
1915	--------	58,389	--------	45,193	1925	56,169	70,726	57,139	51,955
1916	--------	55,266	--------	34,344	1926	52,681	61,867	57,908	51,711
1917	38,926	65,321	58,947	49,484	1927	54,161	63,115	54,683	48,447
1918	53,509	73,021	74,038	59,960	1928	47,878	49,127	43,722	40,127
1919	55,413	74,781	55,444	40,469	1929	41,122	35,968	35,670	30,756
1920	44,024	65,618	61,105	47,212	1930	30,824	35,618	28,533	23,786
1921	46,318	58,795	50,213	45,015					

VIRGINIA SUN CURED, TYPE 37

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912	--------	--------	--------	11,157	1922	10,146	10,637	9,844	8,282
1913	--------	13,098	--------	10,252	1923	8,426	10,371	9,298	8,307
1914	--------	12,725	--------	13,205	1924	8,787	8,581	7,605	6,255
1915	--------	13,655	--------	9,465	1925	5,739	6,769	5,503	4,172
1916	--------	11,758	--------	7,286	1926	4,771	6,059	5,319	4,243
1917	8,907	9,169	7,158	4,863	1927	5,482	7,966	7,236	5,925
1918	5,712	7,427	7,939	6,320	1928	6,504	7,558	6,347	5,052
1919	8,091	10,480	10,097	8,592	1929	4,422	7,915	6,073	5,492
1920	9,258	9,238	8,320	9,679	1930	4,941	5,820	4,935	3,878
1921	7,172	10,071	9,812	9,467					

PENNSYLVANIA SEEDLEAF, TYPE 41

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1929	--------	115,639	93,861	83,306	1930	73,186	93,795	90,292	79,592

PENNSYLVANIA CIGAR LEAF, TYPES 41 AND 53

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912	--------	--------	--------	118,782	1921	69,445	93,919	93,622	83,072
1913	--------	141,015	--------	127,345	1922	69,854	96,827	101,276	90,258
1914	--------	125,606	--------	113,013	1923	81,375	119,621	110,387	99,080
1915	--------	127,239	--------	105,460	1924	87,395	127,273	120,441	109,726
1916	--------	109,392	--------	79,294	1925	97,444	118,585	122,487	113,400
1917	69,536	90,751	87,922	76,503	1926	97,585	117,839	118,905	105,261
1918	62,970	99,766	96,753	85,127	1927	89,708	113,551	95,539	84,067
1919	75,764	94,496	99,954	91,696	1928	71,516	106,646	95,466	84,649
1920	80,439	105,736	98,671	87,750	1929	72,424	--------	--------	--------

OHIO CIGAR LEAF (MIAMI VALLEY), TYPES 42, 43, 44

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912	--------	--------	--------	89,575	1922	71,414	75,579	79,182	73,974
1913	--------	90,327	--------	84,081	1923	64,026	85,024	81,719	74,119
1914	--------	82,436	--------	68,521	1924	62,531	60,244	80,193	73,731
1915	--------	91,029	--------	74,329	1925	65,612	63,296	61,024	56,381
1916	--------	74,191	--------	59,913	1926	51,650	67,024	75,003	71,694
1917	50,304	84,505	74,924	64,379	1927	62,490	72,037	64,386	56,774
1918	52,590	71,822	75,658	66,713	1928	48,420	60,696	55,515	46,875
1919	61,023	56,282	62,094	69,305	1929	38,868	55,392	47,094	39,888
1920	71,550	64,602	79,350	79,763	1930	34,502	41,448	42,282	36,427
1921	70,173	78,771	76,225	78,303					

GEORGIA AND FLORIDA SUN-GROWN, TYPE 45

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1929	--------	1,174	803	2,078	1930	1,538	1,319	1,340	2,345

TABLE 184.—*Tobacco: Stocks in hands of dealers and manufacturers, first of each quarter, 1912–1930*—Continued

GEORGIA-FLORIDA CIGAR LEAF—SUN AND SHADE, TYPES 45 AND 62

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1912				7,677	1921	7,944	6,853	5,544	8,312
1913		6,231		8,352	1922	9,499	7,389	6,697	8,139
1914		6,472		10,549	1923	7,586	6,384	5,199	7,302
1915		6,461		8,515	1924	8,415	7,140	6,149	6,604
1916		6,645		7,697	1925	7,206	5,931	4,759	5,308
1917	6,568	5,459	4,371	6,358	1926	4,364	4,077	3,431	4,957
1918	5,213	5,367	4,778	6,741	1927	4,088	3,190	1,876	4,879
1919	7,166	5,818	4,805	6,010	1928	4,461	4,019	2,618	7,081
1920	6,281	5,914	4,760	6,569	1929	5,994			

PORTO RICO CIGAR LEAF, TYPE 46

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912				2,942	1922	9,408	9,499	8,858	10,873
1913		3,814		4,128	1923	11,331	9,446	6,519	9,546
1914		4,384		4,874	1924	11,673	11,116	8,773	9,221
1915		6,935		5,889	1925	10,455	10,130	8,350	8,074
1916		4,684		4,781	1926	11,279	10,194	7,651	10,719
1917	4,567	3,494	2,480	4,843	1927	18,577	17,639	13,746	16,588
1918	7,308	7,297	6,432	7,669	1928	21,426	23,646	21,172	20,067
1919	10,023	9,137	8,119	11,115	1929	22,230	26,128	25,142	25,270
1920	10,833	8,874	7,419	8,746	1930	29,039	28,442	24,734	23,510
1921	9,541	9,116	7,866	7,698					

NEW ENGLAND BROAD LEAF, TYPE 51

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912					1922	26,142	27,159	33,560	31,761
1913					1923	30,997	36,840	38,504	33,690
1914				31,496	1924	30,386	39,737	45,588	39,827
1915		30,538		31,218	1925	36,294	43,978	49,382	44,712
1916		33,689		29,884	1926	41,758	47,857	49,197	43,774
1917	26,277	28,620	30,253	25,397	1927	40,278	46,483	45,925	37,709
1918	21,671	26,476	27,373	23,344	1928	32,827	38,915	32,205	31,441
1919	21,133	24,165	27,749	24,073	1929	28,102	37,880	34,458	31,016
1920	22,136	27,530	32,026	27,538	1930	29,507	30,072	28,960	24,809
1921	26,726	31,956	31,720	29,982					

NEW ENGLAND HAVANA SEED, TYPE 52

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912					1922	31,389	39,735	39,008	34,821
1913					1923	35,337	44,817	43,804	39,952
1914				17,480	1924	41,780	53,685	50,194	44,791
1915		27,853		24,359	1925	40,944	58,544	53,578	48,862
1916		31,438		22,732	1926	49,739	56,864	52,955	48,471
1917	21,849	29,515	30,797	25,810	1927	43,524	49,565	44,582	42,408
1918	26,262	34,116	31,521	26,662	1928	40,889	45,376	46,066	36,905
1919	26,082	31,370	31,322	23,831	1929	38,076	39,946	35,558	31,388
1920	26,407	33,538	35,087	28,252	1930	33,487	43,468	35,732	32,898
1921	26,850	33,872	29,969	26,043					

NEW YORK HAVANA SEED, TYPE 53

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912				5,239	1922	3,554	5,740	4,985	4,535
1913		5,853		4,989	1923	3,628	4,235	3,982	3,302
1914		6,053		3,721	1924	3,289	4,098	3,524	3,183
1915		5,475		4,250	1925	2,859	4,159	4,393	4,438
1916		6,305		3,989	1926	3,991	5,284	4,974	4,577
1917	3,065	3,634	2,882	3,089	1927	3,783	4,425	3,509	3,196
1918	2,558	3,446	3,123	2,654	1928	2,673	2,601	2,608	2,279
1919	2,588	3,607	3,018	2,343	1929	2,054	3,342	2,781	2,200
1920	2,763	3,114	3,376	2,479	1920	2,395	2,811	2,533	2,166
1921	2,647	4,487	4,022	3,547					

WISCONSIN CIGAR LEAF, TYPES 54 AND 55

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912				71,157	1922	82,767	130,690	132,009	120,573
1913		93,764		72,088	1923	102,653	125,742	126,919	117,166
1914		85,741		71,334	1924	99,798	105,828	116,353	110,005
1915		88,662		78,891	1925	97,749	107,438	110,344	98,223
1916		86,796		59,783	1926	83,895	114,828	105,421	93,205
1917	46,473	62,592	66,877	53,051	1927	82,781	107,151	96,658	83,058
1918	40,714	64,947	65,207	50,784	1928	69,925	94,135	84,924	72,543
1919	44,411	72,145	79,407	68,713	1929	62,359	97,345	97,380	86,701
1920	54,758	71,221	84,292	85,344	1930	72,614	101,420	97,023	85,274
1921	77,181	102,405	103,535	93,475					

TABLE 184.—*Tobacco: Stocks in hands of dealers and manufacturers, first of each quarter, 1912–1930*—Continued

NEW ENGLAND SHADE GROWN, TYPE 61

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1912					1922	9,087	8,811	7,706	7,512
1913					1923	9,487	9,255	7,644	9,044
1914				1,226	1924	12,630	11,479	11,174	9,705
1915		2,305		2,195	1925	12,181	10,633	9,493	10,412
1916		2,605		1,913	1926	11,734	9,430	6,840	6,416
1917	2,477	3,463	3,582	2,833	1927	8,659	7,606	6,494	6,492
1918	3,790	6,281	4,825	4,594	1928	8,363	7,878	5,878	6,815
1919	5,757	6,280	6,839	5,727	1929	8,722	8,749	5,954	6,476
1920	7,990	8,019	5,492	5,218	1930	11,329	10,499	10,207	10,162
1921	6,793	6,314	6,452	7,654					

GEORGIA AND FLORIDA SHADE, TYPE 62

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1929		3,844	3,564	4,824	1930	5,048	4,950	3,868	5,921

MISCELLANEOUS [1]—EASTERN OHIO EXPORT

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1912				2,709	1921	7,565	11,015	11,206	9,356
1913		3,006		702	1922	6,865	6,630	6,078	6,536
1914		2,473		1,769	1923	4,206	4,506	3,577	2,986
1915		3,206		4,190	1924	2,260	2,283	2,080	2,029
1916		2,750		1,890	1925	1,809	2,667	2,482	1,519
1917	1,813	1,947	2,081	1,939	1926	1,553	1,812	1,609	1,165
1918	2,521	3,742	5,149	4,985	1927	1,375	1,520	1,501	946
1919	5,557	5,575	7,092	6,644	1928	1,501	1,673	1,415	985
1920	7,837	8,040	8,256	9,135	1929	1,614			

MISCELLANEOUS DOMESTIC, TYPE 70 [2]

Year	Jan. 1	Apr. 1	July 1	Oct. 1	Year	Jan. 1	Apr. 1	July 1	Oct. 1
1929		5,928	3,122	2,302	1930	1,989	4,105	2,932	2,918

Bureau of Agricultural Economics.

[1] Not including small quantities of other miscellaneous, e. g., Louisiana perique.
[2] Includes Eastern Ohio Export and all other tobacco classed as miscellaneous.

TABLE 185.—*Tobacco: Exports, by types, 1923–24 to 1929–30*

Year beginning October	Flue-cured, types 11–14 [1]	Virginia fire-cured, type 21	Kentucky and Tennessee fire-cured, types 22 and 23	Burley, type 31	Southern Maryland,[2] type 32	Green River, type 36
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*
1923–24	266.0	27.4	167.1	7.7	19.2	16.2
1924–25	207.5	25.7	125.3	6.0	13.7	16.8
1925–26	324.4	19.3	110.0	5.8	12.3	14.4
1926–27	288.7	22.0	128.4	18.1	18.8	14.2
1927–28	328.9	21.2	84.7	7.1	12.6	8.1
1928–29	411.8	18.1	75.4	6.1	13.1	9.9
1929–30	429.9	18.1	104.5	9.7	7.8	8.9

Bureau of Agricultural Economics. Compiled from reports of the Bureau of Foreign and Domestic Commerce.

[1] Year beginning July. [2] Includes eastern Ohio.

TABLE 186.—*Tobacco, unmanufactured: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year									
	Average 1909–1913		1926		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	52,768	381,127	67,906	487,058	102,754	511,868	74,797	583,846	68,066	565,902
Dutch East Indies	8,074	161,265	10,798	162,729	14,413	169,563	11,376	154,128	[1] 16,980	[1] 123,784
Brazil	620	60,164	3,624	61,044	3,988	69,699	3,772	64,495		68,060
Bulgaria	0	4,310	0	60,546	0	59,391	0	49,381	0	44,581
Philippine Islands	45	26,018	785	33,164	732	53,912	816	49,371	506	64,833
Greece	12,024	18,113	0	120,552	0	116,231	0	107,812	0	110,351
British India	6,538	28,874	16,197	42,095	16,395	39,401	16,562	42,177	17,372	37,445
Dominican Republic	0	22,395	0	21,504	0	44,750	0	31,014	0	36,297
Cuba	141	37,743	0	40,234	0	40,130	0	50,708		
Algeria	4,776	11,681	9,945	39,668	11,106	28,696	11,523	40,474		
Paraguay	0	11,361	180	10,920	144	10,194		12,269		
Russia	1,084	23,283	0	6,281	0	7,582	0	12,670		
Hungary	(2)	(2)	10,433	3,240	7,886	8,757	7,523	15,185	6,437	30,091
Yugoslavia	(2)	(2)	236	3,068	0	2,324	2,663	6,219	650	7,453
Ceylon	0	4,093	3	1,973	14	1,554	116	1,643		
PRINCIPAL IMPORTING COUNTRIES										
Germany	168,437	116	135,346	672	210,918	545	244,290	683	228,112	916
Netherlands	57,218	3,786	70,952	3,322	68,159	3,473	71,297	3,082	72,438	2,471
United Kingdom	117,956	4,603	186,190	3,853	212,538	8,166	206,996	5,621	230,623	8,404
Poland	(2)	(2)	27,434	2,487	33,663	506	22,568	335	36,341	257
France	63,914	26	98,090	695	91,108	141	67,825	510	85,568	120
Spain	51,026	0	25,758	0	51,826	0	68,156	0		
China	15,113	25,487	100,678	28,969	84,400	30,338	142,647	19,677	121,459	17,207
Belgium	22,094	33	41,934	49	45,450	71	46,129	84	47,733	101,853
Czechoslovakia	(2)	(2)	41,528	28	37,626	0	24,918	7	45,287	1
Italy	47,732	3,008	12,970	7,035	12,383	5,379	13,334	7,601	16,531	9,345
Austria	[3] 49,984	[3] 23,192	29,235	737	40,034	1,983	33,024	2,490	28,819	2,492
Argentina	14,988	41	24,137	356	23,314	588	26,695	412		
Egypt	19,005	0	16,370	0	15,929	0	17,117	0	17,073	0
Norway	3,994	0	4,981	0	5,103	0	5,210	0	5,527	0
Canada	17,891	433	16,100	5,508	18,679	5,867	17,943	6,200	17,718	7,244
Australia [4]	[5] 13,740	0	22,040	0	22,141	0	23,683	0	21,138	0
Switzerland	17,949	47	12,795	0	13,634	214	13,896	71	15,651	172
Japan	1,707	696	10,284	1,445	14,120	8,536	14,689	814	14,864	280
Denmark	8,774	100	12,303	7	11,714	1	12,312	0	12,168	
Sweden	9,772	1	12,830	22	12,794	185	8,788	214	17,061	254
Irish Free State	(2)	(2)	7,896	473	10,005	346	8,134	191	9,328	108
Finland	9,597	0	6,557	0	7,107	0	7,379	0	7,455	0
Total, 37 countries	796,961	851,996	1,036,515	1,149,734	1,200,077	1,230,391	1,226,178	1,269,384	1,160,905	1,239,921

Bureau of Agricultural Economics. Official sources. Tobacco comprises leaf, stems, and strippings, but not snuff.

* Preliminary.
[1] Java and Madura only.
[2] Figures for pre-war years are included in the countries of the pre-war boundaries.
[3] Average for Austria-Hungary.
[4] Year ended June 30.
[5] Average calendar years.

TABLE 187.—*Apples: Production, foreign trade of the United States, and average price per barrel for Baldwin apples at Boston, 1889–1930*

Year	Production: Total	Production: Commercial	Price per bushel received by producers Dec. 1	Car-lot shipments from crop of year shown: Cars	Car-lot shipments: Equivalent bushels[1]	Foreign trade, year beginning July 1[2]: Domestic exports: Fresh	Domestic exports: Dried	Domestic exports: Dried in terms of fresh	Imports, fresh and dried in terms of fresh	Net exports[3]: Total	Net exports: Percentage of production	Average price of Baldwins at Boston, season November to April[4]
	1,000 bush.	*1,000 bush.*	*Dolls.*		*1,000 bush.*	*1,000 bush.*	*1,000 pounds*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*P. ct.*	*Dolls.*
1889	*143,106*					1,361	20,861	2,173		3,534	2.5	3.24
1890	80,142					406	6,973	726	49	1,083	1.4	4.40
1891	198,907					2,816	26,042	2,713	21	5,508	2.8	1.78
1892	120,536					1,224	7,967	830	860	1,194	1.0	2.31
1893	114,773					236	2,847	296	278	254	.2	4.21
1894	134,648					2,456	7,086	738	378	2,816	2.1	2.40
1895	219,600					1,080	26,692	2,780	153	3,707	1.7	3.10
1896	232,600					4,512	30,775	3,206	198	7,520	3.2	1.03
1897	163,728					1,816	31,031	3,233	23	5,026	3.1	3.23
1898	118,061					1,140	19,306	2,011	236	2,915	2.5	3.18
1899	*175,398*					1,580	34,964	3,642	79	5,143	2.9	2.94
1900	205,930					2,651	28,309	2,949	57	5,543	2.7	2.28
1901	135,500					1,379	15,664	1,632	42	2,969	2.2	4.07
1902	212,330					4,968	39,646	4,130	16	9,082	4.3	1.93
1903	195,680					6,055	48,302	5,031	39	11,047	5.7	2.40
1904	233,630					4,500	39,273	4,091	20	8,571	3.7	1.96
1905	136,220					3,627	27,853	2,901	99	6,429	4.7	3.59
1906	216,720					4,618	45,698	4,760	16	9,362	4.3	2.44
1907	119,560					3,149	24,238	2,525	262	5,412	4.5	2.35
1908	148,940					2,689	33,475	3,487	45	6,131	4.1	3.99
1909	*145,412*					2,766	25,077	2,612	95	5,283	3.6	2.99
1910	141,640		0.90			5,163	21,804	2,271	37	7,397	5.2	3.68
1911	214,020		.72			4,369	53,665	5,590	27	9,932	4.6	2.56
1912	235,220		.66			6,450	41,575	4,331	23	10,758	4.6	2.28
1913	145,410		.98			4,520	33,566	3,496	60	7,956	5.5	3.95
1914	253,200		.59			7,055	42,589	4,436	67	11,424	4.5	2.08
1915	230,011		.69			4,399	16,219	1,689	15	6,073	2.6	2.36
1916	193,905	80,241	.91			5,220	10,358	1,079	20	6,279	3.2	3.44
1917	166,749	67,023	1.22			1,906	2,603	271	46	2,131	1.3	4.40
1918	169,625	74,229	1.33			4,729	18,909	1,970	50	6,649	3.9	5.94
1919	*136,561*											
1919	142,086	78,477	1.84			3,152	11,819	1,231	849	3,534	2.5	6.71
1920	223,677	101,715	1.15	116,117	69,670	7,995	18,053	1,881	142	9,734	4.4	4.02
1921	99,002	64,671	1.68	89,559	53,735	3,282	12,431	1,295	1,353	3,224	3.3	6.69
1922	202,702	95,835	.99	113,961	68,377	5,269	12,817	1,335	189	6,415	3.2	4.84
1923	202,842	107,808	1.02	138,184	84,405	12,295	30,410	3,168	132	15,331	7.6	
1924	*152,967*											
1924	171,725	84,039	1.18	103,843	61,763	9,604	19,225	2,002	106	11,500	6.7	5.65
1925	172,389	99,738	1.26	127,804	77,885	11,015	24,833	2,587	74	13,528	7.8	4.88
1926	246,609	117,384	.74	133,550	80,800	21,293	32,670	3,403	84	24,612	10.0	3.42
1927	123,693	78,051	1.39	93,094	58,375	9,430	21,704	2,261	154	11,537	9.3	6.60
1928	186,893	106,383	.99	127,530	80,164	21,043	50,024	5,221	117	26,147	14.1	4.66
1929	142,788	87,012	1.32	102,801	64,091	10,279	23,769	2,476	299	12,456	8.7	5.12
1930[5]	163,543	101,169	.93	[6]109,998								

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. Prices to producers are based upon returns from crop reporters.

1 For years 1920–1922, it is assumed that the car lots averaged 600 bushels per car. For years 1923 to 1929, inclusive, the estimates of bushels shipped have been calculated according to estimated loadings in each State.

2 Compiled from Commerce and Navigation of the United States, 1890–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1930, and official records of the Bureau of Foreign and Domestic Commerce.

3 Total exports (domestic plus foreign) minus imports.

4 Figures 1889–1922 from Boston Chamber of Commerce reports, average of weekly quotations of price actually paid by wholesale dealers on days quoted. Figures 1924–1929 from Special Apple Market Report issued by Mass. Dept. of Agr., Div. of Markets, based on prices "for sales by original receivers."

5 Preliminary.

6 December forecast of total shipments from 1930 crop.

TABLE 188.—*Apples: Production, by States, 1925–1930*

State and division	Total						Commercial[1]					
	1925	1926	1927	1928	1929	1930[2]	1925	1926	1927	1928	1929	1930[2]
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	3,305	2,260	2,236	1,400	3,360	3,024	1,935	1,350	1,365	861	2,076	1,869
New Hampssire	1,230	1,240	1,100	1,000	974	1,419	711	762	690	615	594	864
Vermont	935	800	990	560	1,029	762	510	465	570	330	594	441
Massachusetts	3,160	4,100	2,520	2,700	2,650	4,750	1,965	2,640	1,590	1,734	1,701	3,048
Rhode Island	299	391	242	230	253	396	171	237	150	144	150	231
Connecticut	1,375	1,900	1,045	1,500	990	1,936	900	1,050	540	753	489	957
New York	32,500	40,375	13,600	21,900	16,520	27,683	18,750	18,000	8,163	12,690	10,212	16,125
New Jersey	2,660	4,310	2,697	3,290	1,880	3,713	1,821	2,832	1,833	2,238	1,290	2,547
Pennsylvania	7,300	17,000	6,300	8,460	5,973	9,774	3,033	5,388	2,550	3,129	2,400	3,450
North Atlantic	52,764	72,376	30,730	41,040	33,629	53,457	29,796	32,724	17,451	22,494	19,506	29,532
Ohio	6,300	11,900	5,600	5,880	2,660	3,500	2,034	3,018	1,623	1,647	741	1,050
Indiana	2,430	4,100	1,249	2,520	1,170	1,240	600	864	276	528	243	291
Illinois	7,300	9,000	4,450	7,150	4,725	4,932	3,645	3,870	2,250	3,720	2,400	2,808
Michigan	9,000	9,045	4,288	5,400	7,020	5,223	5,100	4,467	2,271	2,787	3,618	3,135
Wisconsin	2,106	2,158	1,200	2,160	1,749	928	471	465	270	477	396	210
Minnesota	820	1,263	854	1,230	726	315	114	171	111	114	87	39
Iowa	2,400	3,652	1,720	2,740	2,120	1,272	240	402	207	330	255	150
Missouri	4,100	5,015	2,104	3,380	2,800	1,992	1,938	1,857	870	1,422	1,140	849
South Dakota	62	169	200	230	150	90						
Nebraska	450	700	850	470	868	462	195	228	330	90	270	150
Kansas	1,600	1,428	1,925	820	1,310	601	855	930	1,347	540	864	396
North Central	36,568	48,430	24,440	31,980	25,298	20,555	15,192	16,272	9,555	11,655	10,014	9,078
Delaware	1,340	2,376	1,150	1,520	1,012	1,748	1,140	1,980	900	1,290	861	1,488
Maryland	1,900	3,500	1,700	2,190	2,200	1,650	972	1,800	1,200	1,326	1,365	990
Virginia	7,844	19,902	6,600	16,100	13,000	7,700	4,320	11,100	4,950	11,100	9,300	3,900
West Virginia	4,185	10,875	5,000	8,750	5,600	3,944	2,247	5,100	4,050	4,410	4,200	2,040
North Carolina	3,192	5,986	1,825	5,040	2,628	2,555	480	1,035	273	750	450	300
South Carolina	386	647	363	480	308	454						
Georgia	741	1,827	595	1,400	680	1,126	180	456	240	351	228	327
South Atlantic	19,588	45,113	17,233	35,480	25,428	19,177	9,339	21,471	11,613	19,227	16,404	9,045
Kentucky	2,625	6,408	720	5,700	2,000	1,212	210	501	75	456	159	96
Tennessee	1,984	5,360	1,152	3,790	2,000	1,653	123	375	81	264	138	114
Alabama	595	1,328	328	885	500	760						
Mississippi	221	324	152	250	185	206						
Arkansas	4,315	3,450	1,015	2,200	1,400	1,700	1,950	1,500	609	1,242	660	840
Louisiana	28	35	18	30	25	30						
Oklahoma	644	770	493	350	634	310	87	93	60	33	72	36
Texas	264	380	168	216	230	150						
South Central	10,676	18,055	4,046	13,421	6,974	6,021	2,370	2,469	825	1,995	1,029	1,086
Montana	80	410	295	516	420	410	42	309	153	450	345	345
Idaho	6,029	4,200	6,000	5,500	5,500	5,000	5,250	2,775	5,478	4,800	4,950	4,500
Wyoming	25	47	40	48	35	32						
Colorado	3,200	3,444	2,592	3,020	2,460	1,130	2,850	2,907	2,253	2,700	2,160	1,005
New Mexico	1,021	1,147	456	675	1,035	420	780	600	360	507	756	306
Arizona	98	112	62	76	104	97	30	33	30	24	30	30
Utah	1,300	817	660	880	500	1,100	900	480	450	570	255	855
Nevada	74	42	18	52	25	50						
Washington	29,550	34,030	25,343	33,500	29,500	37,850	26,010	25,950	22,302	30,000	24,900	34,065
Oregon	5,400	8,036	4,320	7,600	4,000	6,600	3,888	5,250	2,925	5,100	2,250	4,800
California	6,016	10,350	7,458	13,105	7,880	11,644	3,291	6,144	4,656	6,861	4,413	6,522
Western	52,793	62,635	47,244	64,972	51,459	64,333	43,041	44,448	38,607	51,012	40,059	52,428
United States	172,389	246,609	123,693	186,893	142,788	163,543	99,738	117,384	78,051	106,383	87,012	101,169

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Included in "Total crop." By commercial crop is meant that portion of the total crop which is sold for consumption as fresh fruit.

[2] Preliminary.

TABLE 189.—*Apples: Car-lot shipments by State of origin, 1929–30 and 1930–31* [1]

State and crop season	Crop-movement season [2]													
	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
EASTERN														
New England States:	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1929–30	----	----	2	221	1, 339	781	79	64	40	30	11	1	----	2, 568
1930–31	----	----	1	481	969	991	282	----	----	----	----	----	----	----
New York:														
1929–30	----	39	231	845	1, 906	1, 104	735	890	965	1, 238	836	350	114	9, 253
1930–31	----	29	487	1, 459	3, 580	2, 820	1, 435	----	----	----	----	----	----	----
Pennsylvania:														
1929–30	----	24	62	259	882	273	202	244	233	144	58	19	1	2, 401
1930–31	----	39	51	234	933	576	205	----	----	----	----	----	----	----
Illinois:														
1929–30	253	396	229	937	454	14	7	9	9	12	4	2	----	2, 326
1930–31	256	339	247	1, 050	1, 256	60	15	----	----	----	----	----	----	----
Michigan:														
1929–30	----	7	228	461	2, 122	872	95	87	71	76	29	5	----	4, 053
1930–31	----	29	270	447	961	115	21	----	----	----	----	----	----	----
Missouri:														
1929–30	10	23	36	296	286	29	18	19	16	19	6	----	----	758
1930–31	6	45	62	179	144	19	5	----	----	----	----	----	----	----
Delaware:														
1929–30	110	488	31	73	103	----	----	3	8	3	1	----	----	820
1930–31	25	732	59	110	290	51	17	----	----	----	----	----	----	----
Maryland:														
1929–30	19	124	85	352	891	285	50	21	19	5	1	----	----	1, 852
1930–31	16	204	43	217	589	226	20	----	----	----	----	----	----	----
Virginia:														
1929–30	----	182	813	4, 406	5, 469	1, 171	907	1, 166	1, 087	779	321	216	188	16, 705
1930–31	----	89	76	920	2, 847	1, 113	554	----	----	----	----	----	----	----
West Virginia:														
1929–30	2	192	392	1, 515	3, 529	980	296	255	108	94	19	3	----	7, 385
1930–31	3	95	95	572	1, 686	580	89	----	----	----	----	----	----	----
Arkansas:														
1929–30	8	11	210	85	82	4	1	4	3	7	2	----	----	417
1930–31	15	21	100	27	122	10	8	----	----	----	----	----	----	----
Other Eastern:														
1929–30	110	211	332	976	1, 005	121	48	18	22	33	19	6	----	2, 901
1930–31	66	286	203	449	531	125	35	----	----	----	----	----	----	----
Total Eastern:														
1929–30	512	1, 697	2, 651	10, 426	18, 068	5, 634	2, 438	2, 780	2, 581	2, 440	1, 307	602	303	51, 439
1930–31	387	1, 908	1, 694	6, 145	13, 908	6, 686	2, 686	----	----	----	----	----	----	----
WESTERN														
Idaho:														
1929–30	----	----	----	393	4, 293	1, 164	472	319	218	149	97	14	----	7, 119
1930–31	----	2	1	1, 039	3, 235	1, 055	635	----	----	----	----	----	----	----
Colorado:														
1929–30	----	----	----	112	1, 354	589	153	43	53	13	5	----	----	2, 322
1930–31	----	----	----	10	643	245	88	----	----	----	----	----	----	----
Washington:														
1929–30	----	18	112	1, 989	11, 37	56, 229	2, 555	2, 710	3, 182	2, 369	2, 059	1, 251	371	34, 220
1930–31	----	56	384	4, 469	13, 796	7, 411	3, 999	----	----	----	----	----	----	----
Oregon:														
1929–30	----	----	3	119	1, 071	584	188	182	224	143	95	70	1	2, 680
1930–31	----	7	8	306	2, 401	1, 361	470	----	----	----	----	----	----	----
California:														
1929–30	2	307	894	584	699	258	158	183	131	100	98	37	11	3, 462
1930–31	32	1, 347	695	1, 092	1, 288	470	157	----	----	----	----	----	----	----
Other Western:														
1929–30	----	----	131	373	829	190	18	6	8	3	1	----	----	1, 559
1930–31	----	----	67	256	1, 016	216	50	----	----	----	----	----	----	----
Total Western:														
1929–30	2	325	1, 140	3, 570	19, 621	9, 014	3, 544	3, 443	3, 816	2, 777	2, 355	1, 372	383	51, 362
1930–31	32	1, 412	1, 155	7, 172	22, 379	10, 758	5, 399	----	----	----	----	----	----	----
Total														
1923–24	152	3, 360	4, 122	16, 689	49, 876	26, 571	8, 061	8, 299	8, 213	6, 370	3, 469	2, 295	707	138, 184
1924–25	205	2, 362	3, 126	14, 641	39, 866	20, 231	6, 399	5, 294	4, 023	3, 277	2, 295	1, 615	509	103, 843
1925–26	433	2, 895	4, 330	20, 905	44, 895	20, 085	7, 372	6, 253	6, 855	6, 228	4, 114	2, 494	945	127, 804
1926–27	260	3, 840	3, 387	20, 950	45, 321	23, 251	8, 365	7, 969	8, 020	5, 348	3, 596	2, 355	888	133, 550
1927–28	253	1, 815	3, 539	12, 106	33, 556	17, 109	5, 963	5, 315	4, 900	3, 500	2, 355	1, 819	864	93, 094
1928–29	230	3, 452	4, 330	19, 405	45, 901	19, 774	8, 309	7, 774	7, 749	5, 418	2, 944	1, 710	534	127, 530
1929–30	514	2, 022	3, 791	13, 996	37, 689	14, 648	5, 982	6, 223	6, 397	5, 217	3, 662	1, 974	686	102, 801
1930–31	419	3, 320	2, 849	13, 317	36, 287	17, 444	8, 085	----	----	----	----	----	----	----

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis. See preceding Yearbooks for data for earlier years.

[1] Beginning January, 1930, figures are subject to revision.
[2] Crop movement season extends from June of one year through June of the following year.

TABLE 190.—*Apples: Cold-storage holdings, United States, 1921–1930*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	Oct. 1	Nov. 1	Dec. 1
BARRELS[1]									
	1,000 barrels	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*
1921	3,966	3,016	2,020	1,027	449	170	570	1,822	1,979
1922	1,742	1,424	996	561	248	74	1,219	4,133	4,319
1923	3,708	2,839	2,013	1,199	578	150	664	4,619	5,477
1924	4,962	3,993	3,024	1,925	1,113	451	543	3,551	4,167
1925	3,643	2,811	2,006	1,151	543	175	1,058	4,434	5,051
1926	4,556	3,714	2,667	1,531	727	262	601	3,933	5,458
1927	4,901	3,857	2,682	1,603	828	295	690	2,967	3,357
1928	2,758	2,038	1,358	801	415	195	1,013	4,622	4,575
1929	3,767	2,746	1,852	1,088	516	181	1,333	4,315	4,301
1930	3,598	2,651	1,832	999	483	199	1,161	3,820	3,771
BOXES									
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
1921	7,259	6,266	4,890	8,548	2,009	826	667	5,464	11,281
1922	11,061	8,667	6,282	4,107	2,088	721	669	4,164	7,271
1923	8,319	7,612	5,593	3,345	1,475	380	789	6,886	13,866
1924	14,201	11,550	8,821	5,837	2,901	949	829	6,620	9,917
1925	9,089	7,264	5,266	3,412	1,801	674	1,091	9,165	13,041
1926	11,868	10,009	7,898	5,350	2,892	1,104	1,809	9,523	15,083
1927	13,365	10,435	7,298	4,613	2,312	717	1,043	9,074	13,423
1928	12,260	9,809	7,023	4,960	2,889	1,223	1,854	12,333	17,452
1929	15,853	12,388	7,995	4,889	2,224	631	901	11,045	15,235
1930	13,108	10,149	7,282	4,790	2,446	761	2,135	15,669	21,267
TOTAL, IN BUSHELS									
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1921	19,158	15,315	10,950	6,630	3,357	1,335	2,376	10,929	17,217
1922	16,287	12,939	9,270	5,790	2,832	942	4,356	16,563	20,229
1923	19,443	16,128	11,631	6,942	3,210	831	2,781	20,742	30,297
1924	29,088	23,529	17,895	11,613	6,240	2,304	2,460	17,274	22,419
1925	20,019	15,699	11,283	6,864	3,429	1,197	4,266	22,467	28,194
1926	25,536	21,153	15,900	9,942	5,073	1,890	3,612	21,321	31,458
1927	28,068	22,005	15,342	9,423	4,794	1,602	3,114	17,976	23,493
1928	20,534	15,923	11,097	7,363	4,134	1,808	4,893	26,199	31,177
1929	27,154	20,626	13,551	8,153	3,772	1,174	4,900	23,991	28,139
1930	23,902	18,102	12,778	7,787	3,895	1,358	5,618	27,129	32,580

Bureau of Agricultural Economics. Compiled from reports made by cold-storage establishments.

[1] All apples, except those packed in western-style boxes, are tabulated in terms of barrels, on the basis of 3 bushels to the barrel; since Oct. 1, 1923, apples packed in bushel baskets are also included in this tabulation; 3 boxes are considered the equivalent of 1 barrel.

Table 191.—*Apples:*[1] *International trade, average 1911–1913, annual 1926–1929*

Country	Calendar year									
	Average 1911–1913		1926		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
United States	------	9,870	55	16,170	163	15,534	112	13,635	268	16,856
Canada	840	3,858	546	3,578	631	2,902	633	2,977	440	4,665
France [2]	267	7,140	292	2,023	491	1,729	615	956	1,534	422
Australia [3]	78	1,140	0	2,702	0	1,316	0	3,619	0	1,342
Netherlands	105	933	610	583	401	1,462	391	586	557	1,738
Belgium	792	936	176	1,107	361	1,301	274	773	405	1,108
Italy	39	660	0	1,876	0	1,659	1	1,405	2	1,907
Rumania	6	0	0	769	0	[2] 510	------	------	------	------
Yugoslavia	(4)	(4)	------	1,006	1	719	0	463	6	1,125
New Zealand	[2] 51	[2] 15	31	604	36	441	21	814	30	739
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	7,686	0	18,339	0	13,511	0	13,401	0	12,832	0
Germany	14,454	93	8,322	15	7,891	31	9,777	17	7,501	38
Sweden	132	3	603	1	757	0	874	0	998	0
Egypt	------	------	357	1	366	2	345	3	491	[2] 3
Denmark	108	3	620	0	943	0	638	0	867	0
Irish Free State	(4)	(4)	524	0	449	0	441	0	441	0
Norway [2]	222	0	189	0	249	0	186	0	218	0
Finland	192	0	161	0	161	0	210	0	218	0
Brazil	81	0	203	0	128	0	214	0	------	------
Cuba	39	0	90	0	130	0	94	0	------	------
Poland	(4)	(4)	4	8	30	8	49	25	274	7
Total, 21 countries	25,092	24,651	31,122	30,443	26,699	27,614	28,276	25,273	27,082	30,000

Bureau of Agricultural Economics. Official sources.

* Preliminary.
1 Foreign weights are converted to bushels on the basis of 48 pounds per bushel; domestic, 1 barrel equals 3 boxes (or bushels).
2 Includes pears.
3 Year ended June 30.
4 Figures for pre-war years are included in the countries of the pre-war boundaries.

Table 192.—*Apples: Estimated average price per bushel, received by producers, United States, 1910–11 to 1930–31*

Crop year	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	Weighted average[1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910–11	112.0	76.9	73.8	73.6	77.4	89.3	100.2	115.7	118.6	124.7	138.8	139.6	88.1
1911–12	135.4	94.8	73.0	70.2	65.8	73.1	86.1	92.7	98.8	103.5	114.9	128.8	76.6
1912–13	108.0	82.5	67.5	62.2	61.3	63.5	72.6	74.3	78.4	82.4	85.0	94.0	66.8
1913–14	101.2	86.0	75.2	76.5	85.6	94.4	103.6	110.6	123.0	128.9	137.1	146.4	93.0
1914–15	135.6	91.2	68.6	61.6	56.0	57.3	66.6	69.3	73.1	73.4	80.1	90.6	62.7
1915–16	90.3	78.4	61.8	58.0	66.1	72.4	77.0	86.1	90.5	91.2	94.8	97.5	71.0
1916–17	104.9	86.5	80.7	75.6	82.5	92.0	103.4	104.3	114.4	126.9	137.1	142.9	90.7
1917–18	146.5	125.1	100.6	96.6	105.1	116.8	127.4	132.9	138.5	142.6	143.9	155.8	113.6
1918–19	144.6	125.7	114.5	118.9	129.4	138.9	150.9	148.9	159.8	190.1	203.5	220.8	137.5
1919–20	223.4	187.6	161.4	153.2	175.6	184.9	213.9	215.9	229.2	236.7	253.5	285.8	186.1
1920–21	249.1	196.7	152.1	134.8	125.9	130.7	143.2	130.8	132.8	134.7	142.2	162.3	133.8
1921–22	173.9	165.3	165.1	171.4	196.4	215.7	224.5	183.5	206.7	206.2	194.5	241.4	195.2
1922–23	202.7	181.7	100.4	94.3	93.4	101.5	108.6	131.5	142.3	144.9	156.5	178.7	109.4
1923–24	188.6	166.7	121.4	108.0	114.0	114.6	114.0	121.3	125.0	129.1	129.4	131.3	117.4
1924–25	159.3	141.3	121.6	109.8	115.9	119.5	128.2	144.9	150.7	155.4	158.4	179.2	122.1
1925–26	201.4	158.7	130.7	112.5	120.5	127.7	137.4	146.3	146.3	139.8	143.2	148.2	127.0
1926–27	168.7	133.8	103.8	88.4	80.2	81.6	87.7	97.3	98.8	100.0	103.8	113.5	88.3
1927–28	140.0	144.4	135.8	130.7	134.7	141.8	152.4	161.7	168.3	177.0	183.3	190.6	141.7
1928–29	188.7	156.0	105.5	96.6	99.4	107.9	118.5	124.1	129.9	134.1	133.5	147.9	110.3
1929–30	153.1	160.5	138.9	131.0	137.9	135.6	143.4	148.3	154.0	155.2	159.9	168.2	141.4
1930–31	173.6	144.8	106.3	103.2	98.4	96.7	98.8	------	------	------	------	------	------

1 Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of apples for each State; yearly price obtained by weighting monthly prices by car-lot shipments.

TABLE 193.—*Apples: Average l. c. l. price to jobbers, 1927–28 to 1930–31*[1]

BARRELS[2]

Market, variety, and crop season	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
NEW YORK									
Baldwin:	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1927–28			5.93	6.31	6.44	7.28	8.02	8.25	8.69
1928–29			5.16	[3] 5.19	[3] 5.30	[3] 5.12	5.16	5.00	5.83
1929–30			5.74	5.72	5.43	5.49	5.60	6.34	5.86
1930–31			3.44	4.22					
Rhode Island Greening:									
1927–28		6.48	7.80	8.00	8.50	9.75			
1928–29		5.12	5.42	5.22	5.16	5.40	5.20		
1929–30		6.10	7.05	6.84	6.34	6.70			
1930–31			3.51	4.08					
McIntosh:									
1927–28	7.31	7.72	8.86	9.24	9.94	10.31			
1928–29		7.77	10.08	10.03	9.80	9.58	9.10		
1929–30	8.47	7.76	8.57	8.71	8.80	9.53			
1930–31			6.15	5.62					
York Imperial:									
1927–28		[3] 5.32	5.73	6.13	6.79	7.36	8.03		
1928–29			4.25	4.64	4.40				
1929–30		4.69	4.93		5.08		6.59		
CHICAGO									
Baldwin:									
1927–28			6.68	6.85	7.52	7.86	8.78	8.23	8.64
1928–29			4.75		6.04	6.16	6.08	5.91	
1929–30							6.81	6.92	
1930–31				4.25					
Rhode Island Greening:									
1927–28		7.37	8.76	9.64	9.96				
1928–29		5.96	6.14	6.49	6.05	6.24	5.99		
1929–30							8.06		
1930–31				4.77					
Jonathan:									
1927–28	7.83	7.63	8.53	8.78	8.65	9.86			
1928–29	5.70	5.81	6.08	6.57	6.13	6.60		7.50	
1929–30	7.37	7.18					7.06		
1930–31	6.00	6.33							
Northern Spy:									
1927–28			9.35	9.98	9.83	10.00	9.78	9.66	9.54
1928–29				8.00	7.94		8.53	8.33	
1929–30							8.41	8.28	

BOXES[4]

Market, variety, and crop season	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
CHICAGO									
Delicious:									
1927–28		[5] 3.86	[5] 3.88	4.35	4.43	4.60	4.80		
1928–29		3.02	[5] 3.05	3.20	3.12	3.31	3.37	3.73	4.27
1929–30		3.72	[5] 3.78	3.76	3.88	3.73	3.78	3.98	3.99
1930–31		3.17	2.62	2.71					
Jonathan:									
1927–28		[5] 2.79	[5] 3.11						
1928–29	2.51	2.07	[5] 2.16	[5] 2.42	2.53	2.83			
1929–30	3.28	2.96	2.95	3.07	3.00	3.00	3.00		
1930–31		2.34	2.09	2.21					
Rome Beauty:									
1927–28		[5] 3.62	[5] 3.19	3.23	3.11	[5] 3.37	[5] 3.14		
1928–29		2.35	[5] 2.25	2.15	2.32	2.60	2.56		
1929–30 [5]			3.03	3.00	3.00	3.00	3.00	3.05	3.11
1930–31 [5]		2.43	1.91	1.85					

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives at these markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices. See 1927 year book, p. 837, for data for 1921–1926.

[1] Commodity reports were issued for season as follows: 1927–28, Aug. 29–May 26; 1928–29, Aug. 29–May 25; 1929–30, Sept. 3–May 24; 1930–31, Sept. 2.
[2] Quotations on 2½-inch stock unless otherwise stated.
[3] Less than 10 quotations.
[4] Quotations on medium-large stock unless otherwise stated.
[5] Quotations include very large stock.

TABLE 194.—*Apple trees: Estimated number of trees in commercial orchards, by States and by age groups, January 1, 1928* [1]

State and geographic division	Age groups and years when planted: 3 years and under, 1925–1927	4 to 8 years 1920–1924	9 to 13 years 1915–1919	14 to 18 years 1910–1914	19 to 23 years 1905–1909	24 to 28 years 1900–1904	29 to 33 years 1895–1899	34 to 38 years 1890–1894	39 to 43 years 1885–1889	44 years and over 1884 and earlier	Total
	1,000 trees	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*
Maine	104	245	121	208	163	181	222	[2] 780	------	------	2,024
New Hampshire	44	106	120	93	44	29	23	[2] 149	------	------	608
Vermont	69	70	63	166	4	4	2	[2] 20	------	------	398
Massachusetts	191	394	414	309	101	59	52	[2] 196	------	------	1,716
Rhode Island	7	18	32	28	16	18	11	[2] 17	------	------	147
Connecticut	61	115	104	126	96	92	32	[2] 56	------	------	682
New England	476	948	854	930	424	383	342	[2] 1,218	------	------	5,575
New York	889	1,500	839	1,754	1,010	628	379	286	326	1,432	9,043
New Jersey	68	619	345	319	177	92	87	[2] 66	------	------	1,773
Pennsylvania	433	936	600	1,366	339	453	161	138	91	175	4,692
Middle Atlantic	1,390	3,055	1,784	3,439	1,526	1,173	627	490	417	1,607	15,508
Ohio	169	833	1,092	477	626	181	13	16	57	18	3,482
Indiana	124	335	281	203	118	178	70	25	6	11	1,351
Illinois	381	1,424	823	234	291	402	313	123	67	5	4,063
Michigan	306	965	545	988	367	496	192	137	123	292	4,411
Wisconsin	95	65	70	175	150	110	14	110	31	37	857
East North Central	1,075	3,622	2,811	2,077	1,552	1,367	602	411	284	363	14,160
Minnesota	35	93	99	77	70	99	33	------	------	(3)	506
Iowa	186	178	43	109	125	97	108	10	2	4	862
Missouri	527	938	251	200	237	604	139	179	16	1	3,092
Nebraska [4]	101	58	66	10	------	16	21	1	------	------	273
Kansas	131	315	186	53	147	141	63	23	1	------	1,060
West North Central	980	1,582	645	449	579	957	364	213	19	5	5,793
Delaware	38	120	239	288	135	25	33	4	1	3	886
Maryland	44	345	277	415	162	90	22	19	8	16	1,398
Virginia	186	978	911	2,437	944	884	427	185	54	127	7,133
West Virginia	196	760	569	1,393	758	389	155	97	86	109	4,512
North Carolina	218	389	409	467	148	257	86	48	15	38	2,075
South Carolina	35	122	21	9	9	1	------	1	------	------	198
Georgia	27	295	379	113	61	34	6	7	1	(3)	923
South Atlantic	744	3,009	2,805	5,122	2,217	1,680	729	361	165	293	17,125
Kentucky	210	487	305	358	113	86	33	51	9	30	1,682
Tennessee	182	550	97	141	113	225	14	7	7	9	1,345
Alabama	106	71	19	------	21	23	------	1	------	------	241
East South Central	498	1,108	421	499	247	334	47	59	16	39	3,268
Arkansas	315	1,012	257	192	366	782	70	44	1	3	3,042
Oklahoma	333	241	58	33	150	12	------	2	------	------	829
West South Central	648	1,253	315	225	516	794	70	46	1	3	3,871
Montana	20	11	3	209	197	68	------	------	1	------	509
Idaho	45	122	52	990	107	14	6	------	------	------	1,336
Wyoming	------	1	2	15	------	(3)	------	------	------	------	18
Colorado	31	24	53	282	313	170	126	41	23	3	1,066
New Mexico	20	58	83	178	76	40	40	------	7	------	502
Arizona	------	23	8	16	6	2	------	------	------	1	56
Utah	14	40	35	223	120	23	16	2	1	1	475
Mountain	130	279	236	1,913	819	317	188	43	32	5	3,962
Washington	318	787	309	3,251	1,434	160	66	23	12	8	6,368
Oregon	27	69	105	1,206	316	154	15	3	2	4	1,901
California [5]	91	284	332	1,132	601	342	196	125	84	83	3,270
Pacific	436	1,140	746	5,589	2,351	656	277	151	98	95	11,539
All States	6,377	15,996	10,617	20,243	10,231	7,661	3,246	[6] 2,992	[7] 1,032	[7] 2,410	80,805

Bureau of Agricultural Economics. Preliminary estimates.

[1] See notes 1 and 2, Table 194.
[2] 34 years and over.
[3] Less than 500 trees.
[4] Figures for Nebraska are for the 7 counties of Richardson, Nemaha, Otoe, Cass, Sarpy, Douglas, and Washington.
[5] Figures for California are for the 3 commercial apple districts of Watsonville, Sebastopol, and Yucaipa.
[6] Includes trees 34 years and over, for New England States, and for New Jersey.
[7] Does not include trees for New England States, and for New Jersey.

TABLE 195.—*Apple trees: Estimated number of trees of 16 important varieties, in commercial orchards, by States, January 1, 1928* [1]

State and geographic division [2]	Trees of important varieties [3]																All other varieties [3]	Total
	Delicious	Winesap	Jonathan	Baldwin	Stayman Winesap	Ben Davis	Rome Beauty	York Imperial	McIntosh	Grimes Golden	Yellow Newtown	Wealthy	Yellow Transparent	Rhode Island Greening	Northern Spy	Gravenstein		
	1,000 trees	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*
Maine	53			660		324			206			63		47	107	20	544	2,024
New Hampshire	19			319					122			38		5	13	16	76	608
Vermont	29		1	9		3	(4)		167			26	(4)	21	63	1	78	398
Massachusetts	86			601					429			120	29	22	22	86	321	1,716
Rhode Island	8			51					24			7	3	13	3	6	32	147
Connecticut	44	6		269		8	3		105			36		33	12	17	149	682
New England	239	6	1	1,909		335	3		1,053			290	32	141	220	146	1,200	5,575
New York	234		79	2,383	26	385	183		1,264	8	19	519	42	1,097	527	26	2,251	9,043
New Jersey	170	86	32	62	247	45	112		65	82		185	82			29	576	1,773
Pennsylvania	303	61	152	431	882	80	232	578	127	152	3	110	65	69	151		1,296	4,692
Middle Atlantic	707	147	263	2,876	1,155	510	527	578	1,456	242	22	814	189	1,166	678	55	4,123	15,508
Ohio	240	35	316	286	634	132	780	56	14	265		63	84	11	11		555	3,482
Indiana	137	139	117	17	94	83	85	22		187		19	71		7		373	1,351
Illinois	363	452	680		115	480	82	71		257		63	517				983	4,063
Michigan	357	14	423	344	54	93	11	11	224	131		263	73	120	424		1,869	4,411
Wisconsin	56	4				7			76			162	7				545	857
East North Central	1,153	644	1,536	647	897	795	958	160	314	840		570	752	131	442		4,325	14,164
Minnesota	12		4						20			215					255	506
Iowa	112	12	243		29	87		5		57		53					264	862
Missouri	286	150	644		146	463	18	138		197		21	34				995	3,092
Nebraska [5]	19	69	60		3	14	(4)	6		15		3	1				83	273
Kansas	94	192	268		43	80	14	47		79		7	11				225	1,060
West North Central	523	423	1,219		221	644	32	196	20	348		299	46				1,822	5,793
Delaware	36	20	26		146	5	32	29	7	24		1	183				377	886
Maryland	62	39	56	15	307	55	31	214	6	132		13	81			5	382	1,398
Virginia	548	1,743	118	10	852	366	102	1,486	10	181	358	9	81				1,269	7,133
West Virginia	378	102	163	41	342	363	482	682	13	319	6	32	101		15		1,473	4,512
North Carolina	297	181	25	5	279	74	75	74		22	10		10				1,023	2,075

South Carolina	42	31	-	-	47	1	-	1	-	1	-	-	1	-	-	-	74	198
Georgia	134	89	-	-	96	25	4	15	-	17	-	-	17	-	-	-	526	923
South Atlantic	1,497	2,205	388	71	2,069	889	726	2,501	36	696	374	55	474	-	15	5	5,124	17,125
Kentucky	217	314	34	-	130	50	207	21	-	52	-	7	82	10	-	-	558	1,682
Tennessee	171	74	-	-	143	65	-	67	-	17	-	-	202	-	-	-	606	1,345
Alabama	56	15	-	-	-	-	-	-	-	-	-	-	2	-	-	-	168	241
East South Central	444	403	34	-	273	115	207	88	-	69	-	7	286	10	-	-	1,332	3,268
Arkansas	314	215	431	-	167	911	23	28	-	107	-	-	60	-	-	-	786	3,042
Oklahoma	78	96	121	-	30	127	-	-	-	41	-	-	-	-	-	-	336	829
West South Central	392	311	552	-	197	1,038	23	28	-	148	-	-	60	-	-	-	1,122	3,871
Montana	11	(4)	22	-	-	2	3	-	431	(4)	-	11	(4)	-	-	(4)	29	509
Idaho	160	98	407	-	12	20	342	8	17	37	36	-	-	-	-	-	199	1,336
Wyoming	(4)	-	(4)	-	-	-	-	-	2	-	-	8	1	-	-	-	7	18
Colorado	77	109	341	-	16	130	96	6	3	14	-	16	7	-	2	-	249	1,066
New Mexico	31	37	110	1	26	19	32	22	-	19	-	1	-	1	1	-	202	502
Arizona	6	6	2	-	1	2	1	-	-	5	-	-	-	-	-	-	33	56
Utah	37	36	187	-	11	17	51	17	-	2	-	2	1	2	-	-	112	475
Mountain	322	286	1,069	1	66	190	525	53	453	77	36	38	9	3	3	-	831	3,962
Washington	1,269	1,969	1,034	15	186	13	734	-	8	19	252	-	15	-	18	46	790	6,368
Oregon	80	86	158	-	12	-	255	-	-	26	715	-	-	-	19	13	537	1,901
California [6]	200	137	80	-	-	-	190	-	-	-	927	-	-	-	-	1,020	716	3,270
Pacific	1,549	2,192	1,272	15	198	13	1,179	-	8	45	1,894	-	15	-	37	1,079	2,043	11,539
All States	6,826	6,617	6,334	5,519	5,076	4,529	4,180	3,604	3,340	2,465	2,326	2,073	1,863	1,451	1,395	1,285	21,922	80,805

Bureau of Agricultural Economics. Preliminary estimates.

[1] In this study all orchards of 100 or more apple trees were classed as "commercial" orchards and all smaller orchards as "farm" orchards, irrespective of the age or productiveness of the trees. The numbers shown in Tables 194, 195, and 196 are estimates which were based on the 1925 census figures and on reports received from apple growers in practically all commercial sections of the United States, in 1927. Trees for which the varieties were unknown or not reported were assumed to include the same proportion of each variety as orchards in the same area for which varieties were reported. The varieties for which the age was unknown or not reported were assumed to include the same proportion of trees in each age group as those varieties in the same area for which age was reported. The figures in Tables 194, 195, and 196 have been rounded to the nearest thousand to avoid an appearance of meticulous accuracy. It has been assumed that all trees were planted in the spring; that is, trees reported set in 1927 were assumed to be 1 year old on January 1, 1928.

[2] Estimated numbers of trees in commercial orchards in the States omitted are as follows: North Dakota, none; South Dakota, 59,000; Florida, none; Mississippi, none; Louisiana, none; Texas, 89,000; Nevada, 20,000.

[3] While the 16 varieties listed in Tables 194 and 196 are the most important in numbers for the United States as a whole, in some States varieties other than those mentioned were of more importance in numbers but are included under "all other varieties." Since estimates of the numbers of trees were made only for varieties which constituted 0.1 per cent of the total trees in a State, blank spaces in Tables 194 and 196 do not always mean that there were no trees of the variety reported but rather that the number was so small that it was included under "all other varieties." "All other varieties" also include various mixtures of trees of little commercial importance, some trees of unknown variety, seedlings, crabs, and some minor varieties.

[4] Less than 500 trees.

[5] Figures for Nebraska are for the 7 counties of Richardson, Nemaha, Otoe, Cass, Sarpy, Douglas, and Washington.

[6] Figures for California are for the 3 commercial apple districts of Watsonville, Sebastopol, and Yucaipa.

TABLE 196.—*Apple trees: Estimated number of trees of 16 important varieties in commercial orchards, by age groups and by geographic divisions, January 1, 1928* [1]

Age groups (seasons of growth) [2]	Trees of important varieties																All other varieties	Total
	Delicious	Winesap	Jonathan	Baldwin	Stayman Winesap	Ben Davis	Rome Beauty	York Imperial	McIntosh	Grimes Golden	Yellow Newtown	Wealthy	Yellow Transparent	Rhode Island Greening	Northern Spy	Gravenstein		
NEW ENGLAND																		
Years	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*
3 and under	35			114			1		150			27	2	3	27	12	105	476
4 to 13	175	4	1	417		11	2		568			143	20	15	47	70	329	1,802
14 to 23	26	2		379		71			295			101	9	36	58	38	339	1,354
24 to 33	2			295		134			35			12	1	28	40	15	163	725
34 and over	1			704		119			5			7		59	48	11	264	1,218
Total	239	6	1	1,909		335	3		1,053			290	32	141	220	146	1,200	5,575
MIDDLE ATLANTIC																		
3 and under	124	6	13	81	83	2	49	12	364	16	1	25	7	101	63	1	442	1,390
4 to 13	469	63	120	416	606	35	298	78	688	116	5	307	108	231	159	17	1,123	4,839
14 to 23	106	62	105	818	430	243	153	256	376	77	4	402	57	268	227	18	1,363	4,965
24 to 33	7	13	24	423	35	167	22	201	25	25	7	63	14	142	105	12	515	1,800
34 to 43 [3]	1	2	1	377	1	53	3	29	2	7	4	15	2	100	54	4	252	907
44 to 53 [4]		1		420		6	1	1				1	1	164	39	1	205	840
54 and over [4]				341		4	1	1	1	1	1	1		160	31	2	223	767
Total	707	147	263	2,876	1,155	510	527	578	1,456	242	22	814	189	1,166	678	55	4,123	15,508
EAST NORTH CENTRAL																		
3 and under	188	53	102	15	80	3	58	2	95	51		15	38	14	31		330	1,075
4 to 13	821	431	856	263	641	61	380	63	145	444		184	546	31	117		1,450	6,433
14 to 23	132	92	324	147	166	199	359	69	66	232		247	126	22	160		1,288	3,629
24 to 33	11	57	201	91	10	431	98	20	4	100		62	35	21	55		773	1,969
34 to 43	1	10	49	61		91	51	5	3	11		49	6	14	39		305	695
44 to 53		1	3	44		7	1	1		1		3	1	16	23		91	192
54 and over			1	26		3	11		1	1		10		13	17		88	171
Total	1,153	644	1,536	647	897	795	958	160	314	840		570	752	131	442		4,325	14,164

WEST NORTH CENTRAL

3 and under	167	87	267		43	19	9	32	16	48		9	14				269	980
4 to 13	306	193	535		137	46	20	80	4	166		118	22				600	2,227
14 to 23	37	61	157		33	175	1	31		71		73	3				386	1,028
24 to 33	13	73	204		8	323	1	34		57		98	7				503	1,321
34 to 43		9	56			80	1	19		6		1					60	232
44 to 53						1											3	4
54 and over																	1	1
Total	523	423	1,219		221	644	32	196	20	348		299	46				1,822	5,793

SOUTH ATLANTIC

3 and under	159	55	10	1	89	5	44	24	3	19	6	1	18		1		309	744
4 to 13	926	817	122	12	846	103	262	333	25	303	27	35	274		2	5	1,722	5,814
14 to 23	402	907	237	29	1,025	376	290	1,514	8	348	70	16	154		8		1,955	7,339
24 to 33	9	342	19	22	86	337	92	520		21	183	2	24		2		750	2,409
34 to 43	1	48		4	8	49	30	87		4	61	1	3		1		229	526
44 to 53		7		2	1	4	7	4		1	13		1		1		100	141
54 and over		29		1	14	15	1	19			14						59	152
Total	1,497	2,205	388	71	2,069	889	726	2,501	36	696	374	55	474		15	5	5,124	17,125

SOUTH CENTRAL

3 and under	213	98	91		110	32	47	5		44			93				413	1,146
4 to 13	491	370	310		290	206	99	61		129		1	183				957	3,097
14 to 23	105	156	103		52	353	63	24		28		6	59	10			528	1,487
24 to 33	27	73	81		18	528	16	11		16			11				464	1,245
34 to 43		15	1			25	3	8									70	122
44 to 53		2				8	2	7									15	34
54 and over						1											7	8
Total	836	714	586		470	1,153	230	116		217		7	346	10			2,454	7,139

[1] See Table 194 for the States included in each geographic division, also notes 1, 2, 3, 5, and 6.
[2] Old trees shown for the newer varieties are mostly trees that have been top-worked.
[3] Includes trees 34 years and over for New Jersey.
[4] Does not include trees for New Jersey.

TABLE 196.—*Apple trees: Estimated number of trees of 16 important varieties in commercial orchards, by age groups and by geographic divisions, January 1, 1928*—Continued

Age groups (seasons of growth)	Trees of important varieties: Delicious	Winesap	Jonathan	Baldwin	Stayman Winesap	Ben Davis	Rome Beauty	York Imperial	McIntosh	Grimes Golden	Yellow Newtown	Wealthy	Yellow Transparent	Rhode Island Greening	Northern Spy	Gravenstein	All other varieties	Total
	1,000 trees	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*
MOUNTAIN																		
3 and under	43	4	9		4		11		31								28	130
4 to 13	110	21	138		11	19	54	1	17	7		5	1	1			130	515
14 to 23	166	212	811	1	48	37	423	40	353	63	36	17	3	1	1		520	2,732
24 to 33	2	41	100		3	112	34	11	52	5		11	4	1	2		127	505
34 to 43	1	8	10			22	3	1		2		5	1				22	75
44 to 53			1														4	5
54 and over																		
Total	322	286	1,069	1	66	190	525	53	453	77	36	38	9	3	3		831	3,962
PACIFIC																		
3 and under	179	104	9		1		30		2		23		1			33	54	436
4 to 13	584	335	90	1	26		164		2	4	117		3		1	315	244	1,886
14 to 23	764	1,695	1,143	3	166	2	963		4	40	1,190		8		24	604	1,334	7,940
24 to 33	20	55	29	7	5	7	19			1	392		2		6	91	299	933
34 to 43	1	1	1	4		4	2				129		1		4	25	77	249
44 to 53											39				2	3	28	72
54 and over	1	2					1				4					8	7	23
Total	1,549	2,192	1,272	15	198	13	1,179		8	45	1,894		15		37	1,079	2,043	11,539
ALL STATES																		
3 and under	1,108	407	501	211	410	61	249	75	661	178	30	77	173	118	122	46	1,950	6,377
4 to 13	3,882	2,234	2,172	1,109	2,557	481	1,279	616	1,449	1,169	149	793	1,157	278	326	407	6,555	26,613
14 to 23	1,738	3,187	2,880	1,377	1,920	1,456	2,252	1,934	1,102	859	1,300	862	419	337	478	660	7,713	30,474
24 to 33	91	654	658	838	165	2,039	282	797	116	225	582	248	98	192	210	118	3,594	10,907
34 to 43[5]	6	93	118	1,150	9	443	93	149	10	30	194	78	13	173	146	40	1,279	4,024
44 to 53[6]		11	4	466	1	26	11	13		2	52	4	3	180	65	4	446	1,288
54 and over[6]	1	31	1	368	14	23	14	20	2	2	19	11		173	48	10	385	1,122
Total	6,826	6,617	6,334	5,519	5,076	4,529	4,180	3,604	3,340	2,465	2,326	2,073	1,863	1,451	1,395	1,285	21,922	80,805

Bureau of Agricultural Economics. Preliminary estimates.

[5] Includes trees 34 years and over, for New England States and New Jersey.

[6] Does not include trees for New England States and for New Jersey.

TABLE 197.—*Citrus trees: Number in lower Rio Grande Valley, Tex., by kind and age, 1928–1930*

Year and kind	Age						
	Less than 1 year	1 year	2 years	3 years	4 years	5 years and over	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
1928:							
Grapefruit	916,334	458,232	297,084	244,662	148,826	338,508	2,403,646
Oranges	280,298	181,100	157,434	138,802	79,352	116,392	953,378
Other citrus	7,638	5,717	8,923	10,580	6,973	22,302	62,133
Total	1,204,270	645,049	463,441	394,044	235,151	477,202	3,419,157
1929:							
Grapefruit	1,319,103	916,334	458,232	297,084	244,662	487,334	3,722,749
Oranges	367,236	280,298	181,100	157,434	138,802	195,744	1,320,614
Other citrus	13,485	7,638	5,717	8,923	10,580	29,275	75,618
Total	1,699,824	1,204,270	645,049	463,441	394,044	712,353	5,118,981
1930:							
Grapefruit	716,338	1,213,997	813,658	444,691	299,510	713,456	4,201,650
Oranges	170,340	339,429	257,320	183,287	149,747	339,999	1,440,122
Other citrus	72,175	101,733	68,677	37,151	19,840	59,753	359,329
Total	958,853	1,655,159	1,139,655	665,129	469,097	1,113,208	6,001,101

Plant Quarantine and Control Administration. Citrus tree survey made in connection with the enforcement of Federal Quarantine No. 64, on account of the Mexican fruit worm. Covers Cameron, Hidalgo, and Willacy Counties.

TABLE 198.—*Citrus-fruit production, by States, 1899, 1909, 1919–1930* [1]

Year	California			Florida [2]		Texas		Arizona		Alabama,[3] oranges	Louisiana, oranges	Mississippi, oranges
	Oranges	Grapefruit	Lemons	Oranges	Grapefruit	Oranges	Grapefruit	Oranges	Grapefruit			
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
1899 [4]	5,882	18	874	273	12	------	------	11	1	(5)	1	------
1909 [4]	14,440	123	2,756	4,888	1,062	11	(5)	33	1	1	152	5
1919	15,265	263	3,499	7,400	5,800	9	3	80	29	20	37	31
1920	21,296	304	4,955	8,500	5,400	------	------	60	34	82	42	25
1921	12,640	360	4,050	7,700	6,400	------	------	80	35	82	50	30
1922	20,106	394	3,400	10,200	7,600	4	35	81	44	175	60	45
1923	24,137	363	6,732	12,900	8,400	6	65	86	65	225	75	55
1924	18,100	387	5,125	11,600	8,600	12	211	60	67	(5)	75	0
1925	24,200	600	7,316	9,100	7,300	10	200	86	90	100	100	27
1926	28,167	650	7,712	10,700	7,800	20	340	75	75	75	150	42
1927	23,000	720	6,000	8,200	7,200	30	490	54	176	110	200	50
1928	38,705	972	7,900	15,000	10,500	68	772	99	211	38	220	30
1929	24,400	1,000	5,900	8,800	8,200	128	1,275	104	243	212	187	8
1930 [6]	32,800	1,118	7,020	14,500	12,000	82	725	110	310	3	195	1

Bureau of Agricultural Economics.

[1] The figures in this table of production include fruit consumed on farms, sold locally and used for manufacturing purposes, as well as that shipped. The figures do not include fruit which repened on the trees, but which was destroyed by freezing or storms prior to picking. For California the figures relate to the crop produced from the bloom of the year shown, fruiting through the winter and through the spring and summer of the following year, being picked from Nov. 1 of the year shown to Oct. 31 of the following year. Fruit not picked until after the latter date is included with the crop of the following year. For all States except California the estimates include all fruit picked after about Sept. 1 of the year shown. The estimates for oranges include tangerines.

[2] From prospects on Dec. 1, commercial shipments of Florida citrus fruits from the 1930 crop were estimated at 13,500,000 boxes of oranges, and 9,000,000 boxes of grapefruit, compared with 7,900,000 boxes of oranges and 6,300,000 boxes of grapefruit shipped from the 1929 crop.

[3] For years 1919–1930, equivalent in standard boxes, each equal to about 2 of the "half straps" commonly used.

[4] Census. Size of boxes not specified.

[5] 500 boxes or less.

[6] As estimated from prospects on Dec. 1.

TABLE 199.—*Citrus fruits: Car-lot shipments, by State of origin, 1920–21 to 1929–30*

State	Crop-movement season [2]									
	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30 [3]
ORANGES [1]										
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
California	46,844	28,376	48,346	44,905	34,439	47,017	53,511	43,693	68,797	42,960
Florida	20,859	[4] 15,718	23,006	33,418	25,091	19,625	22,536	16,453	32,480	17,312
Alabama	87	145	476	600	2	338	179	312	97	485
Mississippi	-------	-------	9	13	-------	8	4	15	5	25
Louisiana	-------	-------	-------	3	2	1	1	251	264	278
Texas	-------	-------	-------	3	3	6	9	26	33	156
Arizona	49	78	71	94	45	96	73	33	66	90
Total	67,839	[4] 44,317	71,908	79,036	59,582	67,091	76,313	60,783	101,742	61,306
GRAPEFRUIT										
Florida	11,115	12,943	16,969	19,614	20,087	14,269	17,304	14,166	21,839	13,955
Texas	-------	8	48	99	521	298	747	1,036	1,617	3,493
California	451	503	507	469	449	546	597	756	822	1,176
Arizona	48	62	103	155	159	218	210	211	272	417
Louisiana	-------	-------	-------	-------	-------	-------	-------	-------	-------	1
Total	11,614	13,516	17,627	20,337	21,216	15,331	18,858	16,169	24,550	19,042
LEMONS										
California	11,836	9,907	8,946	13,388	11,680	13,981	13,496	12,745	17,181	13,410
Texas	-------	-------	-------	1	[5] 2	-------	-------	-------	-------	-------
Arizona	-------	-------	1	2	1	1	-------	-------	-------	2
Total	11,836	9,907	8,947	13,391	11,683	13,982	13,496	12,745	17,181	13,412
MIXED CITRUS [6]										
Florida	-------	-------	2,631	3,608	4,226	3,565	5,313	6,225	9,109	8,216
California	-------	-------	1,033	1,461	1,148	1,605	1,639	1,590	1,783	1,318
Texas	-------	-------	18	1	18	-------	22	92	185	501
Arizona	-------	-------	3	-------	10	1	10	11	24	48
Louisiana	-------	-------	-------	-------	-------	-------	-------	1	1	10
Total	-------	-------	3,685	5,070	5,402	5,171	6,984	7,919	11,102	10,093

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Include tangerines.
[2] Crop-movement season extends as follows: California, from Nov. 1 through October of the following year except for grapefruit which extends from Sept. 1 through August of the following year; all other States from Sept. 1 through August of the following year except for lemons from Nov. 1 through October of the following year.
[3] Preliminary.
[4] Includes 1 car in August, 1921.
[5] Reported in October, 1924.
[6] No reports available before 1922.

TABLE 200.—*Lemons: International trade, average 1911–1913, annual 1926–1929*

Country	Calendar year: Average 1911–1913 Imports	Average 1911–1913 Exports	1926 Imports	1926 Exports	1927 Imports	1927 Exports	1928 Imports	1928 Exports	1929 * Imports	1929 * Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Italy	2	8,147	0	7,008	0	7,345	0	6,609	0	6,822
Spain	0	101	0	372	0	383	0	340	------	------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	[1] 1,116	0	1,942	0	1,827	0	1,655	0	1,965	0
United States	[2] 1,750	[3] 66	999	296	849	308	943	251	634	266
Germany	[2] 1,107	------	1,615	[4] 18	1,741	[4] 29	1,665	[4] 28	1,859	[4] 22
Belgium [5]	763	0	98	4	95	4	90	4	1,172	5
Czechoslovakia	(6)	(6)	450	0	483	0	381	0	459	0
Canada [7]	------	------	361	0	352	0	385	0	370	0
Rumania	123	0	225	0	235	0	------	------	------	------
Poland	(6)	(6)	244	0	308	0	288	0	351	0
Netherlands	94	3	187	19	187	29	170	35	188	36
Switzerland	------	------	146	0	153	0	165	0	167	0
Yugoslavia	(6)	(6)	145	0	147	0	144	0	135	0
Hungary	[8] 1,032	[8] 228	111	0	216	0	202	0	196	0
Total 14 countries	5,987	8,545	6,523	7,717	6,593	8,098	6,088	7,267	7,496	7,151

Bureau of Agricultural Economics. Official sources.

* Preliminary.
[1] Includes "Other citrus fruits, not elsewhere specified."
[2] 2-year average.
[3] 1 year only.
[4] Includes oranges and similar fruits.
[5] Includes oranges and similar fruits except for imports for 1926, 1927, and 1928.
[6] Figures for pre-war years are included in the countries of the pre-war boundaries.
[7] Reported in value only prior to 1925.
[8] Average for Austria-Hungary.

TABLE 201.—*Lemons, California: Weighted average auction price per box, New York, by months, 1924–25 to 1930–31*

Crop year	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1924–25	------	------	4.47	4.45	4.59	4.75	5.73	6.84	4.66	4.67	8.55	6.83	------
1925–26	4.13	4.46	3.91	4.16	5.40	4.12	4.83	3.79	4.83	4.38	3.56	4.50	4.35
1926–27	3.82	4.03	4.20	3.43	3.90	3.50	3.89	4.50	6.44	6.37	8.82	9.27	4.64
1927–28	6.92	6.13	6.33	6.03	5.19	5.54	6.42	6.04	6.97	6.11	5.59	5.19	6.07
1928–29	4.90	5.62	5.26	3.95	4.07	4.55	3.82	6.89	5.39	7.82	11.87	11.22	5.82
1929–30	8.70	8.63	5.68	5.06	4.81	5.51	7.24	6.15	7.26	7.93	5.36	4.23	6.42
1930–31	4.18	4.52	------	------	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those published in Yearbooks prior to 1930.

TABLE 202.—*Oranges: International trade, average 1911–1913, annual 1926–1929*

Country	Calendar year									
	Average 1911–1913		1926		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Spain	0	14,830	0	20,265	0	17,538	3	24,268	------	------
Italy	3	3,476	1	3,835	0	4,410	0	2,245	0	2,613
United States	[1] 73	1,154	12	2,692	19	3,562	24	2,678	0	5,512
Palestine	------	------	0	1,885	0	2,645	0	2,151	0	1,813
Union of South Africa	0	------	0	563	0	749	0	694	0	1,002
Brazil	0	2	0	258	0	397	0	605	0	------
Japan	0	353	0	491	0	479	0	464	0	440
Cuba	------	111	------	322	------	33	0	0	------	------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	7,638	0	11,160	0	10,975	0	10,753	0	12,859	0
France [2]	3,198	38	3,816	100	3,668	57	4,008	106	[3] 3,700	[3] 24
Germany	3,935	------	5,375	------	5,941	------	7,340	------	6,741	------
Canada [4]	------	------	2,133	0	2,544	0	2,212	0	3,128	0
Netherlands	631	9	1,717	456	1,631	527	1,938	666	2,027	743
Belgium [5]	------	------	871	------	671	------	947	------	------	------
China	------	------	526	231	461	313	411	332	566	353
Egypt	------	0	315	3	393	4	250	5	265	5
Poland	(6)	(6)	177	1	210	0	134	0	123	0
Switzerland	372	0	437	0	419	0	494	0	476	0
Norway [2]	208	0	369	0	387	0	426	0	434	0
Sweden	166	0	320	0	360	0	399	0	440	0
Denmark	97	0	229	0	224	0	243	0	254	0
Czechoslovakia	(6)	(6)	450	0	417	0	384	0	390	0
Irish Free State	(6)	(6)	244	0	255	0	258	0	282	0
Hungary	[7] 2,110	[7] 102	220	0	351	0	360	0	296	0
Yugoslavia	(6)	(6)	161	1	162	0	179	0	180	0
Total 25 countries	18,431	20,075	28,543	31,103	29,088	30,714	30,768	34,214	32,161	12,505

Bureau of Agrucultural Economics. Official sources.

* Preliminary.
[1] 2-year average.
[2] Includes lemons.
[3] Oranges only.
[4] Reported in value only prior to 1925.
[5] Included with lemons except for 1926 and 1927 and 1928 imports.
[6] Figures for pre-war years are included in the countries of the pre-war boundaries.
[7] Average for Austria-Hungary.

TABLE 203.—*Grapefruit, Florida: Weighted average auction price per box, New York, by months, 1924–25 to 1930–31*

Crop season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1924–25	------	------	------	2.83	2.83	2.71	3.78	4.38	5.94	(1)	------
1925–26	4.96	3.97	3.95	4.01	4.03	4.61	5.16	4.70	4.74	5.51	4.38
1926–27	5.35	4.07	3.40	3.58	3.75	3.67	3.59	3.66	3.80	2.44	3.66
1927–28	4.60	4.70	4.71	4.82	5.07	5.52	5.45	4.92	3.93	6.28	[2] 4.93
1928–29	4.41	4.25	3.44	3.52	3.20	3.30	3.32	3.83	4.71	6.36	3.70
1929–30	4.51	4.23	4.26	4.43	4.09	4.78	5.09	4.25	3.24	3.10	[3] 4.42
1930–31	3.64	3.00	2.82	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those published in Yearbooks prior to 1930.

[1] Reported for one week only.
[2] Includes a price in August, 1928, of \$4.51.
[3] Includes a price in September, 1929, of \$5.80.

TABLE 204.—*Oranges, California, Navel: Weighted average auction price per box, New York, by months, 1924–25 to 1930–31*

Crop season	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1924–25	-------	-------	4.64	4.47	5.35	5.48	6.51	6.21	-------
1925–26	8.00	4.56	4.24	4.55	4.70	5.50	4.73	5.56	4.80
1926–27	6.32	5.06	4.69	4.71	4.54	4.89	4.43	5.60	4.74
1927–28	(1)	5.55	4.56	5.18	5.52	5.98	7.39	-------	-------
1928–29	5.72	4.46	4.84	3.89	3.52	4.06	3.56	3.56	4.10
1929–30	(1)	5.56	4.98	4.99	5.67	6.03	6.64	-------	-------
1930–31	5.23	3.58	-------	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those published in Yearbooks prior to 1930.

[1] Reported for one week only.

TABLE 205.—*Oranges, California Valencia: Weighted average auction price per box, New York, by months, 1925–1930*

Crop season	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Average [1]
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1925	4.80	6.28	7.43	6.40	6.47	7.58	8.23	9.90	7.15
1926	4.92	4.58	4.46	5.21	4.89	5.39	6.44	6.79	5.28
1927	4.66	4.43	4.98	5.90	6.15	6.73	7.02	6.71	6.00
1928	5.94	7.38	7.22	7.58	7.45	7.77	7.53	6.79	7.45
1929	(2)	4.40	4.58	4.13	4.85	4.73	4.85	4.77	4.63
1930	6.59	7.97	7.19	7.36	7.33	7.29	8.69	7.78	7.59

Bureau of Agricultural Economics. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those published in Yearbooks prior to 1930.

[1] Includes prices in December as follows: 1925, $2.14; 1926, $6.69; 1927, $5.75; 1929, $4.85.
[2] Reported for one week only.

TABLE 206.—*Oranges, Florida: Weighted average auction price per box, New York by months, 1924–25 to 1930–31*

Crop season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average [1]
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1924–25	-------	-------	-------	3.68	4.26	5.69	6.43	7.82	8.26	-------
1925–26	7.45	7.19	4.00	4.25	4.44	5.02	5.80	5.87	6.72	5.10
1926–27	3.70	4.79	3.53	3.76	3.91	4.10	4.86	4.75	4.54	4.11
1927–28	3.67	6.31	5.59	5.23	5.97	6.29	6.84	8.58	9.11	6.24
1928–29	5.08	3.71	3.55	3.45	3.30	3.30	3.55	3.33	2.99	3.40
1929–30	3.42	4.04	4.21	4.49	4.44	4.98	7.13	7.42	6.60	4.94
1930–31	4.76	3.45	3.01	-------	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economic. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those published in Yearbooks prior to 1930.

[1] Includes prices in other months as follows: 1926, $3.12 in July; 1928, $2.92 in July, and $2.29 in August.

TABLE 207.—*Cherries: Production in 10 States,[1] imports and exports 1924–1930*

Year	Production											Imports, year beginning July 1			Exports, canned,[2] year beginning July 1
	New York	Michigan	Wisconsin	Montana	Idaho	Colorado	Utah	Washington	Oregon	California	10 States	Natural, in brine	Prepared or preserved	Total	
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1924	17, 500	16, 500	9, 550	265	1, 700	750	3, 800	4, 800	10, 400	13, 500	78, 765	4, 937	9, 175	14, 112	1, 612
1925	15, 300	11, 600	3, 550	310	2, 400	3, 900	5, 500	8, 400	7, 200	12, 000	70, 160	2, 904	11, 153	14, 057	1, 688
1926	16, 400	13, 800	9, 700	385	3, 200	7, 600	5, 300	10, 500	15, 100	20, 000	101, 985	5, 733	15, 974	21, 707	2, 111
1927	10, 500	6, 800	3, 150	350	1, 300	4, 500	3, 800	4, 100	11, 300	12, 000	57, 800	15, 136	1, 048	16, 184	1, 719
1928	9, 600	21, 500	10, 250	130	3, 100	1, 650	4, 600	9, 700	11, 500	18, 500	90, 530	13, 173	384	13, 557	2, 202
1929	11, 900	16, 500	5, 950	280	3, 200	4, 900	4, 000	11, 000	9, 900	17, 000	84, 630	22, 353	875	23, 228	1, 897
1930[3]	25, 000	23, 400	6, 850	270	3, 500	2, 400	4, 500	12, 100	11, 300	18, 000	107, 320	------	------	------	------

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Trade figures compiled from Monthly Summary of Foreign Trade of the United States, June issues.

[1] Estimates include only certain States where total production can be calculated from commercial sales (shipments, canning, cold pack, etc.) and differs from previously published commercial estimates for some States by an increased allowance for farm and local use.
[2] Fresh cherries not separately reported.
[3] Preliminary.

TABLE 208.—*Cranberries: Production and farm value, United States, 1914–1930*

Year	Production	Price per barrel received by producers, Dec. 1	Farm value	Year	Production	Price per barrel received by producers, Dec. 1	Farm value
	1,000 bbls.	*Dollars*	*1,000 dolls.*		*1,000 bbls.*	*Dollars*	*1,000 dolls.*
1914	697	3. 97	2, 766	1923	652	7. 15	4, 664
1915	441	6. 59	2, 908	1924	582	9. 42	5, 485
1916	471	7. 32	3, 449	1925	569	11. 20	6, 370
1917	249	10. 24	2, 550	1926	744	7. 56	5, 623
1918	352	10. 77	3, 791	1927	496	12. 28	6, 089
1919	549	8. 37	4, 597	1928	551	14. 51	7, 997
1920	449	12. 28	5, 514	1929	546	13. 09	7, 154
1921	384	16. 99	6, 526	1930[1]	570	10. 15	5, 789
1922	560	10. 18	5, 702				

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] Preliminary.

TABLE 209.—*Cranberries: Production and December 1 price, by States, 1925–1930*

State	Production						Price per barrel received by producers					
	1925	1926	1927	1928	1929	1930[1]	1925	1926	1927	1928	1929	1930
	Bbls.	*Bbls.*	*Bbls.*	*Bbls.*	*Bbls.*	*Bbls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Massachusetts	429, 000	430, 000	370, 000	335, 000	400, 000	380, 000	11. 25	7. 75	12. 50	15. 00	13. 25	10. 00
New Jersey	115, 000	210, 000	75, 000	138, 000	90, 000	144, 000	10. 75	7. 00	11. 00	13. 00	12. 00	9. 75
Wisconsin	25, 000	80, 000	24, 000	50, 000	42, 000	40, 000	12. 32	8. 00	13. 50	16. 00	13. 50	12. 50
Washington	------	16, 600	21, 000	22, 000	9, 500	3, 500	------	7. 80	12. 00	13. 50	14. 25	12. 75
Oregon	------	7, 000	6, 000	6, 000	5, 000	3, 000	------	7. 50	10. 50	13. 50	14. 50	13. 50
United States	569, 000	743, 600	496, 000	551, 000	546, 500	570, 500	11. 20	7. 56	12. 28	14. 51	13. 09	10. 15

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] Preliminary.

TABLE 210.—*Cranberries: Car-lot shipments, by State of origin, 1920–21 to 1929–30*

State	Crop-movement season [1]									
	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Massachusetts	966	644	999	1,324	1,045	[3] 1,457	3,762	1,242	1,050	1,199
New Jersey	452	637	789	713	806	427	804	290	478	308
Wisconsin	82	68	223	140	150	73	309	80	171	141
Other States	2	4	5	6	12	40	34	116	82	53
Total	1,502	1,353	2,016	2,183	2,013	[3] 1,997	4,909	1,728	1,781	1,701

Bureau of Agricultural Economics. Compiled from monthly reports received by the bureau from local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat, reduced to car-lot basis.

[1] Crop-movement season extends from Sept. 1 of one year through April of the following year.
[2] Preliminary.
[3] Includes 1 car in August.

TABLE 211.—*Grapes: Production, farm price, imports and exports, United States, 1922–1930*

Year	Production	Seasonal farm price per ton [1]	Value, basis seasonal farm price [1]	Foreign trade, year beginning July 1 [2]			
				Domestic exports	Imports	Net exports [3]	
						Total	Percentage of production
	Short tons	*Dollars*	*Dollars*	*Short tons*	*Short tons*	*Short tons*	*Per cent*
1922	1,981,171	48.09	95,271,520	7,011	16,326	[4] 9,315	----------
1923	2,227,395	31.88	71,009,078	10,128	10,015	198	([5])
1924	1,777,722	41.79	74,297,480	10,151	1,608	8,566	0.5
1925	[6] 2,202,085	32.03	66,115,000	12,134	1,415	10,735	.5
1926	[6] 2,438,413	26.66	64,604,000	15,396	1,011	14,414	.6
1927	[6] 2,605,238	26.52	65,332,000	19,410	1,735	17,747	.7
1928	[6] 2,671,076	19.75	49,740,000	27,819	1,703	26,155	1.0
1929	2,098,547	26.85	56,337,000	23,079	2,690	20,445	1.0
1930 [7]	[6] 2,368,557	18.63	41,821,000	----------	----------	----------	----------

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] For years 1925–1930, the average price for the States reporting price, except California, is used for computing the value of the grape crop in the less important States for which no price is determined. Price and value are based on quantities actually harvested.
[2] Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1923–1926; January and June issues, 1927–1930.
[3] Total exports (domestic plus foreign) minus total imports.
[4] Net imports equals total imports minus total exports (domestic plus foreign).
[5] Less than 0.05 per cent.
[6] Includes fruit in California not harvested as follows: 138,000 tons in 1925, 15,000 in 1926, 142,000 in 1927, 153,000 in 1928, and 124,000 in 1930. (See also last sentence of Note 1.)
[7] Preliminary.

TABLE 212.—*Grapes: Estimated production, by States, 1927–1930*

State and division	1927	1928	1929	1930 [1]
	Tons	*Tons*	*Tons*	*Tons*
Maine	58	76	81	79
New Hampshire	91	91	130	116
Vermont	45	36	56	64
Massachusetts	655	476	714	765
Rhode Island	152	190	239	221
Connecticut	1,087	1,314	1,620	1,620
New York	51,520	85,470	81,030	76,670
New Jersey	2,535	2,822	2,652	2,890
Pennsylvania	14,850	22,680	16,200	18,630
North Atlantic	70,893	113,155	102,722	101,055
Ohio	20,000	28,700	17,150	26,000
Indiana	2,580	4,980	3,780	4,140
Illinois	3,440	6,800	6,160	4,320
Michigan	51,700	72,800	69,000	77,600
Wisconsin	250	495	434	385
Minnesota	152	198	166	108
Iowa	5,329	6,225	6,675	4,563
Missouri	7,000	14,000	12,045	10,335
Nebraska	1,955	1,920	2,125	1,825
Kansas	3,735	3,465	3,375	2,475
North Central	96,141	139,583	120,910	131,751
Delaware	1,207	1,600	1,710	1,596
Maryland	1,225	1,200	1,314	1,368
Virginia	2,048	2,560	2,336	2,080
West Virginia	720	1,422	954	900
North Carolina	5,135	6,000	5,320	5,548
South Carolina	1,540	1,725	1,495	1,840
Georgia	1,472	1,672	1,430	1,606
Florida	610	900	888	1,241
South Atlantic	13,957	17,079	15,447	16,179
Kentucky	632	1,200	912	832
Tennessee	950	1,368	1,254	1,292
Alabama	627	759	759	814
Mississippi	225	259	245	262
Arkansas	3,000	17,000	13,800	12,650
Louisiana	30	38	36	36
Oklahoma	1,732	2,100	2,070	1,710
Texas	1,260	1,440	1,520	1,280
South Central	8,456	24,164	20,596	18,876
Idaho	304	298	272	291
Colorado	314	357	374	223
New Mexico	458	600	608	375
Arizona	1,900	1,785	1,890	1,680
Utah	1,320	1,520	1,660	1,826
Nevada	270	210	252	276
Washington	3,200	4,300	4,700	3,300
Oregon	2,025	2,025	2,116	1,725
California	[2] 2,406,000	[2] 2,366,000	1,827,000	[2] 2,091,000
Western	2,415,791	2,377,095	1,838,872	2,100,696
United States	2,605,238	2,671,076	2,098,547	2,368,557

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

[2] The totals shown for California include 142,000 tons not harvested in 1927, 153,000 tons not harvested in 1928, and 124,000 tons not harvested in 1930. For grapes by varieties see Table 228.

TABLE 213.—*Grapes: Car-lot shipments, by State of origin, 1920–1930*

State	Crop-movement season [1]										
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York [3]	5, 904	2, 535	7, 720	4, 312	5, 641	3, 763	7, 242	3, 050	3, 752	2, 541	1, 968
Pennsylvania	1, 223	390	1, 558	847	1, 166	589	1, 350	689	1, 076	879	775
Michigan	5, 046	1, 292	6, 020	4, 202	4, 680	398	3, 081	2, 023	1, 571	1, 746	1, 551
Iowa	104	77	237	217	79	50	176	196	234	369	202
Missouri	27	4	128	58	101	166	686	108	415	225	310
Arkansas	14	3	38	33	243	394	1, 170	108	998	510	322
Washington	8	64	47	62	83	191	125	167	235	232	114
California [3]	28, 832	33, 344	43, 952	55, 348	57, 695	76, 066	64, 327	75, 925	73, 157	59, 205	63, 919
Other States	152	108	219	257	245	261	433	411	332	395	257
Total [3]	41, 310	37, 817	59, 919	65, 336	69, 933	81, 878	78, 590	82, 677	81, 770	66, 102	69, 418

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau; from officials and local agents of common carriers throughout the country. Shipments as shown in cart lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from June 1 through December of a given year.
[2] Preliminary.
[3] Figures for certain States include shipments in succeeding crop year as follows: California, 1920, January, 1 car; 1921, January, 2 cars; 1922, January, 7 cars; 1923, January, 13 cars; 1924, January, 6 cars, February, 2 cars; 1925, January, 21 cars; 1926, January, 2 cars; February, 1 car; 1927, January, 7 cars, February, 2 cars; 1928, January, 31 cars; February, 8 cars; March, 1 car; 1929, January, 6 cars.

TABLE 214.—*Grapes, California: Number of packages sold and weighted yearly average price, auction sales in 11 markets,[1] 1925–1930*

Variety	Number of packages (crates and lugs)						Average price per package					
	1925 [2]	1926 [3]	1927 [4]	1928 [5]	1929 [6]	1930 [7]	1925 [2]	1926 [3]	1927 [4]	1928 [5]	1929 [6]	1930 [7]
	Thous.	*Thous.*	*Thous.*	*Thous.*	*Thous.*	*Thous.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Flame Tokay	3, 208	2, 495	2, 785	2, 762	1, 855	2, 489	1. 20	1. 43	1. 40	1. 34	1. 42	1. 15
Malaga	4, 211	3, 737	3, 719	3, 129	2, 027	2, 096	1. 18	1. 21	1. 22	1. 17	1. 37	1. 08
Emperor	445	333	236	103	56	41	1. 02	1. 38	1. 15	1. 15	1. 62	1. 06
Sultanina (Thompson seedless)	4, 025	1, 752	2, 531	2, 484	2, 713	2, 377	1. 14	1. 16	1. 36	1. 05	1. 48	1. 28
Muscat (type)	3, 117	2, 429	4, 660	4, 888	2, 754	2, 455	. 97	1. 02	1. 02	. 81	1. 06	1. 08
Alicante Bouschet	2, 611	3, 167	4, 475	4, 966	4, 759	5, 123	2. 02	1. 65	1. 59	1. 22	1. 29	1. 11
Carignane	795	774	1, 313	1, 711	541	1, 973	1. 48	1. 47	1. 32	1. 06	1. 14	. 97
Cornichon	753	625	575	558	314	267	1. 29	1. 22	1. 17	1. 05	1. 26	. 98
Mataro	340	193	299	320	193	176	1. 68	1. 37	1. 30	. 96	1. 14	1. 13
Mission	1, 039	499	530	585	270	283	1. 12	1. 31	1. 06	. 88	1. 23	. 91
Petit Syrah	220	244	316	365	257	235	1. 41	1. 27	1. 35	. 96	1. 15	1. 11
Zinfandel	1, 385	1, 017	1, 592	1, 680	1, 402	1, 112	1. 54	1. 22	1. 30	1. 00	1. 14	1. 06
Total or average	22, 149	17, 265	23, 031	23, 551	17, 141	18, 628	1. 29	1. 31	1. 30	1. 08	1. 29	1. 11

Bureau of Agricultural Economics. Compiled from daily reports of the fruit and vegetable marke news service. Principal varieties only shown.

[1] Baltimore, Boston, Chicago, Cincinnati, Cleveland, Detroit, Minneapolis, New York, Philadelphia, Pittsburgh, and St. Louis.
[2] Aug. 3 to Nov. 14.
[3] Aug. 5 to Nov. 6.
[4] Aug. 2 to Nov. 12.
[5] July 19 to Nov. 30.
[6] Aug. 5 to Nov. 9.
[7] Aug. 4 to Nov. 8.

TABLE 215.—*Grapes: Average l. c. l. price to jobbers, specified markets, October, 1924–1930*

Year	New York Concord, 12-quart baskets				Michigan Concord, 4-quart baskets		
	Boston	New York	Philadelphia	Pittsburgh	Chicago	Minneapolis	St. Louis
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1924	91	84	90	85	28	-------	30
1925	102	114	104	109	43	46	39
1926	61	62	56	60	18	27	22
1927	56	61	64	64	25	30	27
1928	60	54	49	51	21	26	23
1929	50	54	51	48	20	25	23
1930	57	51	54	48	16	21	21

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets.

TABLE 216.—*Olive oil (including inedible): International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year									
	Average 1909–1913 [1]		1926		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Spain	30	86, 454	9	213, 186	0	122, 251	0	263, 197	[2] 0	[2] 113,251
Italy	[3] 6, 643	75, 130	3, 141	52, 044	1, 220	76, 527	3, 509	29, 698	313	79, 298
Greece	0	22, 272	0	9, 733	0	20, 389	0	20, 211	0	31, 709
Tunis	2, 020	18, 090	613	49, 012	486	56, 707	2, 472	30, 818	[2] 11	[2] 95,803
Algeria	[3] 974	[3] 11,566	139	27, 288	85	13, 190	38	48, 096	162	28, 505
Portugal	[3] 2, 020	[3] 5, 492	[2] 4, 709	[2] 4, 375	[2] 23, 722	3, 409	362	13, 541	2, 246	3, 331
Yugoslavia	(4)	(4)	1, 012	281	559	1, 289	1, 319	1, 120	400	2, 238
Morocco	267	375	279	3, 656	306	142	186	10, 375	417	6, 802
PRINCIPAL IMPORTING COUNTRIES										
United States	39, 903	0	128, 731	0	124, 151	0	131, 214	0	153, 005	0
Argentina [2]	48, 248	0	91, 174	0	77, 066	0	116, 417	0	112, 309	0
France	[3] 42, 502	12, 935	45, 930	11, 670	27, 467	17, 151	40, 286	17, 508	49, 306	14, 295
United Kingdom	22, 950	823	17, 983	325	18, 980	392	20, 727	273	20, 541	338
Cuba	0	0	17, 319	0	12, 919	0	18, 927	0	[2] 16,673	0
Uruguay	4, 249	0	13, 618	0	10, 326	0	16, 577	0	13, 790	0
Chile	7, 255	0	14, 590	0	12, 231	[2] 7	26, 679	[2] 8	7, 796	20
Brazil	8, 409	0	11, 262	0	9, 661	0	20, 005	0	9, 815	0
Macao (Portugese China) [2]	0	0	5, 302	3, 437	5, 280	1, 858	6, 395	838	-------	-------
Norway	3, 458	33	6, 148	0	7, 006	0	7, 163	0	10, 453	0
Palestine	0	0	3, 627	325	4, 421	2, 140	7, 835	479	7, 666	361
Switzerland	4, 138	71	3, 355	0	2, 881	7	3, 734	0	3, 701	0
Egypt	4, 803	0	2, 934	38	1, 911	29	2, 196	35	2, 946	26
Bulgaria	4, 003	7	1, 445	0	1, 031	0	598	0	474	0
Canada	1, 593	0	3, 532	0	4, 448	0	5, 132	0	4, 732	0
Belgium	[3] 4, 295	[3] 582	1, 528	36	796	17	1, 313	47	1, 127	11
Germany	6, 085	0	1, 837	34	2, 438	50	2, 919	55	2, 600	87
Rumania	7, 328	0	1, 901	1	2, 083	4	-------	-------	-------	-------
Australia [2]	510	11	1, 413	1	1, 351	1	1, 841	0	1, 996	0
Peru	[3] 684	[3] 77	1, 238	0	917	0	1, 667	0	1, 528	0
Czechoslovakia	(4)	(4)	966	36	911	62	1, 119	5	1, 069	25
Sweden	889	2	405	5	312	4	453	4	601	2
Japan	126	0	357	0	309	0	-------	-------	-------	-------
Philippine Islands	360	0	348	0	328	0	271	0	346	0
Netherlands	[3] 282	[3] 205	171	5	150	17	209	4	185	3
Denmark	146	0	101	5	209	4	116	7	[2] 194	[2] 6
New Zealand	68	0	136	0	141	0	273	0	166	0
Total, 35 countries	224, 238	234, 125	387, 253	375, 493	356, 102	315, 647	441, 952	436, 319	426, 568	376, 111

Bureau of Agricultural Economics. Official sources except where otherwise noted. Conversions made on the basis of 7.5 pounds to the gallon.

*Preliminary.
[1] International Institute of Agriculture, "Oleaginous Products and Vegetable Oils."
[2] International Yearbook of Agricultural Statistics.
[3] 4-year average.
[4] Figures for pre-war years are included in the countries of the pre-war boundaries.

TABLE 217.—*Peaches: Total production, foreign trade of the United States, and average price per bushel, 1913–1930*

Year	Production	Price per bushel, received by producers [2]	Farm value	Domestic exports, year beginning July 1[1]			
				Fresh	Dried	Canned [3]	Total in terms of fresh
	1,000 bushels	*Dollars*	*1,000 dollars*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 bushels*
1913	39,707				6,712		736
1914	54,109				14,465		1,586
1915	64,097				13,739		1,507
1916	37,505				8,188		898
1917	48,765				5,863		643
1918	33,094	1.62	53,637		4,835		530
1919	*50,686*						
1919	53,178	1.89	100,485		12,756		1,399
1920	45,620	2.10	95,970		3,573		392
1921	32,602	1.59	51,739	[4] 611	6,260		699
1922	55,852	1.34	74,717	13,170	5,586	54,624	3,163
1923	45,382	1.37	62,025	15,065	12,975	50,374	3,835
1924	*47,755*						
1924	53,848	1.26	68,084	16,172	4,668	57,390	3,240
1925	46,562	1.38	64,171	15,749	3,351	83,160	4,161
1926	[5] 69,865	1.00	68,426	14,453	6,968	81,896	4,477
1927	[5] 45,463	1.18	50,494	17,969	6,542	86,634	4,701
1928	[5] 68,369	.99	63,643	22,067	12,436	101,438	6,050
1929	45,789	1.36	62,140	19,973	3,847	74,470	3,915
1930 [6]	[5] 53,286	.90	42,340				

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. Prices based upon return from crop reporters.

[1] Dried peaches converted to terms of fresh on the basis that dried peaches equal 19 per cent of fresh. Canned peaches converted to terms of fresh on the basis that 25 pounds of fresh equal 1 dozen cans of 1 pound each; 48 pounds fresh equals 1 bushel. In practice, 1 bushel of fresh fruit is figured as the equivalent of 2 dozen cans of 1 pound each.

[2] From 1918 to 1922, Sept. 15 price; 1923–1925, Sept. 15 price in North, Aug. 15 price in South; 1926–1930, approximate average price for the season, as reported Dec. 1.

[3] Canned peaches were reported in value only prior to July 1, 1922.

[4] No exports reported prior to Jan. 1, 1922; figures for 1921 represent exports Jan. 1, 1922, to June 30, 1922.

[5] Includes fruit not harvested as follows: 1926, 1,462,000 bushels in Georgia and northern States; 1927, 2,708,000 bushels in California; 1928, 2,917,000 bushels in California and 1,000,000 bushels in Georgia; 1930, 6,376,000 bushels in California. Values are based on the quantity actually harvested.

[6] Preliminary.

TABLE 218.—*Peaches: Production and seasonal form price, by States, 1924–1930*

State and division	Production 1924	1925	1926	1927	1928	1929	1930 [2]	Seasonal farm price per bushel [1] 1924	1925	1926	1927	1928	1929	1930
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New Hampshire	------	34	29	26	25	26	37	-----	2.00	1.50	2.20	2.40	2.00	2.00
Massachusetts	40	218	213	140	189	165	232	2.30	2.50	1.80	2.10	2.30	2.10	1.60
Rhode Island	29	30	37	23	27	25	28	2.30	3.00	1.70	2.10	2.30	2.50	1.80
Connecticut	220	210	255	186	239	177	276	2.10	2.80	1.70	2.20	1.90	2.00	1.30
New York	2,178	1,920	2,300	1,140	2,400	1,470	2,158	1.93	1.90	.90	1.90	1.45	1.80	1.15
New Jersey	2,500	1,740	3,000	2,304	1,625	2,600	1,788	1.79	1.50	.70	1.50	1.35	1.15	1.70
Pennsylvania	1,715	600	2,498	947	1,867	1,157	936	1.91	2.40	1.00	2.00	1.55	1.75	1.70
North Atlantic	6,682	4,752	8,332	4,766	6,372	5,620	5,455	1.88	1.89	.92	1.75	1.50	1.51	1.46
Ohio	800	1,100	2,120	1,326	1,742	494	400	2.05	2.15	1.25	1.95	1.55	1.95	1.95
Indiana	240	320	900	242	605	726	12	2.20	2.30	1.60	2.35	1.60	1.60	2.00
Illinois	700	500	2,660	1,122	1,638	3,600	(3)	2.20	2.50	1.25	2.05	1.40	1.35	1.60
Michigan	464	592	1,564	578	1,156	816	629	2.30	2.20	1.00	2.10	1.55	1.90	1.65
Iowa	3	12	97	65	50	55	7	2.60	2.50	1.60	1.95	1.50	1.50	1.70
Missouri	860	870	1,722	340	655	1,261	24	1.40	1.80	1.25	1.90	1.55	1.40	1.95
Nebraska	2	33	50	82	6	68	31	2.40	2.35	1.50	1.60	2.00	1.65	1.90
Kansas	231	371	266	259	84	385	35	2.00	1.85	1.70	1.75	1.90	1.55	1.75
North Central	3,300	3,798	9,379	4,014	5,936	7,405	1,138	1.96	2.11	1.26	2.00	1.52	1.50	1.78
Delaware	400	155	450	287	100	378	162	1.40	1.55	.85	1.10	1.20	1.10	1.60
Maryland	600	240	700	352	465	532	231	1.36	1.85	.75	1.50	1.30	1.20	1.50
Virginia	1,500	362	1,176	400	880	928	240	1.20	1.90	1.00	1.60	1.40	1.00	1.60
West Virginia	1,000	100	1,000	202	810	580	122	1.60	2.20	1.25	2.10	1.50	1.55	1.80
North Carolina	2,500	1,500	2,250	1,300	2,590	1,400	1,800	1.28	1.60	.90	1.70	1.15	1.40	1.35
South Carolina	800	740	1,054	615	1,363	552	952	1.16	1.35	1.00	1.50	1.10	1.35	1.35
Georgia	8,342	7,304	9,400	5,943	10,000	2,880	4,698	1.01	1.40	.80	1.35	.90	1.15	1.15
Florida	127	115	125	69	112	94	102	1.70	1.65	1.60	1.75	1.35	1.70	1.20
South Atlantic	15,269	10,516	16,155	9,168	16,320	7,344	8,307	1.15	1.46	.88	1.44	.97	1.23	1.26
Kentucky	1,250	570	1,110	180	1,035	600	75	1.45	1.75	1.30	1.90	1.25	1.45	1.75
Tennessee	2,450	1,415	1,860	638	2,190	1,225	630	1.30	1.55	1.05	1.70	1.10	1.25	1.35
Alabama	1,230	1,312	1,159	540	1,350	504	1,105	1.17	1.60	1.10	1.50	1.10	1.30	1.20
Mississippi	700	712	551	279	635	444	490	1.79	1.55	1.40	1.65	1.45	1.50	1.45
Arkansas	2,700	2,200	2,400	1,628	3,000	2,635	84	1.02	1.50	1.05	1.40	1.20	1.20	1.60
Louisiana	230	275	228	86	211	154	112	1.80	2.00	1.50	1.80	1.60	1.70	1.75
Oklahoma	1,861	950	180	760	480	1,100	80	1.02	1.33	1.30	1.30	1.30	1.00	1.30
Texas	1,900	1,750	2,310	800	1,612	1,953	750	1.48	1.50	1.10	1.60	1.30	1.25	1.40
South Central	12,321	9,184	9,798	4,911	10,513	8,615	3,326	1.26	1.54	1.13	1.51	1.21	1.24	1.35
Idaho	102	23	297	144	335	288	32	2.00	1.90	1.00	1.60	1.05	1.35	2.00
Colorado	920	450	976	892	650	1,000	817	1.60	1.90	1.10	1.20	1.20	1.45	1.45
New Mexico	62	156	131	40	46	94	51	1.90	1.75	1.80	2.20	1.95	1.80	1.90
Arizona	40	65	91	55	66	60	88	2.00	1.70	1.70	2.30	2.00	1.80	1.80
Utah	750	100	550	561	612	542	335	1.50	2.00	.90	1.20	.95	1.00	1.35
Nevada	2	8	8	2	5	5	6	1.75	2.25	1.50	2.30	2.00	2.25	2.00
Washington	460	870	1,222	250	1,470	1,250	615	2.40	1.85	.90	1.75	1.00	1.35	1.35
Oregon	189	222	384	160	292	232	280	1.50	1.80	1.20	1.60	1.40	1.70	1.15
California	13,751	16,418	22,542	20,500	25,752	13,334	32,836	.84	.86	.94	.60	.55	1.36	.54
Western	16,276	18,312	26,201	22,604	29,228	16,805	35,060	.98	.96	.95	.68	.56	1.36	.61
United States	53,848	46,562	[4] 69,865	[4] 45,463	[4] 68,369	45,789	[4] 53,286	1.26	1.38	1.00	1.18	.99	1.36	.90

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] From 1924–1925, Sept. 15 price in North, Aug. 15 price in South; 1926–1930, approximate average price for the season as reported Dec. 1.
[2] Preliminary.
[3] Too small to estimate.
[4] Includes fruit not harvested as follows: 1926, 1,462,000 bushels in Georgia and Northern States; 1927, 2,708,000 bushels in California; 1928, 2,917,000 bushels in California and 1,000,000 bushels in Georgia; 1930, 6,376,000 bushels in California. Values are based on the quantity actually harvested.

TABLE 219.—*Peaches: Car-lot shipments by State of origin, 1928–1930*

State and year	Crop movement season [1]						
	May	June	July	August	September	October	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York:							
1928				5	1,389	350	1,744
1929				2	804	59	865
1930 [2]				7	2,185	135	2,327
New Jersey:							
1928				15	26		41
1929			14	474	56		544
1930 [2]				6	5		11
Illinois:							
1928			24	1,942	9		1,975
1929		11	51	4,568	7		4,637
1930 [3]							
Michigan:							
1928				3	474	37	514
1929					312		312
1930 [2]				11	170		181
North Carolina:							
1928		57	1,032	2,153			3,242
1929	4	31	1,198	17			1,250
1930 [2]	2	48	1,824	265			2,139
Georgia:							
1928	3	1,492	11,986	2,445			15,926
1929	95	2,088	3,102	13			5,298
1930 [2]	12	2,280	6,012	371			8,675
Tennessee:							
1928			26	2,051			2,077
1929			873	271			1,144
1930 [2]			78	178			256
Arkansas:							
1928		1	2,419	1,590			4,010
1929		3	2,443	233			2,679
1930 [2]		2	36	3			41
Texas:							
1928			240	38			278
1929		12	548	9			569
1930 [2]		4	17				21
Colorado:							
1928				498	618	1	1,117
1929				42	1,711	12	1,765
1930 [2]				1,112	249	4	1,365
Utah:							
1928				26	667	1	694
1929				4	546		550
1930 [2]		1		254	97		352
Washington:							
1928			6	693	1,020	22	1,741
1929				186	1,347	21	1,554
1930 [2]			1	153	450		604
California:							
1928	9	114	6,669	9,640	3,157		19,589
1929	5	130	1,370	4,912	3,241	122	9,780
1930 [2]	4	126	4,347	12,755	3,848	3	21,083
Other States:							
1928		91	720	1,720	1,442	51	4,024
1929	2	99	830	3,281	284	8	4,504
1930 [2]		45	621	485	324	6	1,481
Total:							
1921	1,325	4,005	9,544	7,381	5,035	44	27,334
1922	695	3,189	7,598	11,928	13,779	1,216	38,405
1923	1	2,384	10,963	9,757	9,654	766	33,525
1924	28	1,873	14,603	13,781	7,889	[4] 1,323	39,497
1925	328	4,951	17,932	9,921	7,420	306	40,858
1926	52	2,209	21,793	24,538	8,847	[5] 1,026	58,465
1927	267	5,638	12,675	13,217	9,739	178	41,714
1928	12	1,755	23,122	22,819	8,802	462	56,972
1929	106	2,374	10,429	14,012	8,308	222	35,451
1930 [2]	18	2,506	12,936	15,600	7,328	148	38,536

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat educed to car-lots basis. See 1927 Yearbook, p. 855, for data for earlier years.

[1] Crop movement season extends from May 1 through October of a given year.
[2] Preliminary.
[3] No shipments in 1930 because of frost killing.
[4] Includes 1 car in November.
[5] Includes 5 cars in November.

TABLE 220.—*Peaches: Average l. c. l. price to jobbers, New York and Chicago, 1921–1930* [1]

Market, and season beginning May	6-basket carrier			Bushel basket				
	June	July	August	June	July	August	September	October
New York:	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1921	3.34	3.04	5.00	----------	2.62	----------	----------	----------
1922	3.05	2.57	2.16	----------	2.29	1.90	1.78	1.43
1923	3.31	2.10	2.03	----------	2.18	2.16	2.48	1.94
1924	2.97	2.25	2.31	----------	1.74	2.18	2.09	2.46
1925	3.43	2.24	2.23	3.38	2.22	2.18	2.74	2.46
1926	3.14	1.79	1.28	3.05	1.74	1.48	1.26	1.17
1927	3.22	2.59	2.65	3.10	2.80	2.94	2.19	2.59
1928	3.48	2.17	1.62	3.61	2.01	1.69	2.05	1.74
1929	3.86	3.45	2.70	3.85	2.95	2.56	2.52	----------
1930	3.58	3.22	2.62	4.08	2.94	2.63	2.10	----------
Chicago:								
1921	2.47	2.95	4.23	2.74	3.20	----------	----------	----------
1922	2.72	2.65	----------	2.76	2.51	1.91	1.70	1.38
1923	2.79	2.39	2.56	----------	2.76	3.06	2.11	2.25
1924	1.98	1.88	2.07	1.84	1.86	2.30	2.91	2.17
1925	3.11	2.35	3.01	3.08	2.45	3.16	2.72	2.38
1926	3.02	1.96	1.53	2.44	2.02	1.79	1.76	1.44
1927	2.30	2.32	----------	2.35	2.66	2.81	2.30	----------
1928	3.40	2.09	1.44	----------	2.18	1.94	2.15	2.11
1929	4.08	3.45	----------	----------	2.93	2.05	2.31	----------
1930	3.55	3.18	2.45	2.97	3.04	3.02	2.34	----------

Bureau of Agricultural Economcis. Compiled from daily market reports from bureau resprentatives in the various markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices.

[1] Commodity reports were issued for season as follows: 1921, June 3–Aug. 9; 1922, May 25–Oct. 11; 1923, June 5–Oct. 13; 1924, June 3–Oct. 13; 1925, June 1–Oct. 3; 1926, June 7–Oct. 21; 1927, June 11–Oct. 12; 1928, June 20–Oct. 15; 1929, June 7–Oct. 5; 1930, June 2–Oct. 3.

TABLE 221.—*Pears: Total production, foreign trade of the United States, and average price per bushel, 1913–1930*

Year	Production	Price per bushel received by producers [2]	Farm value	Domestic exports, year beginning July [1]			
				Fresh [3]	Canned [3]	Dried	Total in terms of fresh
	1,000 bushels	*Dollars*	*1,000 dollars*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 bushels*
1913	10,108	----------	----------	----------	----------	----------	----------
1914	12,086	----------	----------	----------	----------	----------	----------
1915	11,216	----------	----------	----------	----------	----------	----------
1916	11,874	----------	----------	----------	----------	----------	----------
1917	13,281	----------	----------	----------	----------	----------	----------
1918	13,362	1.38	18,419	----------	----------	----------	----------
1919	*14,204*	----------	----------	----------	----------	----------	----------
1919	15,006	1.84	27,614	----------	----------	----------	----------
1920	16,805	1.66	27,865	----------	----------	----------	----------
1921	11,297	1.71	19,268	----------	----------	----------	----------
1922	20,705	1.06	21,943	36,785	49,358	----------	2,823
1923	17,845	1.21	21,570	50,237	38,431	----------	2,648
1924	18,866	1.42	26,689	41,452	53,851	----------	3,107
1925	20,720	1.40	29,066	71,205	75,876	----------	4,645
1926	25,249	.89	22,399	73,877	66,104	----------	4,293
1927	18,373	1.32	24,298	51,056	52,671	----------	3,258
1928	24,212	1.02	24,663	82,847	82,652	[4] 2,626	5,388
1929	22,063	1.43	31,588	62,024	54,709	3,655	3,876
1930 [5]	25,703	.76	19,611	----------	----------	----------	----------

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. Prices are based upon returns from crop reporters.

[1] Canned pears converted to terms of fresh on the basis that 1 pound canned fruit is equivalent to 2 pounds fresh; dried pears converted to terms of fresh on the basis that dried pears equal 25 per cent of fresh; 48 pounds fresh equals 1 bushel. No imports of pears reported.
[2] From 1918 to 1925, Nov. 15 price; 1926 to 1930 approximate average price for the season, as reported Dec. 1.
[3] Exports were reported in value only, prior to July 1, 1922.
[4] January–June, 1929. Not previously reported.
[5] Preliminary.

TABLE 222.—*Pears: Production and seasonal farm price, by States, 1924–1930*

State and division	Production							Seasonal farm price per bushel [1]						
	1924	1925	1926	1927	1928	1929	1930 [2]	1924	1925	1926	1927	1928	1929	1930
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	12	13	6	13	10	13	10	1.50	1.90	1.50	1.70	1.50	1.85	1.70
New Hampshire	17	19	10	14	9	15	15	1.50	1.58	1.65	1.70	1.70	1.60	1.50
Vermont	12	12	6	12	6	12	10	1.50	1.62	2.00	2.15	2.10	1.95	1.60
Massachusetts	84	90	60	81	56	74	93	1.70	1.65	1.80	1.75	1.70	1.80	1.20
Rhode Island	12	13	12	12	7	11	13	1.70	1.75	1.60	1.80	1.80	2.00	1.25
Connecticut	62	60	57	54	42	52	69	1.65	2.00	1.90	2.00	1.60	2.00	1.15
New York	2,100	3,045	2,088	1,872	1,800	1,152	3,168	1.45	1.55	1.25	1.50	1.45	1.85	.90
New Jersey	624	512	645	420	502	338	488	1.05	1.70	.65	1.00	1.00	1.60	.90
Pennsylvania	629	468	748	400	620	272	620	1.29	1.55	1.15	1.50	1.20	1.55	1.10
North Atlantic	3,552	4,232	3,632	2,878	3,052	1,939	4,486	1.36	1.58	1.15	1.45	1.34	1.77	.94
Ohio	326	354	430	250	395	175	190	1.20	1.25	.85	1.25	.90	1.40	1.15
Indiana	180	209	328	140	288	209	136	.92	1.00	.65	1.05	.75	.85	.90
Illinois	500	540	818	312	540	711	315	1.01	1.20	.75	1.10	.85	.90	.95
Michigan	810	450	889	702	819	468	805	1.10	1.15	.80	1.25	.95	1.35	1.05
Wisconsin	15	15	----	----	----	----	----	1.50	1.50	----	----	----	----	----
Iowa	40	45	68	41	47	52	33	1.80	1.70	1.20	1.50	1.20	1.35	1.45
Missouri	375	342	473	270	171	445	177	1.06	1.20	.80	1.15	1.15	.95	1.10
Nebraska	30	18	29	36	12	40	27	2.20	2.00	1.60	1.60	1.90	1.50	1.55
Kansas	262	165	186	258	51	234	108	1.15	1.50	1.25	1.10	1.40	1.10	1.15
North Central	2,538	2,138	3,221	2,009	2,323	2,334	1,791	1.11	1.22	.82	1.19	.93	1.07	1.06
Delaware	328	180	388	128	108	248	142	.90	1.00	.40	.60	.60	.50	.55
Maryland	335	280	394	193	193	254	180	.82	1.00	.55	.90	.90	.80	.85
Virginia	430	135	410	130	230	330	80	.76	1.30	.80	1.15	1.05	.90	1.35
West Virginia	84	34	100	12	63	49	15	1.39	1.70	1.15	1.65	1.25	1.40	1.70
North Carolina	273	158	270	100	234	205	115	1.41	1.70	1.15	1.35	1.10	1.20	1.30
South Carolina	114	87	133	68	133	104	102	1.42	1.50	1.20	1.30	1.10	1.25	1.15
Georgia	232	155	257	104	245	174	174	1.27	1.50	1.05	1.35	1.00	1.05	1.05
Florida	55	54	66	44	52	51	56	1.50	1.25	1.25	1.15	.95	1.05	1.05
South Atlantic	1,851	1,083	2,018	779	1,258	1,415	864	1.05	1.29	.81	1.07	1.00	.92	1.01
Kentucky	117	85	144	34	116	129	29	1.42	1.35	.95	1.45	1.10	1.00	1.35
Tennessee	250	148	266	125	255	242	124	1.23	1.50	1.05	1.45	1.05	1.05	1.15
Alabama	224	157	211	83	234	142	200	1.28	1.40	.90	1.30	1.10	1.15	1.00
Mississippi	187	189	189	120	194	132	162	1.50	1.30	1.15	1.10	1.10	1.05	.95
Arkansas	124	89	116	70	102	104	65	1.25	1.45	1.15	1.30	1.20	1.20	1.30
Louisiana	65	74	71	50	69	59	57	1.90	1.45	1.30	1.40	1.35	1.35	1.30
Oklahoma	235	146	81	130	72	190	40	1.19	1.60	1.40	1.30	1.30	1.05	1.20
Texas	483	386	580	345	390	455	350	1.21	1.35	.90	1.25	1.25	1.00	1.10
South Central	1,685	1,274	1,658	957	1,432	1,453	1,027	1.30	1.41	1.02	1.29	1.16	1.06	1.10
Idaho	60	39	68	56	72	53	66	1.65	2.10	1.50	1.60	1.35	1.70	1.30
Colorado	550	510	564	480	185	650	173	1.40	1.15	.65	1.40	1.05	1.50	1.30
New Mexico	28	56	42	28	27	63	30	1.75	1.70	1.50	1.70	1.55	1.40	1.45
Arizona	11	14	15	12	15	16	14	2.00	2.20	2.50	2.50	2.50	2.45	2.10
Utah	70	25	80	60	87	70	87	1.88	1.75	1.10	1.70	1.40	1.50	1.25
Nevada	4	7	6	2	6	3	6	2.00	2.00	2.00	2.50	2.50	2.55	2.20
Washington	1,750	2,300	3,220	1,670	3,700	3,400	4,500	1.65	1.70	.80	1.35	1.05	1.35	.75
Oregon	1,225	1,500	2,100	1,900	2,700	2,750	3,200	1.70	1.60	.85	1.40	1.00	1.40	.75
California	5,542	7,542	8,625	7,542	9,355	7,917	9,459	1.60	1.25	.84	1.30	.90	1.65	.55
Western	9,240	11,993	14,720	11,750	16,147	14,922	17,535	1.61	1.38	.83	1.33	.96	1.53	.66
United States	18,866	20,720	25,249	18,373	24,212	22,063	25,703	1.42	1.40	.89	1.32	1.02	1.43	.76

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] From 1924–25, Nov. 15 price; 1926–1930, approximate average price for the season as reported Dec. 1.
[2] Preliminary.

TABLE 223.—*Pears: Car-lot shipments, by State of origin, 1920–21 to 1929–30*

State	Crop-movement season [1]									
	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	3, 979	2, 893	5, 461	1, 701	2, 978	4, 510	2, 263	1, 694	1, 590	547
New Jersey	74	23	40	76	60	52	47	19	16	4
Ohio	64	17	96	33	47	62	100	130	104	33
Indiana	71		44	39	61	59	44	39	31	73
Illinois	1, 179	33	468	318	595	614	858	228	370	787
Michigan	1, 264	653	1, 860	543	394	151	457	536	449	147
Delaware	290		151	541	273	128	249	49	1	20
Maryland	54	3	36	63	30	29	33	32	27	42
Texas	98	115	50	99	129	121	144	213	39	231
Colorado	654	745	774	696	955	717	750	737	264	1, 082
Utah	88	33	82	65	81	29	77	34	49	47
Washington	1, 902	2, 903	2, 678	4, 274	2, 456	3, 560	5, 278	2, 589	5, 868	4, 035
Oregon	1, 006	985	1, 862	2, 575	1, 483	2, 225	2, 909	2, 977	4, 437	4, 211
California	5, 016	4, 500	6, 465	7, 143	6, 312	8, 718	11, 673	9, 215	11, 003	9, 466
Other States	202	150	314	423	392	282	327	252	186	399
Total	15, 941	13, 053	20, 381	18, 589	16, 246	21, 257	25, 209	18, 744	24, 434	24, 148

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from June of one year through May of the following year.
[2] Preliminary.

TABLE 224.—*Pears: Estimated average price per bushel received by producers, United States, 1921–1930*

Year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average	Year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*		*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	165. 2	175. 1	186. 4	194. 9	198. 7	172. 2	1926	137. 5	119. 2	117. 2	105. 6	97. 1	127. 0
1922	147. 1		116. 2	119. 8	118. 7	139. 7	1927	141. 3	140. 5	150. 9	156. 6	163. 1	142. 7
1923	168. 3	172. 5	165. 1	150. 2	133. 0	165. 5	1928	128. 6	124. 6	134. 0	125. 2	146. 7	126. 4
1924	175. 2	157. 8	155. 0	141. 0		165. 4	1929	170. 3	166. 7	160. 0	146. 0	159. 2	167. 0
1925	172. 6	165. 2	164. 2	149. 7	162. 6	168. 2	1930	101. 1	86. 0	95. 6	92. 3	95. 8	94. 5

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of pears for each State; yearly price obtained by weighing monthly prices by car-lot shipments. For previous data see 1930 or earlier Yearbooks.

TABLE 225.—*Strawberries, commercial crop: Acreage, production, and price per quart, by States, 1927–1930*

Group and State	Acreage				Production [1]				Seasonal farm price per quart			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
Early:	*Acres*	*Acres*	*Acres*	*Acres*	*1,000 quarts* [2]	*1,000 quarts* [2]	*1,000 quarts* [2]	*1,000 quarts* [2]	*Cents*	*Cents*	*Cents*	*Cents*
Alabama	4, 520	5, 380	6, 820	6, 930	7, 924	11, 836	12, 481	7, 207	15	16	10	13
Florida	3, 680	3, 670	5, 640	8, 100	6, 900	5, 138	12, 408	14, 175	29	35	22	28
Louisiana	21, 100	23, 200	24, 360	24, 600	16, 711	33, 083	34, 104	28, 290	23	23	21	23
Mississippi	600	1, 000	1, 080	1, 240	960	1, 500	1, 750	1, 209	20	18	14	11
Texas	1, 200	1, 600	3, 160	2, 030	2, 520	2, 448	2, 891	1, 756	22	20	12	18
Group total	31, 100	34, 850	41, 060	42, 900	35, 015	54, 005	63, 634	52, 637	22. 2	22. 3	18. 4	22. 5
Second early:												
Arkansas	17, 000	21, 600	20, 100	15, 300	19, 958	21, 773	24, 723	11, 169	11	10	11	15
California (Southern district)	1, 620	1, 600	1, 280	1, 400	8, 664	8, 320	6, 400	7, 144	24	17	18	16
Georgia	170	170	170	140	245	265	255	154	13	12	12	11
North Carolina	5, 800	7, 120	6, 600	5, 100	16, 658	19, 224	15, 840	9, 792	16	12	13	12
South Carolina	300	300	460	360	528	720	690	576	15	12	14	12
Tennessee	17, 240	18, 080	16, 810	12, 600	28, 136	24, 372	25, 887	14, 818	11	08	10	13
Virginia	9, 420	9, 980	8, 980	7, 900	22, 796	23, 453	16, 433	9, 559	14	10	11	11
Group total	51, 550	58, 850	54, 400	42, 800	96, 985	98, 127	90, 228	53, 212	13. 8	10. 5	11. 6	13. 3
Intermediate:												
California (other)	2, 130	2, 150	2, 280	2, 250	9, 419	8, 925	7, 820	11, 614	22	15	16	15
Delaware	4, 000	4, 930	4, 830	4, 100	9, 600	12, 719	11, 302	5, 822	11	08	11	12
Illinois	4, 280	4, 700	4, 790	4, 070	3, 595	6, 228	6, 802	4, 477	12	12	09	15
Kansas	960	960	960	860	2, 304	461	1, 536	834	15	14	10	15
Kentucky	8, 420	8, 720	6, 240	4, 250	9, 767	12, 426	10, 608	5, 100	16	10	11	18
Maryland	12, 780	13, 800	11, 750	9, 400	28, 666	22, 080	21, 738	15, 510	12	07	11	12
Missouri	27. 000	26, 490	21, 990	15, 000	25, 758	28, 212	28, 587	11, 880	15	11	11	19
New Jersey	6, 600	6, 000	5, 000	4, 500	14, 784	13, 056	9, 440	7, 344	12	10	10	16
Oklahoma	-------	1, 550	1, 900	1, 400	-------	1, 240	1, 824	910	------	08	10	14
Group total	66, 170	69, 300	59, 740	45, 830	103, 893	105, 347	99, 657	63, 491	14. 0	9. 9	11. 1	15. 1
Late:												
Indiana	1, 650	1, 680	1, 510	1, 540	2, 053	3, 276	2, 869	1, 386	14	10	13	16
Iowa	2, 560	2, 560	2, 690	2, 770	4, 915	3, 072	4, 170	3, 944	18	15	18	19
Michigan	6, 480	6, 090	6, 940	7, 220	12, 843	9, 013	8, 606	10, 830	15	15	18	19
New York	4, 570	4, 480	4, 300	4, 390	13, 308	7, 840	9, 073	9, 219	18	17	17	19
Ohio	3, 780	3, 700	4, 370	4, 280	5, 795	5, 920	7, 342	3, 638	16	18	13	19
Oregon	8, 400	10, 000	10, 500	9, 450	14, 280	17, 000	15, 225	12, 285	14	13	11	14
Pennsylvania	3, 260	3, 190	2, 870	2, 900	6, 650	8, 358	6, 199	4, 930	15	14	14	16
Utah	1, 300	1, 400	1, 300	1, 300	2, 544	2, 800	2, 080	2, 106	12	12	12	12
Washington	7, 670	8, 900	7, 900	7, 500	17, 411	16, 821	12, 758	8, 250	12	17	12	15
Wisconsin	2, 760	2, 840	2, 840	2, 840	5, 299	3, 096	6, 134	3, 408	15	21	15	20
Group total	42, 430	44, 840	45, 220	44, 190	85, 098	77, 196	74, 456	59, 996	15. 0	15. 2	13. 6	16. 9
Grand total	191, 250	207, 840	200, 420	175, 720	320, 991	334, 675	327, 975	229, 336	14. 8	13. 3	13. 3	16. 8

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Includes undetermined quantities used for canning, cold pack, etc.
[2] Quarts containing approximately 1½ pounds.

TABLE 226.—*Strawberries: Car-lot shipments, by State of origin, 1920–1930*

Group and State	Calendar year										
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930[1]
Early:	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Alabama	139	285	460	693	408	421	440	901	1,021	1,354	771
Florida[2]	182	150	322	1,035	580	678	341	618	545	1,633	1,721
Louisiana	626	1,525	1,576	1,678	1,865	1,076	2,342	1,659	2,850	2,859	2,388
Mississippi	16	38	89	141	108	54	53	65	88	115	68
Texas	2	2	9	59	76	21	45	126	148	253	92
Second early:											
Arkansas	650	1,087	2,165	1,342	1,613	993	1,375	2,049	2,046	2,488	686
California, southern district	------	------	20	------	7	5	------	35	18	10	16
North Carolina	363	503	1,101	1,668	2,046	1,634	1,253	2,202	2,151	1,483	756
South Carolina	------	------	8	60	70	44	22	33	71	30	9
Tennessee	1,150	1,839	3,634	3,279	2,902	1,637	1,253	2,425	2,180	2,151	1,166
Virginia	270	679	1,691	1,193	1,919	1,249	1,136	1,104	984	849	332
Other States	------	------	3	27	26	20	7	20	23	17	9
Intermediate:											
California, other	[3] 258	[3] 292	181	[3] 226	184	125	104	147	141	162	203
Delaware	652	866	940	924	1,307	472	671	915	621	418	203
Illinois	112	73	260	224	367	295	247	176	324	273	163
Indiana	65	25	51	26	24	29	52	44	126	105	32
Iowa	43	20	73	82	113	37	49	41	19	52	48
Kansas	------	------	8	19	40	20	1	57	2	63	29
Kentucky	265	395	772	827	467	312	581	976	1,078	851	404
Maryland	793	1,132	1,634	1,916	2,155	1,092	1,394	1,515	980	734	416
Missouri	245	451	1,963	872	990	1,497	1,435	1,986	2,637	2,062	770
New Jersey	363	363	274	187	402	126	207	134	186	176	106
Other States	------	------	14	3	------	2	------	33	46	111	39
Late:											
Michigan	446	454	640	408	554	39	155	114	61	79	57
New York	257	243	325	301	345	200	238	189	70	55	31
Ohio	5	19	25	8	11	------	------	2	------	3	------
Oregon	103	116	141	115	39	57	39	110	99	103	35
Pennsylvania	18	5	9	9	27	------	9	5	------	------	------
Utah	------	3	13	23	------	------	------	------	1	2	------
Washington	22	140	188	177	39	42	17	93	106	61	13
Wisconsin	80	52	84	151	183	27	40	31	39	26	7
Other States	74	108	88	128	99	52	111	88	54	48	50
Total	7,199	10,865	18,761	17,801	18,966	12,256	13,617	17,893	18,715	18,626	10,620

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Preliminary.
[2] Figures for Florida include shipments in December of preceding year as follows: 1921, 8 cars; 1924, 3 cars; 1925, 10 cars; 1927, 2 cars; 1929, 1 car; 1930, 107 cars.
[3] Not reported by separate divisions.

TABLE 227.—*Strawberries: Average l. c. l. price per quart to jobbers, New York and Chicago, 1919–1930* [1]

Season beginning March	New York				Chicago			
	March	April	May	June	March	April	May	June
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1919	---------	38	29	24	---------	33	25	24
1920	---------	43	35	31	---------	34	32	27
1921	47	41	27	20	31	37	24	14
1922	60	37	21	16	45	29	14	12
1923	65	43	20	18	45	41	20	15
1924	---------	41	20	13	---------	46	22	17
1925	42	37	21	23	50	43	21	25
1926	---------	51	26	21	---------	42	27	17
1927	40	37	18	17	37	32	16	19
1928	50	36	20	10	51	35	27	12
1929	38	28	13	---------	46	26	16	---------
1930	36	39	20	17	39	36	20	20

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices. In some cases conversions have been made from larger to smaller units or vice versa in order to obtain comparability.

[1] Commodity reports were issued for season as follows: 1919, Apr. 7–June 20; 1920, Apr. 12–June 10; 1921, Mar. 17–June 3; 1922, Mar. 23–June 6; 1923, Mar. 28–June 13; 1924, Mar. 31–June 17; 1925, Mar. 19–June 9; 1926, Mar. 29–June 19; 1927, Mar. 7–June 20; 1928, Feb. 27–June 12; 1929, Apr. 1–June 7; 1930, Mar. 27–June 12. Quotations for March, 1929, and 1930, taken from miscellaneous reports.

TABLE 228.—*Fruits and nuts: Production and value in California, 1921–1930*

Crop and year	Production	Farm value, Dec. 1	
		Per unit [1]	Total
	Tons	*Dollars*	*1,000 dollars*
Almonds:			
1921	6,000	320.00	1,920
1922	8,500	290.00	2,465
1923	11,000	260.00	2,860
1924	8,000	300.00	2,400
1925	7,500	400.00	3,000
1926	16,000	300.00	4,800
1927	12,000	320.00	3,840
1928	14,000	340.00	4,760
1929	4,600	480.00	2,208
1930	13,500	200.00	2,700
Apricots: [2]			
1921	100,000	50.00	5,000
1922	145,000	70.00	10,150
1923	210,000	25.00	5,250
1924	142,000	46.00	6,532
1925	150,000	54.00	8,100
1926	176,000	63.00	11,088
1927	208,000	57.00	11,856
1928	175,000	50.00	8,750
1929	215,000	63.00	13,545
1930	203,000	39.00	7,215
Avocados:			
1924	129	720.00	93
1925	233	540.00	126
1926	625	400.00	250
1927	319	707.00	226
1928	1,125	330.00	371
1929	396	658.00	261
1930	2,000	200.00	400
Cherries:			
1921	13,000	125.00	1,625
1922	14,000	180.00	2,520
1923	17,000	160.00	2,720
1924	13,500	140.00	1,890
1925	12,000	160.00	1,920
1926	20,000	180.00	3,600
1927	12,000	180.00	2,160
1928	18,500	150.00	2,775
1929	17,000	190.00	3,230
1930	18,000	148.00	2,664
Dates:			
1924	214	360.00	77
1925	340	282.00	96
1926	522	342.00	179
1927	710	302.00	214
1928	817	262.00	214
1929	865	222.00	192
1930	1,560	222.00	346
Figs, dried:			
1921	9,600	145.00	1,392
1922	11,000	120.00	1,320
1923	9,500	90.00	855
1924	8,500	100.00	850
1925	9,600	110.00	1,056
1926	11,350	95.00	1,078
1927	12,000	45.00	540
1928	11,500	45.00	518
1929	15,000	90.00	1,350
1930	15,000	48.00	720
Figs (marketed fresh and canend):			
1924	2,135	104.00	222
1925	3,075	100.00	308
1926	5,100	112.00	571
1927	5,400	100.00	540
1928	6,130	87.00	533
1929	6,700	100.00	670
1930	6,500	90.00	585

Crop and year	Production	Farm value, Dec. 1	
		Per unit [1]	Total
Grapes:			
Table varieties [2]—	*Tons*	*Dollars*	*1,000 dollars*
1921	163,000	80.00	13,040
1922	213,000	60.00	12,780
1923	312,000	40.00	12,480
1924	325,000	40.00	13,000
1925	477,000	20.00	6,780
1926	398,000	25.00	9,575
1927	490,000	26.00	9,048
1928	478,000	26.00	10,478
1929	312,000	35.00	10,920
1930	418,000	21.13	6,635
Wine varieties [2]—			
1921	310,000	82.00	25,420
1922	450,000	65.00	29,250
1923	428,000	40.00	17,120
1924	350,000	63.00	22,050
1925	395,000	60.00	23,700
1926	414,000	45.00	18,630
1927	473,000	45.00	21,285
1928	482,000	25.00	11,600
1929	417,000	35.00	14,595
1930	451,000	19.40	8,361
Raisins [3]—			
1921	145,000	190.00	27,550
1922	237,000	105.00	24,885
1923	290,000	45.00	13,050
1924	170,000	70.00	11,900
1925	200,000	80.00	16,000
1926	272,000	70.00	19,040
1927	285,000	60.00	17,100
1928	261,000	40.00	10,440
1929	215,000	61.00	13,115
1930	168,000	59.00	9,912
Raisin varieties for fresh market [2] [4]—			
1923	130,000	20.00	2,600
1924	180,000	20.00	3,600
1925	378,000	20.00	7,560
1926	229,000	20.00	4,580
1927	303,000	23.00	6,969
1928	362,000	10.00	3,020
1929	238,000	20.00	4,760
1930	550,000	11.65	6,408
Olives:			
1921	8,200	90.00	738
1922	10,000	125.00	1,250
1923	17,000	65.00	1,105
1924	6,500	92.00	598
1925	14,000	60.00	840
1926	12,000	80.00	960
1927	21,500	80.00	1,720
1928	23,900	80.00	1,912
1929	21,000	75.00	1,575
1930	20,000	70.00	1,400
Peaches:			
Clingstone varieties [2]—			
1924	125,000	----	----
1925	215,000	----	----
1926	327,000	----	----
1927	322,000	22.50	5,783
1928	414,000	21.70	7,459
1929	179,000	68.30	12,226
1930	577,000	20.00	8,480

[1] For products largely marketed by Dec. 1, prices represent approximate seasonal averages to that date.
[2] Includes some fruit not harvested on account of market conditions (but not included in computing value), as follows: Apricots, 1930—18,000 tons; peaches, clingstone, 1927—65,000 tons, 1928—70,000 tons, 1930—153,000 tons; grapes, table varieties, 1925—100,000 tons, 1926—15,000 tons, 1927—142,000 tons, 1928—75,000 tons, 1930—104,000 tons; grapes, wine varieties, 1928—18,000 tons, 1930—20,000 tons; grapes, raisin varieties for fresh market, 1925—38,000 tons, 1928—60,000 tons.
[3] Dried basis. To calculate the approximate quantity of fresh grapes used for raisins multiply the production of raisins by 4.
[4] For years prior to 1923 the quantity of raisins marketed fresh was small and has been included with other table grapes.

TABLE 228.—*Fruits and nuts: Production and value in California, 1921–1930*—Continued

Crop and year	Production	Farm value, Dec. 1	
		Per unit [1]	Total
Peaches—Contd.			
Freestone varieties—	*Tons*	*Dollars*	*1,000 dollars*
1924	205,000		
1925	179,000		
1926	214,000		
1927	170,000	28.80	4,896
1928	204,000	25.00	5,100
1929	141,000	41.50	5,852
1930	211,000	27.50	5,802
Persimmons:			
1924	450	176.00	79
1925	729	96.00	70
1926	404	124.00	50
1927	1,024	130.00	133
1928	2,239	40.00	90
1929	2,862	70.00	200
1930	3,553	44.00	156
Plums: [5]			
1921	42,000	53.00	2,226
1922	48,000	50.00	2,400
1923	69,000	30.00	2,070
1924	39,000	45.00	1,755
1925	51,000	40.00	2,040
1926	71,000	25.00	1,775
1927	57,000	45.00	2,565
1928	66,000	37.00	2,442
1929	40,000	90.00	3,600
1930	79,000	35.00	2,765
Pomegranates:			
1924	1,800	41.00	74
1925	2,100	28.00	59
1926	3,300	18.00	59
1927	2,200	40.00	88
1928	2,800	20.00	56
1929	2,000	45.00	90
1930	2,900	20.00	58
Prunes: [6]			
1921	100,000	130.00	13,000
1922	110,000	140.00	15,400
1923	130,000	100.00	13,000
1924	139,000	110.00	15,290
1925	146,000	110.00	16,060
1926	150,000	100.00	15,000
1927	225,000	70.00	15,750
1928	220,300	100.00	22,030
1929	103,000	155.00	15,965
1930	225,000	55.00	12,375

Crop and year	Production	Farm value, Dec. 1	
		Per unit [1]	Total
Walnuts, English:	*Tons*	*Dollars*	*1,000 dollars*
1921	19,500	400.00	7,800
1922	27,000	360.00	9,720
1923	25,000	400.00	10,000
1924	22,500	460.00	10,350
1925	36,000	440.00	15,840
1926	15,000	480.00	7,200
1927	51,000	330.00	16,830
1928	25,000	420.00	10,500
1929	39,000	320.00	12,480
1930	31,000	360.00	11,160
Citrus fruits:			
Oranges [7]—	*Boxes*		
1921	12,640,000	2.80	[8] 36,400
1922	20,106,000	2.00	[8] 41,000
1923	24,137,000	2.00	[8] 49,000
1924	18,100,000	3.55	[8] 65,629
1925	24,200,000	2.84	[8] 70,432
1926	28,167,000	3.05	85,909
1927	23,000,000	4.00	92,000
1928	38,705,000	2.05	79,345
1929	24,400,000	3.90	95,160
1930	32,800,000	2.20	72,160
Grapefruit—			
1921	360,000		
1922	394,000		
1923	363,000		
1924	387,000		
1925	600,000		
1926	650,000	3.05	1,983
1927	720,000	3.80	2,736
1928	972,000	2.50	2,430
1929	1,000,000	2.65	2,650
1930	1,118,000	2.30	2,571
Lemons [7]—			
1921	4,050,000	3.45	13,973
1922	3,400,000	3.30	11,220
1923	6,732,000	1.60	10,771
1924	5,125,000	3.48	17,835
1925	7,316,000	2.11	15,437
1926	7,712,000	2.81	21,671
1927	6,000,000	3.80	22,800
1928	7,900,000	2.60	20,540
1929	5,900,000	3.70	21,830
1930	7,020,000	3.00	21,060

Bureau of Agricultural Economics: California estimates in cooperation with California Department of Agriculture; 1930 estimates are preliminary.

[5] The production shown includes a small quantity of prune varieties shipped fresh but does not include prunes dried.
[6] Dried basis. To calculate in terms of fresh fruit multiply the quantity of dried prunes produced by 2½.
[7] Representing the commercial crop year beginning Nov. 1 of the year shown; the numbers for 1930, for instance, represent the fruit that set during the season of 1930 and will be picked and marketed from Nov. 1, 1930, to Oct. 31, 1931.
[8] Includes value of quantity of grapefruit as shown below.

TABLE 229.—*Miscellaneous fruits and nuts:*[1] *Production and value, 1928, 1929, and 1930*

Crop and State	1928			1929			1930		
	Production	Seasonal farm price	Farm value	Production	Seasonal farm price	Farm value	Production	Seasonal farm price [2]	Farm value
	Tons	*Dollars*	*1,000 dollars*	*Tons*	*Dollars*	*1,000 dollars*	*Tons*	*Dollars*	*1,000 dollars*
Prunes (for use fresh):									
Idaho	21, 700	30. 00	651	25, 000	22. 00	550	20, 700	24. 00	497
Oregon	25, 300	25. 00	632	28, 500	24. 50	698	25, 000	20. 00	500
Washington	19, 500	28. 00	546	22, 500	22. 50	506	18, 750	22. 00	412
Prunes (for drying):									
California	220, 300	100. 00	22, 030	103, 000	155. 00	15, 965	225, 000	55. 00	12, 375
Oregon	5, 000	160. 00	800	50, 000	140. 00	7, 000	[3] 25, 500	70. 00	875
Washington	900	160. 00	144	6, 500	140. 00	910	3, 500	70. 00	245
Idaho	84	150. 00	13	880	130. 00	114	215	65. 00	14
Walnuts, English:									
California	25, 000	420. 00	10, 500	39, 000	320. 00	12, 480	31, 000	360. 00	11, 160
Oregon	1, 500	440. 00	660	1, 050	300. 00	315	600	400. 00	240
Figs (commercial):									
California—									
Dried [4]	11, 500	45. 00	518	15, 000	90. 00	1, 350	15, 000	48. 00	720
Not dried	6, 130	87. 00	533	6, 700	100. 00	670	6, 500	90. 00	585
Texas, not dried	6, 338	65. 50	415	2, 778	70. 00	194	----------	----------	----------
Filberts: Oregon	----------	----------	----------	200	280. 00	56	300	340. 00	102
	Boxes			*Boxes*			*Boxes*		
Limes: Florida	6, 000	4. 50	27	7, 000	5. 00	35	8, 000	5. 00	40
Pineapples: Florida	9, 000	1. 70	15	6, 000	2. 50	15	6, 000	1. 75	10

Bureau of Agricultural Economics.

[1] Incomplete. Estimates for some States are not available. See also Table 228.
[2] For products not entirely marketed by Dec. 1, prices represent approximate seasonal averages to that date.
[3] Includes 13,000 tons not harvested on account of market conditions. Price and value computed on quantity actually harvested.
[4] Estimates for dried figs include some not of merchantable quality.

TABLE 230.—*Pecans: Estimated production and value, by States, 1926–1930*

PRODUCTION

State	Improved varieties					Seedling varieties					Total				
	1926	1927	1928	1929	1930	1926	1927	1928	1929	1930	1926	1927	1928	1929	1930
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Ill	0	0	0	0	0	280	90	18	90	200	280	90	18	90	200
Mo	22	5	8	24	20	2,170	488	386	1,160	730	2,192	493	394	1,184	750
N. C	412	427	390	412	408	299	284	240	252	192	711	711	630	664	600
S. C	1,218	902	900	752	1,000	406	255	200	165	200	1,624	1,157	1,100	917	1,200
Ga	6,220	2,927	6,760	2,545	2,866	1,185	476	840	315	284	7,405	3,403	7,600	2,860	3,150
Fla	1,031	801	1,500	300	750	485	343	500	100	250	1,516	1,144	2,000	400	1,000
Ala	2,593	1,255	2,500	1,248	2,000	864	354	500	256	500	3,457	1,609	3,000	1,504	2,500
Miss	1,508	1,120	3,300	1,300	2,500	3,692	2,080	3,000	1,200	2,650	5,200	3,200	6,300	2,500	5,150
Ark	90	60	95	63	100	2,910	1,440	1,600	993	1,300	3,000	1,500	1,695	1,056	1,400
La	719	398	750	218	825	4,811	2,253	4,250	1,236	4,675	5,530	2,651	5,000	1,454	5,500
Okla	52	23	20	39	40	10,258	4,663	4,420	7,841	6,260	10,310	4,686	4,440	7,880	6,300
Tex	838	192	765	525	300	41,062	9,408	26,683	16,971	9,200	41,900	9,600	27,448	17,496	9,500
U. S	14,703	8,110	16,988	7,426	10,809	68,422	22,134	42,637	30,579	26,441	83,125	30,244	59,625	38,005	37,250

ESTIMATED PRICE PER POUND DECEMBER 1

State	Improved 1926	Improved 1927	Improved 1928	Improved 1929	Improved 1930	Seedling 1926	Seedling 1927	Seedling 1928	Seedling 1929	Seedling 1930	Total 1926	Total 1927	Total 1928	Total 1929	Total 1930
	Cts.	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Ill	-----	-----	-----	-----	-----	17.0	14.0	15.0	15.0	14.0	17.1	14.4	16.7	15.0	14.0
Mo	32.0	48.0	35.0	30.0	20.0	16.0	20.0	16.0	13.0	12.0	16.1	20.3	16.5	13.3	12.3
N. C	44.0	40.0	36.0	34.0	33.0	25.0	27.0	22.0	20.0	18.0	36.0	34.9	30.6	28.6	28.3
S. C	28.0	35.0	33.0	35.0	28.0	21.0	23.0	17.0	20.0	18.0	26.2	32.4	30.1	32.3	26.3
Ga	31.0	34.0	28.0	31.0	30.0	15.0	17.0	13.0	15.0	14.0	28.4	31.6	26.3	29.2	28.6
Fla	30.0	33.0	31.0	33.0	29.0	14.0	17.0	16.0	17.0	17.0	24.9	28.1	27.2	29.0	26.0
Ala	34.0	37.0	30.0	30.0	25.0	19.0	20.0	13.0	16.0	12.0	30.3	33.3	27.2	27.6	22.4
Miss	37.0	38.0	30.0	32.0	27.0	18.0	19.0	14.0	17.0	12.0	23.5	25.7	22.4	24.8	19.3
Ark	35.0	35.0	32.0	35.0	30.0	15.0	15.0	14.0	12.0	12.0	15.6	15.8	15.0	13.4	13.3
La	32.0	38.0	27.0	31.0	24.0	14.0	16.0	10.7	15.0	12.0	16.3	19.3	13.1	17.4	13.8
Okla	30.0	35.0	35.0	39.0	30.5	10.0	13.0	11.0	10.2	9.1	10.1	13.1	11.1	10.3	9.2
Tex	30.0	35.0	35.0	32.0	27.0	11.0	16.0	11.7	11.0	11.0	11.4	16.4	12.4	11.6	11.5
U. S	32.2	35.6	29.7	31.8	27.7	12.1	16.0	12.0	11.5	11.1	15.7	21.2	17.0	15.5	15.9

FARM VALUE DECEMBER 1

State	Improved 1926	Improved 1927	Improved 1928	Improved 1929	Improved 1930	Seedling 1926	Seedling 1927	Seedling 1928	Seedling 1929	Seedling 1930	Total 1926	Total 1927	Total 1928	Total 1929	Total 1930
	1,000 dolls.	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*
Ill	-----	-----	-----	-----	-----	48	13	3	14	28	48	13	3	14	28
Mo	7	2	3	7	4	347	98	62	151	88	354	100	65	158	92
N. C	181	171	140	140	135	75	77	53	50	35	256	248	193	190	170
S. C	341	316	297	263	280	85	59	34	33	36	426	375	331	296	316
Ga	1,928	995	1,893	789	860	178	81	109	47	40	2,106	1,076	2,002	836	900
Fla	309	264	465	99	218	68	58	80	17	42	377	322	545	116	260
Ala	882	464	750	374	500	164	71	65	41	60	1,046	535	815	415	560
Miss	558	426	990	416	675	665	395	420	204	318	1,223	821	1,410	620	993
Ark	32	21	30	22	30	436	216	224	119	156	468	237	254	141	186
La	230	151	202	68	198	674	360	455	185	561	904	511	657	253	759
Okla	16	8	7	15	12	1,026	606	486	800	570	1,042	614	493	815	582
Tex	251	67	268	168	81	4,517	1,505	3,122	1,867	1,012	4,768	1,572	3,390	2,035	1,093
U. S	4,735	2,885	5,045	2,361	2,993	8,283	3,539	5,113	3,528	2,946	13,018	6,424	10,158	5,889	5,939

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

TABLE 231.—*Fruits, canned: Production and value, census years, 1899–1929*

Commodity	In terms of standard cases [1]							Actual cases		
	1899	1904	1909	1914	1919	1921	1923	1925	1927	1929
QUANTITY										
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Apples	646	490	1,206	1,515	2,448	2,239	2,726	3,467	2,939	3,540
Apricots	532	540	630	1,052	3,940	1,057	1,562	2,088	3,099	4,203
Blackberries	-----	164	211	452	911	-----	-----	660	626	843
Loganberries	-----	(2)	-----	40	274	-----	-----	386	441	359
Raspberries	-----	177	247	415	551	-----	-----	462	529	603
Strawberries	-----	142	208	186	374	-----	-----	-----	-----	403
Berries, other	600	6	150	241	237	1,257	2,447	612	779	221
Cherries	114	319	390	543	1,363	780	2,124	1,487	1,229	2,124
Fruits for salad	-----	-----	-----	-----	-----	(2)	506	914	1,101	1,680
Grapefruit	-----	-----	-----	-----	-----	(2)	200	88	455	1,175
Olives, ripe	-----	-----	-----	-----	-----	(2)	803	193	458	934
Peaches	1,449	1,305	1,467	3,408	7,707	5,417	7,039	10,526	11,305	8,723
Pears	672	789	638	1,063	2,022	1,165	1,818	3,880	2,954	4,860
Pineapples	-----	-----	79	94	157	-----	-----	-----	-----	-----
Plums	-----	-----	220	288	572	-----	273	222	224	171
Prunes	-----	-----	-----	-----	274	-----	374	380	519	1,069
Other canned fruits	454	695	83	153	604	600	456	628	906	1,833
VALUE										
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Apples	1,125	738	1,899	2,392	9,082	7,748	6,540	6,951	5,895	7,798
Apricots	1,583	1,642	1,825	3,061	25,168	4,314	5,464	7,668	12,256	16,884
Blackberries	-----	285	339	789	5,080	-----	-----	2,190	1,725	2,414
Loganberries	-----	(2)	-----	-----	2,139	-----	-----	1,539	1,641	1,319
Raspberries	-----	409	642	1,137	4,279	-----	-----	2,338	2,614	3,234
Strawberries	-----	343	538	558	3,694	-----	-----	-----	-----	2,418
Berries, other	1,093	21	236	463	1,257	5,783	10,390	3,014	3,826	1,029
Cherries	308	826	1,019	1,629	8,451	4,481	10,668	7,253	6,490	11,689
Fruits for salad	-----	-----	-----	-----	-----	-----	3,018	6,972	7,575	11,005
Grapefruit	-----	-----	-----	-----	-----	-----	792	330	1,759	4,137
Olives, ripe	-----	-----	-----	-----	-----	-----	4,311	1,100	2,808	4,675
Peaches	4,283	3,902	3,754	9,586	46,516	23,865	26,262	38,562	36,235	35,672
Pears	2,188	2,193	1,833	3,854	14,203	7,539	9,390	20,898	13,067	24,196
Pineapples	-----	-----	314	364	1,365	-----	-----	-----	-----	-----
Plums	-----	-----	347	438	2,228	-----	697	701	686	559
Prunes	-----	-----	-----	-----	1,271	-----	955	1,185	1,531	3,225
Other canned fruits	731	1,364	269	626	3,216	2,838	1,737	1,938	3,623	6,012
Total value	11,311	11,723	13,015	24,897	127,949	56,568	80,224	102,639	101,731	136,266

Bureau of Agricultural Economics. Data for 1899 and 1904 compiled from Thirteenth Census of the United States, Vol. X, p. 391. Data for 1909 and 1914 from Census of Manufactures, 1914, vol. 2, pp. 377–379. Data for 1919, 1921, 1923, 1925, 1927, and 1929 from Census of Manufactures, bulletins on canning and preserving.

[1] Expressed in standard cases of 24 cans as follows: Apples, No. 3; apricots, 1899, 1904, 1909, and 1914, No. 3; 1919, 1921, and 1923, No. 2½; blackberries, No. 2; loganberries, 1914, No. 2; 1919, No. 2½; raspberries, 1904, 1909, and 1914, No. 2; 1919, No. 2½; strawberries, 1904, 1909, and 1914, No. 2; 1919, No. 2½; berries, other, 1899, 1904, 1909, and 1914, No. 2; 1919 includes blueberries, No. 2, and other berries, No. 2½; 1921 and 1923, No. 2; cherries, No. 2; fruits for salad, No. 2; grapefruit, No. 2; olives, ripe, No. 2; peaches, 1899, 1904, 1909, 1914, and 1919, No. 3; 1921 and 1923, No. 2½; pears, 1899, 1904, 1909, 1914, and 1919, No. 3; 1921 and 1923, No. 2½; pineapple, No. 3; plums, 1909 and 1914, No. 2; 1919, No. 2½; 1923, No. 2; prunes, 1919, No. 2½; 1923, No. 2; other canned fruit, 1899 and 1904, No. 2; 1909 and 1914, No. 2, except figs in 1909, No. 3, and figs and grapes in 1914, No. 3; 1919, No. 2½, except grapes, No. 2; 1921 and 1923, No. 3.

[2] Not reported separately.

TABLE 232.—*Asparagus, commercial crop: Acreage, production and price per crate, or ton, by States, 1927–1930*

FOR MARKET

Group and State	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
Early:	*Acres*	*Acres*	*Acres*	*Acres*	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
California	10,080	10,400	10,780	10,920	1,341	1,903	1,078	1,791	2.99	1.94	2.68	2.22
Georgia	4,900	5,640	4,900	4,240	118	130	93	102	3.82	2.75	2.85	2.50
South Carolina	6,400	7,000	7,700	8,500	288	280	462	340	4.01	2.91	3.51	2.25
Group total	21,380	23,040	23,380	23,660	1,747	2,313	1,633	2,233	3.21	2.10	2.92	2.24
Late:												
Delaware	1,500	1,500	1,500	1,650	81	126	150	134	2.70	1.65	2.85	2.47
Illinois	3,360	3,700	4,100	4,350	286	185	205	196	1.50	2.70	3.15	2.75
Iowa	200	200	210	220	14	14	16	14	2.00	3.00	2.50	2.50
Maryland	2,120	2,330	2,000	2,150	208	252	208	202	3.44	2.37	3.25	2.62
Massachusetts	------	1,580	1,660	1,800	------	150	153	162	------	3.35	3.30	3.10
Michigan	480	820	860	990	38	59	39	68	2.74	3.30	2.15	1.90
Nevada	------	------	190	200	------	------	7	6	------	------	4.10	3.10
New Jersey	10,000	10,000	10,000	10,000	840	780	820	1,000	2.80	2.45	2.50	2.15
Oregon	160	180	250	200	13	16	25	18	1.75	2.00	2.25	2.11
Pennsylvania	1,000	1,840	2,130	2,330	45	162	177	228	3.22	2.60	2.26	2.10
Washington	1,300	1,740	1,740	1,840	130	171	150	175	1.60	2.10	1.99	1.92
Group total	20,120	23,890	24,640	25,730	1,655	1,915	1,950	2,203	2.55	2.49	2.67	2.31
Total, all States	41,500	46,930	48,020	49,390	3,402	4,228	3,583	4,436	2.89	2.28	2.79	2.27

FOR MANUFACTURE

Group and State	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
					Tons	*Tons*	*Tons*	*Tons*				
California	48,300	49,300	49,400	51,000	53,100	64,100	74,100	71,400	70.00	79.36	79.40	78.90
New York	200	200	200	220	100	100	100	200	225.00	220.00	210.00	200.00
Total, 2 States	48,500	49,500	49,600	51,220	53,200	64,200	74,200	71,600	70.28	79.58	79.58	79.23

FOR MARKET AND MANUFACTURE

Group and State	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
					1,000 crates	*1,000 crates*	*1,000 crates*	*1,000 crates*				
Grand total	90,000	96,430	97,620	100,610	7,835	9,578	9,766	10,403	1.73	1.54	1.63	1.52

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters and canning establishments.

[1] Crates containing approximately 24 pounds.

TABLE 233.—*Asparagus: Car-lot shipments, by State of origin, 1920–1930*

State	Crop movement season [1]										
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New Jersey	465	237	154	64	156	150	226	156	34	33	53
Illinois	164	170	161	93	157	165	144	158	213	146	142
South Carolina	89	129	143	154	185	263	364	447	463	507	550
Georgia	------	------	------	------	8	------	53	111	158	120	145
Washington	1	2	5	10	10	31	111	93	127	107	113
California [3]	502	362	304	458	718	1,279	1,503	1,154	1,875	1,154	1,747
Other States	5	2	------	6	1	18	18	13	7	35	41
Total [3]	1,226	902	767	785	1,235	1,906	2,419	2,132	2,877	2,102	2,791

Bureau of Agricultural Economics. Compiled from daily and monthly reports received from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from Mar. 1 through July of a given year.
[2] Preliminary.
[3] California includes shipments in other months as follows: 1924, 6 in February; 1925, 10 in February; 1926, 8 in October and 5 in November; 1927, 6 in October and 1 in November; 1928, 24 in October and 7 in November; 1929, 36 in October and 6 in November; 1930, 10 in February, 1 in September, 41 in October, and 7 in November.

TABLE 234.—*Lima beans, commercial crop for market: Acreage, production, and price per bushel, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per bushel			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall: Texas	420	510	300	300	45	50	24	18	1.95	1.90	1.80	1.70
Early:												
Georgia	100	90	300	3,250	4	2	30	162	1.45	1.80	2.15	1.00
South Carolina	160	440	400	1,350	8	19	32	94	1.96	2.00	2.00	1.25
Group total	260	530	700	4,600	12	21	62	256	1.83	2.00	2.06	1.09
Intermediate:												
New Jersey	3,000	2,800	3,000	3,000	285	182	225	210	1.70	3.92	1.45	2.00
North Carolina	600	1,080	300	1,200	15	25	15	72	1.97	1.68	2.00	1.00
Virginia, Eastern Shore	250	250	320	350	23	8	32	18	2.00	4.20	2.25	1.50
Group total	3,850	4,130	3,620	4,550	323	215	272	300	1.73	3.67	1.57	1.73
Late: Michigan			200	220			24	15				2.10
Grand total	4,530	5,170	4,820	9,670	380	286	382	589	1.76	3.24	1.57	1.46

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 235.—*Snap beans, commercial crop: Acreage, production, and price per bushel or ton, by States, 1927–1930*

FOR MARKET

Group and State	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.* [1]	*1,000 bush.* [1]	*1,000 bush.* [1]	*1,000 bush.* [1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall: Florida	4,700	12,050	4,500	8,700	367	602	225	757	3.00	2.55	3.76	1.70
Texas	1,010	1,080	840	600	32	43	63	60	1.50	1.13	1.65	1.80
Group total	5,710	13,130	5,340	9,300	399	645	288	817	2.88	2.46	3.30	1.71
Early:												
California	3,120	3,250	2,550	2,650	484	429	326	358	1.25	1.60	1.74	1.58
Florida	14,990	16,760	17,150	20,500	1,049	838	1,372	1,742	2.59	2.10	2.08	2.68
Texas	5,210	4,950	4,860	7,920	255	530	471	570	1.70	1.57	1.81	1.60
Group total	23,320	24,960	24,560	31,070	1,788	1,797	2,169	2,670	2.10	1.82	1.97	2.30
Second early:												
Alabama	960	1,000	900	950	73	64	64	65	1.10	1.75	1.30	.94
Georgia	1,880	1,360	1,350	2,880	62	68	135	187	.97	1.76	1.20	.80
Louisiana	8,910	8,610	8,100	8,670	722	405	688	572	1.37	1.56	1.35	1.05
Mississippi	4,350	5,500	5,000	4,200	222	220	335	256	1.24	2.21	1.18	.97
North Carolina	3,880	6,500	5,000	6,000	330	566	375	540	2.06	.99	1.32	.57
South Carolina	4,500	4,920	4,920	4,900	243	325	462	314	1.23	1.86	1.36	.73
Group total	24,480	27,890	25,270	27,600	1,652	1,648	2,059	1,934	1.44	1.53	1.31	.83
Intermediate:												
Arkansas	1,120	1,410	1,340	1,640	68	83	84	98	1.40	.96	1.41	.75
Delaware	150	130	140	150	18	14	16	12	1.25	1.20	1.75	1.25
Illinois	530	660	660	790	29	39	61	40	2.27	1.14	2.16	1.15
Maryland	4,250	4,340	4,560	5,020	340	326	520	376	1.75	1.00	1.60	1.35
New Jersey	11,300	12,000	12,000	11,000	1,469	1,440	1,260	1,210	1.45	1.47	1.27	1.00
Tennessee	1,000	1,650	1,200	1,850	65	124	114	166	3.19	.93	1.53	1.00
Virginia	2,000	2,300	2,000	2,200	220	214	400	495	2.67	1.11	1.80	.75
Group total	20,350	22,490	21,900	22,650	2,209	2,240	2,455	2,397	1.68	1.31	1.41	1.00

[1] Bushels containing approximately 24 pounds.

TABLE 235.—*Snap beans, commercial crop: Acreage, production, and price per bushel or ton, by States, 1927–1930*—Continued

FOR MARKET—Continued

Group and State	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Late (1):												
Colorado	-------	-------	500	600	-------	-------	125	174	-------	-------	0.84	0.90
Michigan	-------	-------	200	210	-------	-------	20	17	-------	-------	1.50	1.30
Group total	-------	-------	700	810	-------	-------	145	191	-------	-------	.93	.94
Late (2):												
California	-------	-------	960	900	-------	-------	121	129	-------	-------	1.51	1.53
Louisiana	4,360	3,820	4,720	4,440	235	279	354	186	1.32	1.56	1.10	1.03
Maryland	-------	-------	850	650	-------	-------	128	32	-------	-------	1.50	1.00
Mississippi	580	620	1,000	800	30	30	40	40	1.38	1.98	1.60	.90
North Carolina	400	220	600	500	30	17	39	28	1.50	2.50	1.20	.60
South Carolina	800	800	900	900	60	63	112	122	1.12	2.73	1.50	.75
Virginia	1,300	1,170	1,050	1,400	176	105	226	84	1.10	.95	1.60	1.00
Group total	7,440	6,630	10,080	9,590	531	494	1,020	621	1.24	1.64	1.38	1.05
Total, all States	81,300	95,100	87,850	101,020	6,579	6,824	8,136	8,630	1.77	1.63	1.61	1.43

FOR MANUFACTURE

Group and State	Acreage 1927	Acreage 1928	Acreage 1929	Acreage 1930	Production 1927	Production 1928	Production 1929	Production 1930	Price 1927	Price 1928	Price 1929	Price 1930
					Tons	*Tons*	*Tons*	*Tons*				
Maine	600	970	1,300	1,300	1,400	2,300	2,700	3,500	55.83	59.70	60.00	58.00
New York	5,530	6,840	9,800	11,270	7,700	10,900	14,700	14,700	83.71	75.90	77.40	75.00
Pennsylvania	890	1,190	2,720	3,350	1,400	2,500	3,800	2,700	50.98	58.30	57.40	52.00
Indiana	850	1,800	3,500	3,710	2,000	3,200	3,500	2,200	55.50	55.00	55.00	55.00
Michigan	2,400	2,950	5,300	5,990	2,200	4,400	4,800	5,400	53.00	58.40	59.20	60.00
Wisconsin	3,910	4,600	7,400	8,580	5,100	7,400	9,600	6,900	75.00	67.80	71.90	71.80
Delaware	400	670	2,200	2,550	600	900	2,600	1,800	48.75	43.30	50.00	50.00
Maryland	3,300	4,360	8,400	9,740	5,000	6,500	14,300	7,800	54.92	57.50	58.00	55.00
South Carolina	700	700	870	830	1,000	1,500	1,300	800	45.00	45.00	50.00	50.00
Tennessee	1,250	1,220	2,000	2,400	1,800	1,800	2,400	2,400	50.00	50.00	50.00	50.00
Mississippi	1,780	1,690	1,860	2,640	2,700	2,900	1,900	2,600	51.33	50.00	50.00	48.00
Arkansas	880	1,790	2,240	2,510	1,700	2,000	2,500	1,300	50.00	51.30	55.00	54.00
Louisiana	1,640	3,040	2,530	4,810	2,000	2,100	2,500	5,800	50.00	50.00	50.00	45.00
Colorado	900	1,600	2,300	1,960	2,200	3,400	6,900	7,800	60.00	60.00	58.00	60.00
Utah	880	1,020	1,280	1,520	2,400	2,400	2,600	4,700	53.13	58.30	61.00	58.00
Washington	370	700	820	940	1,000	1,500	2,500	3,100	60.20	60.00	60.00	60.00
Oregon	650	650	930	880	1,600	2,000	2,800	3,100	65.00	65.00	57.50	58.00
California	450	470	960	770	2,000	1,700	2,900	3,000	85.00	80.00	77.60	100.00
Other States [2]	1,540	3,010	5,550	6,610	2,200	4,200	6,700	5,300	53.98	52.80	57.00	56.20
Total	28,920	39,270	61,960	72,360	46,000	63,600	91,000	84,900	62.61	61.18	62.23	61.54

FOR MARKET AND MANUFACTURE

Group and State	Acreage 1927	Acreage 1928	Acreage 1929	Acreage 1930	Production 1927	Production 1928	Production 1929	Production 1930	Price 1927	Price 1928	Price 1929	Price 1930
Grand total	110,220	134,370	149,810	173,380	124,900	145,500	188,600	188,500	116.26	103.18	99.26	93.30

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters and canning establishments.

[2] Other States include Alabama, Georgia, Idaho, Illinois, Iowa, Kansas, Kentucky, Minnesota, Missouri, Montana, Nebraska, New Jersey, Ohio, Oklahoma, Texas, Vermont, Virginia, and Wyoming.

TABLE 236.—*Beans, snap: Car-lot shipments, by State of origin, 1920–1930*

State	Calendar year										
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930[1]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	43	28	11	33	81	62	39	31	49	69	30
New Jersey	90	111	68	15	100	48	56	203	110	61	106
Maryland	159	22	149	49	136	127	197	235	246	214	350
Virginia	155	79	268	101	899	570	841	877	657	1,025	540
North Carolina	133	128	219	261	559	459	550	504	690	736	979
South Carolina	142	331	503	585	517	334	449	425	439	779	671
Florida [2]	607	367	715	1,644	1,157	1,992	946	2,583	2,700	3,254	4,119
Tennessee	20	23	63	81	248	84	174	45	119	132	231
Mississippi	105	79	252	47	85	88	130	143	192	312	263
Louisiana	35	202	90	107	439	683	588	662	822	1,156	738
Texas	7	39	26	88	210	407	414	471	294	356	658
California	17	60	20	26	32	118	127	60	116	77	95
Other States	20	91	212	87	219	161	195	242	252	455	665
Total	1,533	1,560	2,596	3,124	4,682	5,133	4,706	6,481	6,686	8,626	9,445

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Preliminary.
[2] Figures for Florida include cars moved in preceding calendar year, as follows: 1920, 35 cars in November and 37 in December; 1921, 11 cars in November and 1 in December; 1922, 26 cars in November and 26 in December; 1923, 41 cars in November and 46 in December; 1924, 1 car in October, 75 in November, and 215 in December; 1925, 73 cars in November and 154 in December; 1926, 1 car in October, 177 in November, and 140 in December; 1927, 14 cars in October, 152 in November, and 300 in December; 1928, 29 cars in October, 710 in November, and 547 in December; 1929, 3 cars in October, 160 in November, and 203 in December; 1930, 9 cars in October, 298 in November, and 993 in December.

TABLE 237.—*Beets, commercial crop, for market: Acreage, production, and price per bushel, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per bushel			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Early: Texas [2]	1,780	2,100	3,000	4,650	329	420	630	814	0.23	0.52	0.41	0.40
Second early:												
Louisiana	5,790	4,310	3,100	1,980	347	284	198	208	.50	.56	.48	.64
Mississippi	440	540	350	350	119	127	52	40	.70	.76	1.07	.75
South Carolina	------	------	140	150	------	------	44	46	------	------	1.00	.78
Group total	6,230	4,850	3,590	2,480	466	411	294	294	.55	.62	.66	.68
Intermediate:												
New Jersey	1,000	1,500	1,800	2,000	245	315	360	600	.90	1.20	1.10	.90
North Carolina	540	930	200	300	270	465	30	21	1.50	.80	.88	.50
Virginia	------	------	370	550	------	------	148	135	------	------	1 20	.90
Group total	1,540	2,430	2,370	2,850	515	780	538	756	1,21	.96	1.12	.89
Late: Pennsylvania	------	------	550	650	------	------	138	260	------	------	.90	.60
Grand total	9,550	9,380	9,510	10,630	1,310	1,611	1,600	2,124	.75	.76	.74	.64

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Bushels containing approximately 56 pounds.
[2] Season begins in fall of previous year.

TABLE 238.—*Cabbage, commercial crop: Acreage, production, and price per ton, by States, 1927–1930*

FOR MARKET

Group and State	Acreage				Production				Seasonal farm price to Dec. 1 per ton			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
Fall:	*Acres*	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
South Carolina	300	600	350	750	1,700	2,400	2,900	9,400	22.70	46.75	68.50	36.00
Virginia (Norfolk)	100	180	180	500	500	900	1,100	2,100	15.00	71.08	50.00	35.00
Group total	400	780	530	1,250	2,200	3,300	4,000	11,500	21.36	53.33	63.50	35.83
Early: [1]												
California	6,350	6,400	5,800	4,780	40,000	38,400	31,900	23,900	18.00	31.00	21.50	29.23
Florida	3,010	2,900	6,500	3,700	14,700	16,000	39,000	25,500	31.22	36.93	33.60	63.20
Louisiana (winter)	5,880	8,980	8,240	5,860	30,000	51,200	38,700	19,300	20.96	23.09	22.10	35.75
Texas	18,530	15,840	20,400	18,000	122,300	91,900	118,300	82,800	9.76	19.15	13.58	46.35
Group total	33,770	34,120	40,940	32,340	207,000	197,500	227,900	151,500	14.50	23.91	19.56	45.14
Second early:												
Alabama	4,200	2,400	2,560	1,550	22,700	11,800	10,200	7,800	19.60	62.62	20.00	45.00
Georgia	200	100	580	410	1,300	300	2,900	3,000	20.89	30.60	20.00	35.00
Louisiana (spring)	8,600	7,150	9,350	4,700	39,600	37,200	44,900	13,600	22.31	42.54	21.70	44.75
Mississippi	2,110	2,500	3,300	2,850	10,600	13,800	20,500	12,800	44.75	45.50	21.30	37.00
North Carolina	780	680	850	800	3,300	3,400	6,000	4,600	50.75	54.00	20.00	44.00
South Carolina	2,300	2,500	3,350	3,050	21,600	15,500	29,500	30,500	40.28	49.02	31.50	42.80
Virginia (Eastern Shore, Norfolk)	4,700	4,900	4,800	3,900	24,000	17,600	37,900	16,800	75.25	33.55	25.40	28.15
Group total	22,890	20,230	24,790	17,260	123,100	99,600	151,900	89,100	37.95	45.10	24.26	39.49
Intermediate:												
Arkansas	560	1,040	980	1,000	4,500	4,700	2,400	2,500	42.00	14.00	12.50	29.50
Delaware	250	250	250	250	1,700	1,400	1,700	1,200	28.00	40.00	20.00	28.00
Illinois	580	1,030	1,220	1,520	3,800	9,300	11,000	13,700	14.37	10.60	22.00	20.00
Iowa	1,030	1,070	730	420	6,600	10,200	4,700	2,600	26.37	6.06	27.10	17.25
Kentucky	200	230	160	140	1,400	1,400	1,600	600	40.00	15.00	30.00	34.00
Maryland	1,800	2,000	2,300	2,400	11,200	12,800	16,300	9,800	52.48	22.40	20.00	36.00
Missouri	860	950	850	940	7,300	5,200	6,000	6,000	44.22	11.25	16.62	21.00
New Jersey	6,000	6,800	4,500	5,000	42,000	39,400	22,500	28,000	29.20	30.00	28.00	22.00
New Mexico	600	500	600	450	4,200	3,500	5,400	3,400	66.20	56.25	22.00	20.00
New York (Long Island)	3,090	3,090	3,020	2,930	43,300	27,200	30,800	26,400	18.41	23.00	26.25	18.50
Ohio (southeast)	850	850	840	350	7,600	8,500	7,400	700	38.25	16.40	25.30	27.45
Tennessee	1,500	1,870	2,640	2,130	9,000	11,400	15,800	11,700	40.88	14.66	21.65	32.90
Virginia (southwest)	2,450	2,200	2,200	2,200	17,200	22,000	14,500	5,500	17.29	18.02	37.50	17.50
Washington	1,080	1,340	1,300	1,300	10,800	9,400	11,000	12,400	60.37	19.00	11.50	16.00
Group total	20,850	23,220	21,590	21,030	170,600	166,400	151,100	124,500	31.31	21.24	24.24	22.46
Late (domestic):												
Colorado	800	800	900	1,200	11,300	11,200	7,200	13,200	13.35	11.06	27.00	10.35
Indiana	830	780	880	950	8,700	8,400	6,800	6,100	16.60	12.78	15.50	12.17
Michigan	1,240	1,200	1,260	1,750	11,200	10,300	7,800	9,100	11.55	11.72	12.48	9.25
Minnesota	650	480	550	670	7,800	5,200	4,200	4,700	8.55	10.01	10.37	14.45
New York (other)	5,990	4,840	6,900	5,250	83,900	37,300	57,600	40,400	5.10	23.45	16.46	12.85
Ohio (other)	410	360	200	280	5,300	3,100	1,700	1,700	7.34	22.50	15.00	14.00
Oregon	840	850	960	1,060	9,500	7,200	4,800	8,500	18.35	31.25	18.00	15.00
Pennsylvania	900	910	920	930	12,400	7,300	9,200	6,300	23.35	25.08	18.43	26.80
Utah	------	180	130	290	--------	1,800	2,000	4,900	-----	16.00	18.00	5.00
Wisconsin	2,640	3,690	4,700	7,600	24,800	38,000	36,700	54,000	8.95	11.36	13.31	8.25
Group total	14,300	14,090	16,500	19,980	174,900	129,800	138,000	148,900	9.40	17.07	15.90	11.23
Late (Danish):												
Colorado	1,500	1,800	1,900	2,200	22,200	26,300	22,800	29,700	14.30	14.38	19.50	8.15
Indiana	------	------	200	350	--------	--------	1,800	1,800	-----	-----	19.00	18.00
Michigan	350	350	360	600	3,000	3,000	2,500	3,900	12.60	19.25	21.70	14.25
Minnesota	1,990	1,590	2,450	1,960	17,300	16,100	13,500	9,400	9.80	16.94	22.59	11.60
New York (other)	23,960	19,170	19,500	20,920	258,800	134,200	156,000	155,000	6.50	26.64	17.46	10.35
Ohio (other)	510	430	430	450	5,400	3,000	3,000	2,900	8.90	26.61	14.85	11.90
Pennsylvania	450	550	670	710	3,400	3,800	4,700	4,600	10.00	29.08	20.00	10.85
Wisconsin	8,770	6,750	8,640	11,180	70,200	72,200	69,100	89,400	9.00	19.70	17.93	6.40
Group total	37,530	30,640	34,150	38,370	380,300	258,600	273,400	296,700	7.68	22.80	18.07	9.10

[1] Season begins in fall of the previous year.

TABLE 238.—*Cabbage, commercial crop: Acreage, production, and price per ton, by States, 1927–1930*—Continued

FOR MARKET—Continued

Group and State	Acreage				Production				Seasonal farm price to Dec. 1 per ton			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
Late (total):	*Acres*	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Colorado	2,300	2,600	2,800	3,400	33,500	37,500	30,000	42,900	13.97	13.39	21.30	8.83
Indiana	830	780	1,080	1,300	8,700	8,400	8,600	7,900	16.60	12.74	16.16	13.42
Michigan	1,590	1,550	1,620	2,350	14,200	13,300	10,300	13,000	11.76	13.46	14.66	10.77
Minnesota	2,640	2,070	3,000	2,630	25,100	21,300	17,700	14,100	9.44	15.26	19.72	12.55
New York (other)	29,950	24,010	25,500	26,170	342,700	171,500	213,600	195,400	6.16	25.95	17.19	10.86
Ohio (other)	920	790	630	730	10,700	6,100	4,700	4,600	8.13	23.77	15.11	12.83
Oregon	840	850	960	1,060	9,500	7,200	4,800	8,500	18.35	31.25	18.00	15.00
Pennsylvania	1,350	1,460	1,590	1,640	15,800	11,100	13,900	10,900	20.51	26.49	18.99	20.09
Utah	-------	180	130	290	---------	1,800	2,000	4,900	-----	16.00	18.00	5.00
Wisconsin	11,410	10,440	13,340	18,780	95,000	110,200	105,800	143,400	8.99	16.82	16.32	7.10
Group total	51,830	44,730	50,650	58,350	555,200	388,400	411,400	445,600	8.22	20.89	17.34	9.81
Total, all States	129,740	123,080	138,500	130,230	1,058,100	855,200	946,300	822,200	16.66	24.60	20.28	21.82

FOR SAUERKRAUT

Group and State	Acreage 1927	Acreage 1928	Acreage 1929	Acreage 1930	Production 1927	Production 1928	Production 1929	Production 1930	Price 1927	Price 1928	Price 1929	Price 1930
New York	3,960	4,120	4,120	6,500	63,400	30,900	39,100	52,000	6.00	12.60	10.60	6.55
Ohio	2,590	2,250	2,700	3,300	33,700	19,600	23,200	19,100	7.50	7.10	7.15	7.20
Indiana	360	730	1,080	1,400	3,200	7,300	5,900	9,000	8.66	7.85	7.85	7.30
Illinois	360	670	670	800	4,000	6,200	5,000	6,200	8.27	12.40	15.10	9.00
Michigan	1,530	1,620	1,700	2,030	13,800	13,000	10,700	13,400	6.40	7.20	7.90	7.35
Wisconsin	2,090	4,000	5,500	7,200	20,100	41,200	47,300	64,800	6.56	8.20	11.00	8.50
Minnesota	430	430	500	540	5,200	4,600	4,000	4,200	6.25	7.00	7.00	6.85
Colorado	300	500	500	500	4,200	7,000	5,000	5,800	7.00	7.00	15.20	7.00
Washington	260	260	320	320	2,600	2,200	2,900	2,900	10.00	10.00	11.00	15.00
Other States [2]	940	1,400	1,640	2,190	7,700	12,000	12,800	15,300	7.03	11.35	12.00	11.25
Total	12,820	15,980	18,730	24,780	157,900	144,000	155,900	192,700	6.68	9.26	10.24	7.97

FOR MARKET AND SAUERKRAUT

	Acreage				Production				Seasonal farm price to Dec. 1 per ton			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Grand total	142,560	139,060	157,230	155,010	1,216,000	999,200	1,102,200	1,014,900	15.36	22.39	18.86	19.19

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters and sauerkraut manufacturers.

[2] Other States include Arkansas, Iowa, Maryland, Montana, Missouri, Nebraska, Oregon, Pennsylvania, Tennessee, Utah, and Virginia.

TABLE 239.—*Cabbage: Car-lot shipments, by State of origin, 1920–1929*

State	Crop-movement season [1]									
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York [3]	9, 511	9, 315	10, 274	9, 086	11, 816	12, 545	12, 898	14, 080	8, 636	10, 609
Pennsylvania [3]	240	300	406	317	409	552	523	420	252	302
Ohio	524	318	589	538	658	414	544	765	581	555
Illinois	157	107	144	289	279	198	195	193	329	296
Michigan [3]	598	477	908	732	644	573	287	375	428	256
Wisconsin	4, 766	2, 908	5, 875	6, 415	4, 955	5, 409	5, 177	4, 547	6, 412	5, 395
Minnesota	895	592	1, 192	989	1, 552	873	1, 125	1, 009	1, 493	1, 200
Iowa	373	150	566	390	541	265	459	435	566	442
Maryland	219	325	448	220	509	238	166	293	266	428
Virginia	1, 546	3, 537	2, 952	3, 343	3, 390	2, 220	1, 805	2, 742	2, 460	3, 984
North Carolina	49	251	222	364	275	356	341	292	254	261
South Carolina	1, 215	3, 419	3, 340	4, 183	1, 409	3, 164	2, 719	1, 933	2, 272	2, 664
Florida [4]	4, 581	1, 617	2, 998	1, 172	3, 842	1, 936	1, 667	1, 051	1, 168	3, 136
Kentucky	112	103	73	85	107	45	17	24	33	75
Tennessee	136	181	563	270	348	317	609	667	823	1, 256
Alabama	420	1, 068	1, 460	1, 358	920	1, 301	1, 831	1, 515	886	832
Mississippi	878	509	1, 629	1, 134	605	674	990	710	1, 249	1, 689
Louisiana	203	350	425	330	80	693	435	480	657	442
Texas [4]	5, 180	1, 847	4, 049	1, 356	7, 281	4, 048	6, 093	5, 546	7, 242	7, 905
Colorado	1, 832	2, 523	1, 964	3, 174	1, 473	1, 432	1, 274	683	1, 162	810
Washington	114	170	104	155	52	103	154	139	82	168
California	913	1, 008	647	616	376	860	412	441	706	627
Other States	364	357	520	473	430	836	794	727	847	912
Total	34, 826	31, 432	41, 348	36, 989	41, 951	39, 052	40, 515	39, 067	38, 804	44, 244

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season covers 17 months; from December through the second following April; i. e., the 1920 season begins December, 1919, and ends April, 1921.
[2] Preliminary.
[3] Figures include shipments in May of succeeding crop year as follows: New York, 1922, 1 car; 1926, 3 cars; 1927, 25 cars; 1928, 1 car; Pennsylvania, 1920, 1 car; Michigan, 1927, 1 car; 1928, 2 cars.
[4] Figures include shipments in November of preceding crop year as follows: Florida, 1928, 5 cars; Texas, 1920, 2 cars; 1922, 4 cars; 1923, 22 cars; 1924, 9 cars; 1925, 12 cars; 1928, 30 cars; 1929, 12 cars.

TABLE 240.—*Cabbage, Danish: Monthly average l. c. l. price per ton [1] to jobbers Chicago and New York, 1921–22 to 1930–31*

Season beginning October [2]	Chicago						New York					
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1921–22	[3] 41. 85	[3] 47. 03	[3] 52. 43	44. 20	36. 60	-------	39. 23	41. 52	49. 50	52. 00	40. 40	42. 20
1922–23	-------	[3] 16. 60	[3] 24. 20	[3] 30. 20	[3] 48. 00	[3] 60. 20	20. 20	15. 80	23. 60	26. 60	41. 60	63. 20
1923–24	-------	17. 00	22. 60	33. 20	32. 00	-------	26. 60	20. 20	27. 20	33. 20	39. 40	48. 80
1924–25	-------	-------	[4] 30. 20	[3] 30. 85	[3] 28. 00	[3] 25. 68	17. 60	18. 40	18. 60	28. 80	22. 60	15. 40
1925–26	[4] 22. 40	[4] 40. 00	42. 25	54. 87	53. 50	-------	23. 16	29. 24	37. 54	56. 09	60. 66	56. 35
1926–27	13. 68	24. 50	25. 00	21. 65	-------	-------	21. 76	22. 54	31. 17	25. 69	18. 70	20. 71
1927–28	[4] 19. 80	[4] 19. 40	[4] 19. 40	[4] 17. 80	[4] 16. 20	-------	18. 42	15. 32	14. 90	15. 31	[4] 14. 40	20. 04
1928–29	[4] 25. 60	[4] 35. 60	[4] 46. 40	[4] 56. 80	[4] 43. 20	-------	41. 46	36. 90	43. 88	50. 32	46. 41	-------
1929–30	27. 00	24. 18	35. 69	51. 22	67. 50	-------	30. 20	28. 98	34. 75	40. 79	68. 17	-------
1930–31	[4] 20. 40	[4] 19. 40	[4] 17. 40	-------	-------	-------	21. 21	19. 63	22. 90	-------	-------	-------

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices. In some cases conversions have been made from larger to smaller units or vice versa in order to obtain comparability.

[1] Unless otherwise stated, quotations are on bulk per ton sales.
[2] The season during which Danish cabbage prices are obtainable usually runs from October to March of the following year.
[3] Sacked per ton delivered.
[4] Converted from hundredweight price.

TABLE 241.—*Cantaloupes,*[1] *commercial crop: Acreage, production, and price per crate, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per crate			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
Early:	*Acres*	*Acres*	*Acres*	*Acres*	*1,000*[2] *crates*	*1,000*[2] *crates*	*1,000*[2] *crates*	*1,000*[2] *crates*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
California (Imperial)	37,920	33,460	38,360	50,900	6,029	6,224	6,713	5,752	1.49	1.60	1.63	1.32
Florida	420	920	500	600	34	37	50	30	2.23	2.00	2.00	1.75
Georgia	710	650	600	750	57	52	48	49	.76	1.50	2.22	.80
Texas, Lower Valley	180	140	740	1,260	21	16	70	113	1.54	1.20	2.00	2.25
Group total	39,230	35,170	40,200	53,510	6,141	6,329	6,881	5,944	1.49	1.60	1.64	1.34
Intermediate:												
Arizona	10,000	10,000	11,500	15,700	1,900	1,800	2,024	2,088	1.46	1.34	1.25	.90
Arkansas	5,410	6,170	3,890	4,100	406	580	300	184	2.19	1.02	1.22	.90
California (other)	7,800	10,250	12,100	13,470	1,513	2,112	2,396	2,465	1.80	1.07	.86	.99
Delaware	2,000	2,400	2,400	2,400	220	324	240	144	1.25	1.00	1.50	1.70
Illinois	200	420	420	420	6	45	44	29	1.90	1.20	1.45	1.75
Indiana	4,380	4,640	4,180	4,390	504	524	418	255	1.92	1.23	1.50	1.55
Maryland	7,100	6,040	6,800	6,900	888	676	578	380	2.20	1.21	1.45	1.55
Nevada	100	250	100	150	19	50	22	14	1.00	.80	1.30	1.70
New Mexico	2,500	1,400	1,570	1,800	250	189	196	243	1.00	1.10	1.00	1.50
North Carolina	2,310	2,310	1,000	620	266	261	70	53	.97	.98	1.20	1.15
Oklahoma	330	500	500	500	30	34	38	38	1.00	.89	1.25	1.10
South Carolina	750	640	510	600	68	56	26	72	.97	1.31	1.90	.75
Texas (other)	2,030	1,570	1,500	1,940	152	141	111	116	.78	.50	1.16	.95
Group total	44,910	46,590	46,470	52,990	6,222	6,792	6,463	6,081	1.66	1.15	1.14	1.06
Late:												
Colorado	12,100	9,000	11,000	10,000	1,537	1,170	2,530	2,000	1.05	.94	.83	1.20
Iowa	1,130	780	580	520	120	78	39	42	1.00	1.06	1.48	1.40
Kansas	450	450	450	450	52	57	54	40	1.25	.92	.81	1.05
Michigan	1,220	1,830	2,400	2,800	168	137	336	448	1.23	1.35	1.35	1.60
Nevada	300	170	320	280	57	30	40	34	1.00	1.70	1.75	.55
New Jersey	4,000	3,400	3,000	3,500	440	544	330	438	.75	.95	1.88	1.25
Ohio			300	360			27	41			1.75	1.85
Oregon			200	600			20	90			1.00	1.25
Tennessee	480	470	120	170	32	33	10	13	1.35	1.05	1.50	1.60
Washington	1,960	2,000	2,100	2,200	245	200	252	220	2.12	.61	.76	1.18
Group total	21,640	18,100	20,470	20,880	2,651	2,249	3,638	3,366	1.49	.95	1.00	1.26
Grand total	105,780	99,860	107,140	127,380	15,014	15,370	16,982	15,391	1.49	1.31	1.31	1.21

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Includes miscellaneous melons not separately reported.
[2] Standard crates (45's) containing approximately 60 pounds.

TABLE 242.—*Cantaloupes:*[1] *Car-lot shipments, by State of origin, 1920–1930*

State	Crop-movement season [2]										
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Indiana	632	644	894	681	822	1,089	629	415	465	389	184
Michigan	209	232	465	306	114	146	84	77	52	16	11
Delaware	600	942	843	818	511	657	551	427	427	285	193
Maryland	781	1,153	1,233	1,270	699	1,116	1,283	1,159	1,002	561	258
North Carolina	358	894	700	620	401	655	401	606	304	88	19
South Carolina	131	281	270	70	116	33	173	179	94	44	125
Georgia	387	619	1,632	217	586	117	136	108	104	76	133
Arkansas	986	1,554	1,002	337	1,052	1,245	1,127	788	854	413	245
Texas	169	156	186	387	456	498	514	242	244	176	362
Colorado	2,482	3,288	4,420	2,306	3,229	3,837	5,108	3,980	2,789	4,664	4,104
New Mexico	968	508	275	364	518	574	640	415	370	352	416
Arizona	1,159	1,504	1,558	1,208	2,145	3,833	3,712	5,217	5,901	5,457	5,834
Washington	380	208	371	207	298	221	145	252	258	382	286
California [4]	13,251	13,166	15,304	16,486	19,930	18,707	18,320	22,406	25,307	26,850	23,630
Other States	460	666	777	646	617	1,091	601	486	523	289	362
Total	22,953	25,815	29,930	25,923	31,494	33,819	33,424	36,757	38,694	40,042	36,162

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Includes Honeydew and other miscellaneous melons not separately reported until 1923. The shipments of melons, other than cantaloupes, amounted in 1923 to 1,152 cars; in 1924 to 2,565; in 1925 to 3,654 in 1926 to 6,484; in 1927 to 6,516; in 1928 to 9,719; in 1929 to 11,894; and in 1930 to 12,273.
[2] Crop-movement season extends from Apr. 1 through November of a given year.
[3] Preliminary.
[4] Figures for California include shipments in December as follows: 1920, 1 car; 1925, 18 cars; 1926, 3 cars; 1927, 4 cars; 1928, 2 cars.

TABLE 243.—*Carrots, commercial crops for market: Acreage, production, and price per bushel, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price to Dec. 1, per bushel			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall: California [2]	860	1,840	2,900	3,950	458	861	1,595	2,267	0.79	0.34	0.70	0.70
Early: Texas [2]	4,340	6,450	7,540	7,460	998	1,354	1,885	1,335	.43	.48	.31	.32
Second early:												
California	2,190	3,020	6,430	5,730	1,064	1,540	[3] 3,112	2,773	.68	.93	.62	.78
Louisiana	11,600	8,010	6,220	3,800	2,448	1,370	1,051	680	.51	.51	.62	.50
Mississippi	2,040	1,750	1,000	540	551	413	185	68	.56	.33	.71	.85
Group total	15,830	12,780	13,650	10,070	4,063	3,323	[3] 4,348	3,521	.56	.68	.62	.73
Intermediate:												
New Jersey	1,400	1,900	1,900	1,800	336	380	437	630	.92	1.18	1.10	.95
North Carolina	680	450	400	350	136	90	70	26	.55	.48	.60	.50
Virginia	250	540	300	300	75	135	123	111	.80	.75	.85	.80
Group total	2,330	2,890	2,600	2,450	547	605	630	767	.81	.98	1.00	.91
Late:												
Colorado	------	600	850	800	------	144	238	180	------	.90	.45	.40
Illinois	800	800	500	670	356	352	230	288	.66	.90	.50	.45
Indiana	------	------	30	50	------	------	16	30	------	------	.55	.40
Michigan	------	------	350	500	------	------	228	350	------	------	.45	.38
Minnesota	------	60	100	220	------	29	66	132	------	.60	.55	.37
New York	2,140	2,120	2,200	2,640	1,338	856	1,181	1,254	.46	1.00	.64	.35
Ohio	------	------	250	380	------	------	158	251	------	------	.75	.44
Oregon	------	------	------	340	------	------	------	163	------	------	------	.25
Pennsylvania	------	------	750	650	------	------	382	344	------	------	1.19	.94
Washington	------	------	------	350	------	------	------	112	------	------	------	.25
Group total	2,940	3,580	5,030	6,600	1,694	1,381	2,499	3,104	.50	.96	.68	.43
Grand total	26,300	27,540	31,720	30,530	7,760	7,524	[3] 10,957	10,994	.56	.68	.61	.60

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Bushels containing approximately 50 pounds.
[2] Season begins in fall of the previous year.
[3] Including 300,000 bushels not harvested, omitted in computing price and value.

TABLE 244.—*Carrots: Car-lot shipments by State of origin, 1920–1929*

State	Crop-movement season [1]									
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	1,158	1,247	1,523	1,410	2,262	1,825	1,845	2,430	1,484	2,111
New Jersey	32	32	26	34	18	48	44	85	67	12
Illinois	53	62	82	24	3	23	2	13	96	33
Michigan	11	33	25	35	55	54	77	91	208	204
Virginia	3	1	10	2	1	40	10	44	137	110
Mississippi	77	81	304	142	266	197	209	496	230	108
Louisiana	28	43	62	58	32	106	70	177	99	71
Texas	5	198	48	65	282	575	1,136	903	1,685	2,860
Colorado	1	9	4	12	26	29	62	10	216	96
California	111	19	21	24	157	278	557	2,363	2,938	6,095
Other States	123	115	151	173	212	252	290	241	295	449
Total	1,602	1,840	2,256	1,979	3,314	3,427	4,302	6,853	7,455	12,149

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season begins in October of the previous year in such early shipping States as California, Louisiana, and Texas, and extends through June of the following year in order to include shipments from storage in Northern States and to have totals comparable with acreage and production figures.
[2] Preliminary.

TABLE 245.—*Cauliflower, commercial crop: Acreage, production, and price per crate, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per crate			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 crates*[1]	*1,000 crates*[1]	*1,000 crates*[1]	*1,000 crates*[1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall and winter: California		4,460	5,800	6,050		1,240	1,740	1,573		0.84	0.57	0.66
Early:												
California (spring)	[2]8,950	8,340	8,200	8,970	2,452	2,319	2,444	2,225	1.00	.84	.79	.85
Oregon (spring)	1,450	940	1,000	350	177	146	70	43	1.05	1.40	1.00	.80
Group total	10,400	9,280	9,200	9,320	2,629	2,465	2,514	2,268	1.00	.87	.80	.85
Late (1):												
Colorado	1,160	1,700	3,600	3,000	336	510	1,296	960	1.78	1.20	.70	.80
New Jersey	300	200	250	300	45	26	38	45	1.50	1.50	1.75	1.60
New York (other)	2,000	2,020	2,340	3,000	400	154	311	249	1.95	1.57	1.30	1.45
Utah	180	270	280	230	49	44	51	29	2.00	1.60	1.40	.85
Washington			220	320			50	77			.90	1.00
Group total	3,640	4,190	6,690	6,850	830	734	1,746	1,360	1.86	1.31	.86	.96
Late (2):												
New York, Long Island	3,060	2,600	2,990	4,500	480	390	293	202	1.73	1.84	1.75	.85
Oregon (fall)	920	900	900	800	320	202	207	192	1.10	1.00	1.00	1.00
Group total	3,980	3,500	3,890	5,300	800	592	500	394	1.48	1.55	1.44	.92
Grand total	18,020	21,430	25,580	27,520	4,259	5,031	6,500	5,595	1.26	1.01	.80	.83

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

1 Crates containing approximately 50 pounds.
2 Includes fall crop.

TABLE 246.—*Cauliflower: Car-lot shipments, by State of origin, 1920–21 to 1929–30*

State	Crop-movement season[1]									
	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30[2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	781	567	683	653	734	834	1,019	696	574	375
Colorado[3]		3	4	101	61	191	220	411	843	1,500
Oregon	76	134	282	374	109	1,246	780	559	502	421
California[4]	2,957	3,640	3,613	3,034	3,408	4,353	4,730	7,040	7,532	6,930
Other States	39	30	35	121	146	[5]100	[6]143	[7]340	447	[8]309
Total	3,853	4,374	4,617	4,283	4,458	6,724	6,892	9,046	9,898	9,535

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

1 Crop-movement season extends from July through June of the following year.
2 Preliminary.
3 Totals include figures in June of preceding crop year as follows: 1925, 1 car; 1928, 1 car; 1929, 2 cars.
4 Totals include figures in succeeding crop year as follows: 1921, 4 cars in August and 7 in September; 1922, 7 cars in July, 5 in August, and 8 in September; 1924, 4 cars in July; 1927, 1 car in July.
5 Includes 2 cars in July, 1926, from Virginia.
6 Includes 1 car in May and 6 in June, 1926, from Washington.
7 Includes 12 cars in June, 1927, from Washington.
8 Includes 19 cars in June, 1929, from Washington.

TABLE 247.—*Celery, commercial crop: Acreage, production, and price per crate, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price to Dec. 1 per crate			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 crates*[1]	*1,000 crates*[1]	*1,000 crates*[1]	*1,000 crates*[1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall and winter: California	[2] 8,550	7,400	7,000	7,620	2,078	999	1,512	1,257	1.82	1.09	1.08	1.00
Early:												
California, spring	------	1,200	1,000	1,150	------	547	494	596	------	2.15	2.10	1.98
Florida [3]	4,240	5,380	6,620	6,650	1,908	2,206	2,383	2,647	2.08	2.83	2.15	2.00
Group total	4,240	6,580	7,620	7,800	1,908	2,753	2,877	3,243	2.08	2.69	2.14	2.00
Second early: California, summer	------	450	850	800	------	264	604	616	------	1.94	2.28	1.60
Intermediate:												
Indiana	------	------	40	110	------	------	7	19	------	------	1.60	1.80
Michigan	------	1,450	1,530	1,170	------	508	457	363	------	1.70	1.55	2.05
New Jersey	800	900	1,000	1,100	172	198	200	261	1.00	1.65	1.75	1.35
New York (Orange County)	290	280	470	550	82	46	129	147	2.21	3.00	2.54	1.21
Group total	1,090	2,630	3,040	2,930	254	752	793	790	1.39	1.77	1.76	1.66
Late: (1)												
Colorado	940	900	1,050	840	282	270	252	218	1.70	1.65	1.10	.90
Michigan	[4] 3,760	2,540	2,620	3,860	846	749	618	753	1.38	1.00	1.30	1.80
New York (other)	4,330	4,310	4,630	4,800	1,633	1,254	1,232	2,165	1.15	1.70	1.35	.90
Ohio	450	520	540	760	128	139	137	144	2.43	2.05	1.50	1.40
Oregon	410	410	450	490	178	154	243	272	1.81	1.48	1.65	1.25
Pennsylvania	280	270	620	600	81	71	179	164	1.42	1.83	1.67	1.60
Group total	10,170	8,950	9,910	11,350	3,148	2,637	2,661	3,716	1.36	1.51	1.37	1.16
Late: (2)												
Idaho	------	60	130	140	------	47	98	105	------	1.35	1.34	1.00
Indiana	------	------	80	160	------	------	16	27	------	------	1.35	1.70
New Jersey	500	420	400	350	75	46	96	79	1.75	1.35	1.30	1.50
Utah	------	550	600	630	------	147	95	174	------	1.00	.67	1.00
Washington	------	------	50	60	------	------	30	36	------	------	2.00	1.50
Group total	500	1,030	1,260	1,340	75	240	335	421	1.75	1.13	1.20	1.18
Grand total	24,550	27,040	29,680	31,840	7,463	7,645	8,782	10,043	1.68	1.91	1.66	1.48

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Two-thirds size (New York) crates containing approximately 90 pounds.
[2] Includes spring and summer crop.
[3] Season begins in fall of the previous year.
[4] Includes intermediate crop.

TABLE 248.—*Celery: Car-lot shipments, by State of origin, 1920–1929*

State	Crop-movement season [1]									
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	3,110	3,047	3,247	3,742	4,529	4,492	4,898	5,907	4,192	3,847
New Jersey	94	219	115	219	177	149	138	106	32	53
Pennsylvania	186	224	212	223	225	208	194	169	71	105
Ohio	46	67	76	55	64	71	51	63	54	25
Michigan	954	1,031	1,626	1,486	1,332	2,224	1,880	1,996	2,139	1,852
Florida	2,652	4,218	4,954	6,398	7,219	7,952	5,504	7,499	8,413	8,831
Colorado	305	211	222	125	197	399	211	161	188	149
Oregon	16	53	82	205	363	398	511	625	605	673
California	3,472	2,617	4,334	4,631	4,240	5,953	7,565	7,837	[3] 9,582	7,975
Other States	24	19	52	76	83	67	48	108	202	275
Total	10,859	11,706	14,920	17,160	18,429	21,913	21,000	24,471	25,478	23,885

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season covers 19 months, from December through the second following June; i. e., the 1920 season begins December, 1919, and ends June, 1921.
[2] Preliminary.
[3] Includes 1 car in July, 1929.

Table 249.—*Corn, sweet, commercial crop: Acreage, production, and price per 1,000 ears, or ton, by States, 1927–1930*

State	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
FOR MARKET												
	Acres	*Acres*	*Acres*	*Acres*	*1,000 ears* [1]	*1,000 ears* [1]	*1,000 ears* [1]	*1,000 ears* [1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
New Jersey	18, 000	18, 500	22, 000	24, 000	95, 400	111, 000	99, 000	100, 800	21. 50	19. 50	20. 80	15. 30
FOR MANUFACTURE												
					Tons	*Tons*	*Tons*	*Tons*				
Maine	8, 260	10, 770	14, 850	13, 200	23, 100	30, 200	46, 000	48, 800	22. 30	24. 70	24. 70	26. 30
New Hampshire	780	1, 110	1, 320	1, 050	1, 800	2, 600	3, 300	3, 200	21. 60	23. 70	23. 80	23. 10
Vermont	1, 870	1, 940	2, 370	2, 100	2, 400	4, 700	6, 200	4, 800	19. 10	18. 30	18. 20	17. 70
New York	20, 290	27, 000	24, 600	24, 000	32, 500	32, 400	36, 900	31, 200	18. 80	16. 50	17. 00	17. 50
Pennsylvania	2, 800	4, 140	6, 000	5, 000	3, 600	4, 100	6, 000	4, 000	12. 00	13. 80	15. 00	16. 00
Ohio	18, 730	27, 910	31, 000	32, 500	30, 000	39, 100	62, 000	35, 800	10. 00	10. 80	11. 20	11. 30
Indiana	17, 010	27, 390	38, 500	43, 500	23, 800	38, 300	50, 000	56, 600	10. 41	13. 00	13. 00	13. 20
Illinois	40, 650	58, 300	64, 000	72, 000	81, 300	128, 300	134, 400	144, 000	11. 00	12. 70	12. 80	13. 00
Michigan	9, 400	8, 930	6, 400	7, 300	14, 100	16, 100	6, 400	4, 400	12. 98	12. 40	12. 50	13. 00
Wisconsin	10, 410	14, 780	11, 600	13, 000	13, 500	29, 600	24, 400	31, 200	10. 66	11. 50	11. 80	11. 10
Minnesota	26, 420	33, 000	45, 800	54, 000	50, 200	85, 800	109, 900	129, 600	10. 00	10. 80	11. 00	10. 45
Iowa	26, 750	39, 860	50, 000	55, 000	61, 500	99, 600	125, 000	110, 000	8. 96	9. 30	9. 90	10. 50
Nebraska	4, 600	5, 470	5, 740	8, 000	11, 500	9, 800	10, 900	11, 200	8. 32	9. 40	10. 00	10. 00
Delaware	3, 500	4, 060	3, 900	3, 630	8, 400	7, 300	5, 800	6, 500	10. 60	12. 00	13. 00	13. 00
Maryland	27, 500	35, 500	44, 000	34, 000	49, 500	53, 200	61, 600	23, 800	11. 78	14, 00	15. 00	14. 50
Tennessee	-------	3, 100	3, 400	3, 400	-------	5, 300	6, 800	6, 800	------	14. 00	14. 60	15. 10
Other States [2]	4, 380	2, 700	3, 830	4, 080	7, 000	6, 500	8, 800	9, 800	13. 40	13. 85	13. 95	13. 95
Total	223, 350	305, 960	357, 310	375, 760	414, 200	592, 900	704, 400	661, 700	11. 96	12. 68	13. 14	13. 25
FOR MARKET AND MANUFACTURE												
Grand total	241, 350	324, 460	379, 310	399, 760	451, 500	636, 300	743, 100	701, 100	15. 57	15. 22	15. 22	14. 71

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters and canning establishments.

[1] Approximately 2,560 ears per ton.

[2] Other States include Colorado, Idaho, Kentucky, Missouri, Montana, Oregon, South Dakota, Utah, Washington, and Wyoming.

Table 250.—*Corn, canned: Pack* [1] *in the United States, 1918–1930*

State	Season												
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Maine	1, 113	1, 652	1, 588	911	1, 066	923	1, 294	1, 693	1, 347	806	966	1, 521	1, 930
New York	489	1, 014	829	564	616	434	749	1, 311	1, 038	676	666	782	647
Ohio	1, 584	1, 360	1, 544	850	1, 073	1, 390	787	2, 375	1, 735	846	1, 138	1, 551	750
Indiana	513	586	861	709	665	1, 208	846	2, 223	2, 044	703	1, 131	1, 250	1, 272
Illinois	2, 199	2, 225	2, 271	1, 711	1, 939	2, 833	2, 310	4, 030	3, 053	1, 961	3, 017	3, 153	3, 261
Wisconsin	373	635	590	576	625	648	388	1, 148	843	310	578	547	686
Minnesota	309	456	643	573	598	898	1, 199	1, 541	1, 762	1, 088	1, 648	2, 604	2, 912
Iowa	2, 300	2, 496	3, 246	1, 190	1, 959	2, 382	1, 764	4, 105	3, 361	1, 377	2, 541	2, 908	2, 552
Maryland	2, 033	2, 081	2, 217	1, 130	1, 944	2, 256	1, 707	3, 678	2, 133	1, 493	1, 648	1, 865	622
Other States	809	1, 045	1, 251	629	934	1, 134	1, 087	2, 216	1, 753	1, 087	1, 164	1, 306	1, 060
United States	11, 722	13, 550	15, 040	8, 843	11, 419	14, 106	12, 131	24, 320	19, 069	10, 347	14, 497	17, 487	15, 692

Bureau of Agricultural Economics. Compiled from National Canners' Association data, except 1927 and 1928 from Census of Manufactures.

[1] Stated in cases of 24 No. 2 cans.

TABLE 251.—*Cucumbers, commercial crop: Acreage, production, and price per bushel, by States, 1927–1930*

FOR MARKET

Group and State	Acreage				Production				Seasonal farm price per bushel			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall: Florida	280	860	980	1,100	38	69	75	99	1.92	2.75	3.60	2.50
Early (1):												
Florida	7,440	8,560	10,360	11,000	1,042	685	1,088	550	1.92	3.04	2.66	2.40
Texas	4,150	5,220	2,450	5,940	415	360	184	594	1.05	1.69	1.86	1.80
Group total	11,590	13,780	12,810	16,940	1,457	1,045	1,272	1,144	1.67	2.57	2.54	2.09
Early (2):												
Alabama	3,830	2,680	2,560	3,200	582	364	384	400	.97	1.01	1.20	.65
California	1,000	1,050	1,000	1,050	163	181	159	184	.97	1.06	1.19	.95
Georgia	720	720	1,150	2,200	90	45	80	110	1.26	1.18	1.93	.60
Louisiana	2,760	2,360	1,440	2,250	317	189	196	286	.79	1.25	1.31	1.06
South Carolina	4,300	5,300	7,500	9,000	636	398	578	675	1.37	.71	.97	.28
Group total	12,610	12,110	13,650	17,700	1,788	1,177	1,397	1,655	1.09	.96	1.16	.60
Second early:												
Arkansas	1,760	1,970	1,350	2,300	176	177	139	58	1.51	.63	1.27	.60
North Carolina	4,340	4,340	4,200	7,300	764	573	525	438	.90	.72	1.76	.35
Virginia	1,650	1,730	1,000	1,000	214	164	150	75	.91	1.00	2.75	.80
Group total	7,750	8,040	6,550	10,600	1,154	914	814	571	1.00	.75	1.86	.43
Intermediate:												
Delaware	1,120	1,210	1,150	1,380	202	157	132	97	.90	.40	1.37	.95
Illinois	560	590	650	810	28	41	49	32	1.21	.71	1.97	.65
Maryland	1,700	1,750	2,000	2,500	292	315	340	250	1.30	.53	1.38	1.10
New Jersey	2,500	3,000	3,300	3,300	462	525	478	544	1.25	1.00	1.45	1.20
Ohio (Washington County)	------	110	100	80	------	6	5	1	------	.95	1.00	.90
Group total	5,880	6,660	7,200	8,070	984	1,044	1,004	924	1.19	.76	1.44	1.13
Late:												
Michigan	------	------	350	600	------	------	12	36	------	------	2.00	1.25
New York	1,180	1,230	1,000	1,270	177	191	127	178	.93	1.06	1.59	.85
Group total	1,180	1,230	1,350	1,870	177	191	139	214	.93	1.06	1.63	.92
Total, all States	39,290	42,680	42,540	56,280	5,598	4,440	4,701	4,607	1.24	1.28	1.77	1.11

FOR PICKLES

Group and State	Acreage 1927	Acreage 1928	Acreage 1929	Acreage 1930	Production 1927	Production 1928	Production 1929	Production 1930	Price 1927	Price 1928	Price 1929	Price 1930
Massachusetts[2]	------	------	700	700	------	------	88	94	------	------	0.70	0.70
New York	3,450	3,700	3,930	4,770	448	500	401	549	1.01	0.93	.93	.80
Ohio	1,750	1,700	1,730	3,000	61	110	69	222	1.02	1.00	1.00	.90
Indiana	6,800	9,870	9,000	12,500	258	572	270	850	.93	.87	.90	.90
Illinois	960	1,560	1,250	1,400	34	90	44	56	1.24	1.10	1.10	.90
Michigan	17,350	22,840	21,000	29,000	520	1,256	609	1,479	.90	.88	.90	.90
Wisconsin	6,800	10,190	11,310	17,500	272	550	475	1,015	1.08	.98	1.00	.89
Minnesota	3,060	3,500	3,500	4,500	92	105	105	234	.73	.93	.95	.75
Iowa	270	1,500	2,200	4,000	12	99	68	196	.90	1.03	1.05	.80
Missouri	670	2,300	2,350	2,800	35	138	31	76	1.00	.75	.75	.80
Maryland[2]	------	1,450	1,500	1,800	------	116	99	112	------	.70	.70	.70
Virginia[2]	------	------	800	1,350	------	------	76	70	------	------	.75	.60
Kentucky[2]	------	1,220	1,150	1,500	------	61	53	81	------	.75	.85	.75
Mississippi[2]	------	4,500	5,000	7,100	------	158	135	248	------	.55	.60	.51
Louisiana[2]	------	------	960	1,600	------	------	55	64	------	------	1.02	.80
Texas[2]	------	------	1,600	2,700	------	------	40	68	------	------	.60	.60
Colorado	3,130	2,300	2,000	2,800	156	232	230	364	.75	.60	.60	.53
Oregon[2]	------	------	1,320	2,060	------	------	172	293	------	------	.65	.55
Washington	410	460	610	700	28	44	92	112	.82	.75	.75	.65
California	2,120	2,760	2,710	3,440	337	486	585	605	.97	.62	.63	.63
Other States[3]	10,680	4,640	3,550	4,660	726	223	241	345	.96	.75	.80	.73
Total	57,450	74,490	78,170	109,880	2,979	4,740	3,938	7,133	.95	.84	.82	.79

FOR MARKET AND PICKLES

Group and State	Acreage 1927	Acreage 1928	Acreage 1929	Acreage 1930	Production 1927	Production 1928	Production 1929	Production 1930	Price 1927	Price 1928	Price 1929	Price 1930
Grand total	96,740	117,170	120,710	166,160	8,577	9,180	8,639	11,740	1.14	1.05	1.34	0.91

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters and pickle manufacturers.

[1] Bushels containing approximately 48 pounds.
[2] Included in other States where figures are not shown.
[3] Other States include Alabama, Connecticut, Delaware, Florida, Nebraska, North Carolina, Pennsylvania, South Dakota, Utah, and Wyoming.

TABLE 252.—*Cucumbers: Car-lot shipments, by State of origin, 1920–1930*

State	Calendar year—										
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930[1]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	312	540	395	383	694	686	456	607	1,001	529	872
New Jersey	287	271	164	258	276	481	261	368	370	161	115
Ohio	52	118	124	68	111	91	187	203	191	119	131
Indiana	9	25	18	6	16	57	104	135	147	126	61
Illinois	142	164	68	15	77	245	150	101	148	118	254
Delaware	256	137	191	225	240	302	304	366	214	163	119
Maryland	297	343	368	446	311	598	479	692	563	469	527
Virginia	83	19	221	84	387	448	200	339	229	179	176
North Carolina	408	641	687	1,175	1,639	1,562	869	935	812	651	691
South Carolina	525	664	887	720	918	794	687	916	663	1,043	1,089
Florida	835	1,414	2,034	1,647	1,381	1,963	2,048	2,300	1,572	2,271	1,133
Alabama	259	109	702	367	576	706	684	583	606	795	882
Texas	95	64	119	46	147	72	316	178	382	294	885
Arkansas	26	62	8	24	93	145	234	228	328	195	130
Other States	103	261	363	236	316	342	293	229	242	356	535
Total	3,689	4,832	6,349	5,700	7,182	8,492	7,272	8,180	7,468	7,469	7,600

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Preliminary.

TABLE 253.—*Eggplant, commercial crop: Acreage, production, and price per bushel, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per bushel			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall:[2]												
Florida	150	620	660	780	46	136	132	125	1.61	0.91	2.00	1.38
Texas	370	300	250	540	111	90	10	140	.45	.59	1.60	.67
Group total	520	920	910	1,320	157	226	142	265	.79	.78	1.97	1.00
Early: Florida	580	930	620	850	188	236	188	190	1.21	.91	1.34	1.12
Second early: Louisiana	890	830	800	750	139	132	123	110	1.00	.90	1.30	.87
Late: New Jersey	1,100	1,210	1,300	1,300	330	302	260	292	.80	.88	.75	.52
Grand total	3,090	3,890	3,630	4,220	814	896	713	857	.93	.87	1.24	.85

Bureau of Agricultural Economics. Estimate based upon returns from crop reporters.

[1] Bushel containing approximately 38 pounds.
[2] Season begins in fall of previous year.

TABLE 254.—*Lettuce, commercial crop: Acreage, production, and price per crate, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per crate			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Early: [2]												
Arizona	7,000	12,700	16,500	14,000	1,281	1,664	1,766	1,260	0.97	0.98	1.60	2.30
California (Imperial)	34,400	22,000	27,250	38,100	[3] 5,229	3,740	4,006	4,267	1.34	1.62	2.09	1.74
Florida	1,840	1,850	1,970	1,530	294	314	362	499	1.62	1.61	1.29	2.00
Texas	950	1,000	800	740	103	100	160	24	1.00	1.02	1.00	1.00
Goup total	44,190	37,550	46,520	54,370	[3] 6,907	5,818	6,294	6,050	1.26	1.43	1.88	1.88
Second early:												
Arizona	7,800	13,500	11,000	19,000	1,755	1,418	1,727	1,900	1.63	1.88	2.85	1.45
California (other)	16,530	24,500	26,150	31,570	2,314	3,479	2,693	3,062	.96	1.39	1.86	2.02
North Carolina	1,490	1,490	1,160	1,400	207	171	136	130	1.87	1.60	1.65	.98
South Carolina	700	750	680	450	158	112	102	59	1.59	2.11	1.83	2.16
Group total	26,520	40,240	38,990	52,420	4,434	5,180	4,658	5,151	1.29	1.55	2.22	1.78
Intermediate:												
Idaho	120	40	50	60	18	4	8	12	1.22	1.67	2.25	1.40
New Jersey	1,200	1,300	1,100	1,000	300	292	220	150	2.34	1.70	1.76	1.85
New Mexico	20	200	------	------	2	16	------	------	.75	1.25	------	------
Oregon	200	50	70	80	10	7	6	8	1.25	1.25	1.30	1.05
Virginia	300	300	280	200	50	60	57	28	1.50	1.45	1.00	2.00
Washington	1,940	1,760	2,390	3,340	388	370	514	768	1.49	1.00	1.27	.75
Group total	3,780	3,650	3,890	4,680	768	749	805	966	1.81	1.32	1.40	.97
Late:												
California	5,260	7,800	9,630	12,700	773	975	1,194	1,651	.97	2.16	2.12	1.93
Colorado	13,240	9,800	9,800	9,000	1,456	1,127	1,078	810	1.63	1.07	1.25	.85
New Mexico	340	200	200	200	49	13	20	16	.75	1.50	1.30	1.10
New York	5,540	4,460	5,800	5,450	1,457	1,004	1,740	1,499	1.48	2.68	1.13	1.05
Pennsylvania	80	80	80	80	10	9	12	11	1.50	2.70	1.20	1.05
Group total	24,460	22,340	25,510	27,430	3,745	3,128	4,044	3,987	1.42	1.93	1.46	1.37
Late (fall):												
California	21,350	19,120	24,500	27,050	2,946	3,174	4,067	3,354	.77	2.24	1.74	1.86
Idaho	1,000	260	260	320	200	38	38	51	.85	1.67	.75	1.00
New Jersey	1,250	1,200	900	800	312	180	194	192	1.76	2.26	2.20	1.75
New Mexico	50	30	------	------	8	1	------	------	.75	1.65	------	------
Oregon	100	50	50	50	5	4	5	5	1.25	1.25	1.30	.80
Washington	110	350	350	450	22	70	72	90	1.48	1.25	1.50	.95
Wyoming	200	40	40	40	22	3	3	3	1.20	1.82	1.30	.90
Group total	24,060	21,050	26,100	28,710	3,515	3,470	4,379	3,695	.87	2.21	1.75	1.82
Grand total	123,010	124,830	141,010	167,610	[3] 19,369	18,345	20,180	19,849	1.25	1.69	1.82	1.70

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Western crates containing 4 dozen heads.
[2] Season begins in fall of the previous year.
[3] Includes 1,650,000 crates not harvested, omitted in computing price and value.

TABLE 255.—*Lettuce: Car-lot shipments, by State of origin, 1920–1930*

Group and State	Crop-movement season [1]										
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	1,775	3,240	3,167	3,817	3,698	3,821	3,019	3,496	3,140	3,704	3,205
New Jersey	208	469	572	456	416	463	303	308	144	169	26
North Carolina	207	445	622	718	714	537	540	447	477	363	364
South Carolina	121	716	987	576	424	736	372	369	241	310	169
Florida	2,666	2,910	2,899	2,926	2,490	2,190	707	950	880	1,117	560
Idaho	25	180	889	1,241	533	500	398	196	72	76	154
Colorado	129	234	812	1,436	1,036	3,096	2,795	2,848	2,368	2,109	1,609
Arizona	248	114	577	834	1,776	2,689	4,572	7,679	9,325	9,285	8,431
Washington	354	635	812	1,082	673	820	904	1,151	1,240	1,747	2,228
California	5,997	9,223	10,321	13,916	17,040	20,999	25,126	28,502	32,122	33,854	38,736
Other States	412	531	654	791	661	658	541	400	319	286	218
Total	12,142	18,697	22,312	27,793	29,461	36,509	39,277	46,346	50,328	53,020	55,700

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season begins in October of the previous year and extends through December of the given year; i. e. 1920 season begins in October, 1919, and extends through December, 1920.
[2] Preliminary.

TABLE 256.—*Onions, commercial crop: Acreage, production, and price per bushel, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price to Dec. 1, per bushel			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
Early (Bermuda and Creole):	*Acres*	*Acres*	*Acres*	*Acres*	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
California	3,950	3,950	3,450	2,050	1,118	980	869	570	1.80	0.77	1.25	0.98
Louisiana	2,900	2,310	2,180	1,260	316	293	277	77	1.22	.89	1.09	1.16
Texas	11,220	18,280	19,700	16,310	2,199	3,546	3,763	3,360	1.69	1.10	1.02	.70
Group total	18,070	24,540	25,330	19,620	3,633	4,819	4,909	4,007	1.68	1.02	1.06	.75
Intermediate (domestic):												
California	550	780	840	940	228	299	373	466	.74	.75	.45	.48
Iowa (Scott County District)	800	1,000	1,000	1,050	206	288	260	336	1.35	.88	.86	.91
Kentucky	800	800	600	510	110	320	48	18	1.00	.45	.43	.75
New Jersey	2,900	3,000	2,000	2,200	696	780	510	396	1.25	1.00	1.35	1.00
Texas (Collin County District)	1,050	2,000	1,170	1,160	131	760	302	237	1.89	.56	1.27	.93
Virginia	600	400	250	250	89	64	62	35	.75	.51	1.15	1.00
Washington (Walla Walla County)	1,000	1,000	1,030	1,080	418	415	525	491	.63	.40	.63	.56
Group total	7,700	8,980	6,890	7,190	1,878	2,926	2,080	1,979	1.07	.69	.91	.74
Late (domestic):												
California	5,170	5,160	5,750	6,350	1,872	1,533	1,587	[2] 1,918	.70	1.28	.85	.62
Colorado	4,300	3,760	7,000	5,600	1,376	1,241	[2] 2,583	1,725	.45	1.42	.45	.32
Idaho	1,900	1,000	1,100	1,800	902	700	522	720	.47	1.14	.50	.30
Illinois	670	740	770	750	201	169	212	188	.87	1.22	.70	.72
Indiana	8,100	8,510	8,400	9,120	2,738	2,042	2,436	3,493	.59	1.60	.56	.37
Iowa (other)	1,470	1,280	1,420	1,510	400	421	469	461	.67	1.15	.60	.48
Massachusetts	4,550	3,500	2,730	2,530	1,342	840	1,051	1,063	.74	1.01	.85	.63
Michigan	3,200	4,520	5,000	6,700	1,360	1,243	1,780	2,767	.54	1.40	.62	.43
Minnesota	2,180	1,740	2,160	2,650	691	632	756	702	.51	1.28	.60	.37
Nevada	------	------	150	130	------	------	32	43	------	------	.83	.42
New York	8,530	5,830	7,910	8,000	3,352	1,283	3,243	3,576	.59	1.35	.75	.45
Ohio	7,000	6,550	8,160	6,500	2,352	891	2,220	1,794	.60	1.60	.55	.42
Oregon	1,200	950	1,040	1,080	420	361	406	486	.58	1.43	.60	.32
Pennsylvania	180	150	140	150	54	37	38	37	.75	1.10	.90	.70
Utah	900	1,000	1,100	1,200	360	520	475	398	.50	1.20	.60	.35
Washington (other)	860	710	820	1,120	359	411	377	504	.57	1.12	.53	.30
Wisconsin	1,600	1,100	980	940	507	385	294	263	.58	1.25	.69	.55
Group total	51,810	46,500	54,630	56,130	18,286	12,709	[2] 18,481	[2] 20,138	.58	1.35	.63	.43
Total, domestic	59,510	55,480	61,520	63,320	20,164	15,635	[2] 20,561	[2] 22,117	.63	1.23	.66	.46
Grand total	77,580	80,020	86,850	82,940	23,797	20,454	[2] 25,470	[2] 26,124	.79	1.18	.74	.50

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Bushels containing approximately 57 pounds.
[2] Includes 145,000 bushels in Colorado in 1929 and 75,000 bushels in California in 1930 not harvested, omitted in computing price and value.

TABLE 257.—*Onions: United States imports, by countries, annual, 1920–21 to 1929–30*

Year beginning July—	Netherlands	Spain	Italy	United Kingdom	Canada	Canary Islands	Bermuda	Mexico	Chile	Australia	Egypt	Other countries	Total
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1920–21	2	575	8	43	8	14	28	(1)	0	3	6	2	689
1921–22	40	1,522	74	247	66	18	34	26	43	119	243	56	2,488
1922–23	33	990	11	157	42	13	18	20	1	3	447	48	1,783
1923–24	(1)	1,098	17	52	1	8	9	29	30	4	148	10	1,406
1924–25	60	1,090	19	71	29	7	9	18	79	8	618	67	2,075
1925–26	11	1,342	100	36	11	4	9	20	26	3	599	33	2,194
1926–27	48	1,084	65	59	9	2	9	1	76	8	912	25	2,298
1927–28	11	701	35	12	2	1	3	(1)	213	3	392	26	1,399
1928–29	580	1,007	145	26	4	2	(1)	11	134	4	105	32	2,050
1929–30	5	768	42	11	(1)	1	(1)	(1)	49	2	38	2	918

Bureau of Agricultural Economics. Compiled from official records of the Bureau of Foreign and Domestic Commerce.

[1] Less than 500 bushels.

TABLE 258.—*Onions: Car-lot shipments, by State of origin, 1920–21 to 1929–30*

State	Crop-movement season [1]									
	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Massachusetts	3, 914	2, 244	1, 912	2, 454	2, 481	2, 856	3, 586	2, 495	1, 416	1, 854
New York	3, 384	2, 890	2, 812	5, 505	5, 335	5, 109	3, 720	4, 102	1, 807	3, 985
New Jersey	371	429	479	335	403	235	253	295	333	239
Ohio	3, 239	1, 749	4, 493	2, 714	4, 492	1, 856	2, 287	4, 070	1, 774	2, 988
Indiana	4, 124	1, 972	4, 684	4, 610	3, 735	4, 158	4, 493	5, 000	3, 939	5, 195
Illinois	409	251	487	378	241	291	158	142	180	142
Michigan	939	417	1, 867	1, 222	1, 623	1, 402	2, 171	2, 653	2, 664	2, 964
Wisconsin	409	90	330	273	212	361	270	279	294	241
Minnesota	287	169	500	189	487	674	684	1, 289	1, 077	1, 448
Iowa	830	416	927	882	1, 176	1, 365	1, 434	1, 333	1, 430	1, 492
Virginia	139	280	371	274	345	138	178	131	178	234
Kentucky	304	382	258	263	266	152	134	145	69	59
Texas	4, 957	4, 209	4, 630	3, 027	3, 918	3, 941	5, 316	4, 028	7, 081	7, 232
Idaho	28	50	161	256	322	876	531	891	1, 152	731
Colorado	150	447	651	928	1, 064	1, 809	1, 758	1, 460	2, 244	4, 035
Utah	9	54	170	177	216	599	662	654	1, 029	950
Washington	810	702	765	1, 126	1, 016	1, 000	1, 200	1, 302	1, 153	1, 417
Oregon	27	343	263	392	558	681	678	671	663	660
California	4, 802	3, 542	3, 631	4, 145	2, 671	3, 603	3, 013	3, 753	4, 492	4, 144
Other States	340	254	369	330	235	540	536	499	351	264
Total	29, 472	20, 890	29, 760	29, 480	30, 796	31, 646	33, 062	35, 192	33, 326	40, 274

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from Mar. 1 of one year through June of the following year.
[2] Preliminary.

TABLE 259.—*Onions: Average l. c. l. price per 100 pounds to jobbers, at New York and Chicago, 1921–22 to 1930–31* [1]

Market and crop season	Various common varieties								Bermuda varieties					
									April		May		June	
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Yellow	Crystal white wax	Yellow	Crystal white wax	Yellow	Crystal white wax
New York:	*Dolls.*	*Dolls.*	*Dolls*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	2. 80	3. 43	5. 06	5. 63	5. 45	7. 34	8. 25	8. 21	7. 66	6. 20	4. 14	3. 79	3. 91	3. 54
1922–23	2. 08	1. 52	1. 72	2. 00	2. 99	2. 83	2. 45	2. 98	......	......	5. 31	5. 19	......	......
1923–24	2. 68	3. 21	3. 26	2. 75	2. 76	2. 73	2. 33	2. 20	......	......	3. 27	......	......	......
1924–25	2. 17	1. 89	1. 84	2. 08	2. 84	3. 05	3. 05	2. 86	4. 19	5. 04	6. 16	5. 01	7. 18	......
1925–26	2. 94	2. 36	2. 86	2. 80	3. 26	2. 95	2. 69	2. 81	......	......	4. 37	......	3. 27	......
1926–27	2. 26	1. 59	1. 82	1. 92	2. 74	3. 08	2. 76	3. 46	5. 36	......	5. 64	......	6. 64	......
1927–28	2. 17	1. 72	1. 60	1. 72	2. 18	2. 60	2. 89	4. 25	5. 38	6. 17	3. 14	3. 33	2. 37	2. 00
1928–29	2. 62	3. 53	3. 62	4. 14	4. 42	4. 88	5. 42	4. 67	4. 47	......	3. 10	......	3. 50	......
1929–30	2. 31	2. 02	1. 91	1. 86	2. 28	2. 23	2. 37	2. 11	3. 40	4. 05	2. 60	......	2. 96	......
1930–31	1. 88	1. 70	1. 53	1. 63	1. 55									
Chicago:														
1921–22	2. 58	3. 61	4. 47	5. 11	5. 62	7. 09	7. 64	8. 53	6. 21	6. 47	4. 05	4. 20	3. 43	3. 89
1922–23	2. 12	1. 61	1. 70	2. 22	2. 29	2. 56	3. 44	3. 38	5. 96	......	5. 15	5. 79	......	......
1923–24	3. 19	3. 48	3. 29	3. 22	3. 07	3. 27	3. 04	2. 79	5. 17	......	3. 37	4. 10	......	......
1924–25	3. 11	2. 73	2. 43	2. 52	2. 88	3. 96	3. 38	4. 32	4. 15	5. 46	6. 33	6. 75	7. 94	8. 39
1925–26	3. 41	2. 90	3. 11	3. 35	3. 46	3. 20	2. 81	3. 18	5. 60	5. 92	3. 97	4. 71	3. 21	3. 61
1926–27	2. 25	2. 07	1. 92	1. 69	2. 46	3. 31	3. 42	3. 92	5. 27	5. 96	5. 66	6. 15	5. 57	6. 07
1927–28	2. 57	1. 74	1. 68	1. 65	2. 02	2. 77	2. 78	4. 04	4. 57	5. 23	3. 04	3. 17	2. 31	2. 64
1928–29	2. 72	3. 35	3. 66	4. 22	4. 59	5. 27	5. 39	5. 26	4. 07	5. 22	3. 06	3. 33	3. 45	4. 42
1929–30	3. 08	2. 44	2. 12	2. 20	2. 29	2. 39	2. 18	1. 73	3. 87	4. 55	2. 78	3. 15	3. 02	3. 48
1930–31	[2] 2. 12	[2] 1. 80	[2] 1. 14	[2] .89	1. 47									

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets.

Average prices as shown are based on stock of U. S. No. 1 grade; they are simple averages of daily range of selling prices. In some cases conversions have been made from larger to smaller units or vice versa, in order to obtain comparability.

[1] Commodity reports were issued as follows: 1921-22, Aug. 22–June 14; 1922-23, Aug. 7–May 29; 1923-24, Aug. 14–June 4; 1924-25, Aug. 22–June 10; 1925-26, July 22 to end of season. For subsequent years onion reports have run through the entire year.
[2] Car-lot sales.

TABLE 260.—*Peas, green, commercial crop: Acreage, production, and price per bushel, per 1,000 pounds, or ton, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
FOR MARKET												
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Early:												
Arizona	500	500	300	170	25	50	38	15	1.33	2.00	1.68	1.74
California (Imperial)	1,700	3,000	4,400	3,800	85	240	242	437	2.20	3.00	2.52	2.25
Florida	700	1,230	1,320	730	34	68	59	29	3.50	2.50	2.80	1.50
Group total	2,900	4,730	6,020	4,700	144	358	339	481	2.35	2.77	2.47	2.19
Second early:												
California (other)	16,300	13,560	14,350	19,200	1,744	1,451	1,622	1,613	2.00	1.75	1.68	1.46
Louisiana	1,600	1,330	1,430	1,420	78	77	79	84	1.67	1.68	2.38	1.75
Mississippi	2,250	2,200	2,310	2,400	169	156	171	180	1.58	1.78	1.38	1.20
South Carolina	2,200	3,100	2,880	4,000	99	183	181	208	1.09	1.50	1.64	.70
Group total	22,350	20,190	20,970	27,020	2,090	1,867	2,053	2,085	1.91	1.72	1.68	1.37
Intermediate: (1)												
North Carolina	3,960	4,390	3,100	4,740	277	351	217	327	1.92	.82	1.61	.44
Tennessee	500	500	150	150	28	35	9	9	2.17	1.00	1.25	.75
Virginia	3,000	3,000	2,600	2,520	291	273	182	76	1.57	1.02	1.30	.45
Group total	7,460	7,890	5,850	7,410	596	659	408	412	1.76	.91	1.46	.45
Intermediate: (2)												
Delaware	80	80	100	100	7	6	7	2	2.00	1.75	1.00	1.00
Maryland	450	800	820	820	35	51	62	29	1.32	1.12	1.25	.90
New Jersey	4,000	3,500	3,800	3,800	360	280	304	224	2.13	1.40	1.30	1.65
Group total	4,530	4,380	4,720	4,720	402	337	373	255	2.06	1.36	1.29	1.56
Late: (1)												
Colorado	4,000	6,500	9,500	7,790	200	358	770	584	2.84	1.60	1.30	1.65
Idaho	-------	-------	1,150	2,500	-------	-------	126	275	-----	-----	.45	.60
New York	6,940	7,500	7,580	9,600	923	660	606	941	1.86	1.30	2.33	1.12
Oregon	-------	100	250	240	-------	12	35	35	-----	1.55	1.60	1.70
Washington	-------	-------	1,700	2,900	-------	-------	298	580	-----	-----	.90	.98
Group total	10,940	14,100	20,180	23,030	1,123	1,030	1,835	2,415	2.03	1.41	1.52	1.16
Late: (2)												
California (other)	4,810	3,250	4,280	7,300	390	481	437	657	1.90	2.93	1.82	1.90
Late: (3)												
California (Imperial)	4,000	6,000	8,500	11,500	280	300	425	690	2.10	1.75	2.24	1.92
Virginia (Norfolk)	-------	-------	400	800	-------	-------	160	12	-----	-----	3.00	1.50
Group total	4,000	6,000	8,900	12,300	280	300	585	702	2.10	1.75	2.45	1.91
Total, all States	56,990	60,540	70,920	86,480	5,025	5,032	6,030	7,007	1.96	1.72	1.72	1.41
FOR MANUFACTURE												
					1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	720	1,100	1,150	1,330	1,152	1,980	1,840	2,992	3.5	3.5	3.5	3.5
New York	25,540	32,200	32,800	34,440	40,864	48,815	39,360	75,768	3.0	3.0	3.0	3.1
New Jersey	500	350	400	500	1,200	770	800	250	3.2	4.0	3.8	3.5
Pennsylvania	1,320	1,680	1,730	2,010	3,696	3,063	4,325	1,809	2.9	3.0	3.0	3.0
Ohio	2,990	4,020	5,030	5,410	4,784	6,030	7,545	4,598	3.1	2.7	2.2	2.0
Indiana	1,880	5,290	5,500	6,270	3,008	9,797	9,350	13,857	2.9	2.0	2.6	3.0
Illinois	8,830	8,840	11,010	12,660	12,362	15,356	18,056	27,852	3.0	2.0	2.5	3.0
Michigan	8,400	8,500	10,900	11,660	11,760	13,294	13,625	22,037	2.8	2.0	2.4	2.6
Wisconsin	80,000	101,000	111,000	127,000	160,000	203,616	205,350	217,170	2.8	3.0	3.0	2.9
Minnesota	6,980	7,920	12,670	17,900	11,168	16,347	21,184	30,967	2.2	2.0	2.7	2.5
Delaware	1,700	2,060	3,040	3,200	5,100	3,529	6,536	1,056	3.0	3.0	3.0	3.0
Maryland	8,000	10,500	12,400	13,000	22,400	20,475	27,900	7,150	3.0	3.0	3.0	3.0
Tennessee	-------	1,400	1,400	1,400	-------	2,520	2,520	1,260	-----	3.0	3.0	3.0
Montana	-------	3,500	3,900	3,500	-------	7,560	7,254	8,190	-----	2.5	2.5	2.3
Colorado	1,900	3,000	3,400	3,700	3,420	5,700	6,038	6,727	3.0	2.5	2.2	2.3
Utah	8,460	10,150	11,670	13,070	20,304	26,035	26,316	35,942	2.7	3.0	2.8	2.8
Washington	-------	-------	1,940	2,100	-------	-------	4,268	5,250	-----	-----	3.0	3.0
California	750	1,100	880	950	2,100	2,420	799	2,508	3.0	2.8	3.0	3.0
Other States[2]	5,840	3,450	2,100	3,000	14,016	6,072	3,990	5,250	2.4	3.0	3.0	3.0
Total	163,810	205,960	232,920	263,100	317,334	393,379	407,056	470,633	2.8	2.8	2.9	2.9
FOR MARKET AND MANUFACTURE												
					Tons	*Tons*	*Tons*	*Tons*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Grand total	220,800	266,500	303,840	349,580	239,100	277,200	300,000	347,400	78.50	71.55	73.80	67.45

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters and canning establishments.

[1] Bushels containing approximately 32 pounds.
[2] Other States include Idaho, Iowa, Kansas, Virginia, and Wyoming.

TABLE 261.—*Peas, green: Car-lot shipments by State of origin, 1925–1930*

State	Crop movement season [1]					
	1925	1926	1927	1928	1929	1930 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	885	1, 110	975	837	731	891
New Jersey	20	27	40	38	28	2
Maryland	48	55	54	68	52	2
Virginia	303	288	259	281	222	129
North Carolina	491	596	570	685	368	482
South Carolina	104	167	207	247	244	265
Mississippi	149	233	243	250	199	234
Idaho	13	40	101	176	238	407
Colorado	35	58	149	348	459	450
Washington	43	64	111	152	334	797
California [3]	223	859	1, 328	1, 529	2, 177	2, 983
Other States [3]	42	125	109	77	108	134
Total	2, 356	3, 622	4, 146	4, 688	5, 160	6, 776

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season is for calendar year except for Imperial Valley, California; Florida; and Texas which begins in October of the preceding year.
[2] Preliminary.
[3] Figures for certain States include shipments in preceding year as follows: California, 1926, 4 cars in October, 220 in November, and 94 in December; 1927, 1 car in October, 223 in November, and 38 in December; 1928, 202 cars in November and 92 in December; 1929, 259 cars in November and 148 in December; 1930, 4 cars in October, 188 in November and 243 in December. Florida, 1927, 2 cars in December; 1928, 5 cars in November and 4 in December; 1929, 1 car in December. Texas, 1927, 1 car in December; 1928, 1 car in November.

TABLE 262.—*Peas, canned: Pack [1] in the United States, 1917–1930*

State	Season													
	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 cases	*1,000 ca es*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
New York	1, 394	2, 000	1, 040	2, 381	1, 382	2, 137	2, 541	2, 931	2, 385	2, 624	1, 668	2, 222	1, 683	3, 164
New Jersey [2]	755	332	248	549	345	153	199	331	257	143	267	242	383	74
Ohio	322	442	306	282	241	225	384	430	232	278	205	336	337	208
Indiana	604	454	381	271	182	268	367	483	86	500	90	427	404	564
Illinois	576	978	433	460	331	516	586	697	357	680	563	617	767	1, 560
Michigan	523	477	425	549	317	455	392	710	451	723	399	542	558	880
Wisconsin	3, 569	4, 520	4, 317	5, 804	4, 063	7, 042	6, 961	10, 390	10, 003	9, 287	6, 549	9, 248	9, 399	10, 492
Minnesota [3]	-----	-----	-----	-----	-----	-----	254	470	432	446	497	722	926	1, 333
Maryland	721	683	509	696	533	489	591	873	956	840	986	1, 030	1, 469	400
Utah	421	527	395	595	376	751	918	830	1, 346	1, 029	802	1, 154	1, 241	1, 662
California	350	253	205	328	84	496	239	282	271	222	(4)	(4)	(4)	(4)
Other States	594	397	426	402	353	510	516	888	1, 040	937	910	1, 403	1, 363	1, 698
U. S	9, 829	11, 063	8, 685	12, 317	8, 207	13, 042	13, 948	19, 315	17, 816	17, 709	12, 936	17, 943	18, 530	22, 035

Bureau of Agricultural Economics. Compiled from National Canners' Association except 1927 and 1928 from Census of manufactures.

[1] Stated in cases of 24 No. 2 cans.
[2] Includes Delaware.
[3] Previous to 1923, included in "Other States."
[4] Included in "Other States."

TABLE 263.—*Peppers, commercial crop for market: Acreage, production, and price per bushel, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per bushel			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.* [1]	*1,000 bush.* [1]	*1,000 bush.* [1]	*1,000 bush.* [1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall: Florida [2]	1,180	2,510	920	650	406	643	157	195	1.69	0.93	3.00	2.60
Early: Florida	1,520	3,900	5,000	4,980	485	1,470	1,675	1,494	1.25	1.34	1.46	1.50
Second early:												
Georgia			100	600			23	60			1.10	.75
Louisiana	3,020	2,220	2,250	2,320	616	309	506	302	1.21	.73	.93	.70
Mississippi	150	400	290	180	13	34	26	11	1.25	.75	1.00	.60
North Carolina	620	670	630	750	81	134	158	105	.75	.53	.75	.75
South Carolina			80	140			22	35			.75	1.05
Texas (other)			100	100			14	10			1.20	1.00
Group total	3,790	3,290	3,450	4,090	710	477	749	523	1.16	.68	.90	.74
Intermediate: New Jersey	7,000	7,500	7,500	7,000	1,680	1,725	1,350	1,750	.75	.65	.65	.50
Late:												
California	380	410	550	1,090	111	123	160	305	.60	1.23	.80	.78
Texas	900	280	510	950	144	28	69	114	.82	1.37	1.25	.80
Group total	1,280	690	1,060	2,040	255	151	229	419	.73	1.25	.93	.79
Grand total	14,770	17,890	17,930	18,760	3,536	4,466	4,160	4,381	1.01	.94	1.13	.99

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Bushels containing approximately 22 pounds.
[2] Season begins in fall of previous year.

TABLE 264.—*Pimientos, commercial crop for manufacture: Acreage, production, and price per ton, by States, 1927–1930*

State	Acreage				Production				Seasonal farm price per ton			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
California	3,340	3,250	2,120	2,140	10,490	8,420	7,000	6,910	40.00	40.00	40.00	40.00
Georgia	3,700	5,600	6,900	7,400	5,990	7,500	12,350	9,180	36.09	38.68	35.12	35.80
Total, 2 States	7,040	8,850	9,020	9,540	16,480	15,920	19,350	16,090	38.59	39.38	36.90	37.60

Bureau of Agricultural Economics. Estimates based upon returns from canning establishments.

TABLE 265.—*Potatoes: Acreage, production, value, exports, etc., United States, 1909–1930*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Wholesale price per bushel at New York [1]	Domestic exports, year beginning July 1 [2]	Imports year beginning July 1 [2]	Net balance, year beginning July 1 [2 3]
	1,000 acres	*Bushels*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	*3,669*	*106.1*	*389,195*						
1909	3,669	107.5	394,553	54.2	213,679	49	999	353	+646
1910	3,720	93.8	349,032	55.7	194,566	54	2,384	219	+2,177
1911	3,619	80.9	292,737	79.9	233,778	106	1,237	13,735	−12,283
1912	3,711	113.4	420,647	50.5	212,550	62	2,028	337	+1,693
1913	3,668	90.4	331,525	68.7	227,903	78	1,794	3,646	−1,823
1914	3,711	110.5	409,921	48.7	199,460	47	3,135	271	+2,866
1915	3,734	96.3	359,721	61.7	221,992	103	4,018	210	+3,810
1916	3,565	80.5	286,953	146.1	419,333	238	2,489	3,079	−558
1917	4,384	100.8	442,108	122.8	542,774	129	3,453	1,180	+2,273
1918	4,295	95.9	411,860	119.3	491,527	127	3,689	3,534	+205
1919	*3,252*	*89.3*	*290,428*						
1919	3,542	91.2	322,867	159.5	514,855	284	3,723	6,941	−3,212
1920	3,657	110.3	403,296	114.5	461,778	103	4,803	3,423	+1,399
1921	3,941	91.8	361,659	110.1	398,362	123	2,327	2,110	+222
1922	4,307	105.3	453,396	58.1	263,355	97	2,980	572	+2,408
1923	3,816	109.0	416,105	78.1	324,889	118	3,075	564	+2,512
1924	*2,911*	*121.1*	*352,462*						
1924	3,310	126.8	419,560	62.5	262,097	78	3,653	478	+3,187
1925	3,074	104.4	320,915	187.0	600,120	238	1,824	5,420	−3,575
1926	3,120	113.6	354,458	[4] 141.4	501,186	161	2,092	6,349	−4,205
1927	3,476	115.9	402,741	[4] 96.5	388,741	129	2,424	3,803	−1,313
1928	3,837	121.3	465,350	[4] 53.9	251,048	76	3,165	2,698	+528
1929	3,338	107.6	359,048	[4] 130.9	469,837	163	2,386	6,006	−3,521
1930 [5]	3,394	106.4	361,090	[4] 90.4	326,457				

Bureau of Agricultural Economics. Acreage, yield, and production figures are estimates of the crop-reporting board; italic figures are census returns. Prices received by producers are based upon returns from crop reporters. See 1927 Yearbook, p. 881, for data for earlier years.

[1] Compiled from Producers Price Current. Prices 1909–1919 are averages of the high and low weekly quotations of New York potatoes, October–June, converted from dollars per 180 pounds to cents per bushel beginning 1920, season September–May.

[2] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926, January and June issues, 1927–1930 and official records of the Bureau of Foreign and Domestic Commerce.

[3] The difference between total exports (domestic exports plus reexports) and total imports + indicates net exports and − indicates net imports.

[4] For some of the early and midseason States prices represent approximate seasonal average.

[5] Preliminary.

Table 266.—*Potatoes: Acreage and production, by States, average 1924–1928, annual 1927–1930*

State and division	Acreage					Production				
	Average, 1924–1928	1927	1928	1929	1930 [1]	Average, 1924–1928	1927	1928	1929	1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	149	161	181	179	188	38, 559	37, 352	39, 820	50, 120	45, 120
New Hampshire	11	12	12	10	11	1, 747	1, 800	1, 656	1, 660	2, 365
Vermont	20	21	21	17	17	2, 982	3, 255	2, 982	2, 550	3, 400
Massachusetts	14	14	15	12	12	1, 819	1, 400	1, 620	1, 596	2, 400
Rhode Island	2	2	2	2	2	295	220	244	250	380
Connecticut	15	15	17	14	14	1, 998	1, 635	2, 210	1, 820	2, 660
New York	274	270	284	270	251	31, 046	28, 620	32, 376	24, 840	29, 116
New Jersey	57	57	57	44	43	8, 225	9, 177	9, 120	5, 340	8, 260
Pennsylvania	215	220	246	234	234	26, 036	26, 400	31, 980	25, 740	23, 166
North Atlantic	759	772	835	782	772	112, 709	109, 859	122, 008	113, 916	116, 867
Ohio	113	116	123	106	105	11, 155	12, 180	12, 054	10, 494	9, 450
Indiana	53	53	61	55	56	4, 964	5, 035	6, 649	4, 620	4, 984
Illinois	69	64	70	63	67	6, 215	5, 376	7, 700	5, 040	5, 226
Michigan	268	289	306	263	263	29, 403	23, 120	35, 802	19, 725	15, 254
Wisconsin	244	260	278	220	244	27, 624	23, 920	31, 970	20, 240	18, 056
Minnesota	319	328	354	322	305	34, 704	33, 128	38, 940	27, 370	21, 350
Iowa	78	75	81	65	65	7, 781	6, 150	10, 935	6, 695	4, 550
Missouri	79	68	85	81	82	7, 014	5, 644	10, 285	5, 508	8, 692
North Dakota	115	113	141	145	116	10, 518	11, 526	14, 805	7, 685	7, 192
South Dakota	63	60	67	67	65	5, 187	6, 900	6, 030	4, 422	3, 445
Nebraska	87	84	105	92	94	7, 671	8, 904	10, 080	8, 924	9, 400
Kansas	51	49	54	47	45	5, 122	5, 390	7, 560	4, 375	4, 955
North Central	1, 540	1, 559	1, 725	1, 526	1, 507	157, 359	147, 273	192, 810	125, 098	112, 554
Delaware	6	6	7	6	5	580	714	658	492	250
Maryland	41	43	47	32	32	4, 020	5, 246	5, 405	3, 395	2, 430
Virginia	135	130	151	128	143	16, 615	19, 760	21, 618	17, 135	14, 583
West Virginia	50	52	60	57	60	5, 344	5, 876	7, 500	6, 555	4, 200
North Carolina	70	72	95	74	90	6, 991	7, 368	10, 545	8, 207	8, 839
South Carolina	30	29	36	22	23	3, 210	3, 034	4, 068	2, 608	2, 973
Georgia	19	17	22	20	20	1, 291	1, 304	1, 682	1, 565	1, 624
Florida	27	29	31	23	32	3, 031	3, 045	3, 875	2, 714	2, 560
South Atlantic	379	378	449	362	405	41, 083	46, 347	55, 351	42, 671	37, 459
Kentucky	50	52	57	50	45	4, 558	4, 732	5, 985	4, 395	2, 831
Tennessee	38	39	43	39	41	3, 024	3, 432	4, 086	3, 576	2, 887
Alabama	31	33	38	28	36	2, 252	2, 475	2, 812	2, 409	2, 875
Mississippi	12	12	15	14	14	965	936	1, 329	1, 214	970
Arkansas	30	29	36	31	33	2, 039	1, 972	2, 700	2, 708	2, 869
Louisiana	35	41	41	31	37	2, 287	2, 665	2, 870	1, 977	2, 655
Oklahoma	44	45	63	44	43	3, 174	2, 925	5, 038	3, 313	3, 893
Texas	31	35	39	31	41	2, 031	2, 310	2, 690	2, 459	3, 674
South Central	272	286	332	268	290	20, 330	21, 447	27, 510	22, 051	22, 654
Montana	35	36	37	33	29	3, 772	4, 860	4, 255	1, 980	2, 204
Idaho	92	115	116	102	117	17, 131	24, 380	19, 720	17, 136	25, 038
Wyoming	15	17	21	17	17	1, 762	2, 329	2, 352	1, 734	2, 550
Colorado	84	96	110	88	86	12, 419	14, 400	13, 420	12, 320	15, 050
New Mexico	2	2	2	2	3	140	150	132	182	210
Arizona	3	4	3	3	4	219	320	222	240	320
Utah	18	22	23	18	20	2, 613	2, 970	3, 312	3, 330	3, 600
Nevada	5	6	6	4	3	705	780	840	680	525
Washington	65	79	70	56	64	9, 986	13, 430	9, 450	8, 680	9, 984
Oregon	46	52	52	42	42	4, 996	6, 240	6, 240	3, 780	6, 300
California	48	52	56	35	35	7, 379	7, 956	7, 728	5, 250	5, 775
Western	414	481	496	400	420	61, 123	77, 815	67, 671	55, 312	71, 556
United States	3, 363	3, 476	3, 837	3, 338	3, 394	392, 605	402, 741	465, 350	359, 048	361, 090

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 267.—*Potatoes: Yield per acre and estimated price per bushel December 1, by States, averages, and annual 1925–1930*

State and division	Yield per acre							Estimated price per bushel [1]						
	Av., 1919–1928	1925	1926	1927	1928	1929	1930	Av., 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	246	250	290	232	220	280	240	100	200	133	85	40	120	65
New Hampshire	145	145	165	150	138	166	215	142	235	170	140	80	160	105
Vermont	144	125	155	155	142	150	200	130	215	140	125	85	150	90
Massachusetts	125	140	155	100	108	133	200	153	245	180	155	90	180	110
Rhode Island	124	140	150	110	122	125	190	153	245	180	155	90	180	115
Connecticut	125	135	155	109	130	130	190	157	250	180	165	90	180	115
New York	113	86	117	106	114	92	116	124	215	160	125	65	145	90
New Jersey [1]	134	106	145	161	160	121	192	122	230	155	110	50	160	95
Pennsylvania	112	123	112	120	130	110	99	126	194	170	120	65	160	115
North Atlantic	139.0	132.6	153.2	142.3	146.1	145.7	151.4	117.4	207.0	152.8	110.2	57.2	139.6	87.0
Ohio	90	106	94	105	98	99	90	131	200	170	120	75	155	110
Indiana	84	83	80	95	109	84	89	128	216	165	110	70	150	115
Illinois	77	60	80	84	110	80	78	133	235	175	115	65	155	125
Michigan	104	103	120	80	117	75	58	89	162	120	90	40	125	85
Wisconsin	106	112	118	92	115	92	74	89	170	120	85	35	120	80
Minnesota	99	97	100	101	110	85	70	77	154	115	60	30	100	65
Iowa	88	63	79	82	135	103	70	122	235	170	100	51	140	130
Missouri [1]	81	57	80	83	121	68	106	130	225	170	115	60	150	95
North Dakota	86	72	80	102	105	53	62	78	150	120	50	30	105	80
South Dakota	80	65	60	115	90	66	53	96	180	159	55	40	115	95
Nebraska	84	75	73	106	96	97	100	105	180	160	75	50	110	85
Kansas [1]	88	67	91	110	140	93	110	128	235	170	100	45	140	90
North Central	94.2	88.8	97.7	94.5	111.8	82.0	74.7	96.7	177.7	134.1	82.6	43.0	123.1	88.5
Delaware	87	64	86	119	94	82	50	115	200	140	80	75	160	115
Maryland [1]	92	73	90	122	115	106	76	114	194	140	105	50	120	95
Virginia [1]	115	90	94	152	143	134	102	119	195	140	130	50	125	105
West Virginia	104	87	106	113	125	115	70	133	193	167	125	80	140	135
North Carolina [1]	93	78	94	102	111	111	98	133	180	160	150	65	120	120
South Carolina [1]	98	96	111	105	113	119	129	156	210	170	190	65	140	130
Georgia [1]	69	49	63	77	76	78	81	166	210	190	165	115	140	125
Florida [1]	104	124	118	105	125	118	80	212	260	300	185	150	180	175
South Atlantic	102.3	86.0	96.4	122.6	123.3	117.9	92.5	134.3	200.3	165.4	137.5	67.3	131.3	119.0
Kentucky [1]	85	60	96	91	105	88	63	133	200	155	130	80	135	125
Tennessee [1]	77	56	78	88	95	92	70	138	195	157	135	90	135	125
Alabama [1]	75	57	70	75	74	86	80	160	220	190	150	85	145	145
Mississippi [1]	78	67	71	78	89	87	69	166	200	180	165	120	155	140
Arkansas [1]	67	60	60	68	75	87	87	151	210	185	150	80	140	115
Louisiana [1]	65	60	61	65	70	64	72	163	210	190	165	100	145	135
Oklahoma [1]	70	72	67	65	80	75	91	156	225	170	180	75	130	120
Texas [1]	62	53	70	66	69	79	90	175	240	200	165	100	150	155
South Central	72.9	60.6	72.7	75.0	82.9	82.3	78.1	151.1	212.2	174.3	151.4	87.1	139.6	132.1
Montana	105	108	85	135	115	60	76	97	160	120	65	55	170	110
Idaho	181	196	178	212	170	168	214	81	145	105	55	45	120	60
Wyoming	110	120	112	137	112	102	150	101	160	125	70	65	130	75
Colorado	139	195	145	150	122	140	175	89	155	130	55	45	110	60
New Mexico	64	75	83	75	66	91	70	139	200	175	120	95	150	115
Arizona	74	57	55	80	74	80	80	160	230	200	110	110	170	125
Utah	157	160	145	135	144	185	180	86	133	105	75	45	100	60
Nevada	148	170	140	130	140	170	175	119	190	130	85	85	150	110
Washington	148	155	160	170	135	155	156	91	165	95	60	50	145	75
Oregon	105	104	100	120	120	90	150	98	150	100	75	70	140	85
California [1]	146	159	161	153	138	150	165	116	200	132	95	65	140	105
Western	140.3	158.5	144.1	161.8	136.4	138.3	170.4	92.6	159.5	113.2	64.0	52.4	126.5	70.8
United States	109.0	104.4	113.6	115.9	121.3	107.6	106.4	108.2	187.0	141.4	96.5	53.6	130.9	90.4

Bureau of Agricultural Economics. Yield figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] Prices shown for years 1926–1930 in early and mid-season States marked represent approximate seasonal average.

TABLE 268.—*Potatoes: Acreage, yield per acre, and production in specified countries, average 1909–1913, annual 1929 and 1930*

Country	Acreage			Yield per acre			Production		
	Average, 1909–1913 [1]	1929	1930 *	Average, 1909–1913 [1]	1929	1930 *	Average, 1909–1913 [1]	1929	1930 *
NORTHERN HEMISPHERE									
	1,000 acres	*1,000 acres*	*1,000 acres*	*Bush.*	*Bush.*	*Bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
North America:									
Canada	483	544	571	161.2	122.3	140.8	77,843	66,550	80,402
United States	3,677	3,338	3,394	97.3	107.6	106.4	357,699	359,048	361,090
Total	4,160	3,882	3,965	104.7	109.6	111.3	435,542	425,598	441,492
Europe:									
United Kingdom	746	816	683	232.6	268.4		173,520	219,037	
Irish Free State	420	363	347	192.7	309.2		80,924	112,249	
Norway	102	114	117	242.9	290.1	241.4	24,780	33,070	28,245
Sweden	377	348	347	152.7	203.6	169.5	57,581	70,843	58,822
Denmark	161	158	170	202.7	249.3	217.9	32,642	39,388	37,037
Netherlands	411	450	405	253.2	334.5	233.9	104,051	150,526	94,716
Belgium	404	423	400	274.3	339.5	252.7	110,830	143,593	101,097
France	4,066	3,643	3,491	129.6	167.6		526,793	610,605	
Spain	[2] 642	911	953	[2] 176.0	186.4	161.8	[2] 112,997	169,853	154,153
Italy	759	867	863	89.0	85.1	82.8	67,514	73,771	71,473
Switzerland	[3] 115	118	120	[3] 214.5	258.4	187.4	[4] 24,664	30,497	22,487
Germany	6,775	7,006	6,927	202.7	210.2	235.0	1,373,609	1,472,570	1,627,910
Austria	436	469	474	122.4	219.6	192.1	53,373	102,993	91,046
Czechoslovakia	1,849	1,880	1,750	132.6	209.0	171.7	245,210	392,996	300,491
Hungary	619	701	680	114.9	113.7	87.5	71,118	79,670	59,488
Yugoslavia	458	575		101.1	103.8		46,288	59,696	
Rumania	[4] 399	744		108.0	122.7		43,086	91,261	
Poland	5,941	6,513		153.3	179.1		910,864	1,166,592	1,063,713
Lithuania	403	326	403	101.4	208.8	165.1	40,864	68,082	66,537
Latvia	209	204	231	120.7	194.5	160.1	25,217	39,674	36,994
Estonia	190	152	168	144.9	182.0	178.5	27,526	27,671	29,985
Finland	[5] 181	178	175	101.9	162.1	164.9	18,443	28,858	28,856
Russia	7,225	14,688		102.5	119.7		740,728	1,758,168	
Total European countries reporting area and production, all years	13,633	14,305	14,183	175.3	204.4	198.1	2,390,419	2,924,055	2,809,337
Estimated European total, excluding Russia	25,500	27,100	26,600				4,165,000	5,210,000	4,850,000
Total Northern Hemisphere reporting area and production all years	17,793	18,187	18,148	158.8	184.2	179.1	2,825,961	3,349,653	3,250,829
Estimated Northern Hemisphere total, excluding Russia	30,100	31,900	31,400				4,647,000	5,710,000	5,357,000
SOUTHERN HEMISPHERE									
Chile	69	107		123.3	165.7		8,510	17,726	
Argentina	217	328		140.6	98.4		30,515	32,283	
Australia	144			100.5			14,469		
Estimated Southern Hemisphere total	700	1,500					76,000	100,000	
Estimated world total, excluding Russia and China	30,800	33,400					4,723,000	5,810,000	

Bureau of Agricultural Economics. Official sources and International Insitute of Agriculture. Estimates given are for crops harvested in the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemishpere.

* Preliminary.
[1] Averages for countries having changed boundaries are estimates for present boundaries.
[2] 2-year average.
[3] 3-year average.
[4] 4-year average.
[5] 1 year only.

TABLE 269.—*Potatoes, early commercial crop: Acreage, production, and price per bushel, by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per bushel			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.* [1]	*1,000 bush.* [1]	*1,000 bush.* [1]	*1,000 bush.* [1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall: Texas	350	300	750	650	18	18	38	51	1.40	1.42	1.05	1.80
Early: (1)												
Florida	28,000	30,000	22,000	31,000	2,940	3,750	2,596	2,480	1.84	1.49	1.75	1.75
Texas (Lower Valley)	13,460	10,520	9,800	15,000	740	736	980	1,530	1.81	1.72	1.65	1.75
Group total	41,460	40,520	31,800	46,000	3,680	4,486	3,576	4,010	1.83	1.53	1.72	1.75
Early: (2)												
Alabama	13,200	17,700	8,700	12,300	1,109	1,504	766	1,218	1.37	.75	1.45	1.45
California	17,800	22,650	11,300	12,300	1,798	2,741	1,356	2,103	1.08	.61	1.22	1.20
Georgia	2,250	2,500	1,100	2,200	259	225	143	330	1.96	.80	1.35	1.40
Louisiana	21,860	21,800	15,000	22,000	1,421	1,526	945	1,650	1.69	1.00	1.50	1.35
Mississippi	1,700	1,950	1,560	1,870	136	176	136	137	1.27	1.12	1.45	1.53
South Carolina	18,000	24,000	14,000	16,000	2,070	3,360	2,100	2,400	1.92	.56	1.30	1.28
Texas (other)	8,300	13,580	8,960	13,100	681	896	520	1,100	1.56	.70	1.27	1.26
Group total	83,110	104,180	60,620	79,770	7,474	10,428	5,966	8,938	1.55	.69	1.33	1.30
Second early:												
Arkansas	3,890	6,030	3,440	4,700	276	555	310	494	1.67	.53	1.00	1.15
Maryland	11,500	11,500	9,000	10,350	1,955	1,863	1,440	1,283	1.20	.33	1.20	.85
North Carolina	36,000	46,400	25,000	31,250	4,320	6,403	3,300	4,062	1.91	.54	1.00	1.30
Oklahoma	15,000	17,000	12,000	11,000	1,530	1,428	1,080	1,408	2.00	.37	.95	1.10
Tennesee	------	2,000	1,500	1,700	------	228	156	136	------	.60	1.16	1.20
Virginia	78,700	90,900	73,600	90,000	14,115	15,908	11,641	11,880	1.35	.41	1.17	.98
Norfolk	14,000	14,000	10,700	12,400	2,310	2,100	1,498	1,736	1.28	.41	1.15	1.15
Eastern Shore	60,000	71,700	59,000	73,300	11,100	13,054	9,617	9,542	1.39	.41	1.18	.94
Other	4,700	5,200	3,900	4,300	705	754	526	602	1.00	.41	1.14	1.10
Group total	145,090	173,830	124,540	149,000	22,196	26,385	17,927	19,263	1.50	.44	1.13	1.05
Intermediate:												
Kansas [2]	17,300	18,760	14,790	14,150	2,508	3,613	1,798	2,527	.85	.25	1.08	.70
Kentucky	5,340	5,340	4,270	5,250	662	1,041	705	341	.94	.38	1.35	.90
Missouri	5,180	6,400	4,610	5,070	648	1,280	553	1,039	1.08	.38	1.10	.80
Nebraska	1,700	1,900	1,750	1,650	255	285	262	280	.75	.50	1.20	1.10
New Jersey	36,000	36,000	30,000	30,000	5,796	5,832	3,870	6,210	.81	.45	1.60	.88
Group total	65,520	68,400	55,420	56,120	9,869	12,051	7,188	10,397	.85	.38	1.39	.84
Grand total	335,530	387,230	273,130	331,540	43,237	53,368	34,695	42,659	1.39	.57	1.28	1.12

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Bushels containing approximately 60 pounds.
[2] Scott County included beginning with 1928. Previous estimate relates to Kaw Valley only.

TABLE 270.—*Potatoes: Certified-seed production, 1924–1928*

State	1924	1925	1926	1927	1928	1929	1930
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
California	----------	12,050	12,075	17,800	12,000	11,335	4,200
Colorado	22,037	28,560	31,300	77,105	57,890	71,450	51,945
Idaho	----------	278,148	371,479	866,162	349,509	204,150	188,882
Kentucky	----------	----------	22,920	25,500	8,754	21,117	9,050
Maine	5,052,681	2,226,050	2,294,845	3,278,101	5,094,128	3,998,902	2,709,808
Maryland	----------	8,205	18,390	32,078	21,581	40,488	16,808
Michigan	291,086	214,656	337,000	162,397	854,742	741,215	212,125
Minnesota	777,800	596,605	693,685	621,999	1,162,540	911,099	548,291
Montana	31,950	67,800	113,365	180,562	236,499	72,380	68,962
Nebraska	79,750	121,200	60,200	181,500	152,400	317,770	481,800
New Hampshire	30,328	12,287	2,695	14,778	17,250	9,264	36,064
New Jersey	81,850	57,911	92,916	475	100,355	62,286	49,666
New York	363,065	210,700	225,371	323,080	470,528	572,100	602,561
North Dakota	101,836	171,110	181,400	321,305	539,855	412,300	372,000
Ohio	11,230	4,120	5,600	6,300	6,150	6,400	4,800
Oregon	15,900	27,600	46,000	87,840	154,237	137,711	74,050
Pennsylvania	65,000	25,965	41,115	29,870	60,490	69,760	46,016
South Dakota	----------	23,600	28,441	49,856	59,309	59,206	27,790
Vermont	225,000	108,655	160,031	252,582	136,119	136,531	132,850
Washington	----------	17,550	30,300	121,350	81,825	76,900	85,085
Wisconsin	357,074	163,025	196,500	243,000	448,400	293,360	261,391
Wyoming	----------	21,000	138,000	259,500	350,000	185,500	299,780
Total	7,506,587	4,396,797	5,103,628	7,153,140	10,374,561	8,411,244	6,283,924

Bureau of Agricultural Economics. As reported by certifying officials.

TABLE 271.—*Potatoes: Car-lot shipments, by States of origin, 1928–29 to 1930–31*

State and crop season	Crop movement season [1]																
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Florida: [2]																	
1928–29	1,474	5,895	365	10													7,744
1929–30 [3]	3,988	1,061	7	8	3			2									5,069
1930–31 [3]	2,662	2,089	25	23	1	1		2	17								
Texas: [4]																	
1928–29	1,139	1,326	893	93	12		5										3,468
1929–30 [3]	1,622	440	668	36		1		2									2,769
1930–31 [3]	1,955	2,687	838	1	1		1		53								
Louisiana: [5]																	
1928–29	36	1,167	488	9	9	5		4	5	2	2						1,727
1929–30 [3]	92	751	256	3													1,102
1930–31 [3]	2	2,069	214					3	15								
Alabama:																	
1928–29		934	2,121	66	6	2	1				3						3,133
1929–30 [3]	12	1,126	388	13	2												1,541
1930–31 [3]	16	2,559	131	2		1											
California:																	
1928–29	6	392	974	607	678	794	828	711	688	836	533	406	79	30			7,562
1929–30 [3]		107	614	932	1,052	986	897	690	607	644	510	509	147	92			7,787
1930–31 [3]	1	718	1,286	545	884	1,016	782	652	480								
South Carolina:																	
1928–29		1,161	3,438	40	42	16	6		1	2							4,706
1929–30 [3]		3,146	641	14	6				1		1						3,809
1930–31 [3]		3,297	1,206														
North Carolina:																	
1928–29		13	7,623	1,008	533	390	113	33	7	5	8	2	1				9,736
1929–30 [3]		482	4,857	466	147	34	10	3	4								6,003
1930–31 [3]	1	184	6,893	238	14	22	2		1								
Virginia:																	
1928–29			8,631	13,913	4,128	597	176	92	20	3	6	5	14	94			27,679
1929–30 [3]			10,022	10,489	515	68	29	18	2	4	7	13	8	2			21,177
1930–31 [3]			7,498	13,328	708	137	27	12	1								

[1] Crop-movement season extends from Apr. 1 of one year through July of the following year, except in Florida, where the season begins in March.

[2] Totals for April include cars moved earlier as follows: 1928–29, 27 in December, 46 in January, 57 in February, and 143 in March; 1929–30, 1 in December, 5 in January, 37 in February, 1,013 in March; 1930–31, 30 in January, 183 in February, and 543 in March.

[3] Preliminary.

[4] Totals for April include cars moved earlier as follows: 1928–29, 23 in December, 12 in January, 10 in February, 132 in March; 1929–30, 15 in December, 53 in January, 31 in February, and 263 in March; 1930–31, 6 in December, 10 in January, 59 in March.

TABLE 271.—*Potatoes: Car-lot shipments, by State of origin, 1928–29 to 1930–31*—Continued

State and crop season	Crop movement season [1]																
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Oklahoma:																	
1928–29			1,313	666	35	7		1		18	17	1					2,058
1929–30 [3]			1,727	470	3					3	4		1				2,208
1930–31 [3]		22	2,609	34	5			1									
Maryland:																	
1928–29			27	1,952	1,001	92	12	12	2	1	2	11	10	1			3,123
1929–30 [3]			17	2,197	129	12	31	26	2			10	2				2,426
1930–31 [3]			37	1,822	253	23	11	7	1								
Kansas:																	
1928–29			1	971	1,731	1,382	557	137	34	24	3	7		1			4,848
1929–30 [3]			1	1,570	834	33	2										2,440
1930–31 [3]			347	2,805	650	33											
Washington:																	
1928–29				398	528	916	951	796	511	658	764	783	916	554	274		8,049
1929–30 [3]				310	520	949	1,587	886	393	857	861	809	620	146	208		8,146
1930–31 [3]				431	635	965	1,050	552	413								
New Jersey:																	
1928–29				5	2,644	2,062	543	76	13	8	6	9	1				5,367
1929–30 [3]				826	2,926	37	13	4		3		2					3,811
1930–31 [3]				476	5,197	880	6	6	1								
Idaho:																	
1928–29				51	233	863	1,831	1,926	1,650	2,363	2,566	2,511	2,721	1,881	291		18,887
1929–30 [3]				72	788	1,588	3,021	1,941	1,805	2,568	2,212	2,638	1,809	548	21		19,011
1930–31 [3]				209	756	1,807	3,825	3,080	2,537								
Colorado:																	
1928–29				83	542	1,855	2,144	1,481	1,281	2,360	1,679	1,223	747	286	33		13,714
1929–30 [3]				126	1,022	2,578	2,612	1,403	1,508	2,065	1,416	1,626	888	117	4		15,365
1930–31 [3]				252	770	2,901	3,044	1,613	1,451								
New York:																	
1928–29					641	1,622	2,655	1,693	1,019	1,418	1,328	1,561	1,094	408	38	1	13,478
1929–30 [3]				44	1,789	1,146	1,388	748	665	954	804	894	622	149	5		9,208
1930–31 [3]				62	2,361	2,298	2,908	1,718	1,122								
Minnesota:																	
1928–29				119	707	1,753	4,055	1,659	573	1,143	2,417	3,960	1,656	1,822	589	3	20,456
1929–30 [3]				229	2,412	3,655	4,206	1,483	951	1,558	2,972	3,195	1,664	542	56		22,923
1930–31 [3]				106	1,469	2,019	2,885	833	451								
Oregon:																	
1928–29				11	45	92	310	311	160	123	89	149	253	97	13		1,653
1929–30 [3]				21	42	49	410	251	141	161	135	156	164	28	2		1,560
1930–31 [3]				29	15	49	457	508	393								

Nebraska:																	
1928–29				2	197	535	485	512	412	839	940	525	215	105	17		4,784
1929–30 [3]				14	584	1,051	1,748	632	606	978	977	435	176	8	3		7,212
1930–31 [3]					372	1,099	1,886	964	972								
Maine:																	
1928–29					36	2,874	5,984	3,862	3,801	5,671	5,061	4,978	4,004	3,134	1,608	98	41,111
1929–30 [3]					1,146	6,942	8,818	4,736	5,726	6,633	6,149	7,049	6,639	5,624	1,920	22	61,404
1930–31 [3]					708	5,249	7,117	4,504	5,571								
Wisconsin:																	
1928–29					332	1,763	1,872	1,284	1,135	1,550	1,799	1,824	1,338	1,820	1,092	41	15,850
1929–30 [3]					1,462	1,847	1,769	1,027	1,546	1,954	1,568	1,627	1,271	575	63		14,709
1930–31 [3]				1	994	1,502	936	623	797								
Pennsylvania:																	
1928–29					45	486	1,055	1,027	585	881	671	540	374	159	6		5,829
1929–30 [3]				2	98	212	361	361	238	386	224	152	90	8			2,132
1930–31 [3]				2	13	175	146	64	46								
Michigan:																	
1928–29					10	678	1,977	1,436	836	1,487	1,364	1,634	1,762	2,038	952	15	14,189
1929–30 [3]					14	138	512	479	528	774	847	1,188	1,122	709	26		6,337
1930–31 [3]						40	220	213	292								
North Dakota:																	
1928–29						389	2,453	407	168	308	748	1,143	321	318	72	6	6,333
1929–30 [3]					2	1,433	1,886	296	159	359	608	791	429	62	1		6,026
1930–31 [3]						899	1,911	175	70								
Other States:																	
1928–29		140	477	1,011	2,117	1,954	1,893	772	290	338	398	505	357	266	54		10,572
1929–30 [3]		233	576	1,577	1,899	1,682	2,658	718	270	361	438	412	311	39	1		11,175
1930–31 [3]	1	471	1,535	1,811	926	1,267	1,750	744	408								
Total:																	
1928–29	[6] 2,655	11,028	26,351	21,015	16,252	21,127	29,906	18,232	13,191	20,038	20,404	21,777	15,863	13,014	5,039	164	256,056
1929–30 [3]	[7] 5,714	7,346	19,774	19,419	17,395	24,441	31,958	15,706	15,152	20,262	19,733	21,506	15,963	8,649	2,310	22	245,350
1930–31 [3]	[8] 4,638	14,096	22,619	22,177	16,732	22,383	28,964	16,274	15,092								

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis. Figures for earlier years appear in 1927 and earlier Yearbooks.

[5] Totals for April include cars moved in March, as follows: 1 in 1928 and 6 in 1929.
[6] Includes 50 cars in December, 58 in January, 67 in February, and 276 in March.
[7] Includes 16 cars in December, 58 in January, 68 in February, and 1,282 in March.
[8] Includes 6 cars in December, 40 in January, 183 in February, and 602 in March.

TABLE 272.—*Potatoes: Car-lot shipments, United States, by months, 1920–1930*

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1920	13, 752	9, 471	14, 612	9, 297	7, 043	14, 042	15, 317	14, 119	18, 875	32, 170	26, 067	10, 411	185, 176
1921	14, 477	12, 487	16, 449	14, 948	14, 926	16, 421	15, 606	16, 240	26, 322	42, 956	16, 729	10, 440	218, 001
1922	16, 721	13, 722	22, 334	20, 059	20, 284	22, 104	18, 833	18, 239	24, 420	35, 193	21, 050	12, 448	245, 407
1923	17, 262	14, 609	24, 468	23, 199	16, 302	20, 295	16, 733	16, 735	24, 063	35, 223	20, 737	11, 977	241, 603
1924	19, 762	20, 716	22, 940	19, 461	18, 736	20, 845	23, 626	16, 394	21, 387	34, 141	20, 852	13, 237	252, 097
1925	21, 715	20, 394	21, 639	20, 123	20, 215	19, 798	17, 765	14, 864	23, 569	33, 631	16, 286	11, 524	241, 523
1926	16, 185	14, 834	19, 974	14, 238	16, 903	23, 587	20, 310	15, 327	22, 978	36, 182	18, 419	13, 487	232, 424
1927	17, 974	17, 784	21, 497	20, 283	16, 691	22, 155	21, 053	17, 853	25, 003	38, 333	21, 124	13, 695	253, 445
1928	20, 278	22, 913	23, 710	17, 255	23, 740	29, 675	21, 048	16, 252	21, 127	29, 906	18, 232	13, 207	257, 343
1929	20, 096	20, 472	23, 059	20, 153	20, 360	24, 813	19, 583	17, 395	24, 441	31, 958	15, 706	15, 158	253, 194
1930 [1]	20, 302	19, 916	22, 106	19, 770	22, 745	24, 904	22, 199	16, 732	22, 383	28, 964	16, 274	15, 092	251, 387

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis, 400 to 700 bushels to a carload.

[1] Preliminary.

TABLE 273.—*Potatoes: International trade, average 1911–1913, annual 1926–1929*

Country	Calendar year									
	Average, 1911–1913		1926		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Netherlands	1, 952	16, 451	494	18, 387	748	16, 988	1, 231	17, 833	388	21, 078
France	7, 143	8, 683	14, 449	8, 186	9, 821	9, 347	14, 422	12, 653	15, 535	8, 708
Italy	242	3, 975	461	9, 524	505	8, 295	4, 265	7, 612	4, 165	5, 692
Poland	(1)	(1)	4	4, 468	8	5, 103	8	2, 929	8	3, 240
Belgium	4, 921	8, 692	4, 502	9, 400	3, 813	6, 951	4, 197	14, 027	8, 132	10, 901
Canada	525	1, 207	467	8, 169	504	7, 687	708	6, 309	1, 189	7, 145
Argentina	1, 337	543	226	2, 234	33	2, 966	42	1, 901	[2] 482	2, 338
Spain	0	1, 835	218	2, 227	949	1, 931	1, 800	2, 624	[2] 1, 917	[2] 3, 602
Hungary	(1)	(1)	83	4, 987	211	2, 663	435	2, 255	463	2, 672
Czechoslovakia	(1)	(1)	1, 708	46	1, 498	2, 729	534	1, 208	438	1, 147
Estonia	(1)	(1)	1	396	3	1, 310	1	1, 380	0	490
Japan	0	440	0	485	0	733	0	734	0	603
Denmark	40	928	217	117	741	47	1, 981	38	308	46
China	36	288	0	175	0	124	0	187	0	312
Russia	309	7, 762	[2] 7	[2] 35	[2] 6	1, 066	-----	-----	-----	-----
Norway	215	60	1	76	52	87	99	15	3	24
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	11, 382	6, 246	12, 618	1, 937	10, 838	3, 039	17, 727	1, 854	10, 844	5, 450
Germany	29, 180	12, 412	15, 975	3, 565	23, 484	2, 537	17, 956	6, 683	11, 310	4, 170
Cuba	2, 001	2	3, 570	49	4, 076	78	3, 616	151	[2] 3, 428	[2] 90
Austria	[3] 4, 070	[3] 1, 451	3, 873	129	2, 424	194	2, 066	3, 001	[2] 2, 401	[2] 966
Switzerland	3, 172	42	2, 615	4	1, 887	3	2, 822	5	2, 044	3
Uruguay	[4] 768	1	1, 631	1	1, 452	1	1, 210	2	1, 587	1, 580
United States	5, 707	1, 814	5, 728	2, 033	5, 272	2, 379	3, 710	2, 698	4, 276	2, 735
Algeria	1, 218	931	1, 165	1, 553	1, 381	1, 152	1, 783	1, 396	1, 423	1, 479
Portugal	273	500	[2] 1, 178	[2] 269	[2] 1, 403	[2] 46	2, 397	59	2, 363	70
Brazil	939	0	1, 588	0	1, 314	0	1, 023	0	1, 488	0
Yugoslavia	(1)	(1)	168	71	519	82	652	67	938	29
Finland	479	15	493	0	327	2	738	0	928	------
Egypt	599	[3] 28	827	77	853	101	753	247	949	195
Irish Free State	(1)	(1)	880	636	566	1, 018	322	1, 350	762	579
Tunis	[5] 274	[5] 2	357	3	436	2	409	3	[2] 489	[2] 1
Sweden	700	64	36	16	615	158	1, 081	1	31	0
Philippine Islands	334	0	336	0	345	0	382	0	406	0
Venezuela	[4] 8	0	116	0	142	0	228	0	------	------
Total, 34 countries	77, 824	74, 372	75, 992	79, 255	76, 224	78, 819	88, 599	89, 222	78, 695	83, 765

Bureau of Agricultural Economics. Official sources except where otherwise noted. These figures do not include sweetpotatoes.

* Preliminary.
[1] Figures for pre-war years are included in the countries of the pre-war boundaries.
[2] International Yearbook of Agricultural Statistics.
[3] Average for Austria-Hungary.
[4] One year only.
[5] Three-year average.

Table 274.—*Potatoes: Estimated average price per bushel, received by producers, United States, 1921–22 to 1930–31*

Crop year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	103.4	152.8	153.1	130.6	116.8	109.4	112.0	116.6	115.7	109.0	104.2	103.7	121.4
1922–23	109.0	101.4	78.8	66.2	60.5	58.8	62.0	64.2	68.6	77.4	79.0	79.8	75.3
1923–24	102.9	120.8	109.6	91.4	82.5	81.5	86.4	88.1	87.8	91.1	91.3	100.7	94.6
1924–25	109.0	111.3	81.0	68.8	63.5	64.1	70.2	72.3	71.4	70.5	70.6	84.4	77.9
1925–26	125.5	155.4	121.1	125.6	198.4	201.5	220.5	226.0	225.6	270.5	244.8	190.1	183.4
1926–27	174.6	140.5	130.6	126.4	141.3	137.0	139.1	134.1	127.0	126.8	146.0	191.0	142.0
1927–28	183.1	146.3	107.4	97.9	95.4	94.1	93.6	96.2	113.1	116.8	103.3	83.6	108.1
1928–29	77.4	71.9	64.8	58.0	56.9	57.7	58.9	59.5	58.4	55.3	59.3	63.3	62.0
1929–30	87.0	138.6	135.5	138.2	134.8	135.3	137.8	139.1	136.7	146.1	150.2	148.6	136.2
1930–31	129.4	108.8	109.9	101.7	95.0	89.8	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of potatoes for each State; yearly price obtained by weighting monthly prices by car-lot shipments. Mean of prices reported on 1st of month and 1st of succeeding month, July, 1909–December, 1923. For previous data see 1930 or earlier Yearbooks.

Table 275.—*Potatoes: Shipping-point price, per 100 pounds in car lots, Minneapolis, 1921–22 to 1930–31* [1]

Season beginning Aug.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1921–22	[2] 2.20	1.95	1.72	1.47	1.45	1.73	1.58	1.43	1.32	1.41	1.62
1922–23	[2] .99	[2] .92	[2] .77	.69	.64	.62	.61	.86	1.08	.84	.69
1923–24	1.54	1.19	.86	.81	.85	1.12	1.08	1.04	1.15	1.09	1.48
1924–25	------	.77	.67	.68	.73	.90	.87	.84	.69	.99	1.28
1925–26	2.11	1.83	2.39	3.39	3.48	3.92	3.55	3.85	4.49	3.11	------
1926–27	------	2.20	2.19	2.21	2.09	2.08	1.81	1.78	1.91	2.96	3.98
1927–28	1.42	1.32	1.26	1.30	1.32	1.36	1.58	1.98	1.58	1.22	.99
1928–29	.69	.76	.65	.68	------	------	.72	.67	.63	.68	------
1929–30	2.04	2.22	2.14	2.05	2.13	2.32	2.25	2.17	2.64	------	------
1930–31	1.46	1.79	1.50	1.34	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives. Average prices as shown are based on stock of U. S. No. 1 grade; they are simple average of daily range of selling prices.

[1] Minneapolis-St. Paul freight rate.

[2] Field run and partly graded.

TABLE 276.—*Potatoes: Average price per 100 pounds, to jobbers, at three markets, 1921–22 to 1930–31*

LESS-THAN-CARLOAD PRICE TO JOBBERS

Market and crop season [1]	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
New York:														
1921–22	4.41	4.18	1.90	2.23	2.90	2.11	2.09	1.92	2.07	2.33	2.18	2.03	1.79	1.58
1922–23	4.07	3.27	3.03	1.81	1.04	.95	.96	1.22	1.36	1.39	1.44	1.87	2.09	1.76
1923–24	7.24	4.13	3.08	3.08	2.57	1.49	1.85	1.67	1.59	1.96	2.01	1.96	2.12	1.73
1924–25	5.92	4.12	2.34	1.48	1.41	1.37	1.33	1.22	1.26	1.46	1.56	1.21	1.20	1.36
1925–26	4.03	3.34	2.83	3.18	2.83	2.43	3.23	4.09	4.20	4.61	4.57	4.67	5.64	4.10
1926–27	8.84	6.29	3.78	2.29	2.38	2.57	2.89	2.99	2.92	2.80	2.48	2.45	2.46	3.64
1927–28	4.15	4.50	4.03	2.07	1.83	2.11	2.26	2.26	2.17	2.25	2.64	2.95	2.68	1.94
1928–29	6.32	2.89	1.54	1.02	1.24	1.34	1.37	1.32	1.41	1.52	1.45	1.36	1.48	1.67
1929–30	4.13	3.71	2.30	2.80	3.27	3.04	3.14	3.08	3.05	3.19	3.05	2.79	2.99	2.74
1930–31	4.70	4.15	2.80	1.71	1.61	2.03	1.91	1.78	2.23					
Boston:														
1921–22	4.82	4.76	2.36	2.63	3.29	2.22	1.87	1.90	1.88	2.31	2.03	1.80	1.51	1.36
1922–23	4.80	3.86	3.54	2.33	1.48	1.20	1.20	1.38	1.31	1.44	1.47	1.76	2.18	1.98
1923–24		5.14	3.57	3.64	3.21	2.04	1.72	1.66	1.61	1.93	1.93	1.86	1.93	1.92
1924–25	6.03	5.37	2.72	1.90	1.59	1.41	1.12	1.09	1.12	1.28	1.47	1.12	.99	1.17
1925–26	4.46	3.81	3.21	3.68	3.60	2.01	3.04	4.12	4.17	4.66	4.46	4.62	5.79	4.13
1926–27	7.73	6.51	4.24	2.47	2.87	2.21	2.66	2.95	2.82	2.77	2.48	2.42	2.37	3.44
1927–28	4.43	4.80	4.53	2.28	2.11	2.46	1.94	2.03	1.93	2.02	2.36	2.83	2.49	1.80
1928–29		3.28	1.84	1.19	1.40	1.26	1.15	1.15	1.15	1.27	1.24	1.16	1.24	1.56
1929–30	3.98	3.93	2.63	3.03	3.20	2.63	2.65	2.53	2.54	2.78	2.66	2.43	2.87	2.56
1930–31	4.87	4.34	3.18	1.96	1.82	1.79	1.74	1.62	1.76					

CAR-LOT SALES PRICE TO JOBBERS

Market and crop season [1]	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Chicago:														
1921–22	[2] 4.83	[2] 4.50	2.42	2.33	3.11	2.65	2.00	1.75	1.83	1.98	1.96	1.80	1.69	1.70
1922–23	[2] 4.16	[2] 3.57	3.03	2.29	1.63	1.17	1.00	1.05	.96	1.02	1.07	1.35	1.53	1.13
1923–24		[2] 4.80	3.15	2.76	2.18	1.70	1.14	1.24	1.27	1.58	1.71	1.75	1.79	1.50
1924–25	[2] 5.68	[2] 4.69	[2] 2.65	1.76	1.40	1.32	.97	1.31	1.36	1.47	1.63	1.44	.84	1.18
1925–26	[2] 4.75	[2] 3.90	2.96	3.28	2.68	2.00	2.67	3.47	3.64	4.08	3.81	4.04	4.62	3.23
1926–27	[2] 8.59	[2] 6.57	3.91	2.35	2.22	2.45	2.49	2.65	2.47	2.55	2.37	2.42	2.68	3.51
1927–28	[2] 4.52	4.48	4.65	2.30	2.02	1.82	1.60	1.60	1.55	1.63	1.84	2.36	1.88	1.43
1928–29	[2] 5.95	2.94	1.74	1.15	1.06	1.04	1.16	1.24	1.24	1.31	1.27	1.19	1.21	1.36
1929–30	[2] 3.94	4.04	2.71	2.78	2.45	2.64	2.62	2.57	2.54	2.83	2.79	2.77	3.31	3.15
1930–31	4.48	3.57	3.01	1.84	1.89	2.25	1.89	1.66	1.62					

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets. Average prices as shown are based on stock of U. S. No. 1 grade; they are simple averages of daily range of selling prices. In some cases conversions were made from larger to smaller units, or vice versa, in order to obtain comparability.

[1] Crop-movement season extends from April of one year through May of the following year, with irregular quotations continuing through June and July.
[2] Less-than-carload sales to jobbers.

TABLE 277.—*Potatoes, Maine and New York State: Average l. c. l. price per bushel to jobbers at New York, 1921–22 to 1930–31*

Season	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	137	116	125	123	143	135	125	112	90
1922–23	86	78	82	86	93	96	121	125	110
1923–24	146	113	106	105	120	120	117	119	117
1924–25	91	72	70	73	82	94	73	71	76
1925–26	128	176	228	242	261	262	268	338	241
1926–27	140	162	171	170	161	146	142	143	216
1927–28	111	120	121	118	124	139	166	148	114
1928–29	78	69	68	72	77	76	72	81	91
1929–30	164	167	162	158	168	164	143	179	164
1930–31	111	109	102	115					

Bureau of Agricultural Economics. Compiled from Friday or Saturday issues, New York Producers' Price Current, average of weekly range.
In earlier years New York "State" quotations were included in the general term "State and Western." Earlier data are available in 1925 Yearbook, p. 928, Table 276.

TABLE 278.—*Spinach, commercial crop: Acreage, production, and price per bushel or ton, by States, 1927–1930*

FOR MARKET

Group and State	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.* [1]	*1,000 bush.* [1]	*1,000 bush.* [1]	*1,000 bush.* [1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Fall:												
Arizona	------	------	200	140	------	------	72	42	------	------	0.85	0.90
Virginia	2,760	4,000	4,120	3,900	938	1,488	1,236	1,240	0.72	0.92	.67	.64
Group total	2,760	4,000	4,320	4,040	938	1,488	1,308	1,282	.72	.92	.68	.65
Early:												
California [2]	1,900	1,000	1,400	850	1,520	753	1,085	640	.30	.52	.40	.43
Louisiana	2,280	2,530	2,560	1,990	376	271	397	100	.34	.48	.48	.50
North Carolina	320	170	110	80	80	48	28	19	.67	.96	.75	.90
South Carolina	900	600	789	250	164	180	140	88	.85	.99	.79	.85
Texas [2]	19,450	25,600	28,650	25,060	6,457	5,120	8,595	5,463	.50	.45	.35	.57
Group total	24,850	29,900	33,500	28,230	8,597	6,372	10,245	6,310	.47	.48	.37	.56
Second early:												
Arkansas	450	960	500	1,500	68	182	92	150	.70	.80	.75	.34
Illinois	------	50	50	100	------	13	12	20	------	.75	.70	.30
Maryland	620	750	900	800	229	256	257	200	.32	.32	.40	.35
Missouri	900	990	990	1,000	315	361	272	160	.68	70.	.65	.30
New Jersey	1,500	2,000	2,000	2,000	450	650	620	640	.77	.73	.75	.54
Pennsylvania	------	------	650	1,000	------	------	211	300	------	------	.60	.70
Virginia	5,100	3,700	3,200	4,000	1,530	1,110	800	1,272	.42	.72	.52	.35
Washington	50	60	120	150	20	18	48	49	.30	.40	.32	.30
Group total	8,620	8,510	8,410	10,540	2,612	2,590	2,312	2,791	.51	.68	.60	.43
Intermediate: Colorado	------	------	400	450	------	------	96	81	------	------	.70	.40
Late:												
Illinois	------	100	700	1,000	------	35	140	100	------	1.00	.82	.50
Maryland	620	750	1,100	100	229	256	315	20	.32	.44	.44	.60
Missouri	300	300	320	260	117	109	115	88	.68	.90	.80	.50
New Jersey	2,600	3,000	3,300	2,800	624	975	858	812	.80	.75	.60	.54
Pennsylvania	------	------	700	1,100	------	------	169	330	------	------	.56	.65
Washington	240	250	210	210	96	100	68	69	.36	.35	.50	.50
Group total	3,760	4,400	6,330	5,470	1,066	1,474	1,692	1,419	.64	.69	.59	.56
Total, all States	39,990	46,810	52,960	48,730	13,213	11,924	15,653	11,883	.51	.60	.45	.54

FOR MANUFACTURE

					Tons	*Tons*	*Tons*	*Tons*				
California	10,300	12,340	15,790	8,370	51,500	65,400	90,000	36,000	14.50	16.02	15 35	14.30
Maryland	1,850	1,500	1,500	550	5,600	4,000	3,400	1,000	32.80	37.50	35.50	31.25
Total, 2 States	12,150	13,840	17,290	8,920	57,100	69,400	93,400	37,000	16.30	17.26	16.09	14.76

FOR MARKET AND MANUFACTURE

Grand total	52,140	60,650	70,250	57,650	169,400	170,800	226,400	138,000	45.03	49.17	38.01	50.14

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters and canning establishments.

[1] Bushels containing approximately 17 pounds.

[2] Season begins in fall of the previous year.

TABLE 279.—*Spinach: Car-lot shipments, by State of origin, 1920–1930*

State	Crop-movement season [1]										
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Missouri	5	132	53	46	103	113	100	33	100	27	124
Maryland [3]	292	393	603	798	725	619	846	670	749	628	81
Virginia	1, 372	2, 475	2, 212	3, 208	3, 107	2, 946	2, 669	3, 213	3, 058	2, 974	2, 586
South Carolina	-------	-------	161	422	161	501	614	462	282	110	75
Texas	861	1, 463	1, 455	2, 433	3, 038	3, 235	4, 513	4, 495	5, 528	5, 559	6, 084
California	326	149	302	473	70	241	305	445	334	494	178
Washington [3]	4	19	13	23	40	123	121	145	155	154	205
Other States [3]	[4] 32	115	115	177	263	141	215	192	369	402	300
Total	2, 892	4, 746	4, 914	7, 580	7, 507	7, 919	9, 383	9, 655	10, 575	10, 348	9, 633

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season extends from October of the preceding year through December of the year shown
[2] Preliminary.
[3] Figures include shipments in January of succeeding crop year as follows: Maryland, 1922, 5 cars; 1923, 4 cars; Washington, 1925, 4 cars; New Jersey, 1923, 1 car.
Includes 1 car from New Mexico in March, 1921.

TABLE 280.—*Sweetpotatoes: Acreage and production, by States, average 1924–1928, annual 1927–1930*

State	Acreage					Production				
	Average, 1924–1928	1927	1928	1929	1930 [1]	Average, 1924–1928	1927	1928	1929	1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
New Jersey	16	15	15	14	15	2, 100	1, 890	2, 175	1, 960	1, 995
Ohio	3	3	3	3	3	341	399	360	375	270
Indiana	2	2	2	2	3	246	224	232	250	270
Illinois	11	10	10	10	12	1, 072	1, 030	980	1, 020	960
Iowa	3	3	3	3	3	303	270	369	315	300
Missouri	10	12	11	12	11	1, 094	1, 344	1, 155	1, 320	1, 045
Kansas	3	3	2	2	3	374	408	260	240	315
Delaware	8	8	7	8	9	980	880	980	1, 160	675
Maryland	10	11	10	10	10	1, 436	1, 584	1, 500	1, 250	660
Virginia	40	43	44	45	47	5, 142	5, 805	6, 336	6, 705	3, 760
West Virginia	3	2	2	2	2	272	220	204	240	150
North Carolina	83	89	80	78	98	7, 989	10, 146	7, 840	9, 126	9, 506
South Carolina	50	53	49	50	52	3, 907	5, 300	4, 214	5, 750	5, 200
Georgia	114	132	119	124	115	8, 485	10, 560	10, 234	11, 780	9, 430
Florida	28	29	28	29	28	2, 499	2, 668	2, 464	3, 190	2, 380
Kentucky	15	16	14	15	14	1, 399	1, 488	1, 246	1, 365	952
Tennessee	41	48	41	44	44	4, 168	4, 704	3, 895	4, 400	3, 740
Alabama	68	78	70	74	74	5, 917	7, 644	6, 510	7, 622	6, 290
Mississippi	58	69	55	59	53	5, 600	7, 728	6, 050	7, 670	5, 035
Arkansas	33	38	28	26	28	3, 169	4, 408	2, 520	1, 716	1, 904
Louisiana	77	99	74	80	76	6, 446	9, 702	6, 660	7, 440	6, 232
Oklahoma	21	23	20	15	15	2, 037	2, 438	1, 780	990	915
Texas	98	133	109	104	109	7, 786	11, 970	8, 284	7, 384	7, 630
New Mexico	1	1	1	1	1	123	102	119	123	80
Arizona	2	1	1	1	1	214	120	142	140	140
California	10	12	12	10	12	994	1, 080	1, 152	990	1, 320
United States	806	933	810	821	838	74, 141	94, 112	77, 661	84, 521	71, 154

Bureau of Agricultural Economics. Estimates of the crop-reporting board

[1] Preliminary.

TABLE 281.—*Sweetpotatoes: Acreage, production, and value, United States, 1909–1930*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1
	1,000 acres	*Bushels*	*1,000 bushels*	*Cents*	*1,000 dollars*		*1,000 acres*	*Bushels*	*1,000 bushels*	*Cents*	*1,000 dollars*
1909	*641*	*92.4*	*59,232*	--------	--------	1920	992	104.8	103,925	113.4	117,834
1909	641	90.1	57,764	68.5	39,585	1921	1,066	92.5	98,654	88.1	86,894
1910	641	93.5	59,938	67.1	40,216	1922	1,117	97.9	109,394	77.1	84,295
1911	605	90.1	54,538	75.5	41,202	1923	993	97.9	97,177	97.9	95,091
1912	583	95.2	55,479	72.6	40,264	1924	*467*	*80.2*	*37,444*	--------	--------
1913	625	94.5	59,057	72.6	42,884	1924	688	78.4	53,912	128.8	69,444
1914	603	93.8	56,574	73.0	41,294	1925	779	80.0	62,319	136.4	85,034
1915	731	103.5	75,639	62.1	46,980	1926	819	101.0	82,703	95.5	78,956
1916	774	91.7	70,955	84.8	60,141	1927	933	100.9	94,112	82.5	77,615
1917	919	91.2	83,822	110.8	92,916	1928	810	95.9	77,661	91.5	71,096
1918	940	93.5	87,924	135.2	118,863	1929	821	102.9	84,521	94.4	79,819
1919	*804*	*97.2*	*78,092*	--------	--------	1930 [1]	838	84.9	71,154	90.6	64,480
1919	941	103.2	97,126	134.4	130,514						

Bureau of Agricultural Economics. Acreage, yield, and production figures are estimates of the crop-reporting board; italic figures are census returns. Prices are based upon returns from crop reporters.

[1] Preliminary.

TABLE 282.—*Sweetpotatoes: Yield per acre and estimated price per bushel December 1, by States, averages, and annual 1925–1930*

State	Yield per acre							Estimated price per bushel						
	Av., 1919–1928	1925	1926	1927	1928	1929	1930	Av., 1924–1928	1925	1926	1927	1928	1929	1930
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
New Jersey	135	117	145	126	145	140	133	151	240	120	120	120	140	120
Ohio	111	115	105	133	120	125	90	160	210	150	140	135	145	145
Indiana	116	108	110	112	116	125	90	148	190	145	135	130	135	135
Illinois	101	88	110	103	98	102	80	138	190	135	115	110	130	115
Iowa	93	109	103	90	123	105	100	185	230	200	150	155	170	180
Missouri	104	95	112	112	105	110	95	129	165	130	120	105	120	110
Kansas	120	116	129	136	130	120	105	132	170	135	110	110	135	110
Delaware	126	110	139	110	140	145	75	106	190	65	70	80	90	90
Maryland	138	129	165	144	150	125	66	104	170	75	70	80	90	90
Virginia	125	108	125	135	144	149	80	99	130	100	85	70	90	100
West Virginia	114	92	110	110	102	120	75	156	200	160	140	140	160	150
North Carolina	101	88	90	114	98	117	97	98	120	100	80	85	90	90
South Carolina	87	55	80	100	86	115	100	103	147	100	80	85	85	80
Georgia	81	47	86	80	86	95	82	93	125	80	75	85	80	75
Florida	91	85	100	92	88	110	85	119	140	125	85	115	105	95
Kentucky	99	90	120	93	89	91	68	12	153	108	120	115	120	120
Tennessee	102	90	123	98	95	100	85	106	140	70	85	95	95	90
Alabama	91	70	100	98	93	103	85	102	125	85	85	90	90	85
Mississippi	97	96	104	112	110	130	95	108	100	95	80	90	80	75
Arkansas	96	85	108	116	90	66	68	103	125	95	80	90	115	95
Louisiana	88	80	90	98	90	93	82	104	115	90	70	85	85	90
Oklahoma	97	94	105	106	89	66	61	112	135	100	80	95	115	100
Texas	85	73	93	90	76	71	70	114	142	95	75	100	105	95
New Mexico	122	140	135	102	119	123	80	159	165	100	130	145	175	150
Arizona	139	130	150	120	142	140	140	201	210	155	200	200	220	170
California	109	112	97	90	96	99	110	145	170	110	115	110	145	105
United States	95.2	80.0	101.0	100.9	95.9	102.9	84.9	106.9	136.4	95.5	82.5	91.5	94.4	90.6

Bureau of Agricultural Economics. Yield figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

TABLE 283.—*Sweetpotatoes: Car-lot shipments by State of origin, 1920–21 to 1929–30*

State	Crop movement season [1]									
	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New Jersey [3]	2, 392	2, 196	2, 857	1, 528	1, 894	1, 365	1, 770	1, 225	1, 223	1, 090
Indiana [3]	44	62	65	75	103	236	284	209	231	352
Delaware	1, 877	1, 722	2, 632	1, 549	1, 750	1, 742	1, 885	1, 517	1, 470	1, 454
Maryland	1, 363	1, 286	1, 750	1, 123	1, 155	1, 520	2, 283	2, 256	2, 106	1, 859
Virginia [3]	4, 839	5, 300	6, 633	5, 374	5, 213	4, 750	6, 501	6, 618	6, 480	7, 087
North Carolina [3]	823	1, 022	680	563	816	1, 489	1, 683	1, 711	760	729
South Carolina [3]	56	135	236	154	120	231	162	276	130	372
Georgia [3]	1, 030	1, 400	781	610	1, 018	674	678	667	227	[5] 527
Florida	95	112	123	[4] 62	175	242	185	159	69	[5] 125
Kentucky [3]	12	85	55	30	31	90	302	185	121	268
Tennessee [3]	924	1, 578	1, 495	726	1, 137	2, 592	4, 972	3, 587	2, 915	3, 692
Alabama	579	591	537	382	649	663	515	574	393	570
Mississippi	93	181	116	62	36	156	79	211	126	271
Arkansas [3]	568	584	240	263	371	476	548	392	316	207
Louisiana [3]	772	893	1, 033	463	558	2, 340	1, 285	1, 147	981	1, 461
Oklahoma	91	147	85	110	107	216	268	294	255	105
Texas	632	759	974	535	221	474	702	1, 284	717	802
California	856	1, 000	982	684	466	1, 161	1, 186	805	767	728
Other States [3]	160	332	288	240	247	419	467	306	258	338
Total [3]	17, 206	19, 385	21, 562	14, 533	16, 067	20, 836	25, 755	23, 423	19, 545	22, 037

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from July 1 of 1 year through June of the following year.

[2] Preliminary.

[3] Figures for certain States include shipments in July of succeeding crop year as follows: New Jersey, 1920, 15 cars, 1922, 3 cars; Indiana, 1926, 1 car; Virginia, 1928, 1 car; North Carolina, 1926, 3 cars, 1927, 10 cars; South Carolina, 1922, 1 car; Georgia, 1927, 2 cars; Kentucky, 1921, 1 car, 1926, 12 cars, 1928, 5 cars; Tennessee, 1921, 17 cars, 1924, 3 cars, 1925, 11 cars, 1926, 309 cars, 1927, 6 cars, 1928, 135 cars, 1929, 10 cars; Arkansas, 1921, 1 car, 1926, 1 car; Louisiana, 1926, 1 car; New Mexico, 1921, 5 cars, 1928, 1 car; Tennessee, 1926, 19 cars in August.

[4] Includes 3 cars in June, 1923.

[5] Includes 10 cars in June, 1929.

TABLE 284.—*Sweetpotatoes: Estimated average price per bushel received by producers, United States, 1921–22 to 1930–31*

Crop year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	151. 2	154. 2	118. 2	104. 0	91. 5	95. 3	102. 3	106. 9	114. 3	116. 0	117. 1	120. 7	110. 9
1922–23	125. 3	127. 5	106. 0	90. 4	79. 0	84. 8	92. 5	96. 9	100. 1	103. 8	107. 9	107. 4	97. 4
1923–24	112. 1	151. 3	133. 6	114. 8	101. 0	103. 8	112. 5	123. 7	129. 0	140. 4	139. 2	138. 9	121. 7
1924–25	130. 7	151. 4	157. 0	145. 1	130. 3	140. 1	145. 5	160. 2	180. 8	196. 2	189. 1	170. 2	152. 4
1925–26	188. 7	196. 3	177. 4	169. 4	144. 4	141. 5	149. 3	162. 4	171. 4	180. 4	192. 2	198. 8	165. 9
1926–27	185. 6	189. 0	153. 9	110. 6	88. 5	94. 0	97. 8	109. 0	112. 3	112. 8	118. 9	136. 0	120. 3
1927–28	136. 4	146. 7	121. 9	98. 1	86. 5	91. 9	93. 4	98. 6	109. 6	115. 1	121. 4	124. 7	106. 5
1928–29	119. 5	131. 0	120. 9	111. 2	100. 2	101. 8	104. 2	113. 7	117. 0	120. 8	125. 9	129. 8	113. 1
1929–30	135. 9	136. 2	127. 9	112. 5	97. 7	98. 9	103. 1	109. 6	114. 6	118. 3	126. 4	128. 6	113. 7
1930–31	125. 0	136. 3	128. 7	110. 7	93. 8	94. 1	------	--	------	---	------	------	------

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of sweet potatoes for each State, yearly price obtained by weighting monthly prices by average monthly marketings. For previous data see 1930 or earlier Yearbooks.

TABLE 285.—*Sweetpotatoes: Average l. c. l. price per bushel to jobbers, New York and Chicago, 1921–22 to 1930–31* [1]

Market, and season beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New York:										
1921–22	1.51	1.48	1.26	1.36	1.67	2.02	1.93	1.92	2.27	2.23
1922–23		1.00	.70	.73	.96	1.03	1.01	.94	1.39	
1923–24		1.16	1.20	1.95	2.51	2.94	3.38	3.62	3.98	
1924–25		1.98	1.47	1.88	2.47	2.75	2.74	2.63		
1925–26	1.53	1.70	1.68	1.70	2.23	2.61	2.59	2.96	3.42	
1926–27	2.21	1.47	.97	.98	1.24	1.37	1.46	1.61	1.81	2.09
1927–28	1.31	1.13	.93	1.29	1.48	1.66	1.88	2.08	2.04	
1928–29	1.57	1.29	1.05	1.31	1.62	1.88	2.14	2.32		
1929–30	1.60	1.34	1.09	1.28	1.60	1.58	1.46	1.66	2.06	
1930–31	1.77	1.40	1.21	1.26	1.56					
Chicago:										
1921–22	2.01	1.70	1.57	1.48	1.65	1.81	1.89	1.93	1.69	1.29
1922–23		1.44	1.00	1.22	1.26	1.43	1.44	1.47	1.62	
1923–24		1.67	1.52	2.03	2.73	3.09	3.31	3.76	4.04	
1924–25		2.29	1.88	2.33	2.80	2.92	3.26	2.94		
1925–26	2.04	2.04	2.02	2.25	2.42	2.37	2.29	2.40	2.98	
1926–27	2.23	1.72	1.30	1.37	1.69	1.70	1.66	1.52	1.23	1.44
1927–28	1.54	1.55	1.39	1.44	[2] 1.68	[2] 2.16	[2] 2.51	[2] 2.09	[2] 2.22	
1928–29	2.01	1.69	1.46	1.92	[2] 2.30	[2] 2.40	[2] 2.49	[2] 2.37		
1929–30	1.76	1.83	1.57	[2] 1.64	1.78	[2] 1.90	2.06	2.22	2.61	
1930–31	2.21	1.81	1.59	1.77	1.74					

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets.

Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices. In some cases conversions have been made from larger to smaller units or vice versa, in order to obtain comparability.

[1] Commodity reports were issued for season as follows: 1921–22, Aug. 23–May 26; 1922–23, Sept. 1–May 4; 1923–24, Sept. 18–Apr. 15; 1924–25, Sept. 2–Apr. 3; 1925–26, Aug. 25–Apr. 16; 1926–27, Aug. 16–Apr. 19; 1927–28, Aug. 19–Apr. 3; 1928–29, Aug. 22–Apr. 5; 1929–30, Aug. 19–Apr. 11; 1930–31, Aug. 12.

[2] Kiln-dried.

TABLE 286.—*Tomatoes: United States commercial production, imports and exports, annual, 1923–1930*

Year	Commercial production		Imports, year beginning July				Exports, year beginning July	
	For market	For manufacture	Fresh	Canned	Otherwise prepared	Paste	Canned	Catsup and sauces
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1923	972,300	2,244,800	[1] 50,838	30,946	[1] 1,341	[1] 4,164	9,152	[1] 3,560
1924	1,043,300	2,317,000	69,216	73,902	9,443	17,382	5,203	5,520
1925	1,095,800	3,544,400	82,448	84,897	(2)	18,179	5,794	5,006
1926	762,400	1,984,600	124,489	80,257		15,642	7,504	7,556
1927	976,300	2,288,400	113,357	103,782		12,064	6,725	8,584
1928	884,800	1,908,200	128,627	114,042		9,539	4,009	13,066
1929	971,700	2,821,400	139,886	147,429		16,547	4,872	10,420
1930								

Bureau of Agricultural Economics. Production figures based upon returns from crop reporters and canning establishments; imports and exports compiled from Monthly Summary of Foreign Commerce of the United States, June issues.

[1] January–June, 1924.

[2] From 1926 on included with "tomatoes, canned."

TABLE 287.—*Tomatoes, commercial crop: Acreage, production, and price per bushel or ton, by States, 1927–1930*

FOR MARKET

Group and State	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*1,000 bush.*[1]	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fall:												
Florida	------	400	4,000	460	--------	20	240	28	-----	3.55	3.00	4.40
Texas	800	800	1,300	3,520	57	54	104	236	2.50	1.93	1.92	2.15
Group total	800	1,200	5,300	3,980	57	74	344	264	2.50	2.36	2.67	2.39
Early: (1)												
Florida (south)	12,260	11,640	14,700	11,800	1,962	1,339	1,323	1,298	2.00	3.54	3.00	3.60
Early: (2)												
California (Imperial)	1,300	1,200	1,400	1,000	95	122	134	103	2.56	2.62	1.88	2.23
Florida (other)	17,540	17,240	20,000	19,000	1,772	1,603	1,500	1,045	2.03	3.54	3.00	4.00
Texas (Lower Valley)	6,500	7,310	8,000	9,600	344	731	680	931	1.90	2.40	1.53	2.16
Group total	25,340	25,750	29,400	29,600	2,211	2,456	2,314	2,079	2.03	3.16	2.50	3.09
Second early:												
Georgia	2,090	2,090	860	1,500	163	142	64	75	1.36	1.76	2.30	1.40
Louisiana	1,980	1,690	1,050	1,480	178	166	93	148	1.00	1.27	1.25	1.08
Mississippi	15,360	16,800	14,800	12,050	1,997	1,344	1,658	1,326	2.40	1.75	2.10	1.30
South Carolina	2,000	2,600	1,200	2,650	160	322	180	220	1.51	1.87	2.48	2.00
Texas (other)	9,580	11,210	12,380	19,500	1,207	1,099	1,300	2,126	1.66	1.55	2.22	1.17
Group total	31,010	34,390	30,290	37,180	3,705	3,073	3,295	3,895	2.01	1.67	2.15	1.26
Intermediate:												
Arkansas	2,730	3,280	2,950	3,600	303	341	236	176	2.24	.94	1.96	1.20
California	820	950	1,100	1,550	71	156	147	169	1.27	1.34	1.57	2.14
Illinois (Union County)	940	1,010	1,060	1,380	150	91	91	72	2.04	1.31	2.40	1.70
Maryland	4,000	4,700	5,000	5,500	628	451	950	550	.80	.84	1.15	.95
Missouri	4,480	4,480	4,440	4,880	318	291	511	512	.61	.71	1.60	1.15
New Jersey	11,400	11,500	11,000	10,000	2,508	2,012	2,255	2,030	1.10	1.18	1.13	.85
North Carolina	------	------	50	1,950	------	------	8	58	-----	-----	2.00	2.00
Ohio (southeast)	920	970	1,120	1,200	222	174	293	108	1.35	1.75	2.67	2.60
Tennessee	6,600	9,000	7,500	8,000	825	1,098	938	1,000	2.76	1.17	2.40	1.40
Virginia	1,200	1,360	1,500	1,600	150	196	255	152	2.25	1.93	1.05	1.45
Group total	33,090	37,250	35,720	39,660	5,175	4,810	5,684	4,827	1.44	1.16	1.53	1.15
Late: (1)												
California (northern district)	6,850	5,800	7,450	10,750	808	708	723	1,172	1.55	2.07	1.62	1.37
Colorado	800	600	600	700	160	158	186	224	.85	.91	.97	.80
Delaware	180	160	190	210	36	14	59	21	.75	.72	.54	.80
Illinois (other)	2,750	2,750	2,890	3,320	432	336	332	249	1.51	.74	1.20	1.69
Indiana	4,780	4,970	5,370	5,910	650	537	698	621	.60	.67	.76	1.10
Iowa	450	190	220	550	72	24	31	72	.51	.83	.98	.93
Kentucky	1,630	1,710	1,620	1,700	186	130	224	94	1.18	.82	.90	1.55
Michigan	290	290	700	1,040	57	61	119	135	.91	.98	1.26	1.10
New York	2,640	2,640	2,900	2,990	631	560	667	568	.56	.99	1.05	1.05
Ohio (other)	1,110	840	880	920	179	176	163	131	.78	.93	1.15	1.05
Oregon	-------	200	250	280	--------	40	50	48	-----	1.60	1.50	.98
Pennsylvania	420	450	450	500	75	58	99	68	.60	.92	1.02	1.20
Utah	500	600	650	650	100	138	170	61	.78	.67	.67	.54
Washington	-------	750	880	940	--------	188	220	269	-----	1.40	1.30	1.12
Group total	22,400	21,950	25,050	30,460	3,386	3,128	3,741	3,733	1.00	1.15	1.11	1.20
Late: (2)												
California (southern district)	14,000	14,150	8,350	12,400	938	920	651	1,004	1.55	2.00	1.95	1.56
Total, all States	138,900	146,330	148,810	165,080	17,434	15,800	17,352	17,100	1.62	1.82	1.84	1.65

[1] Bushels containing approximately 56 pounds.

Table 287.—*Tomatoes, commercial crop: Acreage, production, and price per bushel or ton, by States, 1927–1930*—Continued

FOR MANUFACTURE

Group and State	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New York	10,540	12,500	13,600	15,500	70,600	73,800	85,700	77,500	14.92	15.20	15.70	15.40
New Jersey	30,000	33,000	33,000	43,000	156,000	118,800	214,500	258,000	18.00	18.50	19.00	19.40
Pennsylvania	3,740	3,600	3,420	4,280	18,700	13,000	13,700	12,800	14.24	14.50	15.00	15.40
Ohio	10,000	10,400	10,950	13,600	45,000	60,300	52,600	73,400	12.45	11.60	12.00	12.00
Indiana	42,990	49,870	59,840	79,000	163,400	149,600	251,300	395,000	13.06	12.90	13.20	13.30
Illinois	5,110	5,130	5,440	6,500	22,500	17,400	20,700	20,800	13.98	13.00	13.00	13.40
Michigan	1,800	1,660	1,990	2,410	9,900	9,600	9,000	13,000	12.13	11.00	12.00	12.00
Iowa	4,080	4,810	4,570	6,400	18,400	16,800	25,100	32,000	14.29	13.00	13.00	13.00
Missouri	19,440	18,700	20,940	28,900	38,900	33,700	60,700	60,700	12.87	12.60	13.30	13.70
Delaware	15,000	13,500	13,500	14,000	76,500	32,400	68,800	47,600	14.00	17.00	17.00	17.30
Maryland	34,410	23,910	27,500	30,000	151,400	66,900	140,200	93,000	14.28	15.70	16.10	17.40
Virginia	6,420	6,000	6,840	6,790	25,700	14,400	26,000	19,000	13.75	13.20	14.90	15.50
Kentucky	6,530	5,500	6,400	8,430	20,900	11,600	23,700	21,900	13.08	12.60	12.60	12.70
Tennessee	8,450	10,220	9,200	11,000	24,500	18,400	23,000	26,400	13.95	12.00	12.10	13.00
Mississippi	----	----	----	3,550	----	----	----	11,000	----	----	----	13.90
Arkansas	17,820	19,600	22,600	28,000	53,500	43,100	52,000	58,800	12.76	12.60	13.50	13.80
Colorado	2,000	1,600	2,030	2,230	14,000	11,800	17,700	19,000	12.00	11.00	11.00	10.90
Utah	5,200	5,650	6,180	7,720	48,400	65,500	56,900	52,500	11.00	11.00	11.00	11.50
California	28,760	24,700	41,680	44,210	178,300	182,800	241,700	336,000	15.00	14.60	15.20	15.10
Other States [2]	3,310	4,070	6,380	7,650	7,600	14,200	27,400	25,200	14.43	13.20	13.40	13.50
Total	255,600	254,420	296,060	363,170	1,144,200	954,100	1,410,700	1,653,600	14.32	14.17	14.91	14.97

FOR MARKET AND MANUFACTURE

	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Grand total	394,500	400,750	444,870	528,250	1,632,400	1,396,500	1,896,600	2,132,400	27.36	30.31	27.90	24.84

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters and canning establishments.

[2] Other States include Connecticut, Kansas, Louisiana, Nebraska, New Mexico, Oklahoma, Oregon, South Carolina, Texas, Washington, West Virginia, and Wisconsin.

TABLE 288.—*Tomatoes: Car-lot shipments by State of origin, 1920–1930*

State	Calendar year										
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930[1]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	1,945	1,073	1,902	1,261	954	1,024	656	951	1,112	838	508
New Jersey	2,798	2,121	1,930	1,648	2,150	1,907	2,006	1,329	678	694	950
Ohio	450	411	558	956	1,035	1,286	1,065	1,125	926	1,020	956
Indiana	1,265	552	1,332	1,185	1,479	1,889	1,514	1,132	799	1,631	2,191
Illinois	450	155	229	250	230	539	422	270	240	237	280
Maryland	194	110	242	271	66	313	259	586	613	775	539
Virginia	188	91	83	44	167	379	454	360	277	488	243
South Carolina	------	59	145	431	421	568	449	187	161	348	464
Georgia	1	4	23	18	176	85	169	82	73	61	51
Florida [2]	4,192	5,785	10,245	9,760	9,140	7,188	4,351	9,737	8,491	8,038	6,495
Kentucky	468	341	153	121	546	498	300	203	42	244	40
Arkansas	11	23	47	9	38	104	281	240	389	300	317
Tennessee	805	370	920	501	985	1,393	2,374	2,016	2,759	2,317	2,496
Mississippi	1,393	1,945	3,441	2,144	3,776	3,149	3,492	4,849	3,230	4,099	3,450
Texas [3]	1,393	2,025	1,893	1,084	1,694	2,398	2,890	3,393	4,435	5,338	7,513
Utah	261	100	378	369	380	1,457	272	883	899	740	321
California [3]	2,004	1,819	2,349	3,293	2,789	2,961	4,440	4,620	4,475	4,241	5,429
Other States	576	431	847	622	804	1,116	674	701	796	793	1,219
Total [2] [3]	18,394	17,415	26,717	23,967	26,830	28,254	26,068	32,664	30,395	32,202	33,462

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Preliminary.
[2] Figures for Florida include cars moved in preceding calendar year as follows: 1920, 14 cars in November, 34 cars in December; 1922, 10 cars in December; 1923, 26 cars in December; 1924, 2 cars in November, 55 cars in December; 1925, 14 cars in November, 31 cars in December; 1926, 7 cars in November, 13 cars in December; 1927, 1 car in December; 1928, 28 cars in November, 291 cars in December; 1929, 104 cars in November, 392 cars in December; 1930, 4 cars in November, 47 cars in December.
[3] Figures include cars in following calendar year as follows: California, 1922, 3 cars in January; 1924, 1 car in January; 1925, 1 car in January; 1929, 1 car in January; Texas, 1922, 5 cars in January, and 2 cars in February; 1925, 8 cars in January; 1926, 15 cars in January; 1927, 1 car in January; 1928, 1 car in January.

TABLE 289.—*Tomatoes, canned: Pack*[1] *in the United States, 1917–1930*

State	Season													
	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
New York	553	396	437	515	214	340	266	325	389	302	300	261	329	467
New Jersey	380	667	60	517	116	337	412	186	418	204	254	95	257	356
Pennsylvania	[2] 488	[2] 441	[2] 384	[2] 680	[2] 186	[2] 644	258	150	338	118	167	95	122	151
Ohio	107	357	172	142	71	179	174	133	179	120	189	124	153	429
Indiana	398	968	876	778	530	1,312	717	1,050	1,955	900	1,131	613	1,134	2,029
Missouri	704	353	439	715	136	775	839	871	1,836	895	605	396	622	1,120
Delaware	1,381	879	189	553	176	590	1,216	803	1,272	228	827	325	851	755
Maryland	5,934	6,649	2,529	3,347	1,656	3,205	5,722	3,825	6,175	1,901	3,671	1,720	4,050	3,770
Virginia [3]	1,170	1,547	953	1,162	217	891	963	1,116	1,138	572	1,059	466	918	818
Kentucky [2]	------	------	------	------	------	------	59	136	275	223	253	111	167	161
Tennessee [2]	------	------	------	------	------	------	176	386	382	280	368	160	297	518
Arkansas [4]	------	------	------	------	------	------	270	768	1,168	558	678	613	769	1,050
Colorado [5]	213	306	290	218	62	168	182	180	309	183	127	158	195	293
Utah	513	953	594	444	132	664	584	417	1,353	235	792	924	768	788
California	2,603	1,790	3,052	1,773	339	1,701	2,397	1,767	1,839	2,347	2,257	1,991	2,812	3,469
Other States	632	576	835	524	182	732	437	406	744	389	459	487	701	833
United States	15,076	15,882	10,810	11,368	4,017	11,538	14,672	12,519	19,770	9,455	13,137	8,539	14,145	16,998

Bureau of Agricultural Economics. Compiled from National Canners' Association, 1917–1926; Census of Manufactures 1927–28; 1929, American Grocer, Feb. 19, 1930; 1930, Foreign and Domestic Commerce

[1] Stated in cases of 24 No. 3 cans.
[2] Previous to 1923, Pennsylvania, Kentucky, and Tennessee composed one group.
[3] Includes West Virginia.
[4] Previous to 1923, included in "Other States."
[5] Includes Washington.

TABLE 290.—*Watermelons, commercial crop: Acreage, production, and price per 1,000 melons*[1] *by States, 1927–1930*

Group and State	Acreage				Production				Seasonal farm price per 1,000 melons			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*1,000 melons*	*1,000 melons*	*1,000 melons*	*1,000 melons*	*Dols.*	*Dols.*	*Dols.*	*Dols.*
Early:												
California (Imperial)	5, 500	8, 000	8, 900	9, 500	3, 597	4, 912	6, 319	6, 070	120	138	143	95
Florida	29, 420	37, 840	40, 400	34, 700	8, 826	10, 406	11, 635	9, 473	286	299	278	250
Group total	34, 920	45, 840	49, 300	44, 200	12, 423	15, 318	17, 954	15, 543	238	247	231	189
Second early:												
Alabama	9, 820	9, 330	7, 460	7, 000	2, 946	2, 332	2, 387	2, 660	175	151	93	106
Arizona	1, 200	1, 150	1, 250	1, 250	420	391	400	412	287	250	200	215
Georgia	55, 220	62, 950	69, 240	79, 000	17, 946	18, 885	23, 542	27, 650	161	141	150	70
Mississippi	1, 300	1, 400	1, 330	1, 440	390	392	466	396	140	150	162	170
North Carolina	5, 610	5, 610	5, 440	7, 100	2, 014	1, 683	979	1, 917	149	136	175	115
South Carolina	12, 470	14, 340	11, 330	15, 000	4, 240	4, 302	3, 739	4, 875	168	94	175	50
Texas	29, 660	35, 080	34, 240	34, 800	8, 156	8, 770	6, 163	8, 178	165	186	156	150
Group total	115, 280	129, 860	130, 290	145, 590	36, 112	36, 755	37, 676	46, 088	164	148	151	88
Late:												
Arkansas	2, 200	2, 700	2, 190	3, 800	594	810	815	665	186	135	172	185
California (other)	4, 280	4, 400	5, 020	6, 420	1, 644	3, 379	3, 785	5, 149	139	133	115	88
Colorado	700	570	500	500	105	182	150	160	242	150	165	170
Delaware	980	880	740	850	98	132	222	204	105	158	200	125
Illinois	2, 880	3, 170	3, 800	4, 290	734	824	1, 330	858	269	162	190	165
Indiana	2, 720	3, 240	3, 200	3, 780	778	1, 134	2, 342	869	350	146	180	143
Iowa	1, 380	1, 610	1, 580	1, 850	442	523	291	388	218	157	165	180
Maryland	1, 240	1, 180	1, 400	1, 600	446	401	385	360	200	125	177	125
Missouri	8, 000	5, 000	5, 700	8, 550	1, 800	1, 430	1, 550	1, 624	201	154	173	146
Nevada	------	------	80	100	------	------	55	20	-----	-----	169	79
New Jersey	1, 500	1, 000	1, 000	1, 400	300	250	500	700	250	270	300	210
Oklahoma	3, 000	3, 270	4, 260	5, 110	1, 146	818	1, 193	869	175	155	175	155
Oregon	------	------	180	200	------	------	72	80	-----	-----	200	200
Utah	------	------	30	20	------	------	21	7	-----	-----	219	120
Virginia	2, 320	2, 320	2, 440	2, 560	731	784	878	819	144	165	179	150
Washington	710	890	1, 100	1, 160	249	305	360	348	225	202	319	172
Group total	31, 910	30, 230	33, 220	42, 190	9, 067	10, 972	13, 949	13, 120	201	150	169	132
Grand total	182, 110	205, 930	212, 810	231, 980	57, 602	63, 045	69, 579	74, 751	186	172	175	117

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Approximately 1,000 melons per car.

TABLE 291.—*Watermelons, Tom Watson: Price per car to jobbers, Chicago and New York, 1924–1930* [1]

Market and season [2]	June	July	August	Market and season [2]	June	July	August
Chicago:	*Dollars*	*Dollars*	*Dollars*	New York:	*Dollars*	*Dollars*	*Dollars*
1924	576	249	291	1924	474	[3] 270	[3] 273
1925	576	362	[4] 211	1925	[3] 512	[3] 311	202
1926	623	281	[4] 202	1926	460	248	180
1927	471	289	-------	1927	435	289	237
1928	445	301	252	1928	378	262	216
1929	365	339	-------	1929	368	278	[4] 234
1930	511	271	269	1930	469	214	211

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simply averages of daily range of selling price.

[1] Quotations are for southeastern, 22 to 26 pound average.
[2] Commodity reports were issued for season as follows: 1924, June 6–Aug. 30; 1925, May 28–Sept. 5; 1926, May 28–Sept. 1; 1927, May 16–Aug. 26; 1928, May 21–Aug. 24; 1929, May 9–Aug. 31; 1930, May 26–Aug. 16.
[3] Auction sales.
[4] Thurmond Gray.

TABLE 292.—*Watermelons: Car-lot shipments by State of origin, 1929 and 1930*

State and season beginning April	Crop-movement season [1]								
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Florida:									
1929	36	3,355	6,982	106					10,479
1930 [2]		281	6,726	1,669	8				8,684
California:									
1929		23	2,032	2,980	1,121	183	27		6,366
1930 [2]		71	2,883	2,478	734	96	12		6,274
Texas:									
1929		120	1,898	1,678	732	32			4,460
1930 [2]		34	2,274	2,903	839	26	2		6,078
Georgia:									
1929			10,606	9,526	1,701	49			21,882
1930 [2]			5,427	15,804	4,725	200	1		26,157
Alabama:									
1929			230	303	126	63			722
1930 [2]			318	349	193	203	7		1,070
South Carolina:									
1929			190	3,125	176	3			3,494
1930 [2]			90	4,367	472	7			4,936
North Carolina:									
1929				140	618				758
1930 [2]				847	919	1			1,767
Missouri:									
1929				12	921	106			1,039
1930 [2]				366	772	196	15		1,349
Other States:									
1929			109	417	2,187	571	30		3,314
1930 [2]			99	297	1,658	607	61		2,722
Total:									
1921	7	1,133	11,061	19,229	12,256	1,983	80		45,749
1922	8	3,566	15,291	18,003	9,061	1,616	80		47,625
1923	3	762	6,176	15,351	8,583	2,045	159	2	33,081
1924	[3] 2	65	6,602	26,024	10,470	2,458	120	4	45,745
1925		605	11,767	17,814	11,524	2,390	82	2	44,184
1926		443	11,424	29,873	11,497	1,861	28		55,126
1927	4	1,713	15,255	20,898	6,262	1,261	67		45,460
1928		508	10,410	24,937	11,408	1,183	50	1	48,497
1929	36	3,498	22,047	18,287	7,582	1,007	57		52,514
1930 [2]		386	17,817	29,080	10,320	1,336	98		59,037

Bureau of Agricultural Economics. Compiled from daily and monthy reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis. Data for earlier years in previous yearbooks.

[1] Crop-movement season extends from Apr. 1 through December of a given year.
[2] Preliminary.
[3] Reported as shipped in January.

TABLE 293.—*Miscellaneous truck crops, commercial: Acreage, production, and price per unit of production, by States, 1927–1930*

Crop and State	Acreage				Production				Seasonal farm price per unit of production			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
Artichoke, Globe:	*Acres*	*Acres*	*Acres*	*Acres*	*1,000 boxes* [1]	*1,000 boxes* [1]	*1,000 boxes* [1]	*1,000 boxes* [1]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
California	9,940	8,550	9,750	8,550	1,272	1,043	1,082	1,060	2.02	1.96	2.31	2.85
					1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*				
Kale:												
Virginia		2,170	2,400	2,400		868	1,080	1,200		.50	.35	.40
					1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Peppermint (oil):												
Indiana			41,500	45,000			415	720			3.25	2.10
Oregon			2,200	2,200			66	57			2.75	1.40
Washington			800	800			24	21			2.75	1.40
Total			44,500	48,000			505	798			3.16	2.03

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Artichokes, boxes containing approximately 40 pounds; kale, bushels, 18 pounds.

TABLE 294.—*Truck crops, commercial (for consumption, fresh, and for canning and manufacture):* [1] *Total acreage and value, by States, average 1924–1928, annual 1929–30*

State and division	Acreage			Farm value [2]		
	Average 1924–1928	1929	1930	Average 1924–1928	1929	1930
	Acres	*Acres*	*Acres*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	14, 660	17, 300	15, 830	1, 188	1, 362	1, 591
New Hampshire	1, 120	1, 320	1, 050	67	79	74
Vermont	2, 370	2, 530	2, 300	118	124	94
Massachusetts	4, 520	5, 090	5, 030	1, 256	1, 460	1, 238
Connecticut	290	250	280	16	14	14
New York	154, 130	159, 690	172, 990	21, 205	21, 496	18, 456
New Jersey	132, 420	135, 580	145, 780	22, 140	21, 103	20, 078
Pennsylvania	18, 790	25, 030	26, 940	2, 522	3, 482	3, 270
North Atlantic	328, 300	346, 790	370, 200	48, 512	49, 120	44, 815
Ohio	59, 540	68, 940	73, 770	5, 613	5, 528	4, 064
Indiana	119, 090	182, 810	217, 740	8, 285	9, 537	11, 795
Illinois	92, 450	104, 550	117, 730	5, 715	5, 650	5, 743
Michigan	73, 610	70, 060	86, 050	6, 449	6, 592	9, 252
Wisconsin	151, 570	166, 170	198, 040	9, 840	11, 110	10, 535
North Central, east	496, 260	592, 530	693, 330	35, 902	38, 417	41, 389
Minnesota	43, 110	67, 930	82, 650	1, 776	2, 762	2, 829
Iowa	64, 190	66, 840	76, 840	3, 285	3, 308	3, 428
Missouri	63, 360	58, 520	63, 460	5, 785	5, 484	4, 242
South Dakota	210	540	530	9	27	27
Nebraska	7, 330	6, 360	8, 690	185	147	147
Kansas	1, 680	1, 690	2, 220	305	216	211
North Central, west	179, 880	201, 880	234, 390	11, 345	11, 944	10, 884
Delaware	33, 090	34, 340	34, 970	2, 986	3, 950	2, 517
Maryland	123, 420	134, 800	127, 030	11, 112	12, 242	7, 467
Virginia	49, 130	47, 560	47, 960	9, 205	8, 666	5, 062
West Virginia	480	1, 000	1, 150	25	58	51
North Carolina	30, 060	29, 790	38, 390	5, 293	4, 734	2, 725
South Carolina	40, 070	44, 150	53, 080	5, 107	6, 142	4, 313
Georgia	64, 970	86, 650	102, 970	3, 827	5, 013	3, 236
Florida	113, 040	142, 140	136, 330	29, 905	32, 633	33, 998
South Atlantic	454, 260	520, 430	541, 880	67, 460	73, 438	59, 369
Kentucky	18, 470	16, 500	16, 760	2, 176	1, 802	1, 462
Tennessee	42, 770	44, 780	43, 370	5, 846	5, 989	4, 530
Alabama	21, 480	21, 980	21, 960	2, 603	2, 314	2, 014
Mississippi	33, 410	37, 320	39, 340	6, 165	5, 323	3, 397
Arkansas	48, 480	58, 140	63, 760	5, 046	4, 923	3, 291
Louisiana	58, 560	79, 390	72, 390	10, 469	12, 927	10, 460
Oklahoma	5, 150	8, 900	9, 310	292	571	408
Texas	113, 090	153, 590	165, 480	15, 031	17, 031	19, 585
South Central	341, 410	420, 600	432, 370	47, 628	50, 880	45, 147
Montana	3, 040	4, 500	4, 420	159	208	222
Idaho	4, 100	4, 730	7, 430	675	583	668
Wyoming	610	1, 040	880	57	47	40
Colorado	42, 480	58, 370	54, 610	6, 895	8, 812	7, 503
New Mexico	3, 470	2, 760	2, 850	714	365	468
Arizona	21, 520	40, 750	50, 260	5, 108	10, 483	7, 685
Utah	18, 180	23, 480	26, 910	2, 229	2, 367	2, 550
Nevada	640	840	860	108	164	82
Washington	18, 260	26, 580	29, 960	4, 205	4, 717	4, 755
Oregon	15, 110	21, 270	21, 200	3, 477	3, 404	3, 352
California	293, 260	393, 860	446, 140	61, 338	79, 586	80, 147
West	420, 660	578, 180	645, 520	84, 965	110, 736	107, 472
United States	2, 220, 780	2, 660, 410	2, 917, 690	295, 812	334, 535	309, 076

Bureau of Agricultural Economics.

[1] Crops grown for consumption, fresh: Artichokes, asparagus, lima beans, snap beans, beets, cabbage, cantaloupes, carrots, cauliflower, celery, sweet corn, cucumbers, eggplant, kale, lettuce, onions, green peas, green peppers, spinach, strawberries, tomatoes, and watermelons. Those grown for canning and manufacture: Asparagus, snap beans, cabbage (sauerkraut), sweet corn, cucumbers (pickles), green peas, pimientos, spinach, and tomatoes; and peppermint for oil.

[2] Based upon average seasonal farm prices.

TABLE 295.—*Truck crops, commercial (for consumption, fresh, and for canning and manufacture): Acreage, production, and value of specified crops, United States, 1924–1930*

ACREAGE

Crop	1924	1925	1926	1927	1928	1929	1930
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Artichoke		10, 550	11, 760	9, 940	8, 550	9, 750	8, 550
Asparagus	50, 560	65, 530	84, 980	90, 000	96, 430	97, 620	100, 610
Bean, lima	3, 000	3, 000	3, 000	4, 530	5, 170	4, 820	9, 670
Bean, snap	88, 020	107, 170	100, 460	110, 220	134, 370	149, 810	173, 330
Beet	2, 850	3, 000	3, 200	9, 550	9, 380	9, 510	10, 630
Cabbage	119, 700	120, 280	130, 180	142, 560	139, 060	157, 230	155, 010
Cantaloupe	95, 250	93, 260	101, 690	105, 780	99, 860	107, 140	127, 380
Carrot	11, 480	15, 760	19, 000	26, 300	27, 540	31, 720	30, 530
Cauliflower	13, 100	15, 780	22, 170	18, 020	21, 430	25, 580	27, 520
Celery	22, 550	22, 910	21, 830	24, 550	27, 040	29, 680	31, 840
Corn, sweet	323, 790	415, 910	339, 310	241, 350	324, 460	379, 310	399, 760
Cucumber	122, 560	140, 480	110, 450	96, 740	117, 170	120, 710	166, 160
Eggplant	2, 690	3, 490	3, 260	3, 090	3, 890	3, 630	4, 220
Kale					2, 170	2, 400	2, 400
Lettuce	68, 660	86, 030	105, 560	123, 010	124, 830	141, 010	167, 610
Onion	65, 090	65, 280	75, 780	77, 580	80, 020	86, 850	82, 940
Peas, green	254, 280	260, 530	261, 690	220, 800	266, 500	303, 840	349, 580
Peppermint						44, 500	48, 000
Pepper	11, 190	13, 780	15, 560	14, 770	17, 890	17, 930	18, 760
Pimiento			5, 110	7, 040	8, 850	9, 020	9, 540
Potato, early	333, 070	292, 930	311, 900	335, 530	387, 230	273, 130	331, 540
Spinach	33, 990	44, 410	48, 110	52, 140	60, 650	70, 250	57, 650
Strawberry	176, 470	144, 740	152, 040	191, 250	207, 840	200, 420	175, 720
Tomato	441, 790	483, 950	372, 530	394, 500	400, 750	444, 870	528, 250
Watermelon	184, 830	173, 710	199, 060	182, 110	205, 930	212, 810	231, 980
Total (except potato)	2, 091, 850	2, 289, 550	2, 186, 730	2, 145, 830	2, 389, 780	2, 660, 410	2, 917, 690

PRODUCTION

Crop	1924	1925	1926	1927	1928	1929	1930
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Artichoke boxes		1, 266	1, 470	1, 272	1, 043	1, 082	1, 060
Asparagus crates	5, 500	6, 301	7, 813	7, 835	9, 578	9, 766	10, 403
Bean, Lima bushels	258	300	240	380	286	382	589
Bean, snap tons	118	152	120	125	146	189	188
Beet bushels	685	605	530	1, 310	1, 611	1, 600	2, 124
Cabbage tons	1, 074	952	1, 057	1, 216	999	1, 102	1, 015
Cantaloupe crates	13, 834	14, 553	14, 393	15, 014	15, 370	16, 982	15, 391
Carrot bushels	4, 084	4, 800	5, 523	7, 760	7, 524	10, 957	10, 994
Cauliflower crates	2, 763	3, 493	5, 581	4, 259	5, 031	6, 500	5, 595
Celery do	6, 509	6, 702	5, 767	7, 463	7, 645	8, 782	10, 043
Corn, sweet tons	574	1, 064	862	451	636	743	701
Cucumber bushels	7, 677	12, 439	9, 028	8, 577	9, 180	8, 639	11, 740
Eggplant do	794	904	791	814	896	713	857
Kale bushels					868	1, 080	1, 200
Lettuce crates	13, 219	16, 061	17, 144	19, 369	18, 345	20, 180	19, 849
Onion bushels	19, 242	19, 756	21, 574	23, 797	20, 454	25, 470	26, 124
Peas, green tons	275	243	261	239	277	300	347
Peppermint (oil) pounds						505	708
Pepper bushels	3, 681	3, 459	3, 912	3, 536	4, 466	4, 160	4, 381
Pimiento tons			13	16	16	19	16
Potatoes, early bushels	43, 794	29, 902	35, 218	43, 237	53, 368	34, 695	42, 659
Spinach tons	131	132	162	169	171	226	138
Strawberry quarts	318, 121	228, 675	276, 385	320, 991	334, 675	327, 975	229, 336
Tomato tons	1, 680	2, 320	1, 374	1, 632	1, 396	1, 897	2, 132
Watermelon number	57, 086	56, 498	69, 698	57, 602	63, 045	69, 579	74, 751

FARM VALUE [1]

Crop	1924	1925	1926	1927	1928	1929	1930
	1,000 dolls.	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*
Artichoke		2, 279	2, 602	2, 569	2, 044	2, 499	3, 021
Asparagus	9, 589	10, 137	14, 188	13, 579	14, 741	15, 893	15, 756
Bean, Lima	452	375	432	670	926	590	862
Bean, snap	14, 655	15, 949	14, 960	14, 527	15, 012	18, 723	17, 583
Beet	419	318	296	987	1, 224	1, 177	1, 353
Cabbage	17, 568	16, 558	18, 373	18, 683	22, 374	20, 791	19, 475
Cantaloupe	19, 618	21, 273	18, 520	22, 425	20, 056	22, 290	18, 612
Carrot	3, 430	2, 902	3, 533	4, 366	5, 122	6, 553	6, 612
Cauliflower	3, 673	4, 442	5, 557	5, 364	5, 077	5, 206	4, 630
Celery	12, 737	11, 797	10, 649	12, 504	14, 591	14, 617	14, 825
Corn, sweet	10, 322	16, 784	12, 523	7, 026	9, 681	11, 313	10, 311
Cucumber	10, 771	14, 366	10, 500	9, 790	9, 667	11, 537	10, 723

[1] Based upon average seasonal farm price.

TABLE 295.—*Truck crops, commercial (for consumption, fresh, and for canning and manufacture): Acreage, production, and value of specified crops, United States, 1924–1930*—Continued

FARM VALUE—Continued

Crop	1924	1925	1926	1927	1928	1929	1930
	1,000 dolls.	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*
Eggplant	982	937	931	754	777	887	727
Kale					434	378	480
Lettuce	19,405	23,708	28,233	22,118	31,025	36,826	33,670
Onion	16,472	21,488	16,272	18,775	24,099	18,710	13,146
Peas, green	18,220	16,700	18,554	18,770	19,835	22,139	23,432
Peppermint (oil)						1,597	1,621
Pepper	4,141	4,440	4,540	3,559	4,201	4,682	4,341
Pimiento			518	636	627	714	605
Potato, early	39,919	41,544	54,190	59,902	30,197	44,387	47,732
Spinach	7,538	7,898	8,091	7,628	8,399	8,609	6,924
Strawberry	44,381	40,623	48,231	48,268	44,604	43,690	38,648
Tomato	57,266	64,489	43,720	44,667	42,323	52,910	52,978
Watermelon	9,147	13,360	10,156	10,721	10,868	12,195	8,741
Total (except potato)	280,786	310,823	291,379	288,386	307,707	334,535	309,076

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 296.—*Fruits and vegetables: Unloads of 18 commodities at 12 markets, in car lots, 1928–1930*

Commodity and calendar year	New York	Chicago	Philadelphia	Boston	Detroit	Pittsburgh	St. Louis	Los Angeles [1]	Cleveland	Baltimore	Cincinnati	San Francisco
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Apples:												
1928	12,969	7,431	2,211	1,856	2,415	1,932	1,325	3,663	1,640	560	1,153	1,146
1929	11,597	5,337	2,061	1,315	2,527	2,615	1,173	3,110	1,605	416	1,371	680
1930	10,685	5,891	2,419	1,252	2,038	2,800	1,087	4,011	1,384	569	1,375	875
Cabbage:												
1928	4,899	2,228	2,199	1,243	717	1,158	1,194	95	572	1,458	725	2
1929	6,085	2,264	2,527	1,397	882	1,365	1,286	163	716	1,444	735	21
1930	6,024	1,866	2,450	1,221	814	1,443	1,290	14	660	1,573	769	3
Cantaloupes: [2]												
1928	8,958	3,265	1,937	1,936	988	1,403	710	1,067	991	566	650	852
1929	9,821	3,561	2,274	1,961	1,477	1,644	753	817	1,187	595	672	738
1930	9,209	3,214	2,415	2,010	1,140	1,411	872	510	1,096	600	707	589
Celery:												
1928	4,926	2,319	1,698	878	708	791	617	60	411	773	374	443
1929	4,520	2,168	1,636	923	790	1,017	663	151	418	713	410	436
1930	4,654	1,892	1,802	947	830	991	674	79	442	769	394	432
Grapefruit:												
1928	4,138	1,613	902	1,085	481	395	278	155	418	280	241	320
1929	5,260	1,989	1,185	1,242	865	622	510	160	663	454	360	356
1930	6,150	1,868	1,310	1,088	643	597	509	120	572	546	373	352
Grapes:												
1928	14,455	5,751	4,061	4,648	2,036	3,016	931	94	1,468	637	637	2,831
1929	14,374	4,707	3,202	4,418	1,715	2,785	763	36	1,299	565	549	2,214
1930	16,694	4,834	3,740	4,428	1,445	2,867	795	90	1,053	651	584	2,823
Lemons:												
1928	3,851	981	675	584	413	388	412	8	339	372	327	398
1929	3,645	1,147	788	602	470	472	423	0	345	429	365	395
1930	4,296	1,119	840	579	454	414	467	1	385	451	401	367
Lettuce:												
1928	9,346	4,491	2,762	1,691	1,406	1,198	1,238	1,690	916	843	548	348
1929	9,990	4,871	3,141	1,853	1,647	1,414	1,387	1,701	1,055	901	624	348
1930	9,849	4,853	3,357	2,066	1,702	1,481	1,627	1,212	1,118	1,015	712	318
Onions:												
1928	11,951	2,347	1,962	2,495	1,079	851	796	536	785	669	465	806
1929	8,537	2,513	2,072	2,126	1,419	1,191	897	681	819	693	439	651
1930	7,285	2,283	2,408	2,145	1,453	1,141	924	606	878	702	549	671
Oranges:												
1928	11,952	4,809	3,587	4,248	1,853	1,601	1,265	150	1,441	1,150	780	1,160
1929	16,919	6,428	5,710	5,597	3,132	2,803	1,804	48	2,431	1,867	1,283	1,530
1930	13,220	4,932	4,130	3,959	2,032	1,945	1,219	203	1,665	1,372	971	1,064
Peaches:												
1928	5,875	2,377	1,467	1,316	1,452	1,037	816	689	933	555	909	565
1929	3,784	2,000	748	1,013	1,325	850	376	352	876	252	648	307
1930	3,872	1,593	992	807	747	735	509	657	538	383	678	560
Pears:												
1928	6,657	1,760	1,104	798	542	467	170	498	356	290	113	701
1929	4,987	1,495	937	625	491	478	166	428	395	212	96	412
1930	6,119	2,138	1,520	830	607	876	299	886	456	427	256	455

[1] Figures for 1928 include truck receipts not reported separately.
[2] Includes honeydews and other miscellaneous melons.

TABLE 296.—*Fruits and vegetables: Unloads of 18 commodities at 12 markets, in car lots, 1928–1930*—Continued

Commodity and calendar year	New York	Chicago	Philadelphia	Boston	Detroit	Pittsburgh	St. Louis	Los Angeles [1]	Cleveland	Baltimore	Cincinnati	San Francisco
Plums and prunes, fresh:	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1928	1, 631	675	322	192	219	151	127	50	173	89	57	46
1929	1, 394	498	270	148	261	177	92	29	231	51	82	26
1930	1, 772	626	376	284	229	187	185	54	186	115	114	49
Potatoes:												
1928	22, 057	16, 311	6, 653	11, 396	5, 508	3, 565	3, 647	5, 429	3, 699	1, 619	2, 970	3, 260
1929	24, 407	15, 823	7, 530	9, 828	6, 735	4, 344	4, 863	6, 830	3, 393	1, 951	2, 935	3, 639
1930	23, 117	16, 298	8, 871	8, 589	8, 047	4, 610	4, 851	6, 509	3, 921	3, 150	3, 439	3, 613
Strawberries:												
1928	2, 376	1, 806	378	1, 135	877	520	330	170	428	213	559	0
1929	2, 087	2, 055	431	1, 084	722	476	290	55	496	218	572	17
1930	1, 365	1, 151	380	711	511	303	146	75	316	142	304	23
Sweetpotatoes:												
1928	2, 595	1, 711	281	851	631	973	215	335	564	725	496	69
1929	2, 125	1, 733	299	920	757	1, 135	271	324	562	722	583	129
1930	1, 570	1, 636	320	793	702	962	279	305	562	851	558	163
Tomatoes:												
1928	7, 843	3, 159	1, 355	1, 697	1, 129	1, 347	527	573	340	818	478	877
1929	7, 851	2, 990	1, 773	1, 697	1, 073	1, 608	506	726	377	954	455	582
1930	8, 153	2, 965	2, 225	1, 927	1, 354	1, 575	583	566	349	1, 055	504	648
Watremelons:												
1928	3, 663	2, 371	1, 351	724	1, 418	895	1, 001	1, 873	956	780	942	378
1929	4, 251	2, 562	1, 596	833	1, 630	1, 014	1, 229	2, 206	1, 045	872	840	484
1930	3, 652	2, 823	2, 035	724	1, 539	1, 112	1, 568	2, 141	1, 070	985	1, 438	382
Total: [3]												
1924	122, 744	56, 079	35, 874	32, 937	13, 589	21, 124	14, 384	14, 976	16, 082	12, 843	12, 278	11, 516
1925	125, 609	57, 782	35, 229	30, 119	17, 980	20, 416	15, 181	15, 164	15, 541	11, 977	11, 785	13, 095
1926	128, 667	59, 349	35, 383	30, 513	20, 553	21, 075	16, 278	16, 244	16, 380	12, 672	11, 976	14, 121
1927	139, 463	64, 617	35, 970	35, 588	22, 679	21, 434	16, 523	16, 012	16, 825	12, 534	12, 213	14, 648
1928	140, 142	65, 405	34, 905	38, 773	23, 872	21, 688	15, 599	17, 135	16, 430	12, 397	12, 424	14, 202
1929	141, 634	64, 141	38, 180	37, 582	27, 918	26, 010	17, 452	17, 817	17, 913	13, 309	13, 019	12, 965
1930	137, 686	61, 982	41, 590	34, 360	26, 287	25, 450	17, 884	18, 039	16, 651	15, 356	14, 126	13, 387

Bureau of Agricultural Economics. Compiled from daily reports made by common carriers to bureau representatives in the various markets. Unloads as shown in car lots include those by boat and less than car lots reduced to car-lot basis. This table not comparable with table published in former Yearbooks.

[3] Totals include: 1924–1926, 16 commodities; beginning 1927, 18 commodities.

TABLE 297.—*Fruits and vegetables: Total unloads at all markets reporting, in car lots, 1924–1930* [1]

Commodity	1924	1925	1926	1927	1928	1929	1930
FRUITS	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Apples	52, 339	52, 733	61, 048	50, 994	60, 430	56, 043	59, 158
Grapefruit	16, 312	16, 528	15, 007	18, 233	15, 874	22, 353	21, 584
Grapes	48, 778	55, 557	59, 670	62, 904	58, 971	52, 650	57, 994
Lemons	10, 173	11, 448	12, 641	12, 164	13, 193	13, 865	14, 623
Oranges	46, 883	38, 049	47, 516	55, 134	49, 791	75, 533	55, 596
Peaches	20, 476	19, 482	29, 285	22, 319	29, 021	22, 943	20, 827
Pears	----------	----------	----------	13, 675	16, 842	14, 111	19, 366
Plums and prunes, fresh	----------	----------	----------	3, 699	4, 914	4, 495	5, 761
Strawberries	11, 992	8, 177	10, 221	13, 037	14, 282	17, 213	10, 804
Total fruits	206, 953	201, 974	235, 388	252, 159	263, 318	279, 206	265, 713
VEGETABLES							
Cabbage	21, 506	20, 398	23, 771	24, 045	27, 503	32, 101	32, 052
Cantaloupes [2]	22, 571	25, 349	27, 299	29, 410	32, 250	36, 330	35, 082
Celery	13, 144	15, 204	14, 951	19, 442	21, 840	25, 672	28, 118
Lettuce	23, 349	26, 594	34, 509	39, 464	42, 352	48, 711	51, 865
Onions	25, 576	25, 808	27, 693	30, 442	33, 625	32, 383	33, 276
Potatoes	113, 442	112, 988	124, 614	138, 541	139, 531	145, 456	155, 607
Sweetpotatoes	9, 537	11, 679	13, 679	17, 197	15, 343	16, 532	16, 479
Tomatoes	17, 726	18, 846	20, 628	29, 108	29, 975	34, 747	39, 312
Watermelons	23, 016	22, 746	31, 907	27, 056	28, 838	32, 187	35, 212
Total vegetables	269, 867	279, 612	319, 051	354, 705	371, 257	404, 119	427, 003
Total	476, 820	481, 586	554, 439	606, 864	634, 575	683, 325	692, 716

Bureau of Agricultural Economics. Compiled from daily reports made by common carriers to bureau representatives in the various markets. Unloads as shown in car lots include those by boat and less than car lots reduced to car-lot basis; beginning 1928, unloads also include truck receipts reduced to car-lot basis.

[1] Years 1924–1926, 36 markets, beginning 1927, 66 markets.
[2] Includes Honeydew and other miscellaneous melons.

TABLE 298.—*Fruits and vegetables: Unloads by truck of 15 commodities at 12 markets, in car-lot equivalents, 1928–1930*

Commodity and calendar year	Boston	Chicago	Cincinnati	Denver	Kansas City	Los Angeles	Newark	New York	Pittsburgh	Portland, Oreg.	Salt Lake City	San Francisco
Apples:	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1928	986	877	------	------	------	------	219	850	------	85	132	------
1929	1,178	1,098	77	65	11	183	386	1,319	------	50	112	------
1930	1,613	259	------	------	15	199	------	2,793	------	49	127	59
Cabbage:												
1928	438	------	------	------	------	------	185	205	18	91	64	------
1929	412	------	149	108	56	1,099	536	193	------	124	64	------
1930	532	------	------	96	56	1,191	------	1,927	------	42	73	27
Cantaloupes:[1]												
1928	------	112	------	------	------	------	8	364	------	23	141	------
1929	------	141	20	112	35	1,839	115	325	------	47	180	102
1930	------	68	------	115	46	2,163	------	403	------	41	147	142
Celery:												
1928	258	416	------	------	------	------	182	96	11	71	94	------
1929	295	789	8	277	------	2,558	331	577	------	114	82	------
1930	373	467	------	164	------	2,764	------	2,553	16	98	100	143
Grapes:												
1928	------	766	------	------	------	------	73	383	33	13	12	------
1929	3	926	2	------	5	1,370	98	212	------	11	15	------
1930	18	650	------	------	5	2,079	------	207	82	9	16	82
Lettuce:												
1928	1,066	------	------	------	------	------	26	125	35	27	85	------
1929	896	------	259	185	23	2,567	381	718	63	132	90	------
1930	1,041	------	------	198	67	3,000	------	2,241	6	103	116	188
Onions:												
1928	34	------	------	------	------	------	56	59	------	10	57	------
1929	46	------	31	99	10	537	350	208	------	7	80	1
1930	69	------	------	90	29	669	------	1,748	------	7	80	4
Peaches:												
1928	21	287	------	------	------	------	165	302	------	10	92	------
1929	12	330	86	------	13	1,010	377	1,546	------	18	94	------
1930	37	39	------	------	------	1,145	------	660	------	6	74	------
Pears:												
1928	15	291	------	------	------	------	11	84	------	13	28	------
1929	35	274	53	------	------	281	8	76	------	12	25	------
1930	51	67	------	------	1	420	------	334	------	6	42	9
Plums and prunes, fresh:												
1928	------	2	------	------	------	------	------	1	6	4	24	------
1929	------	8	------	4	1	268	------	------	------	4	21	------
1930	------	22	------	6	1	284	------	4	------	4	22	------
Potatoes:												
1928	78	------	------	------	------	------	434	448	------	10	496	------
1929	52	------	187	388	121	1,121	471	266	------	23	527	------
1930	130	------	------	392	149	1,594	------	3,286	------	26	514	1
Strawberries:												
1928	79	103	------	------	------	------	------	------	------	------	105	------
1929	165	118	74	47	5	777	384	1,165	------	------	92	393
1930	173	161	------	42	21	823	------	676	------	28	62	301
Sweetpotatoes:												
1928	------	------	------	------	------	------	46	333	------	------	------	------
1929	------	------	7	------	2	373	110	849	------	------	------	------
1930	------	------	------	------	60	450	------	1,148	------	------	------	33
Tomatoes:												
1928	395	203	------	------	------	------	294	803	7	56	167	------
1929	469	295	452	95	48	2,127	800	1,122	------	129	162	229
1930	581	46	------	152	138	2,710	------	2,266	63	88	153	252
Watermelons:												
1928	------	------	------	------	------	------	------	------	------	------	62	------
1929	------	------	3	13	1	871	1	1	------	------	48	------
1930	------	------	------	35	------	616	------	20	------	------	45	------
Total:												
1928	3,370	3,057	------	------	------	------	1,699	4,053	110	413	1,559	------
1929	3,563	3,979	1,408	1,393	331	[2]21,405	4,348	8,577	63	671	[3]1,593	725
1930	4,618	1,779	------	1,290	588	23,441	------	20,266	167	507	[5]1,572	[6]1,270

Bureau of Agricultural Economics. Compiled from daily reports made by common carriers to bureau representatives in the various markets. Truck unloads for 1928 do not cover the entire year.

[1] Includes honeydews and other miscellaneous melons.
[2] Includes car-lot equivalents of citrus fruit as follows: Grapefruit, 605 cars; lemons, 525; oranges, 3,294.
[3] Includes 1 car-lot equivalent of oranges.
[4] Includes car-lot equivalent of citrus fruit as follows: Grapefruit, 606 cars; lemons, 495; oranges, 2,233.
[5] Includes 1 car-lot equivalent of oranges.
[6] Includes car-lot equivalent of citrus fruit as follows: Grapefruit, 1 car; lemons, 2; oranges, 26.

TABLE 299.—*Vegetables, canned: Production and value for census years, 1899–1929*

QUANTITY

Commodity	In terms of standard cases [1]							Actual cases		
	1899	1904	1909	1914	1919	1921	1923	1925	1927	1929
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Asparagus	(2)	(2)	229	638	1,007	740	1,462	1,896	2,177	2,727
Beans with pork, with sauce and baked [3]	----	----	1,752	5,977	11,142	(4)	14,424	17,009	17,887	17,191
Beans other than baked	1,494	2,588	1,641	3,017	3,682	11,316	6,044	7,671	7,473	13,821
Beets	----	----	126	252	584	391	545	1,557	815	1,908
Corn	6,337	11,210	7,451	9,920	14,403	9,011	14,704	22,597	10,255	16,594
Hominy	----	----	----	686	587	----	----	1,133	1,695	1,765
Peas	2,544	4,694	5,902	8,826	9,326	8,222	14,434	16,544	13,085	17,285
Pimentos	----	----	----	----	----	----	----	253	487	506
Pumpkin	138	247	440	789	383	----	----	} 1,183	1,094	2,421
Squash	----	----	114	166	55	----	----			
Sauerkraut	----	----	----	1,184	1,042	(2)	2,072	2,395	3,101	3,999
Spaghetti	----	----	----	----	----	----	----	1,841	2,751	4,233
Spinach	----	----	149	392	676	581	1,875	2,045	2,462	4,815
Sweetpotatoes	84	193	347	454	746	623	----	769	----	295
Tomatoes	8,701	9,411	12,910	16,200	11,836	4,134	14,781	21,807	18,229	19,906
Tomato paste	----	----	----	----	113	(2)	219	623	438	569
Tomato pulp	----	----	----	752	1,518	(2)	2,005	3,630	2,459	2,877
Tomato sauce	----	----	----	----	----	----	----	580	410	950
Other vegetables	27	1,237	1,691	1,005	1,008	3,169	3,186	} [5]11,335	[5]12,539	18,434
Canned soups	----	----	854	4,886	5,845	6,862	14,186			

VALUE

Commodity	1899	1904	1909	1914	1919	1921	1923	1925	1927	1929
	1,000 dolls.	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*
Asparagus	(2)	(2)	1,976	2,791	6,572	5,137	10,955	10,487	12,202	15,464
Beans with pork, with sauce and baked	----	----	3,418	11,535	28,551	(4)	25,265	35,511	34,959	35,529
Beans other than baked	2,025	4,134	2,596	5,030	10,857	30,712	14,373	19,653	18,110	32,781
Beets	----	----	261	512	1,951	1,203	1,763	3,810	2,050	4,571
Corn	8,191	15,952	10,332	13,923	35,532	19,550	30,833	51,346	22,855	36,546
Hominy	----	----	----	713	1,346	----	----	1,517	2,180	2,532
Peas	4,466	7,929	10,247	15,089	25,073	22,953	39,768	42,887	34,031	43,936
Pimentos	----	----	----	----	----	----	----	1,463	2,069	2,014
Pumpkin	202	346	576	1,023	861	----	----	} 2,593	1,984	4,212
Squash	----	----	195	294	165	----	----			
Sauerkraut	----	----	----	1,568	2,845	(2)	5,146	4,574	5,460	8,351
Spaghetti	----	----	----	----	----	----	----	5,551	6,061	8,312
Spinach	----	----	294	737	2,338	2,087	4,978	5,456	6,225	12,130
Sweetpotatoes	124	284	532	737	2,478	1,808	----	2,122	----	716
Tomatoes	13,667	14,021	18,748	25,532	38,068	12,509	39,677	42,680	33,814	39,531
Tomato paste	----	----	----	----	1,301	(2)	1,988	2,809	2,298	3,481
Tomato pulp	----	----	----	1,454	3,819	(2)	3,870	6,639	3,861	5,269
Tomato sauce	----	----	----	----	----	----	----	1,947	1,084	2,541
Other vegetables	60	2,945	2,394	3,476	2,817	8,645	8,964	} [5]41,842	[5]45,017	[5] 63,088
Canned soups	----	----	2,589	7,877	11,858	13,584	27,135			
Total vegetables and soups	28,735	45,611	54,158	92,291	176,432	118,188	214,715	282,891	234,260	321,004

Bureau of Agricultural Economics. Data for 1899, 1904, and 1909, Thirteenth Census of United States, 1910, Vol. X, Manufactures, pp. 391–396. Data for 1914, Census of Manufactures, 1914, Vol. II, pp. 382–383. Data for 1919, 1921, 1923, 1925, 1927, and 1929, Census of Manufactures bulletins on canning and preserving.

[1] Standard cases expressed as follows: Asparagus, 1909, 24 No. 3 cans, 1914, 24 No. 2 cans, 1919, 1921, 1923, No. 2½ cans; beans, 24 No. 2 cans; beets, 24 No. 3 cans; corn, 24 No. 2 cans; hominy, 24 No. 3 cans: sauerkraut, 24 No. 3 cans; peas, 24 No. 2 cans; pumpkin, 24 No. 3 cans; squash, 24 No. 3 cans; spinach, 24 No. 3 cans; sweetpotatoes, 24 No. 3 cans; tomatoes, 24 No. 3 cans; tomato paste, 100 six-ounce cans; tomato pulp, 1914, standard cases of 12 No. 10 cans, 1919 and 1923, 6 No. 10 cans; other vegetables, 24 No. 3 cans except succotash in 1909, 1914, and 1919, which are No. 2 cans; canned soup, 48 No. 1 cans.

[2] Not reported separately.

[3] 1909–1923 reported as baked beans.

[4] Included in beans other than baked.

[5] Reported as other canned vegetables and canned soups.

TABLE 300.—*Vegetables: Imports into the United States, exclusive of imports from Canada, 1925–26 to 1929–30*

Commodity and country from which imported	Year beginning July 1				
	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Beans, Lima: Total	1, 232	1, 044	2, 778	3, 357	3, 268
Cuba	1, 229	1, 033	2, 729	3, 273	2, 999
Mexico	3	11	49	84	269
Other countries	-----	-----	-----	-----	0
Beans, string: Total	503	469	914	2, 584	3, 423
Mexico	413	428	888	2, 549	3, 295
Cuba	90	41	26	35	128
Beets: Total	997	644	864	403	800
Bermuda	739	414	552	16	4
Mexico	258	220	312	354	361
Other countries	-----	10	-----	33	435
Cabbage: Total	14, 698	3, 050	95	6, 241	42, 184
Netherlands	11, 566	3, 009	40	5, 822	34, 847
Denmark	2, 573	-----	-----	384	5, 007
Cuba	524	-----	20	1	360
Mexico	34	41	34	34	81
Other countries	1	-----	1	-----	1, 889
Carrots: Total	2, 668	2, 408	2, 026	5, 577	2, 627
Mexico	383	471	652	569	619
Bermuda	2, 285	1, 887	1, 374	255	97
Netherlands	-----	50	-----	4, 686	1, 865
Other countries	-----	-----	-----	67	46
Celery: Total	2, 271	3, 706	2, 667	3, 522	2, 602
Bermuda	2, 270	3, 705	2, 665	3, 519	2, 599
Other countries	1	1	2	3	3
Cucumbers: Total	670	1, 325	1, 247	966	1, 834
Cuba	460	1, 015	1, 030	952	1, 702
Mexico	200	310	216	13	126
Other countries	10	-----	1	1	6

Commodity and country from which imported	Year beginning July 1				
	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Eggplant: Total	5, 178	6, 587	7, 061	6, 562	7, 507
Cuba	4, 708	6, 085	6, 216	6, 265	6, 438
Mexico	469	495	796	292	1, 054
Other countries	1	7	49	5	15
Endive: Total	1, 552	1, 680	2, 391	2, 588	1, 986
Belgium	1, 536	1, 651	2, 391	2, 588	1, 976
France	6	-----	-----	-----	-----
England	10	28	-----	-----	10
Netherlands	-----	1	-----	-----	-----
Horse-radish: Total	2, 057	767	690	1, 389	2, 853
Germany	2, 029	767	690	1, 387	2, 822
Other countries	28	-----	-----	2	31
Kale: Bermuda	678	908	676	1, 150	271
Okra: Total	929	640	1, 349	1, 557	1, 626
Cuba	893	640	1, 345	1, 557	1, 626
Mexico	36	-----	4	-----	-----
Parsley: Total	1, 515	1, 045	1, 621	660	611
Bermuda	1, 493	1, 020	1, 593	635	580
Mexico	22	25	28	25	31
Peas: Total	9, 095	14, 278	14, 443	20, 551	30, 105
Mexico	9, 090	14, 277	14, 441	20, 551	30, 105
Other countries	5	1	2	-----	-----
Peppers: Total	17, 391	17, 608	16, 631	12, 222	14, 250
Cuba	12, 032	8, 620	6, 008	4, 479	5, 078
Mexico	5, 350	8, 968	10, 602	7, 738	9, 158
Virgin Islands	1	15	15	1	8
Other countries	8	5	6	4	6

Bureau of Agricultural Economics. Compiled from the annual reports of the Federal Horticultural Board and Plant Quarantine and Control Administration, 1926–1930, as provided by quarantine 56, which became effective Nov. 1, 1923.

STATISTICS OF MISCELLANEOUS CROPS

TABLE 301.—*Beans, dry edible:*[1] *Acreage, production, value, exports, etc., United States, 1899, 1909, 1914–1930*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1[2]	Farm value	Wholesale price at Chicago[3]	Imports, year beginning July 1[4]	Domestic exports, year beginning July 1[4] [5]
	1,000 acres	*Bushels*	*1,000 bushels*	*Dollars*	*1,000 dollars*	*Dollars*	*1,000 bushels*	*1,000 bushels*
1899	*454*	*11.2*	*5,064*			1.23	(6)	
1909	*803*	*14.0*	*11,251*			2.27	1,015	
1914	875	13.2	11,585	2.26	26,213	1.33	906	
1915	928	11.1	10,321	2.59	26,771	1.91	663	
1916	1,107	9.7	10,715	5.10	54,686	2.54	3,748	
1917	1,821	8.8	16,045	6.50	104,350	5.45	4,146	1,517
1918	1,744	10.0	17,397	5.28	91,863	6.89	4,016	4,489
1919	*1,162*	*12.1*	*14,079*					
1919	1,065	12.6	13,399	4.26	57,046	4.75	3,806	1,993
1920	852	10.8	9,225	2.96	27,282	4.06	824	1,216
1921	782	11.7	9,185	2.67	24,515	2.77	520	1,100
1922	1,086	11.9	12,877	3.74	48,133	4.48	2,623	692
1923	1,344	12.1	16,308	3.67	59,782	4.22	886	675
1924	*1,637*							
1924	1,576	9.6	15,164	3.74	56,744	3.28	1,421	549
1925	1,606	12.4	19,928	3.28	65,376	3.70	1,271	576
1926	1,677	10.6	17,707	2.93	51,876	2.97	1,051	529
1927	1,571	10.3	16,181	2.88	46,612	[7] 3.31	2,465	427
1928	1,643	10.7	17,656	4.18	73,815	5.40	1,505	316
1929	1,960	10.6	20,707	3.78	78,371	5.86	2,534	296
1930[8]	2,181	10.1	22,137	2.40	53,098	3.98		

Bureau of Agricultural Economics. Italic figures are census returns; census figures include all States; other figures, estimates of crop-reporting board, principal producing States only.

[1] Table includes, besides the ordinary edible beans and limas, the blackeye of California which is identical with the blackeyed pea of the South. Soybeans not included.

[2] Farm prices are as of Nov. 15, 1914–1924.

[3] Prices 1899 and 1909 from Chicago Board of Trade annual reports, quotations for navy, good to choice; 1914–1929 from Daily Trade Bulletin, pea beans (quoted per 100 pounds; converted to bushels of 60 pounds).

[4] Imports and exports compiled from Commerce and Navigation of the United States, 1910–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1930; and official records of the Bureau of Foreign and Domestic Commerce.

[5] Not separately reported prior to 1918.

[6] Not separately reported.

[7] 11 months.

[8] Preliminary.

TABLE 302.—*Beans, dry edible:*[1] *Acreage, production, and December 1 price, by States, 1927–1930*

State	Acreage				Average yield per acre				Production				Price per bushel received by producers Dec. 1			
	1927	1928	1929	1930[2]	1927	1928	1929	1930	1927	1928	1929	1930[2]	1927	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Me.	6	6	6	7	16.0	15.0	16.5	17.0	96	90	99	119	4.00	5.10	5.10	4.40
Vt.	5	5	6	6	14.0	14.0	13.0	14.0	70	70	78	84	4.10	5.15	4.20	3.30
N. Y.	75	80	100	120	13.0	14.5	12.5	9.3	975	1,160	1,250	1,116	3.70	4.70	4.45	3.35
Mich.	566	538	694	819	8.5	11.0	8.2	5.9	4,811	5,918	5,691	4,832	3.00	4.45	3.70	2.60
Wis.	6	6	9	9	6.7	9.0	8.5	6.7	40	54	76	60	3.30	3.90	3.60	3.40
Minn.	5	5	6	6	11.0	9.0	9.0	8.5	55	45	54	51	3.30	4.00	4.35	3.60
Nebr.	5	9	9	10	12.3	9.7	9.4	11.8	62	87	85	118	3.50	3.50	3.75	3.10
Kans.		6	20	12		6.0	7.0	12.0		36	140	144		3.75	3.70	3.10
Mont.	32	40	60	60	20.0	14.5	11.0	11.5	640	580	660	690	3.00	3.85	3.60	2.45
Idaho	72	86	92	115	23.7	19.0	23.0	21.0	1,706	1,634	2,116	2,415	2.50	3.60	2.75	1.80
Wyo.	17	24	31	33	18.0	15.0	18.5	22.0	306	360	574	726	2.90	3.40	3.10	2.40
Colo.	281	309	350	385	5.5	4.5	6.7	10.2	1,546	1,390	2,345	3,927	2.70	3.40	2.70	1.35
N. Mex.	195	214	225	227	5.0	4.0	7.5	3.2	975	856	1,688	726	2.90	3.15	2.60	1.50
Ariz.	8	6	6	8	8.0	7.0	8.0	8.5	64	42	48	68	3.60	3.70	3.15	2.10
Oreg.			7	1			5.0	12.0			35	12			5.00	3.45
Calif.	296	307	339	363	16.3	17.3	17.0	19.4	4,825	5,325	5,768	7,049	2.70	4.40	4.95	2.90
U. S.	1,569	1,641	1,960	2,181	10.3	10.8	10.6	10.1	16,171	17,647	20,707	22,137	2.88	4.18	3.78	2.40

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Table includes, besides the ordinary edible beans and Limas, the blackeye of California which is identical with the blackeyed pea of the South. Soybeans not included.

[2] Preliminary.

TABLE 303.—*Beans, dry edible:*[1] *Production by varieties, leading States, 1929 and 1930*

State and year	White pea beans	Small white	Large White	Great Northern	Yellow eye	White kidney	Red kidney	Cranberry	Red Mexican	Pinto	Pinks	Limas [2]	Blackeye	Other varieties [3]	Total
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
Maine:															
1928	18		5		38	6	16							7	90
1929	7		5		54	7	14							12	99
1930	13		6		54	7	20							19	119
Vermont:															
1928	10		7		31	4	3							15	70
1929	12		4		39	4	4							15	78
1930	18		7		41	4	4							10	84
New York:[4]															
1928	438		184		121	45	340							32	1,160
1929	516		220		105	62	335							12	1,250
1930	461		255		61	53	231							55	1,116
Michigan:															
1928	4,900		150				660							208	5,918
1929	4,860		180				445							206	5,691
1930	4,220		74				300							238	4,832
Wisconsin:															
1928	36		10											8	54
1929	62		8											6	76
1930	48		7											5	60
Minnesota:															
1928	45														45
1929	54														54
1930	51														51
Nebraska:															
1928		18		27						42					87
1929		42		12						31					85
1930		51		9						58					118
Montana:															
1928		19		524					25					12	580
1929		16		610					25					9	660
1930		15		640					25					10	690
Idaho:															
1928		25		1,134					245	10				[5] 220	1,634
1929		35		1,475					280	10				[5] 316	2,116
1930		50		1,670					340	10				[5] 345	2,415
Wyoming:															
1928				308						11				41	360
1929				485						15				[5] 74	574
1930				603						44				[5] 79	726
Colorado:															
1928				56						1,302				32	1,390
1929				35						2,145				[5] 165	2,345
1930				112						3,615				[5] 200	3,927
New Mexico:															
1928										800	34			22	856
1929										1,600	44			44	1,688
1930										641	60			25	726
Arizona:															
1928											35			7	42
1929											40			8	48
1930											58			10	68
California:															
1928		707	38				115	177	225	85	912	2,258	713	[3] 95	5,325
1929		693	35				80	178	138	85	990	2,572	858	[3] 139	5,768
1930		787	41				107	200	150	140	962	3,052	1,440	[3] 170	7,049
Total 14 States:[6]															
1928	5,447	769	394	2,049	190	55	1,134	177	495	2,286	981	2,258	713	699	17,647
1929	5,511	821	452	2,617	198	73	878	178	443	4,026	1,074	2,572	858	1,006	20,707
1930	4,811	915	390	3,034	156	64	662	200	515	4,652	1,080	3,052	1,440	1,166	22,137

Bureau of Agricultural Economics. Based upon reports by growers on proportion of total production made up of each variety, supplemented by investigations of field statisticians.

[1] Table includes, besides the ordinary edible beans and Limas, the blackeye of California, which is identical with the blackeyed "pea" of the South. Soybeans not included.
[2] Limas include baby Limas: 1928, 668; 1929, 810; 1930, 1,150.
[3] "Other" include Bayo: 1928, 20; 1929, 20; 1930, 25.
[4] Large white in New York is the marrow.
[5] Including garden or seed beans: Idaho, 1928, 195; 1929, 291; Wyoming, 1929, 72; 1930, 65; and Colorado, 1930, 136.
[6] Including also Pintos in Kansas: 1928, 36; 1929, 140; 1930, 144; and small whites in Oregon: 1929, 35; 1930, 12.

TABLE 304.—*Beans, dry: Car-lot shipments, by State of origin, 1920–21 to 1929–30*

State	Crop-movement season [1]									
	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	935	1, 555	1, 650	1, 969	1, 900	1, 158	916	614	889	1, 056
Michigan	5, 095	4, 784	5, 477	8, 333	7, 848	10, 506	8, 699	4, 989	6, 383	5, 616
Montana	29	12	44	104	124	288	280	386	566	733
Idaho	139	141	351	749	1, 336	1, 898	1, 437	2, 074	1, 973	2, 516
Wyoming	------	1	------	9	31	82	130	252	347	577
Colorado	333	486	427	1, 732	1, 316	2, 927	1, 866	1, 711	1, 732	2, 347
New Mexico	740	839	75	146	388	170	412	608	555	1, 750
California	3, 148	3, 403	3, 774	2, 951	1, 847	2, 558	3, 433	3, 251	2, 961	3, 588
Other States	80	83	46	100	134	138	114	55	122	239
Total	10, 499	11, 304	11, 844	16, 093	14, 924	19, 725	17, 287	13, 940	15, 528	18, 422

Bureau of Agricultural Economics. Compiled from monthly reports received by the bureau from local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season extends from September of one year through August of the following year.
[2] Preliminary.

TABLE 305.—*Beans, dry: Wholesale price per 100 pounds, 1921–22 to 1930–31*

PEA, BOSTON [1]

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	5. 41	5. 24	5. 34	5. 08	5. 14	5. 76	6. 88	7. 34	8. 14	9. 69	9. 75	9. 03	6. 90
1922–23	7. 06	6. 97	7. 68	7. 81	7. 62	7. 71	7. 66	7. 60	7. 27	7. 35	7. 18	6. 89	7. 40
1923–24	7. 40	7. 75	7. 79	7. 12	7. 06	7. 40	7. 30	7. 28	7. 12	7. 12	7. 16	7. 68	7. 35
1924–25	8. 04	8. 18	8. 10	8. 00	6. 94	7. 20	6. 91	6. 60	6. 31	6. 34	6. 17	5. 89	7. 06
1925–26	5. 50	5. 49	5. 86	5. 90	5. 67	5. 49	5. 32	5. 06	5. 01	5. 48	5. 65	5. 48	5. 49
1926–27	5. 28	5. 98	6. 32	6. 11	5. 86	5. 66	5. 38	5. 28	5. 46	6. 29	6. 48	6. 62	5. 89
1927–28	6. 34	6. 18	6. 12	6. 16	6. 69	7. 88	8. 71	9. 81	10. 08	10. 18	10. 30	10. 22	8. 22
1928–29	9. 94	9. 75	9. 55	9. 50	9. 95	10. 97	11. 13	10. 41	10. 45	10. 38	9. 97	10. 32	10. 19
1929–30	10. 56	10. 12	8. 66	8. 09	8. 12	8. 00	7. 62	7. 12	7. 22	7. 31	7. 02	7. 81	8. 14
1930–31	8. 25	7. 12	6. 38	6. 32	------	------	------	------	------	------	------	------	------

SMALL WHITE, SAN FRANCISCO

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
1921–22	4. 55	4. 68	4. 79	4. 79	4. 89	5. 25	6. 08	6. 50	6. 58	6. 59	7. 39	6. 33	5. 70
1922–23	5. 40	5. 59	6. 11	6. 48	7. 48	7. 23	7. 27	7. 22	6. 76	6. 81	6. 42	6. 05	6. 57
1923–24	6. 75	6. 05	6. 09	5. 92	5. 92	6. 18	6. 08	6. 02	6. 04	6. 29	7. 04	7. 29	6. 33
1924–25	7. 86	8. 00	7. 89	7. 18	7. 22	7. 71	7. 54	7. 49	7. 38	7. 31	7. 42	7. 42	7. 54
1925–26	7. 32	6. 20	5. 71	5. 98	6. 26	6. 25	5. 97	5. 87	5. 62	5. 57	5. 83	5. 95	6. 04
1926–27	5. 66	5. 89	5. 94	5. 81	5. 83	5. 85	5. 86	6. 34	7. 17	8. 26	8. 57	8. 58	6. 65
1927–28	7. 75	5. 60	5. 88	5. 80	6. 21	6. 66	8. 42	9. 20	9. 28	9. 03	8. 75	8. 36	7. 58
1928–29	7. 15	8. 11	8. 40	8. 52	9. 23	9. 99	9. 90	9. 59	9. 45	9. 45	10. 59	------	------
1929–30	------	8. 67	8. 55	8. 06	7. 38	7. 83	8. 12	7. 87	7. 83	7. 64	7. 43	6. 99	------
1930–31	7. 02	6. 09	5. 20	4. 86	------	------	------	------	------	------	------	------	------

LIMA, CALIFORNIA, NEW YORK

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
1921–22	6. 79	6. 65	7. 05	7. 32	7. 40	8. 88	9. 66	9. 68	10. 00	10. 18	10. 82	9. 84	8. 64
1922–23	8. 91	8. 49	8. 65	8. 91	9. 39	9. 79	9. 59	9. 41	8. 59	8. 80	8. 25	8. 55	8. 94
1923–24	9. 40	9. 84	10. 41	10. 09	10. 81	11. 30	12. 40	12. 68	12. 48	12. 59	12. 62	13. 04	11. 47
1924–25	13. 62	14. 42	14. 12	13. 89	14. 41	15. 00	14. 79	14. 85	14. 94	15. 27	15. 79	16. 27	14. 78
1925–26	15. 92	14. 11	13. 24	11. 88	11. 83	12. 06	11. 20	10. 13	9. 15	8. 88	8. 76	8. 55	11. 31
1926–27	8. 94	8. 44	7. 68	7. 01	7. 14	6. 94	6. 97	6. 97	6. 86	6. 74	6. 68	6. 67	7. 25
1927–28	6. 96	6. 97	6. 85	6. 83	7. 00	7. 87	8. 33	9. 06	9. 69	9. 75	9. 90	10. 17	8. 28
1928–29	9. 90	9. 76	10. 56	12. 01	12. 61	13. 42	13. 50	13. 50	14. 40	15. 25	15. 90	16. 17	13. 08
1929–30	16. 76	14. 39	13. 27	12. 95	12. 28	12. 07	12. 71	12. 71	12. 67	12. 45	12. 01	11. 95	13. 02
1930–31	12. 05	9. 90	8. 74	7. 37	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Boston Produce Market Report, weekly; San Francisco Commerical News, daily; and New York Producers Price Current, daily. See 1930 Yearbook, pp. 794–795 for data for earlier years.

[1] Quoted as New York and Michigan, hand picked.

TABLE 306.—*Soybeans: Acreage production, and value, by States, 1929 and 1930*

State	Beans gathered						Total, except hay						Farm price Dec. 1 of beans gathered		Value of total production except hay [4]	
	Acreage [1]		Yield per acre		Total yield		Total acreage [2]		Yield per acre [3]		Total production [3]					
	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930
	1,000 acres	*1,000 acres*	*Bus.*	*Bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 acres*	*1,000 acres*	*Bus.*	*Bus.*	*1,000 bus.*	*1,000 bus.*	*Dolls. per bu.*	*Dolls. per bu.*	*1,000 dolls.*	*1,000 dolls.*
Ohio	49	51	14.5	13.5	710	688	70	61	14.5	13.5	1,015	824	1.75	1.60	1,776	1,318
Ind.	100	131	14.2	14.0	1,420	1,834	167	172	14.2	14.0	2,371	2,408	1.55	1.20	3,675	2,890
Ill.	240	321	16.5	16.0	3,960	5,136	270	351	16.5	16.0	4,455	5,616	1.50	1.20	6,682	6,739
Mich.	2	2	9.0	10.0	18	20	2	2	9.0	10.0	18	20	2.45	2.00	44	40
Wis.	1	1	11.0	11.5	11	12	1	1	11.0	11.5	11	12	2.55	2.50	28	30
Iowa	35	52	16.0	15.7	560	816	44	61	12.0	10.0	528	610	1.67	1.35	1,116	1,223
Mo.	161	152	10.0	9.5	1,610	1,444	174	167	10.0	9.5	1,740	1,586	1.95	1.65	3,393	2,617
Kans.	10	20	9.5	8.7	95	174	10	20	9.5	8.7	95	174	2.10	1.60	200	278
Del.	16	17	10.5	6.3	168	107	16	17	10.5	6.3	168	107	2.15	2.45	361	262
Md.	3	4	14.4	7.5	43	30	4	5	14.4	7.5	58	38	2.30	2.25	133	86
Va.	13	13	9.0	7.5	117	98	20	20	9.0	7.5	180	150	2.45	2.40	441	360
W. Va.	2	2	15.2	9.6	30	19	2	2	15.2	9.6	30	19	2.70	2.90	81	55
N. C.	162	219	12.0	8.0	1,944	1,752	250	322	14.0	13.0	3,500	4,186	1.70	1.55	5,950	6,488
S. C.	8	16	10.0	8.0	80	128	27	51	13.5	10.5	364	536	2.40	2.05	874	1,099
Ga.	8	14	8.0	7.5	64	105	11	15	10.0	10.0	110	150	2.80	3.00	308	450
Ky.	3	3	8.2	7.0	25	21	14	14	15.0	11.5	210	161	2.45	2.35	514	378
Tenn.	27	30	6.5	8.0	176	240	110	109	10.0	13.0	1,100	1,417	2.35	2.10	2,585	2,976
Ala.	2	3	5.5	4.8	11	14	9	16	14.0	12.0	126	192	2.60	2.10	328	403
Miss.	14	14	10.0	5.0	140	70	56	54	13.5	10.5	756	567	2.85	2.30	2,155	1,304
Ark.	8	7	6.8	4.0	54	28	46	43	14.0	10.5	644	452	2.65	2.40	1,707	1,085
La.	12	15	8.7	8.0	104	120	99	103	9.3	10.5	921	1,082	3.00	2.85	2,763	3,084
Okla.	17	18	5.5	5.5	94	99	26	29	8.0	8.0	208	232	2.50	2.30	520	534
U. S.	893	1,105	12.8	11.7	11,434	12,955	1,428	1,635	13.0	12.6	18,608	20,539	1.90	1.62	35,634	33,699

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

1 Acres from which all or part of the beans grown were gathered.
2 Including acres planted in corn reduced to equivalent solid acres as well as the acreage grown alone.
3 Including beans grazed or otherwise utilized as well as those gathered.
4 Total production (except hay) multiplied by price of gathered beans to give approximate total value.

TABLE 307.—*Soybean oil: Quantity of beans used in production and quantity of crude oil produced, 1922–23 to 1929–30*

Year beginning October	Soybeans crushed					Oil produced				
	Oct.–Dec.	Jan.–Mar.	Apr.–June	July–Sept.	Total	Oct.–Dec.	Jan.–Mar.	Apr.–June	July–Sept.	Total
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1922–23	2,708	3,876	2,350	594	9,528	364	768	272	78	1,482
1923–24	2,230	3,232	564	102	6,128	286	388	72	13	759
1924–25	3,550	7,478	3,038	4,336	18,402	477	870	360	562	2,269
1925–26	5,486	7,746	7,450	358	21,040	728	990	874	46	2,638
1926–27	5,132	6,804	6,032	2,104	20,072	735	862	776	286	2,659
1927–28	8,788	10,278	8,792	5,654	33,512	1,164	1,289	1,132	789	4,374
1928–29	11,480	21,190	9,666	10,560	52,896	1,506	3,046	1,277	1,456	7,285
1929–30	39,658	25,688	20,716	9,614	95,676	5,231	3,235	2,905	1,220	12,591

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census, "Animal and vegetable fats and oils."

TABLE 308.—*Soybeans and soybean oil: International trade, years 1926–1929*

SOYBEANS

Country	1926 Imports	1926 Exports	1927 Imports	1927 Exports	1928 Imports	1928 Exports	1929 * Imports	1929 * Exports
	Calendar year							
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
China [1]	0	2,605,554	0	3,376,789	0	4,780,513	0	5,468,725
PRINCIPAL IMPORTING COUNTRIES								
Denmark	385,051	0	348,406	0	472,469	0	518,939	0
Germany	815,787		1,270,061		1,868,891		2,257,198	
Japan, including Chosen	936,136	4,955	884,710	6,524	1,040,128	5,714	1,251,723	5,692
Netherlands	41,694	2,610	21,907	539	40,180	463	108,305	487
Sweden	139,474	0	150,749	0	199,528	0	221,231	0
United Kingdom	101,082	0	182,831	0	429,014	0	467,925	0
Italy		0	129,318	6	141,478	9	194,652	110
United States [2]	3,728	0	4,189	0	4,256	0	4,337	0
Total, 9 countries	2,422,952	2,613,119	2,992,171	3,383,858	4,195,944	4,786,699	5,024,310	5,475,014

SOYBEAN OIL

Country	1926 Imports	1926 Exports	1927 Imports	1927 Exports	1928 Imports	1928 Exports	1929 * Imports	1929 * Exports
PRINCIPAL EXPORTING COUNTRIES								
China	0	355,631	0	329,298	0	125,625	0	148,673
Denmark	2,288	31,391	4,394	33,837	1,267	46,466	699	43,690
Japan, including Chosen	128	19,235	115	11,167		10,870		14,739
PRINCIPAL IMPORTING COUNTRIES								
Algeria	5,165	3	17,860	[3] 15	3,542	[3] 43		
France	13,057	67	22,936	81	19,064	213	17,082	375
Germany	44,094	11,160	25,290	34,663	2,466	73,140	4,376	103,862
Netherlands	109,709	37,447	166,388	75,314	91,249	35,509	93,739	23,888
Sweden	12,714	9,763	7,874	14,572	10,019	16,796	10,433	15,911
United Kingdom	108,067	55,019	118,075	63,025	55,196	48,919	33,038	40,347
United States	30,712	1,567	14,915	5,444	13,116	7,142	19,489	7,967
Total, 10 countries	325,934	521,283	377,847	567,416	195,919	364,723	178,856	399,452

Bureau of Agricultural Economics. Compiled from official sources.

*Preliminary.

[1] These figures are for yellow beans, including mostly soybeans, according to Agricultural Commissioner Paul O. Nyhus.

[2] Imports for consumption.

[3] International Yearbook of Agricultural Statistics.

TABLE 309.—*Soybeans: Estimated average price per bushel, received by producers, United States, 1921–22 to 1930–31*

Season beginning October	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Weighted average
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1921–22	2.20	2.22	2.08	2.11	2.16	2.17
1922–23	1.89	2.06	1.97	2.07	2.13	2.00
1923–24	2.09	2.11	2.11	2.23	2.26	2.12
1924–25	2.23	2.16	2.36	2.59	2.64	2.29
1925–26	2.27	2.18	2.17	2.38	2.33	2.23
1926–27	1.97	1.85	1.83	1.90	2.03	1.89
1927–28	1.86	1.70	1.61	1.70	1.69	1.72
1928–29	1.72	1.69	1.70	1.82	1.93	1.72
1929–30	1.79	1.70	1.72	1.85	1.91	1.75
1930–31	1.64	1.48	1.44			

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of soybeans for each State; yearly price obtained by weighting monthly prices by estimated monthly marketings. For previous data see 1930 or earlier Yearbooks.

TABLE 310.—*Soybeans for seed: Average wholesale selling price per 100 pounds at Baltimore and St. Louis, 1921–1930*

Season, January–May	Baltimore						St. Louis					
	Jan.	Feb.	Mar.	Apr.	May	Av.	Jan.	Feb.	Mar.	Apr.	May	Av.
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	3.15	3.50	3.50	3.75	4.70	3.72	4.30	5.40	5.75	5.00	5.40	5.17
1922	3.20	3.50	3.50	3.50	4.30	3.40	4.00	4.00	4.20	3.85	4.55	4.12
1923	------	4.00	4.00	3.80	3.75	------	5.00	4.75	4.50	4.50	4.95	4.74
1924	3.50	4.00	4.00	4.50	5.00	4.20	4.70	4.70	4.70	4.70	4.60	4.68
1925	5.10	4.90	5.25	4.95	3.95	4.83	4.00	4.00	4.00	3.75	3.60	3.87
1926	3.35	3.42	3.50	3.56	4.62	3.69	3.55	3.61	3.88	4.25	4.85	4.03
1927	3.00	3.00	3.00	3.00	3.12	3.02	------	4.50	4.00	4.19	4.50	------
1928	3.25	3.22	3.25	3.32	3.55	3.32	3.00	3.00	3.12	3.31	3.75	3.24
1929	3.75	4.00	4.00	4.00	4.50	4.05	4.25	4.25	4.38	4.62	4.75	4.45
1930	3.50	3.50	3.50	3.88	4.40	3.76	3.65	3.75	3.75	3.75	3.75	3.73

Bureau of Agricultural Economics. Compiled from weekly reports to the bureau from seedsmen in the various markets. These prices are the average wholesale selling prices for high-quality seed.

TABLE 311.—*Soybean oil, crude, in barrels: Wholesale price per pound, Saturday nearest the 15th of the month, New York, 1921–1930*

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	8.25	6.50	6.25	7.00	7.75	7.94	8.25	8.50	8.38	8.88	8.88	9.25
1922	8.88	9.12	10.88	11.38	------	------	------	------	------	10.00	10.38	10.88
1923	11.19	11.69	12.62	13.12	13.12	12.62	11.88	11.62	11.62	10.88	11.00	11.38
1924	11.62	12.50	12.50	11.75	12.38	12.00	12.38	12.50	12.75	12.25	13.12	13.38
1925	13.25	13.25	13.25	13.38	13.38	13.38	13.38	13.38	13.38	13.38	13.38	13.38
1926	13.38	13.38	13.38	13.38	13.38	13.50	14.00	14.00	14.00	14.00	13.00	12.00
1927	12.00	12.12	12.12	12.12	12.38	12.12	12.12	12.12	12.12	12.12	12.12	12.12
1928	12.12	12.12	12.12	12.12	12.12	12.38	12.38	12.38	12.38	12.38	12.38	12.38
1929	12.38	12.38	12.38	12.00	11.75	11.75	11.75	11.12	11.12	[1] 12.62	12.62	12.25
1930	12.25	12.25	11.38	11.38	11.12	10.88	10.88	10.88	10.88	10.38	10.12	10.12

Bureau of Agricultural Economics. Compiled from the Oil, Paint, and Drug Reporter. See 1930 Yearbook, p. 798, Table 300, for data for earlier years.

[1] Beginning October, 1929, reported as imported.

TABLE 312.—*Cowpeas: Estimated average price per bushel, received by producers, United States, 1921–22 to 1930–31*

Crop year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	2.41	2.00	2.01	1.85	1.76	1.72	1.80	1.86	1.85	1.90	1.84	1.70	1.91
1922–23	1.66	1.57	1.54	1.64	1.67	1.87	1.98	1.98	2.08	2.08	2.17	2.21	1.73
1923–24	2.08	1.87	1.94	1.95	2.01	2.12	2.21	2.32	2.46	2.53	2.82	2.86	2.14
1924–25	2.56	2.41	2.32	2.34	2.56	2.82	3.16	3.43	3.67	3.70	3.84	3.67	2.73
1925–26	3.24	3.12	2.93	2.98	2.87	3.03	3.21	3.37	3.50	3.43	3.47	3.47	3.09
1926–27	3.22	2.79	2.34	2.05	1.95	1.94	1.94	1.89	1.93	1.90	1.90	1.93	2.21
1927–28	1.84	1.80	1.70	1.72	1.65	1.71	1.74	1.76	1.86	2.00	2.09	2.09	1.80
1928–29	2.01	1.82	1.83	1.83	2.02	2.15	2.45	2.63	2.88	3.05	3.24	3.19	2.18
1929–30	2.99	2.49	2.30	2.22	2.28	2.40	2.59	2.73	2.85	2.93	3.00	2.93	2.48
1930–31	2.66	2.41	2.20	2.05	1.86	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of cowpeas for each State; yearly price obtained by weighting monthly prices by estimated monthly marketings. For previous data see 1930 or earlier Yearbooks.

TABLE 313.—*Cowpeas: Acreage, production, and value, by States, 1929 and 1930*

State	Peas gathered						Total, except hay						Farm price Dec. 1, of peas gathered		Value of total production except hay [4]	
	Acres from which gathered [1]		Peas gathered per acre		Total quantity gathered		Total acres [2]		Yield per acre [3]		Total production [3]					
	1929	1930	1929	1930	1929	1930	1920	1930	1929	1930	1929	1930	1929	1930	1929	1930
	1,000 acres	*1,000 acres*	*Bus.*	*Bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 acres*	*1,000 acres*	*Bus.*	*Bus.*	*1,000 bus.*	*1,000 bus.*	*Dolls. per bu.*	*Dolls. per bu.*	*1,000 dolls.*	*1,000 dolls.*
Ohio	2	1	15.0	10.0	30	10	2	4	15.0	9.0	30	36	2.65	2.50	80	90
Ind	7	6	6.0	6.0	42	36	14	19	8.0	6.0	112	114	2.15	1.90	241	217
Ill	47	41	5.5	4.5	258	184	48	42	8.0	6.5	384	273	1.85	1.75	710	478
Mo	37	19	9.5	7.5	352	142	39	22	9.5	7.5	370	165	2.25	2.20	832	363
Kans	3	4	8.5	6.5	26	26	3	4	8.5	6.5	26	26	2.40	1.70	62	44
Del	4	3	9.5	8.0	38	24	4	3	9.5	8.0	38	24	2.40	2.40	91	58
Md	2	2	10.0	7.0	20	14	2	2	10.0	7.0	20	14	2.45	2.35	49	33
Virginia	5	6	6.0	5.0	30	30	13	14	6.0	5.0	78	70	2.70	2.90	211	203
N. C	50	70	9.0	7.0	450	490	68	81	12.0	11.0	816	891	2.30	2.10	1,877	1,871
S. C	116	157	4.5	5.0	522	785	165	178	7.0	8.5	1,155	1,513	2.30	1.80	2,656	2,723
Ga	124	174	6.2	6.5	769	1,131	121	121	8.0	9.0	958	1,089	2,30	2.00	2,226	2,178
Fla	4	6	6.0	5.5	24	33	14	23	10.5	10.0	147	230	2.50	2.45	368	564
Ky	4	4	6.5	5.0	26	20	11	9	14.0	10.0	154	90	2.60	2.20	400	198
Tenn	45	50	5.5	5.0	248	250	43	52	10.0	12.0	430	624	2.30	2.10	989	1,310
Ala	70	90	5.5	4.6	385	414	135	165	11.0	9.0	1,485	1,485	2.30	1.85	3,416	2,747
Miss	46	62	5.0	5.0	230	310	75	90	12.0	10.5	900	945	2.40	2.00	2,160	1,890
Ark	55	58	2.5	2.2	138	128	63	64	10.0	9.0	630	576	2.40	2.15	1,512	1,238
La	20	28	4.0	4.0	80	112	23	30	10.5	10.0	242	300	2.65	2.60	641	780
Okla	26	25	6.8	4.0	177	100	47	46	10.0	6.0	470	276	2.45	2.40	1,152	662
Tex	65	81	6.0	4.0	390	324	160	182	10.0	9.6	1,600	1,747	2.20	1.90	3,520	3,319
United States	732	887	5.8	5.1	4,235	4,563	1,050	1,151	9.6	9.1	10,055	10,488	2.31	2.00	23,193	20,966

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Acres from which all or part of the peas grown were gathered.
[2] Including acres planted in corn reduced to equivalent solid acres as well as the acreage grown alone. Acreage cut for hay is included in table of legume hay.
[3] Including peas grazed or otherwise utilized as well as those gathered.
[4] Total production (except hay) multiplied by price of gathered peas to give approximate total value.

TABLE 314.—*Cowpeas for seed: Average wholesale selling price per 100 pounds at Baltimore and St. Louis, 1921–1930*

Season, January–May	Baltimore						St. Louis					
	Jan.	Feb.	Mar.	Apr.	May	Average	Jan.	Feb.	Mar.	Apr.	May	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	4.50	4.50	4.50	5.30	6.20	5.00	4.00	4.20	4.45	5.05	6.50	4.84
1922	3.70	4.00	4.00	4.00	4.00	3.94	3.20	3.15	3.65	3.75	3.75	3.50
1923	4.25	4.25	4.25	4.25	4.25	4.25	5.00	4.95	4.75	4.75	4.95	4.88
1924	5.00	5.50	5.25	5.60	5.75	5.42	4.60	4.95	5.00	5.05	5.90	5.10
1925	6.50	6.50	6.50	6.50	6.55	6.51	6.50	6.70	6.80	6.80	6.80	6.72
1926	------	7.08	7.10	7.05	7.02	------	7.50	7.38	7.00	6.81	6.75	7.09
1927	3.75	3.75	3.56	3.50	3.50	3.61	------	4.00	4.00	4.00	4.00	------
1928	3.00	3.05	3.50	3.62	3.88	3.41	4.00	4.00	4.02	4.14	4.50	4.13
1929	4.75	5.88	6.25	6.25	6.25	5.88	------	6.00	6.00	6.12	6.25	------
1930	5.50	5.50	5.50	5.50	5.50	5.50	------	5.25	5.25	5.15	5.00	------

Bureau of Agricultural Economics. Compiled from weekly reports to the bureau from seedsmen in the various markets. These prices are the average wholesale selling prices for high-quality seed.

TABLE 315.—*Velvetbeans: Acreage, production, and December 1 price, by States, 1928–1930*

State	Total acres for all purposes			Yield per acre of beans in the hull [1]			Total production of beans in the hull [1]			Price per ton received by producers Dec. 1		
	1928	1929	1930 [2]	1928	1929	1930	1928	1929	1930 [2]	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*Lbs.*	*Lbs.*	*Lbs.*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*Dollars*	*Dollars*	*Dollars*
North Carolina	11	14	13	1,300	1,300	1,100	7	9	7	------	16.00	16.00
South Carolina	67	82	82	800	1,000	1,100	27	41	45	------	16.00	15.70
Georgia	947	1,090	1,035	900	900	875	426	490	453	------	13.50	13.50
Florida	98	110	99	900	900	650	44	50	32	------	13.50	13.00
Alabama	375	430	450	900	780	580	169	168	130	------	14.00	13.50
Mississippi	33	40	34	1,250	1,480	960	21	30	16	------	16.00	16.00
Louisiana	27	28	29	1,400	1,150	650	19	16	9	------	16.00	16.00
United States	1,558	1,794	1,742	915.2	896.3	794.5	713	804	692	------	13.90	13.74

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] The figures refer to the yield and entire production of velvetbeans in the hull and not merely to those gathered. The pods are gathered from one-fourth to one-third of the acreage and most of these are ground for feed, only enough being shelled to supply seed. A large proportion of the crop is grazed.
[2] Preliminary.

TABLE 316.—*Broomcorn: Acreage, production, and November 15 price, United States, 1915–1930*

Year	Acreage	Average yield per acre	Production	Price per ton received by producers Nov. 15	Year	Acreage	Average yield per acre	Production	Price per ton received by producers Nov. 15
	Acres	*Pounds*	*Tons*	*Dollars*		*Acres*	*Pounds*	*Tons*	*Dollars*
1915	230,100	454.1	52,242	91.67	1923	536,000	302.8	81,153	160.06
1916	235,200	329.3	38,726	172.75	1924	436,000	356.7	77,800	95.81
1917	345,000	332.8	57,400	292.75	1925	214,000	275.7	29,500	[1] 143.02
1918	366,000	340.4	62,300	233.87	1926	306,000	355.6	54,400	[2] 78.77
1919	352,000	303.4	53,400	154.57	1927	237,000	337.6	40,000	[2] 109.50
1920	275,500	265.0	36,500	126.16	1928	298,000	363.1	54,100	[2] 104.21
1921	222,000	344.2	38,200	72.20	1929	303,000	311.6	47,200	[2] 122.65
1922	275,000	271.3	37,300	219.46	1930 [3]	395,000	251.1	49,600	[2] 73.81

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Weighted average of the season to Dec. 1. [2] Dec. 1 price. [3] Preliminary.

TABLE 317.—*Broomcorn: Acreage, production, and December 1 price, by States 1927–1930*

State	Acreage				Average yield per acre				Production				Price per ton received by producers Dec. 1			
	1927	1928	1929	1930 [1]	1927	1928	1929	1930	1927	1928	1929	1930 [1]	1927	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Tons*	*Tons*	*Tons*	*Tons*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Ill	28	21	26	31	380	440	432	480	5,300	4,600	5,600	7,400	155	145	175	110
Mo	3	4	4	4	400	430	380	280	600	900	800	600	90	90	90	85
Kans	27	43	44	66	375	450	340	255	5,100	9,700	7,500	8,400	96	96	115	60
Okla	112	131	122	167	349	350	262	208	19,500	22,900	16,000	17,400	98	111	120	82
Tex	10	9	7	7	260	311	350	340	1,300	1,400	1,200	1,200	110	107	112	75
Colo	35	52	60	69	330	360	336	275	5,800	9,400	10,100	9,500	120	85	112	51
N. Mex	22	38	40	51	220	272	300	200	2,400	5,200	6,000	5,100	110	90	115	57
U. S	237	298	303	395	337.6	363.1	311.6	251.1	40,000	54,100	47,200	49,600	109.50	104.21	122.65	73.81

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 318.—*Broomcorn: Supply and distribution, 1924–1930*

	Year beginning June—						
	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30	1930–31
Supply:							
Stocks June 1—	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Manufacturers	15,169	20,960	16,201	18,173	18,744	19,591	14,980
Dealers [1]	15,489	25,043	9,706	11,498	5,938	7,495	6,667
On farms	6,133	6,024	3,265	2,709	1,206	823	1,043
Total carry-over	36,791	52,027	29,172	32,380	25,888	27,909	22,690
Production	78,200	29,500	54,400	40,000	54,100	47,200	[2] 48,000
Imports	136	(3)	(3)	193	(3)	(3)	----------
Total supply available	115,127	81,527	83,572	72,573	79,988	75,109	----------
Distribution:							
Exports [4]	5,580	4,688	4,701	4,591	4,931	4,985	----------
Domestic use	[5] 57,520	47,667	46,491	41,894	47,148	47,434	----------
Stocks on hand May 31	52,027	29,172	32,380	25,888	27,909	22,690	----------

Bureau of Agricultural Economics.

[1] Storage stocks reported by dealers include manufacturers' stocks held by dealers at country shipping points.
[2] Nov. 1 estimate.
[3] Less than 100 tons.
[4] For crop year, June 1–May 31.
[5] Includes broomcorn destroyed by warehouse fire.

TABLE 319.—*Hay: Acreage, production, December 1 price, exports, etc., United States, 1909–1930*

Year	Tame hay						Wild hay			
	Acreage	Average yield per acre	Production	Price per ton received by producers, Dec. 1	Domestic exports, year beginning July 1 [1]	Imports, year beginning July 1 [1]	Acreage	Yield per acre	Production	Price per ton received by producers, Dec. 1
	1,000 acres	*Short tons*	*1,000 short tons*	*Dollars*	*1,000 short tons*	*1,000 short tons*	*1,000 acres*	*Short tons*	*1,000 short tons*	*Dollars*
1909	*51,041*	*1.35*	*68,833*	----------	----------	----------	*17,187*	1.07	18,383	----------
1909	51,041	1.46	74,384	10.58	62	108	17,187	1.07	18,383	----------
1910	51,015	1.36	69,378	12.14	62	377	17,187	.77	13,151	----------
1911	48,240	1.14	54,916	14.29	67	783	17,187	.71	12,155	----------
1912	49,530	1.47	72,691	11.79	68	175	17,427	1.04	18,043	----------
1913	48,954	1.31	64,116	12.43	56	191	16,341	.92	15,063	----------
1914	49,145	1.43	70,071	11.12	118	23	16,752	1.11	18,615	7.49
1915	51,108	1.68	85,920	10.63	200	48	16,796	1.27	21.343	6.80
1916	55,721	1.64	91,192	11.22	96	65	16,635	1.19	19,800	7.90
1917	55,203	1.51	83,308	17.09	34	460	16,212	.93	15,131	13.49
1918	55,755	1.37	76,660	20.13	32	311	15,365	.94	14,479	15.23
1919	*55,653*	*1.34*	*74,724*	----------	----------	----------	----------	----------	----------	----------
1919	56,888	1.53	86,997	20.05	67	252	17,150	1.07	18,401	16.50
1920	58,101	1.55	89,785	17.66	55	126	15,787	1.11	17,460	11.35
1921	58,769	1.40	82,458	12.10	61	5	15,632	.98	15,391	6.63
1922	61,159	1.57	95,748	12.55	53	35	15,871	1.02	16,131	7.14
1923	59,868	1.49	89,250	14.13	24	403	15,556	1.12	17,361	7.88
1924	*59,073*	----------	----------	----------	----------	----------	----------	----------	----------	----------
1924	60,907	1.60	97,224	13.76	25	119	15,205	.98	14,859	7.83
1925	58,013	1.47	85,431	13.93	18	431	14,560	.87	12,724	8.53
1926	58,558	1.47	86,144	14.10	15	209	12,911	.74	9,568	10.05
1927	60,885	1.74	106,001	11.35	17	84	14,813	1.17	17,326	6.59
1928	58,140	1.61	93,351	12.27	14	40	13,138	.98	12,915	7.35
1929	60,265	1.67	100,893	12.22	60	9	13,938	.92	12,765	8.11
1930 [2]	58,473	1.41	82,656	12.68	----------	----------	14,136	.86	12,111	7.19

Bureau of Agricultural Economics. Italic figures are census returns; other acreage, production, and yield figures are estimates of the crop-reporting board. See 1927 Yearbook, p. 927, for data for earlier years.

[1] Compiled from Commerce and Navigation of the United States, 1910–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1930, and official records of the Bureau of Foreign and Domestic Commerce.
[2] Preliminary.

TABLE 320.—*Hay, tame, by kinds: Production by States, 1930* [1]

State and division	Alfalfa	Clover (red, alsike and crimson)	Sweetclover	Lespedeza (Japan clover)	Clover and timothy mixed	Timothy	Grains cut green for hay	Annual legumes	Millet, Johnson, Sudan grass and other	Sorgo for forage and hay [2]	All tame
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*
Maine	8	57	-	-	668	123	6	-	400	-	1,262
New Hampshire	8	17	-	-	225	53	13	-	206	-	522
Vermont	23	58	-	-	932	189	40	-	223	-	1,465
Massachusetts	9	32	-	-	180	72	21	-	235	-	549
Rhode Island	-	2	-	-	14	6	2	-	22	-	46
Connecticut	21	26	-	-	94	39	18	-	223	-	421
New York	526	688	-	-	2,290	1,180	56	6	838	-	5,584
New Jersey	51	18	-	-	165	58	5	3	24	-	324
Pennsylvania	191	337	-	-	2,010	1,083	7	13	129	-	3,770
North Atlantic	837	1,235	-	-	6,578	2,803	168	22	2,300	-	13,943
Ohio	311	180	23	-	955	760	21	160	52	-	2,462
Indiana	312	460	26	-	385	382	34	316	90	-	2,005
Illinois	547	774	85	-	923	374	52	620	377	-	3,752
Michigan	1,118	416	83	-	1,510	326	28	6	54	-	3,541
Wisconsin	995	1,191	26	-	2,756	532	37	13	122	-	5,672
Minnesota	1,271	597	224	-	891	290	120	5	203	-	3,601
Iowa	1,180	1,093	78	-	2,006	419	31	74	105	24	4,986
Missouri	316	696	81	-	876	712	100	399	130	131	3,310
North Dakota	311	12	354	-	28	39	510	-	232	-	1,486
South Dakota	1,099	22	147	-	66	35	116	-	96	30	1,581
Nebraska	2,974	165	196	-	127	22	46	5	283	397	3,818
Kansas	1,514	131	394	-	37	70	122	20	345	1,462	2,633
North Central	11,948	5,737	1,717	-	10,560	3,961	1,217	1,618	2,089	2,044	38,847
Delaware	12	16	-	-	19	6	4	19	3	-	79
Maryland	28	46	-	-	171	70	7	48	4	-	374
Virginia	49	84	-	-	120	81	29	166	67	16	596
West Virginia	9	37	-	-	211	111	16	28	83	-	495
North Carolina	18	74	18	20	30	13	102	298	175	62	748
South Carolina	6	10	-	-	-	-	26	182	79	18	303
Georgia	6	3	-	-	3	3	30	293	98	59	436
Florida	-	-	-	-	-	-	-	36	23	-	59
South Atlantic	128	270	18	20	554	284	214	1,070	532	155	3,090
Kentucky	69	60	-	34	114	56	47	108	372	116	860
Tennessee	26	118	-	101	151	76	58	267	322	206	1,119
Alabama	28	-	-	13	-	-	28	207	166	42	442
Mississippi	50	-	-	51	3	-	9	124	126	31	363
Arkansas	76	36	-	17	50	16	31	90	173	162	489
Louisiana	33	-	-	38	-	-	-	182	88	2	341
Oklahoma	349	14	9	-	10	10	37	70	169	321	668
Texas	160	-	-	-	-	-	73	106	377	561	716
South Central	791	228	9	254	328	158	283	1,154	1,793	1,441	4,998
Montana	1,290	-	56	-	229	95	248	-	91	-	2,009
Idaho	2,154	185	-	-	166	90	247	-	54	-	2,896
Wyoming	743	8	46	-	110	36	108	-	90	-	1,141
Colorado	1,922	10	49	-	266	58	154	-	200	172	2,659
New Mexico	292	3	-	-	6	6	31	-	48	64	386
Arizona	675	-	-	-	-	-	54	-	27	-	756
Utah	1,325	8	-	-	48	18	11	-	56	-	1,466
Nevada	407	4	-	-	25	16	2	-	67	-	521
Washington	751	68	-	-	290	110	610	-	104	-	1,933
Oregon	694	239	-	-	141	29	1,024	-	155	-	2,282
California	4,630	10	-	-	34	5	944	-	106	-	5,729
Western	14,883	535	151	-	1,315	463	3,433	-	998	236	21,778
United States	28,587	8,005	1,895	274	19,335	7,669	5,315	3,864	7,712	3,876	82,656

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary. [2] Not included in "All tame hay."

TABLE 321.—*Hay: Acreage, yield, and production, by States, averages, and annual 1929 and 1930*

State and division	Acreage						Yield per acre						Production					
	Tame hay			Wild hay			Tame hay			Wild hay			Tame hay			Wild hay		
	Average, 1924–1928	1929	1930 [1]	Average, 1924–1928	1929	1930 [1]	Average, 1919–1928	1929	1930	Average, 1919–1928	1929	1930	Average, 1924–1928	1929	1930 [1]	Average, 1924–1928	1929	1930 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Maine	1,259	1,050	1,038	13	13	11	1.14	1.30	1.22	0.99	1.10	0.90	1,498	1,365	1,262	12	14	10
New Hampshire	466	390	382	17	16	15	1.19	1.45	1.37	.95	1.00	.90	572	567	522	16	16	14
Vermont	924	914	906	13	13	13	1.45	1.67	1.62	1.07	1.10	.90	1,440	1,528	1,465	14	14	12
Massachusetts	469	416	392	13	12	11	1.36	1.48	1.40	1.04	1.10	1.05	643	616	549	13	13	12
Rhode Island	45	38	37	2	2	2	1.33	1.42	1.24	.94	1.15	1.00	61	54	46	2	2	2
Connecticut	358	314	298	11	10	8	1.33	1.45	1.41	1.10	1.10	.95	486	456	421	12	11	8
New York	4,842	4,564	4,340	68	68	68	1.35	1.44	1.29	1.16	1.25	1.20	6,841	6,561	5,584	78	85	82
New Jersey	255	220	215	16	13	14	1.57	1.51	1.51	1.40	1.50	1.25	437	332	324	25	20	18
Pennsylvania	3,011	2,872	2,835	18	14	17	1.42	1.49	1.33	1.28	1.30	1.05	4,548	4,280	3,770	24	18	18
North Atlantic	11,630	10,778	10,443	170	161	159	1.35	1.46	1.34	1.14	1.20	1.11	16,527	15,759	13,943	197	193	176
Ohio	3,044	3,056	2,813	6	6	9	1.37	1.64	.88	1.27	1.50	.80	4,298	5,009	2,462	8	9	7
Indiana	2,042	2,163	1,975	21	16	17	1.28	1.63	1.02	1.12	1.40	1.00	2,701	3,517	2,005	23	22	17
Illinois	3,273	3,463	3,305	38	37	30	1.31	1.56	1.14	1.19	1.30	1.00	4,330	5,408	3,752	45	48	30
Michigan	2,944	2,989	2,822	41	40	54	1.32	1.68	1.25	1.22	1.57	1.10	4,160	5,022	3,541	49	63	59
Wisconsin	3,354	3,416	3,353	219	211	274	1.66	2.14	1.69	1.32	1.40	1.20	5,911	7,320	5,672	293	295	329
Minnesota	2,313	2,499	2,271	1,898	1,827	1,827	1.65	1.78	1.59	1.24	1.10	1.10	4,021	4,457	3,601	2,229	2,010	2,010
Iowa	3,105	3,294	3,070	295	240	216	1.51	1.97	1.62	1.15	1.35	1.15	4,678	6,474	4,986	324	324	248
Missouri	3,428	3,899	3,591	143	139	145	1.26	1.34	.92	1.09	1.00	.75	4,384	5,211	3,310	154	139	109
North Dakota	1,091	1,208	1,279	1,457	1,367	1,381	1.49	1.18	1.16	.98	.70	.80	1,731	1,426	1,486	1,431	957	1,105
South Dakota	1,150	1,151	1,169	2,692	2,509	2,634	1.64	1.68	1.35	.85	.65	.60	1,713	1,933	1,581	1,924	1,631	1.580
Nebraska	1,692	1,532	1,611	2,913	3,048	3,078	2.21	2.33	2.37	.91	.87	.85	3,685	3,572	3,818	2,512	2,652	2,616
Kansas	1,605	1,382	1,370	936	900	864	2.11	2.12	1.92	1.07	1.20	.93	3,461	2,936	2,633	977	1,080	804
North Central	29,040	30,052	28,629	10,658	10,340	10,529	1.51	1.74	1.36	1.00	.89	.85	45,073	52,285	38,847	9,970	9,230	8,914
Delaware	78	70	67	3	2	2	1.46	1.46	1.18	1.39	1.70	1.30	123	102	79	5	3	3
Maryland	422	407	392	4	3	4	1.47	1.54	.95	1.31	1.45	.90	666	628	374	5	4	4
Virginia	1,035	1,037	959	20	21	19	1.16	1.32	.62	1.06	1.30	.60	1,220	1,373	596	22	27	11
West Virginia	811	805	729	13	12	22	1.33	1.43	.68	1.19	1.20	.60	1,137	1,149	495	16	14	13
North Carolina	753	813	874	56	52	57	1.02	.99	.86	1.00	1.15	.80	671	804	748	53	60	46

South Carolina	336	365	380	4	3	3	.77	.86	.80	.78	.85	.64	234	313	303	2	3	2
Georgia	677	691	665	18	19	20	.71	.61	.66	.82	.75	.80	403	423	436	13	14	16
Florida	86	86	87	4	4	4	.78	.71	.68	.88	.70	.75	62	61	59	3	3	3
South Atlantic	4,198	4,274	4,153	122	116	131	1.09	1.14	.74	1.01	1.10	.75	4,517	4,853	3,090	120	128	98
Kentucky	1,169	1,243	1,150	32	29	29	1.31	1.42	.75	1.14	1.35	.75	1,554	1,763	860	41	39	22
Tennessee	1,311	1,425	1,332	48	48	48	1.19	1.32	.84	1.08	1.10	.70	1,542	1,874	1,119	51	53	34
Alabama	582	590	589	22	18	18	.84	.77	.75	.80	.80	.57	450	453	442	15	14	10
Mississippi	422	442	398	35	37	37	1.19	1.26	.91	1.02	.90	.55	478	559	363	30	33	20
Arkansas	606	600	586	137	151	181	1.16	1.05	.83	.99	.80	.45	638	629	489	118	121	81
Louisiana	265	272	306	18	22	26	1.24	1.15	1.11	1.19	1.20	.65	295	314	341	19	26	17
Oklahoma	548	668	609	512	556	600	1.60	1.31	1.10	.98	.88	.80	819	875	668	470	489	480
Texas	610	658	702	219	241	246	1.33	1.13	1.02	1.02	1.02	.85	689	744	716	203	246	209
South Central	5,513	5,898	5,672	1,023	1,102	1,185	1.24	1.22	.88	1.00	.93	.74	6,466	7,211	4,998	947	1,021	873
Montana	1,263	1,426	1,563	637	636	572	1.73	1.43	1.28	.86	.75	.65	2,295	2,034	2,009	609	477	372
Idaho	1,038	1,095	1,079	101	101	106	2.66	2.51	2.68	1.24	1.20	1.10	2,856	2,751	2,896	126	121	117
Wyoming	671	701	736	388	401	381	1.82	1.73	1.55	.98	.95	.85	1,244	1,213	1,141	397	381	324
Colorado	1,228	1,203	1,244	370	387	391	2.13	2.23	2.14	.99	1.10	1.10	2,636	2,677	2,659	363	426	430
New Mexico	182	197	191	32	34	34	2.21	2.27	2.02	.88	.90	.80	412	447	386	29	31	27
Arizona	174	193	202	7	10	12	3.49	3.52	3.74	.85	1.00	1.00	630	679	756	5	10	12
Utah	561	578	610	75	79	76	2.60	2.60	2.40	1.30	1.60	1.50	1,511	1,500	1,466	100	126	114
Nevada	209	211	214	157	158	156	2.51	2.35	2.43	1.09	.90	1.00	513	496	521	167	142	156
Washington	925	945	933	30	28	28	2.17	1.98	2.07	1.38	1.40	1.25	2,060	1,875	1,933	43	39	35
Oregon	919	931	1,004	212	235	223	2.03	2.08	2.27	1.11	1.20	1.25	1,829	1,935	2,282	244	282	279
California	1,751	1,783	1,800	142	150	153	2.64	2.90	3.18	1.09	1.05	1.20	5,061	5,178	5,729	162	158	184
Western	8,920	9,263	9,576	2,151	2,219	2,132	2.28	2.24	2.27	1.01	.99	.96	21,047	20,785	21,778	2,245	2,193	2,050
United States	59,301	60,265	58,473	14,125	13,938	14,136	1.54	1.67	1.41	1.00	.92	.36	93,630	100,893	82,656	13,478	12,765	12,111

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 322.—*Hay, tame, by kinds: Acreage, yield per acre, and production, United States, 1919–1930*

Year	Alfalfa	Clover (red, alsike, and crimson)	Sweetclover	Lespedeza (Japan clover)	Clover and timothy mixed	Timothy	Grains cut green	Annual legumes	Millet, Johnson, Sudan grass, and other	Sorgo for forage and hay [1]	All tame
					ACREAGE						
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
1919	8,750	[2] 7,434	--	--	14,739	11,398	5,266	2,619	6,682	--	56,888
1920	9,131	[2] 7,659	--	--	15,632	11,416	4,704	2,756	6,803	--	58,101
1921	9,228	[2] 7,637	--	--	15,430	11,489	4,925	3,048	7,012	--	58,769
1922	9,368	[2] 9,079	--	--	16,100	11,409	4,560	3,510	7,133	--	61,159
1923	9,816	[2] 8,091	--	--	15,596	11,104	4,295	3,828	7,138	--	59,868
1924	10,759	7,412	790	344	17,476	9,566	3,278	3,710	7,572	1,762	60,907
1925	10,852	6,927	921	300	16,684	8,783	3,319	3,053	7,174	1,794	58,013
1926	11,076	5,637	1,029	330	15,762	9,561	4,320	3,370	7,473	1,775	58,558
1927	11,401	6,689	1,128	361	16,825	9,116	3,133	4,344	7,888	2,230	60,885
1928	11,067	5,081	1,212	366	16,009	8,979	2,927	4,427	8,072	1,930	58,140
1929	11,461	7,711	1,310	361	16,505	7,507	3,420	4,056	7,934	1,768	60,265
1930 [3]	11,565	5,952	1,212	299	15,651	7,573	4,024	4,365	7,832	1,857	58,473
					YIELD PER ACRE						
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
1919	2.56	[2] 1.48	--	--	1.44	1.34	1.12	0.99	1.28	--	1.53
1920	2.71	[2] 1.42	--	--	1.37	1.33	1.31	1.06	1.24	--	1.55
1921	2.57	[2] 1.21	--	--	1.17	1.17	1.31	.99	1.21	--	1.40
1922	2.61	[2] 1.50	--	--	1.47	1.33	1.25	1.09	1.31	--	1.57
1923	2.65	[2] 1.33	--	--	1.30	1.15	1.37	1.05	1.34	--	1.49
1924	2.49	1.61	1.80	0.94	1.58	1.38	1.14	.88	1.20	2.38	1.60
1925	2.62	1.33	1.73	.88	1.27	1.07	1.46	.85	1.09	2.05	1.47
1926	2.48	1.38	1.53	1.18	1.30	1.16	1.18	1.09	1.14	2.03	1.47
1927	2.79	1.75	2.02	1.30	1.63	1.43	1.49	1.10	1.25	2.71	1.74
1928	2.63	1.58	2.05	1.25	1.43	1.25	1.44	1.15	1.22	2.59	1.61
1929	2.60	1.79	1.81	1.17	1.61	1.34	1.29	1.06	1.17	2.49	1.67
1930 [3]	2.47	1.34	1.56	.92	1.24	1.01	1.32	.89	.98	2.09	1.41
					PRODUCTION						
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*
1919	22,364	[2] 11,030	--	--	21,282	15,238	5,909	2,599	8,575	--	86,997
1920	24,758	[2] 10,864	--	--	21,407	15,211	6,177	2,925	8,443	--	89,785
1921	23,705	[2] 9,237	--	--	18,028	13,486	6,475	3,020	8,507	--	82,458
1922	24,434	[2] 13,603	--	--	23,649	15,176	5,715	3,813	9,358	--	95,748
1923	25,990	[2] 10,789	--	--	20,216	12,776	5,876	4,037	9,566	--	89,250
1924	26,786	11,935	1,420	325	27,528	13,179	3,734	3,267	9,050	4,202	97,224
1925	28,439	9,201	1,594	263	21,271	9,400	4,835	2,593	7,835	3,683	85,431
1926	27,505	7,769	1,574	390	20,520	11,073	5,107	3,669	8,537	3,599	86,144
1927	31,823	11,727	2,274	469	27,353	13,058	4,655	4,787	9,855	6,038	106,001
1928	29,135	8,047	2,483	457	22,874	11,204	4,202	5,102	9,847	5,000	93,351
1929	29,745	13,784	2,368	422	26,581	10,028	4,410	4,290	9,265	4,395	100,893
1930 [3]	28,587	8,005	1,895	274	19,335	7,669	5,315	3,864	7,712	3,876	82,656

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Not included in "All tame hay."
[2] All clover hay.
[3] Preliminary.

TABLE 323.—*Hay, all: Stocks on farms, United States, May 1, 1910–1930*

Year	Production of all hay preceding year	Stocks on farms May 1: Per cent	Stocks on farms May 1: Stocks	Price per ton May 1 [1]	Year	Production of all hay preceding year	Stocks on farms May 1: Per cent	Stocks on farms May 1: Stocks	Price per ton May 1 [1]
	1,000 short tons		*1,000 short tons*	*Dollars*		*1,000 short tons*		*1,000 short tons*	*Dollars*
1910	92,767	11.6	10,745	11.08	1921	107,245	17.9	19,160	13.08
1911	82,529	12.4	10,222	11.69	1922	97,849	11.2	10,969	12.98
1912	67,071	8.5	5,732	16.31	1923	111,879	12.0	13,379	12.69
1913	90,734	14.9	13,523	10.42	1924	106,611	12.0	12,835	13.69
1914	79,179	12.2	9,631	11.63	1925	112,083	13.9	15,598	12.32
1915	88,686	12.2	10,797	11.03	1926	98,155	11.7	11,455	12.95
1916	107,263	13.5	14,452	11.27	1927	95,712	11.2	10,746	13.23
1917	110,992	11.4	12,659	13.94	1928	123,327	14.5	17,896	10.50
1918	98,439	11.7	11,476	17.97	1929	106,266	10.5	11,159	12.22
1919	91,139	9.4	8,559	22.31	1930	113,658	10.9	12,376	10.98
1920	105,398	10.2	10,707	24.22					

Bureau of Agricultural Economics. Production and stocks are estimates of the crop-reporting board, prices are based upon returns from special price reporters.

[1] Prices 1923–1930 are the mean of Apr. 15 and May 15.

TABLE 324.—*Hay: Receipts at principal markets, 1908–09 to 1929–30*

RECEIPTS AS REPORTED BY TRADE PUBLICATIONS [1]

Year beginning July	Boston	New York	Philadelphia	Baltimore	Cincinnati	Chicago	Minneapolis	St. Louis	Kansas City	San Francisco
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1908–09	129,450	338,153	92,304	56,151		277,746	31,880	208,025	179,928	164,648
1909–10	142,930	334,760	83,233	58,877		256,269	26,310	200,456	232,368	168,220
1910–11	162,420	338,860	81,529	68,273	166,566	272,104	66,300	252,932	308,940	184,594
1911–12	163,220	292,411	95,715	68,235	106,863	352,324	63,570	259,642	318,948	147,483
1912–13	139,370	309,322	81,853	59,785	165,760	276,187	37,290	229,713	343,392	141,224
1913–14	115,430	318,528	75,614	61,823	230,456	371,120	38,280	262,855	285,288	129,147
1914–15	116,020	329,686	78,583	55,623	204,117	320,071	45,513	299,550	398,604	161,739
1915–16	126,400	296,200	88,780	50,042	139,419	280,224	45,306	223,815	398,172	145,373
1916–17	123,580	214,064	79,006	50,794	233,585	239,062	35,652	209,902	359,316	108,455
1917–18	95,170	200,197	60,296	63,799	222,679	351,972	39,126	238,144	419,964	86,228
1918–19	70,660	217,300	31,487	42,249	125,605	287,217	29,769	202,812	386,460	80,233
1919–20	57,270	170,742	49,868	32,059	112,130	225,217	22,607	256,112	617,052	80,775
1920–21	82,200	146,734	40,036	19,223	83,901	149,718	23,118	179,633	363,900	67,953
1921–22	51,080	102,381	51,262	14,158	71,577	142,753	23,718	119,991	225,516	59,185
1922–23	49,190	98,841	42,246	16,081	64,893	150,342	25,956	138,961	261,084	60,017
1923–24	42,910	85,644	49,734	25,664	76,605	146,496	30,432	138,540	290,676	113,235
1924–25	46,710	64,332	32,824	13,635	92,070	155,158	28,093	142,184	316,932	50,159
1925–26	38,430	66,587	33,199	15,839	55,737	175,885	29,761	127,060	341,892	54,629
1926–27	30,680	54,363	29,539	11,547	50,666	130,665	38,187	85,844	277,020	[2] 23,165
1927–28	25,990	42,921	22,397	6,438	72,710	104,241	17,214	72,870	246,456	38,157
1928–29	21,790	24,862	18,706	2,435	81,114	98,672	17,197	66,360	248,124	30,530
1929–30	(3)	24,443	(3)	1,805	60,890	85,937	10,723	73,704	222,216	43,048

RECEIPTS AS REPORTED BY BUREAU OF AGRICULTURAL ECONOMICS [4]

Year beginning July	Boston	New York	Philadelphia	Cincinnati	Chicago	Minneapolis	St. Louis	Kansas City	Omaha	San Francisco
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1924–25	46,188	126,636	33,408	95,760	127,740	59,724	81,240	303,924	62,520	53,448
1925–26	35,340	97,080	30,708	43,752	117,372	45,732	82,392	318,000	62,268	49,632
1926–27	36,504	71,160	29,676	46,056	108,756	59,100	68,172	270,756	75,936	46,572
1927–28	32,400	48,996	23,064	71,052	91,728	41,340	53,592	240,720	64,800	37,200
1928–29	26,964	37,236	19,056	79,152	95,016	36,300	53,244	247,296	76,488	45,060
1929–30	21,708	33,768	19,716	67,392	70,308	33,072	60,120	216,852	65,820	47,268

Bureau of Agricultural Economics.

[1] Compiled as follows: Baltimore, Baltimore Chamber of Commerce annual reports; Boston, Boston Chamber of Commerce annual reports, 1909–1918; Chicago, Board of Trade annual reports; Kansas City, Board of Trade annual reports; Milwaukee Chamber of Commerce annual reports, except 1923 and 1924; Minneapolis, Chamber of Commerce annual reports; New York, New York Produce Exchange; Peoria, Board of Trade annual reports, 1909–1918; St. Louis, Trade and Commerce of St. Louis, 1909–1923, subsequently Daily Market Reporter; San Francisco, Chamber of Commerce annual reports, 1909–1920; other data from Hay Trade Journal, weekly; and American Elevator and Grain Trade.

[2] Total for 6 months; not reported July–December, 1926.

[3] Not reported.

[4] Compiled from weekly reports from the various markets to the Grain, Hay, and Feed Market News Service of the Bureau of Agricultural Economics.

TABLE 325.—*Hay, tame: Estimated price per ton, received by producers, December 1, average 1924–1928 and annual 1926–1930*

State	Av. 1924–1928	1926	1927	1928	1929	1930	State	Av. 1924–1928	1926	1927	1928	1929	1930
	Dols.	*Dols.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*		*Dols.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*
Me	12.46	13.20	12.70	11.40	11.00	10.90	N. C	19.66	20.00	18.00	17.30	17.80	19.30
N. H	17.28	19.00	16.30	14.10	13.50	13.70	S. C	19.70	20.00	18.00	18.50	19.20	18.80
Vt	13.42	14.50	11.70	11.60	11.00	11.00	Ga	17.98	18.00	16.30	15.60	16.30	15.90
Mass	22.20	23.90	21.00	19.10	19.20	18.90	Fla	20.44	22.00	18.20	19.00	17.50	17.00
R. I	23.30	25.00	22.00	22.00	22.00	22.60	Ky	16.88	16.70	14.50	16.50	15.70	19.70
Conn	23.16	25.70	21.70	18.90	19.10	20.20	Tenn	18.10	16.60	15.00	16.90	17.50	20.10
N. Y	13.34	15.00	11.30	11.30	12.20	14.40	Ala	17.56	18.00	15.00	15.80	16.20	15.10
N. J	18.28	20.30	17.50	14.60	18.60	21.60	Miss	16.28	16.00	15.00	15.20	15.50	16.50
Pa	15.50	18.50	13.50	12.50	13.10	19.70	Ark	15.76	16.00	14.00	14.40	16.00	14.80
Ohio	12.58	14.00	9.20	11.70	10.00	17.40	La	15.90	14.50	13.80	14.40	13.60	13.50
Ind	12.88	14.00	10.40	12.00	10.10	14.60	Okla	12.94	12.00	10.70	12.70	13.70	10.40
Ill	13.94	16.00	11.40	12.90	11.30	13.10	Tex	14.52	12.00	11.80	13.20	13.30	12.50
Mich	13.00	13.80	11.00	11.60	10.70	16.30	Mont	9.56	10.50	8.40	8.90	12.40	11.00
Wis	13.84	15.00	12.50	14.40	10.50	12.70	Idaho	9.88	9.00	8.70	11.00	10.80	8.40
Minn	11.08	14.20	9.00	9.70	10.60	10.20	Wyo	9.26	8.50	9.00	10.10	12.20	9.10
Iowa	13.18	15.50	12.50	13.00	11.00	11.50	Colo	10.50	8.60	9.20	11.70	11.50	9.20
Mo	11.76	13.50	9.90	10.60	10.40	12.00	N. Mex	14.54	12.00	13.40	16.90	18.10	13.00
N. Dak	8.06	11.00	7.80	6.70	8.50	7.00	Ariz	15.74	13.00	14.40	18.00	18.00	13.00
S. Dak	9.74	13.00	7.60	8.20	8.70	8.50	Nev	9.98	8.00	9.20	11.70	10.40	7.50
Nebr	10.84	14.00	8.50	10.00	10.50	8.00	Utah	11.18	10.50	10.00	12.20	15.60	9.10
Kans	10.86	13.00	8.60	9.40	11.80	9.70	Wash	14.04	13.70	12.90	13.10	16.80	13.30
Del	17.68	18.50	16.50	16.40	17.50	22.50	Oreg	11.76	11.00	11.20	11.70	14.60	9.60
Md	16.86	20.00	15.40	13.50	13.70	22.80	Calif	15.00	12.30	12.50	14.50	16.40	10.90
Va	17.92	19.50	16.00	15.30	15.50	22.40							
W. Va	17.34	19.40	15.00	14.70	15.10	23.00	U. S	13.08	14.10	11.35	12.27	12.22	12.68

Bureau of Agricultural Economics. As reported by crop reporters.

TABLE 326.—*Hay: Estimated average price per ton, received by producers, United States, 1909–10 to 1930–31*

ALL (LOOSE)

Crop year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1909–10	10.12	9.70	9.85	10.19	10.42	10.48	10.90	11.48	11.57	11.30	10.96	10.80	10.58
1910–11	10.75	10.98	11.16	11.16	11.67	11.92	11.74	11.68	11.46	11.52	12.04	12.78	11.54
1911–12	13.51	13.73	13.58	13.57	13.95	14.02	14.07	14.52	15.15	15.98	16.26	15.27	14.36
1912–13	13.18	11.62	11.12	11.05	11.44	11.45	10.98	10.74	10.52	10.42	10.48	10.51	11.17
1913–14	10.45	10.74	11.24	11.48	11.97	12.06	11.68	11.68	11.60	11.58	11.64	11.46	11.49
1914–15	11.02	10.93	11.03	10.87	10.95	10.80	10.65	10.86	10.94	11.00	11.10	11.00	10.92
1915–16	10.52	10.07	9.89	9.90	9.92	9.97	10.31	10.65	10.80	11.06	11.37	11.28	10.34
1916–17	10.50	9.80	9.68	9.82	10.31	10.74	11.10	11.44	12.04	13.24	14.31	14.32	11.21
1917–18	13.43	13.08	13.54	14.50	15.85	17.32	18.48	19.01	18.91	18.32	17.55	16.60	16.60
1918–19	16.00	16.67	17.94	18.86	19.31	19.64	19.86	19.80	20.17	21.42	22.80	22.52	19.88
1919–20	20.94	20.34	20.16	19.58	19.40	20.00	21.16	22.04	22.62	23.58	24.54	24.24	21.34
1920–21	22.26	20.38	19.41	18.20	17.08	16.43	15.70	14.76	13.94	13.34	12.80	12.56	16.51
1921–22	12.17	11.72	11.53	11.24	11.19	11.29	11.34	11.58	12.05	12.64	12.82	12.28	11.83
1922–23	11.44	10.78	10.68	10.87	11.38	11.82	11.98	12.04	12.18	12.54	12.82	12.32	11.68
1923–24	11.78	11.98	12.25	12.44	12.75	13.15	13.59	13.60	13.63	13.73	13.65	13.75	12.93
1924–25	13.49	12.95	12.68	12.64	12.88	12.69	12.70	12.83	12.39	12.48	12.17	11.82	12.76
1925–26	12.48	12.25	12.42	12.47	13.07	13.40	13.31	13.03	12.97	12.78	13.12	12.98	12.83
1926–27	12.96	13.04	12.88	13.08	13.22	13.47	13.38	13.64	13.48	13.26	13.20	13.10	13.23
1927–28	11.71	9.97	10.51	10.63	10.54	10.55	10.60	10.24	10.19	10.29	10.70	11.01	10.57
1928–29	10.86	10.39	10.59	10.60	10.89	11.23	11.61	12.06	12.37	12.30	12.15	11.88	11.29
1929–30	11.17	10.85	11.05	11.07	11.18	11.04	11.16	11.19	10.95	10.97	10.98	10.91	11.05
1930–31	10.47	11.31	12.14	12.17	12.19	11.33							

TABLE 326.—*Hay: Estimated average price per ton, received by producers, United States, 1909–10 to 1930–31*—Continued

ALFALFA

Crop year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	9.85	9.66	9.86	9.82	9.67	10.46	10.55	11.04	11.80	12.39	12.28	10.98	10.58
1922–23	10.61	10.54	11.15	11.87	12.70	13.31	14.06	14.02	14.33	14.09	14.40	13.63	12.82
1923–24	12.45	12.01	12.78	13.37	13.59	14.39	13.99	14.08	13.98	14.09	14.12	13.70	13.54
1924–25	13.19	13.84	13.59	12.85	13.91	13.40	14.50	14.78	14.44	14.08	14.34	12.83	13.81
1925–26	13.02	13.00	12.91	13.41	13.74	14.14	13.90	14.24	13.50	13.53	13.17	13.33	13.52
1926–27	12.94	13.15	13.13	13.29	13.79	13.57	13.83	14.21	14.38	13.85	13.59	13.03	13.57
1927–28	11.73	11.47	11.34	11.52	11.75	12.02	12.09	11.84	12.46	12.56	12.90	12.42	11.96
1928–29	11.98	11.82	12.20	12.82	13.29	13.90	14.54	15.34	16.07	16.20	15.50	14.50	13.90
1929–30	13.12	13.17	13.50	13.84	14.00	14.41	14.66	14.45	13.90	13.42	12.87	12.14	13.71
1930–31	11.44	12.16	12.85	12.97	12.94	12.52							

CLOVER

Crop year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
1921–22	13.89	14.17	14.37	13.99	13.83	14.17	13.90	14.10	14.06	14.51	14.90	14.33	14.15
1922–23	12.82	12.66	12.54	12.51	12.67	13.03	13.39	13.35	13.24	13.47	13.58	13.70	13.03
1923–24	13.52	13.51	14.12	14.73	14.94	15.82	15.51	15.93	16.31	16.08	15.92	15.95	15.14
1924–25	15.45	14.00	13.75	13.65	13.64	13.45	13.25	13.30	12.52	12.41	12.67	12.26	13.43
1925–26	13.03	13.67	14.06	14.09	14.74	15.28	14.79	14.82	14.79	14.88	15.13	15.07	14.52
1926–27	14.40	14.25	14.60	14.71	14.76	15.24	15.71	16.16	15.64	15.51	15.21	14.65	15.06
1927–28	13.11	12.16	11.78	11.91	11.86	11.91	12.24	11.96	12.02	12.23	12.51	12.63	12.15
1928–29	12.52	12.25	12.50	12.58	13.01	13.05	13.41	13.59	13.93	13.43	13.24	12.92	13.02
1929–30	11.60	11.61	11.82	11.77	11.82	11.97	12.24	12.24	12.31	12.27	12.19	12.25	11.99
1930–31	11.71	13.20	14.62	41.62	14.62	13.52							

TIMOTHY

Crop year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
1921–22	14.51	15.01	14.83	14.39	14.22	14.31	14.51	14.77	15.06	15.52	16.10	15.75	14.82
1922–23	14.33	13.61	13.44	13.70	13.93	13.91	14.41	14.46	14.59	14.64	14.96	14.95	14.18
1923–24	14.86	14.68	15.13	16.22	16.78	16.95	16.96	17.25	17.53	17.53	17.48	17.52	16.53
1924–25	16.74	15.24	14.47	14.54	14.00	14.37	14.29	14.24	13.31	13.39	13.38	13.05	14.30
1925–26	13.89	14.06	14.98	15.11	15.38	15.87	15.82	15.79	15.59	15.81	16.31	16.64	15.40
1926–27	16.01	15.52	15.32	15.49	15.62	15.81	14.58	15.82	15.39	15.05	15.14	14.97	15.42
1927–28	13.29	12.03	11.70	11.58	11.67	11.31	11.34	11.03	11.14	11.17	11.75	11.82	11.64
1928–29	11.68	11.70	11.77	11.86	12.18	12.35	12.45	12.99	13.01	12.86	12.64	12.57	12.31
1929–30	11.91	11.61	11.60	11.67	11.70	11.57	11.55	11.55	11.57	11.79	12.04	12.29	11.71
1930–31	12.32	13.53	14.76	14.82	14.87	14.58							

PRAIRIE

Crop year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
1921–22	7.67	7.50	7.52	6.78	7.49	7.47	7.39	7.67	7.94	8.02	8.24	8.40	7.62
1922–23	7.68	7.76	7.54	7.74	8.13	8.98	9.44	9.52	9.61	9.74	10.64	10.07	8.79
1923–24	9.17	8.97	8.58	9.19	9.07	9.26	8.84	8.87	8.66	8.78	8.74	8.54	8.92
1924–25	8.35	8.60	8.49	8.25	8.25	8.62	9.14	9.08	9.05	9.11	9.27	8.55	8.70
1925–26	8.93	8.55	9.24	9.41	9.39	9.78	9.73	9.53	9.48	9.08	9.54	9.59	9.36
1926–27	9.63	10.55	10.52	10.78	10.76	10.98	11.28	11.76	11.50	10.70	11.51	10.77	10.87
1927–28	9.15	8.65	7.98	7.67	7.47	7.55	7.41	6.98	6.79	6.96	7.32	7.59	7.64
1928–29	7.80	7.34	7.62	7.71	7.72	7.88	8.01	8.33	8.99	8.81	8.76	8.77	8.10
1929–30	8.21	7.96	8.13	7.97	8.11	8.18	8.30	8.41	8.11	8.12	7.96	7.78	8.12
1930–31	7.12	7.63	7.89	7.66	7.48	7.31							

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of hay for each State; yearly price obtained by weighing monthly prices by monthly marketings. Mean of prices of all loose hay reported on 1st of month and 1st of succeeding month, July, 1909–December, 1923. For previous data on alfalfa, clover, timothy, and prairie hay see 1930 or earlier Yearbooks.

TABLE 327.—*Hay: Average price per ton at leading markets, by kind and grade, 1921–22 to 1929–30*

Year beginning July	Alfalfa, Kansas City		Clover, Cincinnati			Prairie upland, Kansas City		Timothy, Chicago	
	No. 1	No. 2	No. 1	No. 1, light mixed	No. 1, mixed	No. 1	No. 2	No. 1	No. 2
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1921–22	19.75	13.90	19.80	19.00	17.80	11.70	10.00	-------	-------
1922–23	22.10	16.80	16.40	17.40	16.40	14.40	12.90	22.30	18.50
1923–24	23.60	16.90	23.90	23.40	22.60	13.90	12.60	26.30	23.30
1924–25	20.10	15.00	17.90	18.00	17.20	11.20	9.80	23.90	19.50
1925–26	21.10	17.40	22.50	23.60	22.60	14.20	12.80	24.70	21.90
1926–27	19.00	16.60	22.90	21.20	21.70	14.50	12.70	21.80	19.70
1927–28	20.80	16.00	-------	15.70	16.40	10.90	8.90	18.60	16.40
1928–29	24.80	22.70	24.10	19.20	20.90	12.10	10.50	22.20	20.20
1929–30	22.10	17.90	17.20	18.00	17.60	11.70	10.30	19.00	16.70

Bureau of Agricultural Economics. Compiled from reports made direct to the bureau.

TABLE 328.—*Alfalfa meal, No. 1 medium: Average price per ton, bagged, in car lots, Kansas City, 1920–21 to 1930–31*

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920–21	38.25	35.50	34.60	29.70	29.90	25.40	23.10	19.60	18.60	18.70	18.00	18.10	25.80
1921–22	19.00	18.75	17.75	16.90	16.50	16.70	16.75	17.50	19.75	19.40	20.90	21.90	18.50
1922–23	18.60	19.50	21.20	24.60	26.25	26.20	25.40	25.40	24.40	26.50	26.10	23.40	24.00
1923–24	21.50	22.40	25.50	25.70	26.90	25.20	26.25	23.90	23.20	20.90	21.20	21.75	23.70
1924–25	22.00	22.60	23.25	23.10	22.50	23.90	24.20	22.50	22.25	22.00	22.70	22.90	22.80
1925–26	23.00	24.00	24.25	24.40	24.10	24.40	24.80	24.00	23.10	23.90	25.40	23.90	24.10
1926–27	23.00	22.80	22.25	22.40	22.90	22.30	22.00	21.75	21.40	21.00	22.20	21.60	22.10
1927–28	21.75	22.40	23.40	23.10	22.75	23.30	24.40	26.25	29.40	33.50	34.25	31.70	26.40
1928–29	27.60	25.60	26.00	26.60	26.60	28.60	29.75	29.90	28.50	28.00	27.00	25.10	27.40
1929–30	23.50	25.00	27.30	27.50	26.80	27.40	27.40	25.50	23.60	25.00	23.80	22.00	25.40
1930–31	22.70	24.70	26.60	25.60	25.00	24.20	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from reports made to the bureau.

TABLE 329.—*Pasture:*[1] *Condition, 1st of month, United States, 1909–1930*

Year	May	June	July	Aug.	Sept.	Oct.	Year	May	June	July	Aug.	Sept.	Oct.
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*		*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
1909	79.1	86.9	91.8	86.4	------	------	1920	79.3	90.2	91.4	87.7	88.1	86.9
1910	86.9	87.1	79.7	71.5	------	------	1921	90.0	89.4	84.4	78.3	82.1	84.8
1911	83.1	82.7	67.2	62.7	------	------	1922	85.9	94.6	88.5	86.7	78.7	72.7
1912	82.9	92.5	89.7	87.3	------	------	1923	79.4	86.1	87.2	79.4	80.2	85.0
1913	85.5	88.1	81.6	74.3	------	------	1924	82.4	83.2	87.2	82.0	76.6	78.6
1914	88.9	90.0	83.0	76.2	------	------	1925	82.2	75.7	73.0	69.5	67.4	72.9
1915	88.4	92.5	93.2	95.5	97.7	95.9	1926	74.6	77.0	77.0	69.9	78.2	83.7
1916	84.8	90.8	94.8	84.5	79.8	76.9	1927	87.0	88.3	92.8	86.9	84.2	80.1
1917	79.9	83.1	84.1	78.5	77.5	75.5	1928	71.3	78.6	84.4	85.6	83.3	77.7
1918	81.6	89.3	82.0	72.4	67.7	73.5	1929	86.9	87.2	87.5	79.7	67.1	70.2
1919	91.1	97.4	95.8	85.3	81.6	78.9	1930	77.3	80.4	74.6	56.4	47.7	56.1

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] For range States, condition given as reported. Probably relates largely to farm pasture, i. e., range not included.

TABLE 330.—*Pasture:* [1] *Condition, 1st of month, by States, average 1920–1929, and 1930*

State and division	May Average, 1920–1929	May 1930	June Average, 1920–1929	June 1930	July Average, 1920–1929	July 1930	August Average, 1920–1929	August 1930	September Average, 1920–1929	September 1930	October Average, 1920–1929	October 1930
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
Maine	86	88	88	86	87	94	86	87	82	83	79	75
New Hampshire	86	87	89	86	87	89	89	85	85	83	82	71
Vermont	86	83	88	94	91	97	93	90	89	83	87	78
Massachusetts	84	76	89	79	87	84	83	81	83	72	81	66
Rhode Island	84	77	89	77	88	83	84	75	82	65	80	59
Connecticut	82	78	88	80	87	87	82	78	82	62	82	60
New York	81	74	84	82	85	85	82	74	80	51	80	53
New Jersey	82	74	85	77	79	74	76	68	83	50	80	59
Pennsylvania	81	77	85	81	84	77	81	53	81	31	80	39
North Atlantic	81.8	76.6	85.5	82.1	85.0	83.0	82.5	69.1	81.6	49.7	80.2	52.3
Ohio	79	76	85	66	84	52	83	30	84	26	82	52
Indiana	79	76	85	72	85	58	78	34	81	29	81	57
Illinois	82	78	84	74	84	60	77	41	79	27	80	42
Michigan	72	76	84	86	83	77	75	49	72	21	78	28
Wisconsin	78	79	84	83	85	84	79	67	74	42	79	38
Minnesota	78	70	81	83	83	83	76	66	70	41	75	57
Iowa	84	83	83	89	86	89	81	64	84	49	88	49
Missouri	84	73	86	74	88	67	81	41	82	31	83	54
North Dakota	75	69	79	77	84	80	79	55	71	45	72	52
South Dakota	78	85	79	89	82	84	78	51	73	51	74	64
Nebraska	84	92	87	96	88	95	82	70	78	78	79	80
Kansas	83	77	86	91	87	88	83	66	78	62	82	73
North Central	80.9	78.8	84.1	82.1	85.3	76.5	79.9	53.0	78.5	42.9	80.7	54.8
Delaware	82	65	84	58	74	57	74	38	78	31	74	31
Maryland	79	74	82	65	77	56	74	31	79	15	77	20
Virginia	80	70	83	60	80	56	80	30	84	28	79	30
West Virginia	81	72	85	65	87	47	87	32	88	33	84	28
North Carolina	84	74	83	72	85	71	83	61	83	58	79	67
South Carolina	81	71	78	71	79	75	79	72	75	59	71	64
Georgia	82	75	82	76	82	70	83	67	77	59	72	68
Florida	80	85	81	76	87	82	90	77	90	75	86	83
South Atlantic	81.0	72.8	82.9	67.2	82.4	61.0	82.3	46.0	82.4	41.4	78.4	44.8
Kentucky	83	69	86	68	88	50	83	27	83	26	82	43
Tennessee	83	68	86	78	85	57	80	39	81	38	78	55
Alabama	83	68	84	66	82	57	80	49	76	51	70	67
Mississippi	84	68	85	78	85	51	80	42	78	41	73	60
Arkansas	83	72	87	83	85	63	80	25	74	21	74	51
Louisiana	84	68	86	78	87	51	82	45	79	47	77	70
Oklahoma	83	68	87	81	87	83	80	56	72	42	75	46
Texas	84	68	87	78	86	76	78	55	70	43	74	50
South Central	83.5	68.3	86.5	76.9	86.0	68.6	79.3	48.0	74.1	40.2	75.2	51.5
Montana	80	94	88	87	91	63	84	59	80	58	79	64
Idaho	86	93	92	95	89	91	84	82	81	80	80	84
Wyoming	87	92	96	94	98	88	93	80	91	86	90	85
Colorado	85	90	89	90	89	80	84	81	86	88	82	85
New Mexico	73	80	82	67	78	66	75	70	81	76	79	66
Arizona	84	90	82	88	79	90	80	90	85	90	84	88
Utah	86	91	92	91	87	85	84	81	83	83	82	86
Nevada	85	85	90	89	88	88	86	90	84	80	84	84
Washington	84	80	88	75	85	77	74	70	70	55	74	54
Oregon	90	90	93	92	90	90	84	80	78	70	78	68
California	85	82	83	82	81	78	79	77	78	75	76	75
Western	83.5	87.2	87.1	84.9	86.4	77.7	82.2	75.2	81.0	74.6	79.8	74.3
United States	81.9	77.3	85.0	80.4	85.3	74.6	80.6	56.4	78.6	47.7	79.3	56.1

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] For range States, conditions given as reported. Probably relates largely to farm pasture; i. e., range not included.

TABLE 331.—*Hops: Acreage, production, December 1 price, imports, exports, and consumption in the United States, 1915–1930*

Year beginning July	Acreage	Average yield per acre	Production	Price per pound received by producers Dec. 1	Imports [1]	Domestic exports [1]	Net exports [1]	Consumption by brewers [2]
	Acres	*Pounds*	*1,000 pounds*	*Cents*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1915–16	44, 653	1, 187	52, 986	11. 7	676	22, 410	21, 869	37, 452
1916–17	43, 900	1, 153	50, 595	12. 0	237	4, 875	4, 664	41, 949
1917–18	29, 900	983	29, 388	33. 3	121	3, 495	3, 411	33, 481
1918–19	25, 900	829	21, 481	19. 3	(3)	7, 467	7, 472	13, 925
1919–20	21, 000	1, 189	24, 970	77. 6	2, 696	30, 780	28, 187	6, 441
1920–21	28, 000	1, 224	34, 280	35. 7	4, 808	22, 206	18, 226	5, 989
1921–22	27, 000	1, 087	29, 340	24. 1	893	19, 522	19, 116	4, 453
1922–23	23, 400	1, 186	27, 744	8. 6	1, 295	13, 497	12, 401	4, 556
1923–24	18, 440	1, 071	19, 751	18. 8	761	20, 461	19, 832	3, 815
1924–25	20, 350	1, 360	27, 670	10. 3	439	16, 122	15, 737	[4] 3, 256
1925–26	20, 350	1, 404	28, 573	21. 8	581	14, 998	14, 592	[4] 3, 426
1926–27	20, 800	1, 516	31, 522	23. 1	470	13, 369	12, 936	[4] 3, 149
1927–28	24, 600	1, 246	30, 658	22. 9	753	11, 812	11, 087	[4] 3, 071
1928–29	26, 200	1, 257	32, 944	19. 3	649	8, 836	8, 198	2, 735
1929–30	24, 900	1, 334	33, 220	11. 4	926	6, 793	5, 901	2, 627
1930–31 [5]	19, 500	1, 202	23, 447	14. 8				

Bureau of Agricultural Economics. Compiled from reports of the Division of Crop and Livestock Estimates, Bureau of Foreign and Domestic Commerce, records of the Bureau of Internal Revenue, and annual reports of the Commissioner of Prohibition.

[1] Compiled from Commerce and Navigation of the United States, 1910–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1930 and official records of the Bureau of Foreign and Domestic Commerce.

[2] Figures for 1919 and subsequent years represent hops used to make cereal beverages.

[3] Less than 500 pounds.

[4] Not including 57,936 pounds in 1924, 71,508 pounds in 1925, 960 pounds in 1926, and 6,294 pounds in 1927, used in the manufacture of distilled spirits.

[5] Preliminary.

TABLE 332.—*Hops: Acreage, yield per acre and production in specified countries 1928–29 to 1930–31*

Country	Acreage			Yield per acre			Production		
	1928–29	1929–30	1930–31*	1928–29	1929–30	1930–31*	1928–29	1929–30	1930–31*
North America:	*Acres*	*Acres*	*Acres*	*Pounds*	*Pounds*	*Pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Canada [1]	1, 049	1, 165		922	1, 240		967	1, 445	
United States [2]	26, 200	24, 900	19, 200	1, 257	1, 334	1, 271	32, 944	33, 220	24, 400
Europe:									
England and Wales	23, 805	23, 986	[3] 19,997	1, 139	1, 677	[4] 1, 417	27, 104	40, 219	28, 336
Belgium	3, 652	3, 155	2, 545	1, 335	1, 385	892	4, 874	4, 370	2, 271
France	11, 515	11, 584	9, 555	790	1, 331		9, 098	15, 417	
Germany	37, 740	37, 619	32, 306	489	799	754	18, 445	30, 074	24, 366
Austria	744	731	[5] 526	339	360		252	263	
Czechoslovakia	39, 622	41, 327	38, 866	525	630	646	20, 799	26, 054	25, 097
Hungary	655	576	[5] 500	469	564		307	325	
Yugoslavia	22, 775	16, 543	[5] 13,838	507	573	382	11, 538	9, 480	[5] 5, 291
Rumania	146	264		390	462		57	122	
Poland	8, 678	6, 264	[5] 5, 671	438	613	875	3, 802	3, 842	[5] 4, 960
Total European countries reporting all years	149, 186	141, 785	123, 804				86, 562	114, 039	90, 321
Oceania:									
Australia	1, 468	[5] 1, 507		1, 595	1, 645		2, 342	2, 479	
New Zealand	608	598		1, 275	1, 410		775	843	
Total countries reporting acreage and production all years	162, 472	153, 794	132, 423	736	958	866	119, 506	147, 259	114, 721
Estimated world total, excluding Russia [6]	178, 657	170, 219					133, 304	168, 153	

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture except as otherwise stated. Acreage and production figures are for the harvesting season which begins in the summer, extends through the calendar year in the Northern Hemisphere, and is completed in the early part of the following year in the Southern Hemisphere.

*Preliminary.

[1] British Columbia.

[2] Principal producing states.

[3] About 17 per cent of this acreage was left unpicked.

[4] Yield based on total acreage under hops; if allowance were made for the unpicked area the average yield per acre would compare favorably with that of 1929.

[5] Unofficial estimate.

[6] Exclusive of acreage and production in minor producing countries for which no data are available.

TABLE 333.—*Hops: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year— Average 1909–1913		1926		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	6,235	15,416	568	12,833	554	14,119	581	7,985	765	7,677
Czechoslovakia	(1)	(1)	1,195	16,222	1,139	17,904	1,644	14,452	375	18,737
France	5,436	335	3,931	6,159	5,407	5,682	4,338	3,612	4,601	5,437
Yugoslavia	(1)	(1)	169	6,945	273	9,030	198	16,929	218	7,269
Poland	(1)	(1)	330	1,850	593	3,843	366	4,699	644	5,711
New Zealand	61	352	18	393	4	530	1	408	1	266
PRINCIPAL IMPORTING COUNTRIES										
Germany	7,688	17,564	15,953	1,156	10,722	3,825	9,967	3,092	8,011	5,080
Irish Free State	(1)	(1)	6,575	0	5,174	0	5,852	0	5,624	0
United Kingdom	21,028	2,162	3,924	8,800	10,855	6,119	7,412	1,977	6,967	1,478
Belgium	6,915	4,814	4,626	3,140	4,489	1,853	6,321	1,433	6,444	449
Canada	1,396	176	2,165	357	1,962	709	2,397	488	2,823	296
Austria	[2] 938	[2] 18,333	2,977	130	2,924	62	3,141	201	[3] 3,382	[3] 68
Netherlands	2,938	1,405	931	135	1,556	24	1,246	50	1,672	28
Japan	253	0	798	0	1,011	0	1,002	0	823	0
Sweden	987	1	971	2	1,287	1	1,057	0	1,114	0
Argentina	618	0	1,000	0	1,042	0	1,241	0	[3] 830	0
Switzerland	1,257	[4] 2	977	0	1,072	0	1,189	0	1,418	0
Denmark	1,027	[5] 1	812	1	811	0	896	0	883	0
Italy	529	10	816	13	626	0	743	10	425	1
Union of South Africa	487	0	577	0	709	0	496	0	402	0
Norway	289	0	355	0	346	0	199	0	356	0
Russia [3]	[6] 1,258	[6] 2,348	87	0	2	2	------	------	------	------
Hungary	(1)	(1)	356	123	444	146	278	188	198	69
British India	246	0	209	0	148	0	129	0	172	0
Australia [3]	[6] 1,106	[6] 22	299	129	145	397	157	618	121	131
Total, 25 countries	60,692	62,941	50,619	58,388	53,295	64,246	50,851	56,142	48,269	50,697

Bureau of Agricultural Economics. Official sources except where otherwise noted. Lupulin and hop fenmehl (hop meal) are not included.

* Preliminary.
[1] Figures for pre-war years are included in the countries of the pre-war boundaries.
[2] Average for Austria-Hungary.
[3] International Yearbook of Agricultural Statistics.
[4] 1 year only.
[5] 3-year average.
[6] From original source.

TABLE 334.—*Peanuts: Acreage, yield per acre, production, and December 1 price, United States, 1919–1930*

Year	Total acreage, yield, and production: Total acreage [1]	Yield per acre	Total production [2]	Nuts gathered: Area	Yield per acre	Total quantity gathered	Farm price, Dec. 1 [3]
	1,000 acres	*Pounds*	*1,000 lbs.*	*1,000 acres*	*Pounds*	*1,000 lbs.*	*Cents*
1919	------	------	------	1,132	691.9	783,273	9.33
1920	------	------	------	1,181	712.5	841,474	5.26
1921	------	------	------	1,214	683.1	829,307	3.99
1922	------	------	------	1,005	630.0	633,114	4.68
1923	------	------	------	896	722.9	647,762	6.78
1924	1,830	615.3	1,125,932	1,187	627.7	745,059	4.60
1925	1,563	666.4	1,041,514	958	729.1	698,475	3.64
1926	1,315	669.1	879,923	843	749.5	631,825	[4] 4.54
1927	1,786	735.0	1,312,643	1,142	757.0	864,549	[4] 3.98
1928	1,930	661.2	1,276,078	1,211	706.1	855,096	[4] 4.44
1929	2,021	672.2	1,358,552	1,325	701.1	928,975	[4] 3.62
1930 [5]	1,827	647.5	1,183,025	1,108	668.5	740,710	[4] 3.24

Bureau of Agricultural Economics. Estimates of the crop-reporting board. See 1930 Yearbook, p. 813, for data for earlier years.

[1] Including acres planted in corn reduced to equivalent solid acres as well as the acreage grown alone.
[2] Including peanuts grazed or otherwise utilized as well as those gathered.
[3] Farm prices are as of Nov. 15, 1919–1923; Dec. 1, 1924–1930.
[4] Average price weighted on total production.
[5] Preliminary.

TABLE 335.—*Peanuts: Acreage, yield per acre, production, and December 1 price, by States, 1927–1930*

State	Nuts gathered															
	Acreage				Yield per acre				Production				Farm price Dec. 1			
	1927	1928	1929	1930 [1]	1927	1928	1929	1930	1927	1928	1929	1930 [1]	1927	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Va.	152	152	160	147	810	928	913	665	123,120	141,056	146,080	97,755	4.5	4.7	3.9	3.1
N. C.	211	205	220	213	954	1,050	1,020	900	201,294	215,250	224,400	191,700	4.5	4.9	4.0	3.3
S. C.	11	10	10	12	775	690	735	700	8,525	6,900	7,350	8,400	3.7	4.2	3.4	3.4
Ga.	304	350	343	292	725	540	650	680	220,400	189,000	222,950	198,560	3.9	4.4	3.4	3.3
Fla.	44	44	46	37	640	575	600	560	28,160	25,300	27,600	20,720	3.7	4.2	3.5	3.3
Tenn.	20	18	20	16	850	800	820	625	17,000	14,400	16,400	10,000	4.2	4.7	3.3	3.3
Ala.	230	225	260	221	680	560	550	600	156,400	126,000	143,000	132,600	3.4	3.9	3.0	2.8
Miss.	9	10	10	10	725	600	640	520	6,525	6,000	6,400	5,200	6.0	6.5	6.5	6.0
Ark.	11	12	15	10	800	720	575	475	8,800	8,640	8,625	4,750	6.0	6.4	5.0	4.0
La.	13	12	16	15	625	450	595	415	8,125	5,400	9,520	6,225	6.1	6.6	6.5	6.0
Okla.	20	47	80	25	800	750	570	480	16,000	35,250	45,600	12,000	3.5	4.5	3.9	3.0
Tex.	117	126	145	110	600	650	490	480	70,200	81,900	71,050	52,800	3.5	3.8	3.7	3.5
U. S.	1,142	1,211	1,325	1,108	757.0	706.1	701.1	668.5	864,549	855,096	928,975	740,710	[2] 3.98	[2] 4.44	[2] 3.62	[2] 3.24

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

[2] Average price weighted on total production, which includes peanuts grazed or otherwise utilized as well as those gathered.

TABLE 336.—*Peanuts: Estimated average price per pound, in the shell, received by producers, United States, 1921–22 to 1930–31*

Crop year	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Weighted average
1921–22	3.7	3.5	3.6	4.0	4.3	3.9	3.9	4.2	4.4	4.4	4.7	3.6	3.7
1922–23	5.2	5.0	5.9	6.5	6.7	7.1	7.1	7.3	6.9	6.7	6.7	7.0	5.5
1923–24	6.8	6.2	6.4	6.7	6.8	6.7	6.4	6.5	6.4	6.6	6.4	6.4	6.5
1924–25	6.3	5.6	5.4	5.5	5.9	5.7	6.2	6.2	5.4	5.2	5.7	4.7	5.7
1925–26	5.1	4.4	4.5	4.7	4.6	5.1	5.0	4.7	5.3	5.3	5.1	4.9	4.7
1926–27	4.6	4.7	4.9	5.4	5.6	5.7	5.9	6.6	6.4	6.4	6.0	4.9	4.8
1927–28	4.6	5.2	5.4	5.4	5.4	5.5	5.7	5.6	5.5	5.5	5.0	4.6	5.0
1928–29	4.8	5.1	5.0	5.1	5.1	5.2	5.0	5.1	4.9	4.7	4.6	4.4	4.9
1929–30	4.0	3.8	3.7	3.5	3.5	3.5	3.7	3.6	3.7	3.8	3.9	4.2	3.8
1930–31	3.8	3.2	------	------	------	------	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of peanuts for each State; yearly price obtained by weighting monthly prices by estimated monthly marketings. For previous data see 1930 or earlier Yearbooks.

Table 337.—*Peanuts: Monthly average prices of cleaned and shelled peanuts, for prompt shipment f. o. b. important shipping points, 1929–30*

VIRGINIA-NORTH CAROLINA SECTION: VIRGINIA, NORTH CAROLINA, AND TENNESSEE [1]

Description	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
	Cts.	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Cleaned Virginias:												
Jumbos	7⅛	7¼	7	7	6⅞	6⅞	7¼	7¾	7⅞	8	8¾	8⅞
Fancys	6¼	6¼	6	5⅞	5⅝	5⅜	5¼	5⅜	5¼	5¼	5⅞	6
Extras	------	5½	5¼	5¼	5	4⅞	4⅞	4⅞	4⅞	5	5⅜	5⅝
Shelled Virginias:												
Extra Large	10	9⅜	8⅞	8⅝	8¾	8¾	8⅝	8⅝	8¼	8	9	9
No. 1	6⅞	6	5¼	5⅛	5	5	5	5½	5⅜	6⅛	7⅝	7¼
No. 2	5	4½	4	3⅞	3⅞	3⅞	4	4¼	4⅜	4⅞	5⅞	5½
SOUTHEAST SECTION: SOUTH CAROLINA, GEORGIA, ALABAMA, AND FLORIDA [2]												
Shelled:												
Spanish, No. 1	5¾	5½	5⅜	5½	5⅝	5½	5⅜	5½	5⅝	6⅛	6⅝	6⅛
Spanish, No. 2	4⅞	4⅝	4⅛	4⅜	4⅝	4⅝	4¼	4⅜	4½	5¼	5¾	5½
Runners, No. 1	5	4⅝	4½	4⅝	4⅝	4⅜	4⅜	4⅝	5⅛	------	------	5¼
Runners, No. 2	4¼	4⅛	4	3⅞	3¾	3¾	------	------	4	------	------	4½
SOUTHWEST SECTION: TEXAS, OKLAHOMA, ARKANSAS [3]												
Shelled:												
Spanish, No. 1	6⅜	6⅛	5½	5⅝	5¾	5¾	5⅝	6	6⅛	6½	7	7⅛
Spanish, No. 2	5½	5⅜	5⅛	5	5	5⅛	5	5⅛	5¼	5½	6	6⅛

Bureau of Agricultural Economics. Based on returns from cleaners, shellers, and brokers. Crop year extends from November to next October in the Virginia-North Carolina section; farther south it begins earlier.

[1] Important shipping points: Suffolk, Franklin, Petersburg, Wakefield, and Norfolk, Va; Edenton, Enfield, and Scotland Neck, N. C.

[2] Important shipping points: Albany, Cordele, Donalsonville, Dawson, Fort Gaines, Arlington, and Valdosta, Ga.; Enterprise, Dothan, Samson, Headland, Eufaula, and Troy, Ala.; Greenwood, Fla.; Charleston, S. C.

[3] Important shipping points: Denison, Fort Worth, Dublin, and De Leon, Tex.; Hugo and Durant, Okla.; Fort Smith, Ark.

Table 338.—*Peanut oil, crude and virgin: Peanuts used in production and quantity of oil produced in United States, 1919–20 to 1929–30*

Year beginning October	Peanuts crushed [1]					Oil produced				
	October-December	January-March	April-June	July-September	Total	October-December	January-March	April-June	July-September	Total
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1919–20	4, 364	5, 867	9, 214	15, 770	35, 215	1, 395	1, 207	2, 311	3, 498	8, 411
1920–21	27, 414	27, 962	32, 923	23, 480	111, 779	6, 069	7, 287	8, 913	5, 958	28, 227
1921–22	40, 338	44, 152	25, 964	4, 703	115, 157	11, 075	11, 381	6, 771	1, 236	30, 463
1922–23	13, 169	9, 081	8, 436	941	31, 627	3, 256	1, 700	1, 998	255	7, 209
1923–24	6, 164	4, 676	5, 471	1, 928	18, 239	1, 406	1, 122	1, 328	438	4, 294
1924–25	17, 668	24, 678	16, 893	9, 096	68, 335	3, 804	5, 265	4, 091	1, 974	15, 134
1925–26	17, 134	17, 880	10, 668	4, 389	50, 071	3, 827	4, 001	3, 093	1, 006	11, 927
1926–27	10, 576	11, 143	6, 321	6, 966	35, 006	2, 544	2, 446	1, 400	1, 600	7, 990
1927–28	21, 810	24, 168	8, 177	6, 661	60, 816	5, 144	5, 324	1, 920	1, 626	14, 014
1928–29	14, 740	19, 596	10, 392	11, 320	56, 048	3, 569	4, 463	2, 331	2, 614	12, 977
1929–30 [2]	31, 598	55, 388	27, 278	12, 672	126, 936	6, 723	12, 112	6, 413	2, 751	27, 999

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census on "Animal and vegetable fats and oils."

[1] Quantities reported in terms of hulled have been converted to "in the hull" basis by multiplying by 1.5.

[2] Subject to revision.

TABLE 339.—*Peanuts: International trade, average 1909–1913, annual 1927–1929*

Country	Calendar year—							
	Average 1909–1913		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
British India	0	503,448	0	1,063,736	0	1,676,871	0	1,828,689
Senegal	[1] 168	425,937	[1] 19	894,488	[1] 19	[1] 911,494	[1] 131	[1] 896,867
China	32,882	138,472	17,510	430,002	108,966	276,447	55,718	272,645
Nigeria	0	17,163	0	[1] 203,329	0	[1] 231,067	0	[1] 330,079
Gambia	0	131,912	0	145,860	0	[1] 171,968	0	[1] 130,120
French possessions in India	0	306,701	0	287,436	----	----	----	----
Dutch East Indies	612	60,282	655	56,877	1,018	104,402	818	60,153
Mozambique	[2] 1,098	[2] 15,907	8	73,240	5	76,360	54	50,011
Guinea (Portuguese) [1]	0	18,771	0	46,264	0	53,240	0	48,005
Tanganyika	0	[1] 9,275	0	31,689	0	23,733	0	26,090
Anglo-Egyptian Sudan	0	1,961	0	3,607	0	4,001	0	8,258
Spain	0	9,205	0	[1] 3,098	0	[1] 2,573	0	[1] 2,349
Guinea (French)	1	4,863	0	[1] 10,916	0	[1] 14,715	0	[1] 11,232
Brazil	0	274	0	1,687	0	60	----	----
PRINCIPAL IMPORTING COUNTRIES								
France	1,239,659	47,107	1,454,257	11,388	1,731,759	10,469	1,890,119	9,145
Germany	174,970	[3] 98	930,555	0	1,883,601	0	2,050,751	0
United Kingdom	0	0	132,268	0	323,247	0	388,223	0
Netherlands	122,862	32,863	186,034	4,364	165,465	3,695	203,543	3,046
United States	20,988	6,804	62,697	4,827	97,533	5,419	4,555	4,880
Italy	1,194	804	287,131	40	305,784	59	377,166	72
Japan	0	10,675	24,384	288	26,030	657	33,130	140
Denmark	5,236	0	27,558	0	51,033	0	60,788	0
Canada	7,302	0	29,808	0	31,408	0	34,961	0
British Malaya	[1] 19,488	[1 4] 10,839	25,868	6,492	54,204	35,255	28,607	9,872
Belgium	[2] 68,422	[2] 43,393	56,539	241	59,203	266	69,344	187
Egypt	4,664	1,637	3,658	2,029	2,783	2,113	4,347	1,266
Algeria	7,022	218	[1] 9,491	414	[1] 11,713	252	[1] 13,469	178
Sweden	[2 5] 20	0	20,435	0	23,582	0	14,458	0
Poland	(6)	(6)	1,029	0	1,089	0	1,307	0
Tunis	[2] 1,459	0	4,765	0	[1] 4,854	0	[1] 5,814	0
Argentina	8,667	0	6	33	11	79	[1] 9,817	[1] 82
Philippine Islands	2,264	0	3,238	0	3,177	0	3,600	0
Union of South Africa	3,164	7	4,738	310	7,371	969	5,629	461
Yugoslavia	(6)	(6)	769	0	226	0	5,448	0
Total 34 countries	1,722,142	1,798,616	3,283,420	3,282,655	4,894,081	3,606,164	5,301,797	3,693,827

Bureau of Agricultural Economics. Official sources except where otherwise noted. Includes shelled and unshelled, assuming the peanuts to be unshelled unless otherwise stated. When shelled nuts were reported they have been reduced to terms of unshelled at the ratio of 3 pounds unshelled to 2 pounds shelled.

* Preliminary.
[1] International Yearbook of Agricultural Statistics.
[2] 2-year average.
[3] 1 year only.
[4] 3-year average.
[5] International Institute of Agriculture. "Oleaginous products and vegetable oils."
[6] Figures for pre-war years are included in the countries of the pre-war boundaries.

TABLE 340.—*Peanut oil: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year—									
	Average 1909–1913 [1]		1926		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
China	0	[2] 35, 593	0	109, 697	0	78, 889	0	44, 326	0	41, 369
France	142	50, 967	9, 937	67, 300	12, 728	62, 483	13, 293	76, 820	14, 481	93, 584
Germany	1, 602		4, 109	24, 217	5, 861	52, 507	3, 207	83, 763	4, 008	113, 267
Dutch East Indies	[3] 2, 090	[3] 45	1, 581	831	1, 756	1, 843	1, 778	9, 976	1, 951	7, 011
PRINCIPAL IMPORTING COUNTRIES										
Netherlands	2, 743	18, 569	59, 916	26, 892	61, 789	34, 735	71, 595	34, 865	60, 846	35, 005
United Kingdom			29, 678	22, 100	46, 411	9, 354	35, 056	25, 753	49, 542	23, 993
Algeria			21, 803	402	23, 477	[4] 251	35, 105	[4] 190	43, 156	[4] 515
Canada		0	38, 794	0	4, 811	0	14, 186	0	31, 037	0
United States	[5] 7, 295	0	8, 281	0	2, 847	0	4, 749	0	3, 231	0
Norway		0	8, 104	0	7, 124	0	7, 505	0	7, 745	0
Italy	8, 867	[2] 4	14, 908	106	16, 589	171	18, 053	82	8, 318	108
Sweden	2, 459		8, 178	1, 141	4, 701	4, 299	6, 729	2, 819	10, 009	1, 959
Belgium	2, 233	2, 065	6, 816	4, 879	6, 526	5, 608	10, 082	3, 532	15, 976	2, 665
Philippine Islands	[2] 976	0	4, 030	0	5, 483	0	3, 892	0	4, 123	0
Morocco		0	1, 615	0	1, 163	0	1, 483	0	3, 237	0
Denmark	2, 941	[3] 156	1, 086	1, 829	1, 399	2, 743	838	5, 137	800	8, 781
Czechoslovakia	(6)	(6)	1, 433	55	3, 510	81	3, 903	280	6, 444	1, 515
Total, 17 countries	31, 348	107, 399	220, 269	259, 449	206, 175	252, 964	231, 454	287, 543	264, 904	329, 772

Bureau of Agricultural Economics. Official sources except where otherwise noted. Conversions made on the basis of 7.5 pounds to the gallon.

*Preliminary.
[1] International Institute of Agriculture, "Oleaginous products and vegetable oils."
[2] 4-year average.
[3] 2-year average.
[4] International Institute of Agriculture.
[5] 3-year average.
[6] Figures for pre-war years are included in the countries of the pre-war boundaries.

TABLE 341.—*Peanut oil, refined: Average price per pound, in barrels, New York, 1921–22 to 1930–31*

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921–22	10. 62	11. 75	11. 59	11. 22	11. 25	11. 38	12. 25	13. 15	13. 00	13. 00	12. 48	12. 62	12. 03
1922–23	12. 40	12. 25	13. 03	14. 25	16. 88	17. 38	17. 85	17. 75	16. 56	16. 00	16. 00	16. 00	15. 53
1923–24	16. 00	16. 00	15. 59	14. 80	14. 75	14. 75	14. 75	14. 75	14. 88	15. 25	15. 25	15. 56	15. 19
1924–25	16. 45	16. 25	16. 25	16. 25	16. 75	16. 75	16. 75	16. 75	15. 20	15. 00	15. 00	15. 00	16. 03
1925–26	15. 00	15. 00	15. 00	15. 00	15. 00	15. 50	16. 00	16. 00	16. 00	16. 00	16. 00	16. 00	15. 54
1926–27	16. 00	16. 00	15. 50	14. 62	14. 50	14. 50	14. 50	14. 50	14. 50	14. 50	14. 50	14. 50	14. 84
1927–28	14. 50	14. 50	14. 30	13. 50	13. 50	13. 50	13. 50	13. 50	13. 50	13. 50	13. 50	13. 50	13. 73
1928–29	13. 50	13. 50	12. 25	11. 00	13. 50	13. 50	13. 50	13. 44	13. 25	13. 25	13. 25	13. 25	13. 10
1929–30	13. 25	13. 25	13. 25	13. 25	12. 85	12. 75	12. 75	12. 35	11. 75	11. 75	11. 75	11. 75	12. 56
1930–31	11. 38	13. 50	13. 50	13. 50									

Bureau of Agricultural Economics. Compiled from Oil, Paint, and Drug Reporter, average of weekly range. See 1930 Yearbook, p 817, Table 334, for data for earlier years.

TABLE 342.—*Clover seed: Receipts, Chicago, 1920–21 to 1930–31*

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1920–21	1,207	969	747	1,004	2,288	2,165	4,062	1,570	418	164	84	365	15,043
1921–22	739	1,235	2,040	1,833	1,628	2,674	2,448	1,009	279	169	77	997	15,128
1922–23	1,358	1,293	1,479	1,214	1,044	629	1,825	845	350	109	8	272	10,426
1923–24	641	1,681	1,176	1,039	630	1,641	2,054	1,352	259	41	1	40	10,555
1924–25	346	888	2,195	1,801	1,500	1,507	1,574	765	9	27	68	328	11,008
1925–26	393	946	2,125	2,603	1,984	2,079	2,888	849	487	28	107	366	14,855
1926–27	1,107	3,596	2,133	1,350	1,695	1,857	1,671	546	55			64	14,074
1927–28	575	2,285	4,689	1,544	1,557	1,522	1,313	848	268	40	165	168	14,974
1928–29	958	3,125	2,751	1,746	790	1,431	1,616	959	68	110	160	56	13,770
1929–30	1,225	1,883	2,121	1,269									
1930–31 [1]													

Bureau of Agricultural Economics. Compiled from annual reports of the Chicago Board of Trade.

[1] Subject to revision.

TABLE 343.—*Clover, sweetclover, alfalfa, and timothy seed: Production and December 1 price, United States, 1919–1930*

Year	Production				Price per bushel received by producers Dec. 1			
	Clover seed (red and alsike)	Sweetclover seed	Alfalfa seed	Timothy seed	Clover seed (red and alsike) [1]	Sweetclover seed	Alfalfa seed	Timothy seed
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1919	[2] 1,545,000				26.52			
1920	[2] 2,023,000				11.60			
1921	[2] 1,422,000				10.05			
1922	[2] 1,815,000				10.03			
1923	[2] 1,028,000				12.05			
1924	927,000	767,800	1,002,100	2,730,800	14.51	6.81	10.69	3.16
1925	1,062,000	1,058,900	1,107,500	1,950,800	14.90	4.87	10.48	3.43
1926	728,000	1,140,100	958,300	2,529,100	17.71	6.99	9.80	2.62
1927	1,727,000	1,223,800	851,400	3,016,000	15.22	4.67	9.28	1.82
1928	961,000	909,400	532,400	1,229,400	16.22	3.75	12.24	2.20
1929	2,523,000	867,700	792,700	1,448,400	10.19	3.65	10.98	2.23
1930 [3]	1,459,600	656,400	920,200	1,479,100	11.89	3.54	9.85	2.87

Bureau of Agricultural Economics. Estimates of the crop-reporting board. See 1930 yearbook, p. 818, for data for earlier years.

[1] From 1919 to 1924, Nov. 15 price; 1925–1930, Dec. 1 price.
[2] Includes "sweetclover."
[3] Preliminary.

TABLE 344.—*Clover seed (red and alsike), sweetclover seed, Lespedeza (Japan clover) seed, and alfalfa seed: Acreage, yield per acre, production, and December 1 price, by States, 1928–1930*

CLOVER SEED (RED AND ALSIKE)

State	Acreage			Average yield per acre			Production			Price per bushel received by producers Dec. 1		
	1928	1929	1930[1]	1928	1929	1930	1928	1929	1930[1]	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Dols.*	*Dols.*	*Dols.*
New York	1	3	1	1.8	2.3	2.4	2,000	6,900	2,400	19.70	14.00	14.00
Pennsylvania	16	14	8	1.6	2.0	1.5	26,000	28,000	12,000	17.75	15.25	15.00
Ohio	161	322	135	1.2	1.6	1.2	193,000	515,200	162,000	16.90	10.20	13.00
Indiana	80	300	171	1.2	1.3	1.0	96,000	390,000	171,000	16.70	9.80	11.80
Illinois	75	180	198	1.1	1.3	1.1	82,000	234,000	217,800	17.00	10.25	12.40
Michigan	63	151	83	1.6	1.7	1.2	101,000	256,700	99,600	16.10	9.50	12.40
Wisconsin	36	216	162	1.4	1.6	1.7	50,000	345,600	275,400	16.50	9.90	11.40
Minnesota	53	64	54	2.0	1.9	2.2	106,000	121,600	118,800	16.00	10.50	11.80
Iowa	38	249	75	1.3	1.2	1.25	49,000	298,800	93,800	18.00	11.00	12.50
Missouri	23	58	55	1.5	1.5	1.6	34,000	87,000	88,000	14.80	9.60	11.75
North Dakota	3	2	1	2.0	3.0	3.0	6,000	6,000	3,000	15.00	9.60	11.75
Nebraska	14	22	20	1.5	1.6	1.8	21,000	35,200	36,000	15.60	11.00	11.30
Kansas	6	11	16	1.5	1.6	1.6	9,000	17,600	25,600	13.60	9.70	11.00
Tennessee	3	10	2	1.9	2.1	2.0	6,000	21,000	5,000	17.10	13.75	14.60
Idaho	21	19	15	4.7	4.2	5.1	99,000	79,800	76,500	14.60	9.20	9.90
Wyoming	------	2	2	------	2.3	5.0	--------	4,600	10,000	------	12.00	11.00
Colorado	1	2	2	5.0	6.0	5.0	5,000	12,000	10,000	15.60	11.55	9.90
Oregon	23	18	17	3.3	3.5	3.1	76,000	63,000	52,700	14.90	9.95	10.80
United States	617	1,643	1,018	1.56	1.54	1.43	961,000	2,523,000	1,459,600	16.22	10.19	11.89
SWEETCLOVER SEED												
Ohio	6	7	5	3.5	3.6	4.0	21,000	25,200	18,400	5.80	4.80	4.70
Indiana	3	2	2	3.0	3.0	3.0	9,000	6,000	6,000	5.80	5.30	4.70
Illinois	13	17	14	4.0	4.0	3.8	52,000	68,000	53,200	5.30	5.10	4.70
Wisconsin	------	1	5	------	0.6	4.5	--------	600	22,500	------	4.95	4.05
Minnesota	30	24	14	4.1	5.0	5.0	123,000	120,000	72,000	3.40	3.30	3.55
Iowa	14	8	10	4.4	3.0	3.9	61,600	24,000	39,000	5.30	4.95	4.00
Missouri	6	7	3	3.0	3.7	4.0	18,000	25,900	12,000	5.40	4.50	4.00
North Dakota	50	50	40	3.7	4.2	3.8	185,000	210,000	152,000	3.50	3.55	3.35
South Dakota	54	49	35	4.3	4.3	3.7	232,200	210,700	129,500	3.00	3.30	3.10
Nebraska	22	21	18	3.7	4.3	4.2	81,400	90,300	75,600	3.90	3.10	3.10
Kansas	17	15	13	4.1	3.9	3.9	69,700	58,500	50,700	3.30	3.40	3.30
Montana	7	3	3	4.5	4.5	3.5	31,500	13,500	10,500	4.30	4.30	3.70
Colorado	5	3	3	5.0	5.0	5.0	25,000	15,000	15,000	3.70	3.55	3.90
United States	227	207	165	4.01	4.19	3.98	909,400	867,700	656,400	3.75	3.65	3.54
LESPEDEZA (JAPAN CLOVER) SEED												
Tennessee	10	15	12	4.0	4.0	4.0	40,000	60,000	48,000	2.50	2.75	2.75
Mississippi	24	22	13	4.7	5.0	3.5	112,800	110,000	45,500	2.79	3.35	2.75
Louisiana	6	5	2	5.2	3.0	1.5	31,200	15,000	3,000	3.21	3.60	3.25
United States	40	42	27	4.60	4.40	3.57	184,000	185,000	96,500	2.80	3.17	2.77
ALFALFA SEED												
Wisconsin	------	3	21	------	0.6	1.6	--------	1,800	34,100	------	14.05	13.00
Minnesota	4	4	6	1.8	2.0	2.0	6,800	8,400	12,600	19.40	13.95	12.10
Missouri	3	3	2	3.0	2.0	2.5	9,000	6,000	5,000	15.50	12.00	11.50
North Dakota	4	15	10	1.9	2.0	1.5	7,600	30,000	15,800	19.00	16.80	12.40
South Dakota	22	50	40	2.0	2.1	1.9	44,000	105,000	76,000	13.45	12.95	11.50
Nebraska	9	30	27	2.2	2.8	2.8	19,800	84,000	75,600	12.35	11.75	9.50
Kansas	8	29	44	2.4	2.5	3.2	19,000	72,500	140,800	10.85	11.00	8.40
Oklahoma	10	11	12	2.6	3.0	4.0	26,000	33,000	48,000	9.30	10.00	8.25
Texas	3	3	2	1.5	2.9	2.8	4,000	7,500	6,200	9.00	9.80	9.60
Montana	20	30	33	2.4	2.4	2.6	48,000	72,000	85,800	13.90	11.50	10.10
Idaho	15	23	28	3.4	4.0	5.4	51,000	92,000	151,200	13.30	9.20	9.40
Wyoming	3	5	5	3.0	2.3	3.7	9,000	11,500	18,500	13.10	10.35	10.00
Colorado	2	5	5	3.0	4.0	3.0	6,000	20,000	15,000	11.80	10.10	8.40
New Mexico	6	6	5	3.0	3.5	3.0	16,500	21,000	15,000	10.15	10.00	9.00
Arizona	22	22	22	4.5	4.5	5.0	99,000	99,000	110,000	11.50	10.10	9.50
Utah	52	50	35	2.1	1.4	1.2	110,000	70,000	42,000	11.50	8.70	9.30
Oregon	3	3	3	3.5	3.8	3.0	10,500	11,400	9,000	12.75	12.00	11.00
California	14	14	15	3.3	3.5	4.0	46,200	47,600	59,600	11.70	10.20	12.00
United States	199	305	316	2.68	2.60	2.91	532,400	792,700	920,200	12.24	10.98	9.85

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 345.—*Timothy seed: Acreage, yield per acre, production, and December 1 price, by States, 1928–1930*

State	Acreage			Average yield per acre			Production			Price per bushel received by producers Dec. 1		
	1928	1929	1930[1]	1928	1929	1930	1928	1929	1930[1]	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Dollars*	*Dollars*	*Dollars*
New York	3	3	3	5.0	3.3	3.8	15,000	9,900	11,400	2.80	3.00	3.40
Pennsylvania	8	7	5	5.5	4.8	4.5	44,000	33,600	22,500	2.90	3.20	3.70
Ohio	40	50	22	4.3	4.2	3.8	172,000	210,000	83,600	2.20	2.25	3.20
Indiana	10	8	4	3.8	4.0	2.5	38,000	32,000	10,000	2.20	2.25	3.20
Illinois	65	78	86	3.5	4.0	3.6	227,500	312,000	309,600	2.20	2.20	3.10
Wisconsin	4	7	8	4.6	4.0	4.7	18,400	28,000	36,200	2.40	2.45	3.10
Minnesota	12	12	13	3.7	4.2	5.0	44,400	50,400	66,000	2.15	2.20	2.80
Iowa	104	147	145	3.6	3.6	5.0	374,400	529,200	725,000	2.15	2.20	2.80
Missouri	71	64	54	3.5	3.0	3.0	248,500	192,000	162,000	2.15	2.20	2.50
North Dakota	2	2	2	3.5	3.0	3.0	7,000	6,000	6,000	2.15	2.20	2.40
South Dakota	11	11	12	3.0	3.5	3.4	33,000	38,500	40,800	1.90	1.90	2.40
Kansas	2	2	2	3.6	3.4	3.0	7,200	6,800	6,000	1.90	2.00	2.80
United States	332	391	356	3.70	3.70	4.16	1,229,400	1,448,400	1,479,100	2.20	2.23	2.87

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 346.—*Timothy seed: Receipts, Chicago, 1920–21 to 1930–31*

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1920–21	2,347	8,075	5,676	4,009	2,951	1,706	2,076	4,056	2,601	2,368	1,088	579	37,532
1921–22	10,849	6,239	4,586	3,198	2,317	2,404	2,899	2,828	780	1,263	472	119	37,954
1922–23	8,967	9,593	4,577	2,048	1,050	570	1,352	1,697	1,243	398	355	124	31,974
1923–24	5,386	13,397	4,419	1,606	1,329	662	1,298	1,815	1,162	65	315	507	31,961
1924–25	3,698	12,714	4,845	3,736	1,552	2,138	2,038	2,566	1,809	1,240	664	687	37,687
1925–26	5,933	7,599	5,009	2,047	1,651	2,499	1,801	2,316	1,734	1,015	667	672	32,943
1926–27	5,907	7,981	3,368	2,113	1,158	1,588	1,780	2,601	1,481	980	779	516	30,252
1927–28	6,548	7,387	3,741	3,812	961	1,170	1,669	1,826	1,625	1,613	1,039	896	32,287
1928–29	1,652	5,664	3,164	956	921	820	650	802	471	335	311	103	15,849
1929–30	3,519	3,363	2,026	1,915	809								
1930–31[1]													

Bureau of Augricultural Economics. Compiled from annual reports of the Chicago Board of Trade.

[1] Subject to revision.

TABLE 347.—*Alfalfa seed: Estimated average price per bushel, received by producers, United States, 1921–22 to 1930–31*

Crop year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average[1]
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	8.51	8.53	8.33	8.09	7.63	7.39	8.45	7.50	9.00	8.89	8.48	9.00	8.22
1922–23	7.74	8.00	7.94	8.50	9.45	9.58	9.96	10.56	10.44	10.59	10.57	10.25	9.36
1923–24	10.38	9.20	10.75	10.21	10.19	10.43	10.51	11.17	11.41	11.67	11.39	11.13	10.63
1924–25	10.99	10.74	10.39	10.16	10.33	10.52	11.05	11.72	12.73	12.00	10.99	11.41	10.62
1925–26	9.88	10.51	10.30	10.65	9.87	9.51	9.48	9.82	9.94	9.92	10.22	9.79	9.99
1926–27	9.37	9.17	8.94	9.42	9.48	10.12	10.33	10.50	11.04	10.63	10.62	10.17	9.45
1927–28	9.62	9.69	9.78	9.45	9.76	9.55	9.74	10.11	10.35	10.52	10.91	10.24	9.87
1928–29	10.38	10.25	10.71	11.96	12.69	12.67	13.19	13.84	14.19	14.69	14.91	14.68	11.37
1929–30	13.52	12.85	11.68	10.83	11.10	11.15	11.16	11.97	11.97	12.38	12.05	12.10	11.65
1930–31	11.91	11.36	10.68	10.18	9.86								

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of alfalfa seed for each State; yearly price obtained by weighting monthly prices by monthly marketings.

[1] Straight crop year average until 1924. For previous data see 1930 or earlier Yearbooks.

TABLE 348.—*Clover seed: Estimated average price per bushel, received by producers, United States, 1921–22 to 1930–31*

Crop year	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	10.25	10.21	10.09	10.38	10.69	11.88	13.00	13.13	12.84	11.60	11.00	9.88	11.14
1922–23	8.85	9.66	10.18	10.88	11.16	11.52	11.71	11.48	11.20	10.84	10.94	10.46	10.71
1923–24	11.07	12.20	12.18	12.22	12.51	12.67	13.04	13.09	13.07	12.72	12.42	12.09	12.38
1924–25	12.15	12.80	13.42	15.31	16.17	16.95	18.19	17.40	16.82	15.48	15.67	14.86	15.35
1925–26	13.42	14.42	14.85	15.48	16.04	16.83	17.45	17.88	18.08	17.16	17.17	16.83	15.87
1926–27	16.63	17.21	17.85	17.89	19.07	20.18	21.16	22.75	22.45	22.07	20.69	17.94	19.06
1927–28	16.78	15.67	15.07	15.33	15.97	16.37	16.90	16.92	17.04	16.89	16.42	15.90	16.11
1928–29	16.26	16.49	16.68	16.81	16.96	17.37	17.54	17.96	17.90	17.62	17.17	16.30	16.99
1929–30	12.48	10.68	9.75	9.94	9.92	9.95	10.03	10.23	10.23	10.40	10.34	11.01	10.34
1930–31	11.65	12.47	12.35	11.76	------	------	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of clover seed for each State; yearly prices obtained by weighting monthly prices by average monthly marketings. For previous data see 1930 or earlier Yearbooks.

TABLE 349.—*Timothy seed: Estimated average price per bushel, received by producers, United States, 1921–1930*

Crop year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921–22	2.71	2.31	2.70	2.41	2.57	2.70	2.82	2.95	3.11	3.21	2.81	2.53	2.64
1922–23	2.20	2.28	2.48	2.49	2.69	3.06	2.98	3.00	2.99	2.87	2.92	3.16	2.60
1923–24	2.63	3.01	3.12	3.15	3.19	3.37	3.56	3.60	3.54	3.48	3.44	3.23	3.19
1924–25	3.20	3.12	3.16	2.88	3.03	3.04	3.03	3.15	3.24	3.10	3.05	3.47	3.11
1925–26	3.36	3.21	3.21	3.31	3.41	3.38	3.56	3.51	3.47	3.36	3.41	3.26	3.33
1926–27	2.68	2.55	2.61	2.46	2.58	2.62	2.70	2.69	2.76	2.69	2.76	2.58	2.61
1927–28	2.06	1.66	1.58	1.61	1.73	1.78	1.92	1.86	1.88	1.96	2.08	2.07	1.77
1928–29	1.86	1.91	2.08	2.20	2.20	2.41	2.49	2.62	2.67	2.65	2.56	2.36	2.20
1929–30	1.69	1.88	2.02	2.17	2.25	2.46	2.37	2.51	2.67	2.69	2.65	2.53	2.16
1930–31	2.51	2.62	3.06	3.11	3.09	------	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of timothy seed for each State; yearly prices obtained by weighting monthly prices by average monthly marketings. For previous data see 1930 or earlier Yearbooks.

TABLE 350.—*Seeds: Average price per 100 pounds, specified markets, 1920–1930*

Season, January–May	Alfalfa, Kansas City	Alsike clover, Chicago	Red clover, Chicago	Kentucky bluegrass, Kansas City	Timothy, Chicago	Sweetclover, Minneapolis	Meadow fescue, Kansas City	Lespedeza, Louisville	German millet, Kansas City	Amber sorgo, Kansas City	Hairy vetch, Baltimore	Sudan grass, Kansas City
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	40.20	53.60	52.40	30.30	13.10	33.50	---------	32.90	---------	2.75	27.60	12.80
1921	18.30	22.30	19.70	29.00	6.60	9.80	---------	21.80	---------	1.40	9.70	3.00
1922	18.00	18.20	23.50	53.50	7.00	8.50	15.90	17.10	---------	2.00	12.00	4.70
1923	20.00	16.50	20.90	25.90	7.00	12.40	10.00	19.00	---------	4.25	16.80	15.10
1924	22.30	15.70	20.90	25.10	8.00	15.30	10.60	21.10	4.00	1.70	10.40	8.20
1925	22.70	23.40	34.00	28.00	6.80	12.30	9.40	-------	5.00	2.20	8.90	5.70
1926	20.40	27.60	33.70	38.00	7.90	9.70	15.50	15.20	3.10	2.80	12.30	4.20
1927	19.90	37.30	42.50	20.50	6.00	13.60	25.00	8.20	3.30	3.30	15.20	7.00
1928	21.80	27.80	30.60	19.70	4.70	8.50	14.60	18.80	2.40	2.00	9.70	3.70
1929	26.00	34.70	33.70	31.30	6.60	8.50	16.00	20.60	3.40	2.10	9.30	5.60
1930	24.90	19.90	21.30	20.00	8.20	8.00	10.00	13.70	3.60	3.60	9.00	5.80

Bureau of Agricultural Economics. Compiled from weekly reports to the bureau from seedsmen in the various markets. These prices are the average wholesale selling prices for high-quality seed.

TABLE 351.—*Field seeds: Average wholesale selling price per 100 pounds at specified markets, by months, 1921–1930*

Season, January–May	Alfalfa, common, Kansas City					Alsike clover, Chicago				
	Jan.	Feb.	Mar.	Apr.	May	Jan.	Feb.	Mar.	Apr.	May
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1921	18.50	18.00	18.40	18.50	18.15	25.65	22.40	22.45	21.60	19.50
1922	16.90	18.00	18.50	17.90	18.50	18.20	19.25	19.00	17.30	17.30
1923	19.50	19.50	19.50	20.65	21.00	16.50	16.50	16.50	16.45	16.35
1924	21.50	21.50	23.30	23.00	23.00	15.55	15.45	15.45	15.90	16.00
1925	22.00	22.10	22.60	23.50	23.25	21.75	22.40	23.05	24.75	25.00
1926	20.00	20.00	20.00	21.00	21.00	26.08	27.25	27.88	28.19	28.38
1927	19.50	20.00	20.00	20.00	20.00	36.01	37.94	39.44	38.71	34.56
1928	21.50	22.00	21.50	22.00	22.00	28.35	28.06	27.80	27.70	27.09
1929	26.00	26.00	26.00	26.00	26.00	34.40	34.25	35.20	35.40	34.20
1930	23.70	25.00	25.25	25.25	25.25	20.08	19.78	19.50	20.08	19.90
	Red clover, Chicago					Sweetclover, Minneapolis				
1921	21.25	18.05	20.80	19.95	18.55	10.65	10.00	10.00	9.60	9.00
1922	22.20	24.55	25.45	23.35	21.95	8.00	8.25	8.50	8.90	9.00
1923	22.55	22.45	20.60	19.70	19.35	12.40	12.00	12.40	13.00	12.25
1924	23.10	21.55	21.10	19.60	19.00	15.00	15.00	15.40	15.90	15.10
1925	34.20	36.00	34.30	33.40	32.00	13.00	13.00	12.75	11.94	11.00
1926	32.17	33.50	34.69	34.00	34.00	9.00	9.46	9.89	9.96	10.00
1927	38.60	42.31	45.00	44.25	42.38	14.38	14.31	14.00	13.00	12.50
1928	32.50	30.65	30.08	30.22	29.70	8.75	8.65	8.44	8.46	8.38
1929	33.00	33.40	34.60	34.40	33.20	8.50	8.50	8.50	8.50	8.50
1930	21.26	20.98	21.00	21.62	21.60	8.00	8.00	8.00	8.00	8.00
	Kentucky bluegrass, Kansas City					Timothy, Chicago				
1921	25.50	27.00	27.75	30.60	34.00	7.10	6.50	6.40	6.40	6.45
1922	50.00	52.50	55.00	55.00	55.00	7.05	7.30	7.30	6.60	6.70
1923	25.00	25.00	25.00	26.90	27.50	7.00	7.00	7.05	7.05	7.00
1924	25.10	25.40	25.00	25.00	25.00	8.15	8.25	8.10	7.75	7.55
1925	28.00	28.00	28.00	28.00	28.00	6.95	6.70	6.50	6.85	7.00
1926	40.00	39.25	37.00	37.00	37.00	8.10	8.10	7.99	7.78	7.75
1927	20.25	21.00	21.00	20.25	20.00	6.08	6.08	5.86	5.98	5.98
1928	19.50	19.60	19.50	20.00	20.00	4.75	4.55	4.32	4.75	5.30
1929	31.20	31.10	31.25	31.50	31.50	6.75	6.70	6.60	6.50	6.20
1930	20.00	20.00	20.00	20.00	20.00	7.14	7.21	7.32	8.54	10.67

Bureau of Agricultural Economics. Compiled from weekly reports to the bureau from seedsmen in the various markets. These prices are the average wholesale selling prices for high-quality seed.

TABLE 352.—*Forage plant seed: Imports into United States, 1921–22 to 1929–30* [1]

Kind of seed	Year beginning July								
	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Alfalfa	7,259	8,784	12,818	4,783	4,548	5,134	782	1,146	337
Canada bluegrass	1,034	836	817	1,150	284	882	1,102	1,228	608
Awnless brome grass	14				11		(2)	5	4
Alsike clover	7,057	5,566	11,056	10,425	10,989	4,163	7,609	4,798	7,220
Crimson clover	3,443	2,262	7,745	4,834	5,766	2,385	1,346	3,395	3,099
Red clover	10,391	448	24,729	6,541	19,725	10,816	4,641	7,547	2,154
White clover	16,623	520	1,408	1,227	1,666	975	1,778	2,410	2,278
Biennial white sweetclover			4,039	3,493	5,879	4,130	3,379	1,464	206
Biennial yellow sweetclover			222	52	502	174	116	29	3
Clover mixtures	57	20	74	13	122	24	41	250	32
Grass mixtures	43	(3)		200	(2)			5	
Meadow fescue	1		(2)	1	13	16	(2)	8	1
Broomcorn millet	1,496	5,360	595	253	456	(4)	(4)	(4)	(4)
Foxtail millet	302	65	184	243	125		30	108	
Orchard grass	2,922	768	603	992	253	260	173	2,377	318
Rape	4,763	6,384	6,600	4,345	6,526	6,788	6,438	6,982	6,681
Perennial ryegrass	1,868	1,834	1,952	1,335	2,302	1,203	1,083	1,180	937
Italian ryegrass	828	860	1,034	831	1,683	833	456	300	244
Timothy	95	32	(2)	1	3	45	23	(2)	37
Hairy vetch	1,941	1,599	3,215	2,068	3,986	2,124	3,895	4,064	2,483
Spring vetch	345	1,858	1,210	1,266	1,603	992	563	1	821

Bureau of Agricultural Economics. Compiled from data of the seed laboratory, Bureau of Plant Industry.

[1] Imports of hairy vetch sweetclover for all years, are based on information furnished by U. S. Customs Service. All other figures represent imports of seed permitted entry under the Federal seed act (formerly designated the seed importation act).

[2] Less than 500 pounds.

[3] Figures missing.

[4] Data not compiled.

STATISTICS OF BEEF CATTLE, HOGS, SHEEP, HORSES, MULES, ASSES, AND HONEY

TABLE 353.—*All cattle and beef cattle: Number and value per head in the United States, 1840, 1850, 1860, 1867–1931*

Year	Cattle on farms: All cattle [1]	Cattle on farms: Other than milch cows: Number [2]	Cattle on farms: Other than milch cows: Value per head, Jan. 1 [3]	Beef cattle on farms and elsewhere, Jan. 1 [4]	Year	Cattle on farms: All cattle [1]	Cattle on farms: Other than milch cows: Number [2]	Cattle on farms: Other than milch cows: Value per head, Jan. 1 [5]	Beef cattle on farms and elsewhere, Jan. 1 [4]
	Thousands	*Thousands*	*Dollars*	*Thousands*		*Thousands*	*Thousands*	*Dollars*	*Thousands*
1840 [6]	*14,972*				1900 [7]	43,902	27,610		34,170
1850 [6]	*16,078*	*9,693*		14,400	1900 [6]	*67,720*	*50,584*		
1860 [6]	*23,365*	*14,779*		18,900	1900	57,518	41,226	23.60	
1867	20,080	11,731	15.79	12,600	1901	60,544	43,710	18.83	36,382
1868	20,634	11,942	15.06	13,600	1902	62,215	45,518	17.73	37,252
1869	21,433	12,185	18.73	14,800	1903	63,788	46,677	17.44	37,716
1870 [6]	*22,501*	*13,566*			1904	64,137	46,717	15.42	37,024
1870	25,484	15,388	18.87	20,000	1905	64,003	46,431	14.32	36,826
1871	26,235	16,212	20.78	21,000	1906	62,872	43,078	14.98	35,202
1872	26,694	16,390	18.12	21,100	1907	62,373	41,405	16.16	35,636
1873	26,990	16,414	18.06	20,900	1908	60,794	39,600	15.96	33,997
1874	26,923	16,218	17.55	20,500	1909	59,634	37,914	16.53	32,547
1875	27,220	16,313	16.91	20,400	1910 [6]	*61,803*	*41,178*		
1876	27,870	16,785	17.00	20,800	1910	57,940	37,315	18.02	30,874
1877	29,217	17,956	15.99	22,200	1911	56,219	35,396	19.41	29,163
1878	30,523	19,223	16.72	23,800	1912	55,022	34,323	20.03	27,622
1879	33,234	21,408	15.38	26,400	1913	55,833	35,336	24.91	27,806
1880 [6]	*34,932*	*22,489*			1914	58,737	38,000	29.42	29,039
1880	33,258	21,231	16.10	25,900	1915	62,532	41,270	31.54	31,177
1881	33,308	20,939	17.33	24,900	1916	66,394	44,286	31.69	33,953
1882	35,892	23,280	19.89	27,600	1917	69,533	46,639	33.91	36,059
1883	41,172	28,046	21.81	33,400	1918	71,229	47,919	38.63	38,070
1884	42,547	29,046	23.52	34,100	1919	70,261	46,786	41.79	38,056
1885	43,772	29,867	23.25	34,400	1920 [6]	*66,639*	*46,934*		
1886	45,510	31,275	21.17	35,700	1920	68,871	47,444	39.93	36,995
1887	48,034	33,512	19.79	37,900	1921	67,184	45,776	28.92	35,629
1888	49,234	34,378	17.79	38,300	1922	67,264	45,476	21.87	35,385
1889	50,331	35,032	17.05	38,300	1923	66,156	44,093	23.44	33,718
1890 [6]	*50,246*	*33,734*			1924	64,507	42,252	23.07	31,779
1890	52,802	36,849	15.21	39,800	1925 [6]	*60,760*	*43,115*		
1891	52,896	36,876	14.76	40,900	1925	61,996	39,498	22.58	28,711
1892	54,067	37,651	15.16	42,000	1926	59,122	36,934	26.42	26,608
1893	52,378	35,954	15.24	40,500	1927	56,832	35,031	28.28	24,585
1894	53,095	36,608	14.66	43,700	1928	55,676	33,848	36.31	23,749
1895	50,869	34,364	14.06	41,700	1929	56,389	34,540	42.98	24,224
1896	48,223	32,085	15.86	39,700	1930	57,978	35,535	40.79	24,926
1897	46,450	30,508	16.65	38,700	1931 [8]	58,955	35,980	28.30	25,250
1898	45,105	29,264	20.92	38,000					
1899	43,984	27,994	22.79	37,100					

Bureau of Agricultural Economics.

[1] Prior to 1900 estimates for each 10-year period represent an index of annual changes applied to census as base on first report after census data were available. Figures for 1900–1919 are tentative revised estimates of the Bureau of Agricultural Economics as first published in 1927 yearbook.

[2] Obtained by subtracting the estimates of "milk cows on farms" shown in Table 438 from the estimates of "all cattle on farms" shown in this table.

[3] Series for 1867–1899 are estimates as currently reported.

[4] Data for beef cattle on farms and elsewhere as of Jan. 1 estimated by the Bureau of Animal Industry. Prior to 1920 census figures were adjusted to a Jan. 1 basis and to include all ages and all animals in towns villages and ranges, as well as on farms. For methods, see Department Circular 241. Revisions have been made by the Bureau of Animal Industry for 1900–1927 in line with revision of estimates of cattle on farms; 1928–1931 estimates of Bureau of Agricultural Economics.

[5] Data for 1900–1925 are an old series adjusted on basis average relationship between the old and new series from 1926 to 1928. Old series was weighted averages of prices by age groups only and was shown in 1928 Yearbook. The conversion factor was 0.9466 (base is old series). Data for 1926–1931 are a new series referred to above, of average values by age and sex classification weighted by numbers in each class.

[6] Italic figures for Census years represent classification of cattle as follows: 1840 reported as "neat cattle," 1880 and 1890 exclude an estimated number of unenumerated cattle on ranges as follows: 1880, 3,750,022; 1890, 6,285,220. No estimate made prior to 1880. Figures for censuses prior to 1900 were nominally exclusive of calves, though some calves may have been included. 1900, 1910, and 1920 include calves. 1850–1890 exclude working oxen as follows: 1850, 1,700 744; 1860, 2,254, 911; 1870, 1,319,371; 1880, 993,841; 1890, 1,117,-494. Not seperately reported after 1890. Census dates were June 1, from 1840 to 1900; April 15, 1910; January 1, 1920 and 1925.

[7] Original estimate of the Bureau of Agricultural Economics.

[8] Preliminary

Table 354.—*All cattle and calves, including cows and heifers kept for milk: Estimated number on farms and value per head, by States, January 1, 1927–1931*

State and division	Number 1927	Number 1928	Number 1929	Number 1930	Number 1931 [2]	Value per head [1] 1927	Value per head 1928	Value per head 1929	Value per head 1930	Value per head 1931 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	233	224	221	231	233	51. 20	57. 90	65. 40	70. 70	51. 10
New Hampshire	113	112	118	120	118	64. 10	79. 30	86. 70	89. 70	69. 40
Vermont	403	412	407	416	421	60. 70	76. 70	77. 30	78. 00	61. 40
Massachusetts	181	181	177	181	179	81. 60	102. 80	106. 10	112. 00	98. 10
Rhode Island	27	27	28	28	28	89. 30	109. 30	114. 50	120. 00	97. 70
Connecticut	144	142	140	146	147	82. 70	109. 90	111. 20	110. 80	86. 10
New York	1, 808	1, 865	1, 923	2, 000	2, 000	74. 20	90. 60	100. 10	96. 40	70. 00
New Jersey	157	161	153	155	152	87. 90	102. 40	113. 80	129. 70	106. 50
Pennsylvania	1, 289	1, 332	1, 385	1, 440	1, 411	60. 70	77. 10	86. 70	87. 00	64. 00
North Atlantic	4, 355	4, 456	4, 552	4, 717	4, 689	68. 63	85. 00	93. 07	92. 76	69. 39
Ohio	1, 608	1, 560	1, 575	1, 670	1, 637	52. 50	65. 10	72. 00	72. 00	46. 70
Indiana	1, 320	1, 294	1, 307	1, 333	1, 360	48. 90	59. 00	67. 00	66. 50	43. 10
Illinois	2, 161	1, 967	2, 006	2, 066	2, 087	50. 00	59. 30	68. 70	67. 80	48. 80
Michigan	1, 406	1, 420	1, 463	1, 507	1, 492	54. 00	66. 50	76. 00	75. 40	48. 10
Wisconsin	2, 960	2, 920	2, 913	3, 030	3, 120	57. 20	69. 90	79. 10	79. 30	52. 50
Minnesota	2, 710	2, 710	2, 764	2, 819	2, 875	43. 00	54. 50	63. 30	61. 20	42. 00
Iowa	4, 029	3, 720	3, 845	3, 922	4, 012	44. 00	54. 30	61. 90	61. 10	42. 30
Missouri	2, 174	2, 109	2, 109	2, 172	2, 215	37. 40	47. 60	57. 80	53. 60	34. 60
North Dakota	1, 100	1, 100	1, 155	1, 270	1, 347	33. 30	43. 60	53. 50	51. 60	34. 90
South Dakota	1, 635	1, 603	1, 650	1, 732	1, 801	35. 40	47. 80	55. 40	54. 70	37. 10
Nebraska	2, 819	2, 766	2, 931	3, 001	3, 121	37. 00	49. 40	59. 00	54. 90	38. 90
Kansas	2, 568	2, 696	2, 826	2, 961	3, 042	35. 70	44. 20	52. 40	50. 30	33. 00
North Central	26, 490	25, 865	26, 544	27, 483	28, 109	44. 10	55. 03	63. 65	62. 05	41. 81
Delaware	48	49	50	50	49	60. 30	77. 60	93. 70	95. 20	68. 30
Maryland	265	275	283	291	291	54. 70	69. 90	79. 50	81. 80	61. 60
Virginia	707	729	758	796	772	35. 00	47. 10	54. 90	55. 80	34. 40
West Virginia	473	482	496	531	499	36. 30	52. 00	60. 30	60. 10	37. 50
North Carolina	486	496	496	521	547	34. 80	44. 70	48. 10	47. 20	36. 10
South Carolina	280	275	258	250	250	28. 40	34. 10	39. 30	40. 30	33. 60
Georgia	854	837	820	846	863	20. 50	27. 00	31. 00	31. 40	23. 80
Florida	592	533	480	432	410	17. 00	17. 60	23. 40	29. 10	23. 30
South Atlantic	3, 705	3, 676	3, 641	3, 717	3, 681	30. 15	39. 70	46. 52	48. 08	33. 90
Kentucky	910	955	955	955	879	35. 40	46. 90	51. 40	50. 40	32. 50
Tennessee	912	958	977	987	987	28. 50	38. 80	43. 60	44. 30	28. 70
Alabama	746	709	702	688	688	20. 50	27. 80	32. 20	34. 00	23. 30
Mississippi	853	879	835	902	965	18. 90	25. 80	30. 10	31. 50	19. 80
Arkansas	795	772	772	780	780	20. 60	29. 90	34. 10	33. 80	19. 10
Louisiana	616	579	567	595	613	20. 70	23. 70	31. 90	31. 10	22. 90
Oklahoma	1, 723	1, 723	1, 775	1, 899	1, 994	30. 90	39. 70	45. 00	41. 00	25. 50
Texas	5, 841	5, 300	5, 406	5, 563	5, 563	27. 20	37. 30	41. 70	37. 90	24. 20
South Central	12, 396	11, 875	11, 989	12, 369	12, 469	26. 68	35. 99	40. 81	38. 58	24. 60
Montana	1, 114	1, 114	1, 152	1, 164	1, 199	33. 00	46. 00	58. 10	54. 10	38. 90
Idaho	605	588	588	606	636	41. 00	48. 60	56. 70	52. 40	41. 00
Wyoming	771	764	764	772	811	37. 60	48. 90	59. 10	54. 50	40. 50
Colorado	1, 418	1, 317	1, 317	1, 330	1, 396	36. 20	46. 70	55. 30	50. 70	37. 90
New Mexico	1, 189	1, 070	1, 017	1, 045	1, 045	29. 20	38. 90	46. 50	40. 60	30. 40
Arizona	794	961	855	923	1, 025	32. 70	40. 90	49. 50	46. 30	33. 10
Utah	472	460	460	444	444	37. 30	45. 60	57. 50	52. 40	40. 20
Nevada	350	332	305	290	281	35. 80	46. 40	59. 90	53. 30	39. 60
Washington	530	530	557	579	602	50. 00	58. 20	72. 40	67. 50	49. 40
Oregon	687	673	693	721	750	40. 00	49. 50	59. 90	55. 30	41. 00
California	1, 956	1, 995	1, 955	1, 818	1, 818	47. 70	53. 70	64. 50	63. 80	52. 40
Western	9, 886	9, 804	9, 663	9, 692	10, 007	38. 44	47. 65	57. 99	53. 96	40. 87
United States	56, 832	55, 676	56, 389	57, 978	58, 955	40. 29	51. 06	59. 09	57. 30	39. 71

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Sum of total value of subgroups (classified by age and sex) divided by total number and rounded to nearest dime for States. Division and United States averages not rounded. State figures are new weighted value series not comparable to State figures previously published for the years prior to 1925.

[2] Preliminary.

Table 355.—*Cattle: Number in countries having 150,000 or over, average 1909–1913 and 1921–1925, annual 1926–1930*

Country	Month of estimate	Average, 1909–1913 [1]	Average, 1921–1925 [1]	1926	1927	1928	1929	1930
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
North America and West Indies:								
Canada	June	6, 551	9, 588	8, 571	9, 172	8, 793	8, 825	8, 937
United States	January	56, 750	65, 421	59, 122	56, 832	55, 676	56, 389	57, 978
Mexico	June	[2] [3] 5, 142	[4] 2, 492	5, 585				
Guatemala	July	557	268	564	310	298	396	
Honduras		411	[5] 466					
Salvador		350						
Nicaragua		[3] [6] 252	1, 200					
Costa Rica		333	435	423	478	443	399	
Cuba	December [7]	2, 917	4, 841	3, 783	4, 704	4, 729	4, 421	4, 865
Dominican Republic	May		640					
Porto Rico		[3] 316	279					
Estimated total [8]		74, 900	86, 600					
South America:								
Colombia		4, 000	7, 468	6, 500	6, 727			7, 343
Venezuela		2, 004	2, 689					
British Guiana		76	117	138	141	154	154	
Ecuador			[9] 1, 500	1, 280			[9] 1, 285	
Peru	February		1, 198				[9] 1, 500	
Bolivia		734	2, 145	2, 320	1, 404		1, 855	
Chile		1, 780	1, 957					
Brazil [10]	September	30, 705	[3] [11] 34, 271					
Uruguay		[3] [6] 8, 193	[3] 8, 432				[9] 9, 153	
Paraguay	December [7]	4, 422	4, 600					
Argentina	Do. [7]	[3] [12] 25, 867	[3] 37, 065					[3] [12] 32, 212
Estimated total [8]		80, 300	101, 500					
Europe:								
England and Wales	June	5, 843	5, 824	6, 253	6, 275	6, 026	5, 958	5, 846
Isle of Man	do	21	19	19	19	19	20	
Scotland	do	1, 203	1, 171	1, 198	1, 210	1, 214	1, 233	1, 233
Northern Ireland	do	786	748	667	697	738	700	673
Irish Free State	do	4, 061	4, 266	3, 947	4, 047	4, 125	4, 137	4, 038
Norway [13]	do	[14] 1, 134	1, 128	1, 200	1, 209	1, 221	1, 224	1, 251
Sweden	do	3, 069	2, 418		2, 898			
Denmark	July	2, 717	2, 613	2, 838	2, 913	3, 016	3, 031	3, 101
Netherlands	(May–June)	[3] 2, 062	[3] 2, 063					[3] 2, 352
Belgium	December [7]	1, 925	1, 550	1, 655	1, 712	1, 739	1, 751	1, 738
France	do	15, 338	13, 582	14, 373	14, 482	14, 941	15, 005	
Spain	do	2, 587	3, 457	3, 794	3, 688			
Portugal		[3] [15] 703	754					
Italy [10]	(March–April)	6, 590	6, 812	[9] 7, 400				
Switzerland	April	[3] 1, 443	[3] 1, 425	[3] 1, 587				
Germany	December [7]	18, 474	16, 786	17, 202	17, 221	18, 011	18, 414	18, 033
Austria	(December–April)	2, 356	2, 241				[9] 2, 330	
Czechoslovakia	December [7]	4, 596	4, 377	4, 690				
Hungary	April	2, 150	1, 866	1, 847	1, 805	1, 812	1, 819	1, 785
Yugoslavia [10]	January	5, 155	4, 122	3, 738	3, 760	3, 686	3, 765	
Greece [10]	December [7]	665	742	890	964	947	955	
Bulgaria [10]	do	2, 048	1, 928		2, 266			
Rumania [10]	do	5, 648	5, 570	5, 219	4, 992	4, 744	4, 625	4, 521
Poland	November	8, 664	8, 063		8, 602		9, 057	
Lithuania		918	1, 149	1, 396	1, 128	1, 199	1, 160	
Latavia	June	912	867	955	967	961	[9] 975	
Estonia	July	528	508	599	634	651	604	627
Finland	September	1, 605	1, 847	1, 860	1, 872	1, 917	1, 903	
Russia, European and Asiatic [16]	Summer	[17] 60, 280	58, 159	63, 025	68, 158	70, 668	67, 231	53, 800
Estimated total, excluding Russia [8]		103, 300	98, 000					
Africa:								
Abyssinia (Ethiopia)						4, 000		
Morocco		[18] 675	1, 711	1, 933	1, 865	1, 814	2, 017	
Algeria	September	1, 112	853	946	849	887	897	
Tunis	December	195	459	370	468	501	484	498
French West Africa			2, 165	2, 329	2, 402	2, 529	2, 617	
French Sudan			1, 086	910	1, 030	909		
Nigeria, including British Cameroon.			2, 919	3, 262	3, 112	3, 073	3, 105	
French Cameroon			354	332	342	400	400	
Egypt [10]	September	1, 316	1, 310	1, 485	1, 497	1, 580	1, 623	
Anglo-Egyptian Sudan			864	1, 500	1, 501	1, 503	1, 505	
Italian Somaliland	February		[3] [11] 1, 246			[3] 1, 106	1, 112	
Eritrea		517	553		748	[3] 799		
Kenya Colony	March–June	754	3, 038	3, 413	3, 476	3, 482	3, 498	
Uganda	December [7]	556	1, 109	1, 342	1, 338	1, 733	1, 710	1, 911
French Equatorial Africa.			815	881				
Belgian Congo		500	495	465	495	485	256	

See footnotes at end of table.

TABLE 355.—*Cattle: Number in countries having 150,000 or over, average 1909–1913 and 1921–1925, annual 1926–1930*—Continued

Country	Month of estimate	Average, 1909–1913	Average, 1921–1925	1926	1927	1928	1929	1930
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Africa—Continued								
Ruanda-Urundi			700	750	771	800	820	
Angola-Portuguese West Africa.			524	742	1,053	1,074		
Mozambique (Portuguese East Africa).			342	470	418	402		
British Southwest Africa.		206	561	621	585	655	698	
Bechuanaland		[3] 324	482	518	598	625		
Union of South Africa	April-May	[3] 5,797	9,459	10,514	10,590	10,650	[19] 10,695	
Basutoland		[3] 437	604	645	659	650	664	
Rhodesia—								
Northern	December [7]	255	289	382	363	416	441	473
Southern	do.[7]	509	1,794	2,102	2,189	2,327	2,326	
Swaziland		60	244	185	300	350	367	380
Tanganyika Territory		2,095	3,806	4,479	4,706	4,895	4,867	
Madagascar	February	4,890	7,708		7,362	6,901	6,841	
Estimated total [8]		33,800	50,000					
Asia:								
Turkey, European and Asiatic.[10]		7,270	4,821	5,572	5,772	5,559	5,215	
Persia			[9] 1,000					
Syria and Lebanon			257	243	220	312		
India—[10]								
British	December to April	128,451	146,759	150,832	151,288	151,146	151,339	
Native States	do	13,258	33,982	33,276	34,643	33,409		
Ceylon	December [7]	1,484	1,459	1,457	1,537	1,588	1,618	1,650
China, including Turkestan and Manchuria.		21,997						
Japan	December [7]	1,385	1,440	1,460	1,465	1,474	1,484	
Chosen [10]	do.[7]	966	1,567	1,591	1,595	1,586	1,570	1,586
Taiwan [10]	do.[7]	473	407	379	381	386	388	390
French Indo-China [10]		[17] 4,616	3,474	[20] 4,765	[20] 4,584	[20] 4,702	[20] 4,731	
Siam [10]	March	4,501	6,701	8,230	8,495	8,657	9,379	
Philippine Islands [10]	December [7]	1,190	2,393	2,622	2,846	2,958	3,064	
Dutch East Indies—								
Java and Madura [10]	do.[7]	5,091	5,287	5,721	5,680	5,781	5,658	5,700
Other possessions [10]	do.[7]	1,640	1,872	1,965	1,952	1,981	2,022	2,049
Estimated total, excluding Russia.[8]		195,200	235,000					
Oceania:								
Australia	December [7]	11,535	13,789	13,280	11,963	11,617	11,301	
New Zealand	January	[3] 2,020	3,393	3,452	3,258	3,274	3,446	3,766
Estimated total [8]		13,800	17,400					
Total countries reporting all periods, including Russia—								
Pre-war to 1929 (52).[21]		381,634	419,281	431,690	435,898	438,862	436,852	
Pre-war to 1930 (25).[21]		183,707	196,125	193,970	198,453	200,759	198,066	186,829
Estimated world total, including Russia.[8]		561,600	646,700					

Bureau of Agricultural Economics. Compiled from official sources and the International Insitute of Agriculture unless otherwise stated.

[1] Average for 5-year period if available; otherwise, for any year or years within this period except as otherwise stated. In countries having changed boundaries the pre-war figures are estimates for 1 year only of numbers within present boundaries. For the pre-war average the years immediately preceding the war have been used.

[2] Year 1902.
[3] Census.
[4] Incomplete.
[5] Year 1918.
[6] Year 1908.
[7] Countries reporting as of December have been considered as of Jan. 1 of the following year—i. e., figures for number of cattle in France as of Dec. 31, 1925, have been put in the 1926 column, etc.
[8] This total includes interpolations for a few countries not reporting each year and rough estimatse for some others.
[9] Unofficial.
[10] Buffaloes included.
[11] Year 1920.
[12] June, 1914, and 1930.
[13] In rural communities only.
[14] September.
[15] Year 1906.
[16] Year 1916, from Soviet Union Review, April, 1928. Years 1924–1926, Statistical Review, October, 1928, p. 6; year 1927, Agricultural Statistics of the U. S. S. R., Lenin Academy, 1927–1930-Planned Economy No. 12, 1930, State Planning Board.
[17] Year 1916.
[18] Year 1915.
[19] Number in towns assumed to be same as in 1927—i. e., 177,000, and added in for purposes of comparison with preceding years.
[20] Including 1925 estimate of 1,324,500 cattle and buffaloes in order to compare with preceding estimates.
[21] Comparable totals for number of countries indicated.

Table 356.—*Cattle and calves: Receipts and stocker and feeder shipments at all public stockyards, 1921–1930*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	RECEIPTS, CATTLE												
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1921	1,256	871	1,114	1,043	1,065	1,095	893	1,375	1,361	1,754	1,447	1,036	14,310
1922	1,222	1,044	1,145	1,009	1,358	1,217	1,255	1,608	1,802	2,243	1,846	1,392	17,141
1923	1,395	1,038	1,044	1,159	1,305	1,138	1,357	1,622	1,782	2,141	1,650	1,368	16,999
1924	1,388	1,041	1,084	1,161	1,317	1,172	1,254	1,398	1,938	2,096	1,796	1,528	17,173
1925	1,353	1,056	1,273	1,201	1,139	1,160	1,398	1,632	1,592	2,126	1,717	1,470	17,117
1926	1,314	1,065	1,233	1,146	1,277	1,279	1,279	1,421	1,827	2,030	1,836	1,327	17,034
1927	1,327	1,080	1,172	1,107	1,348	1,185	1,089	1,494	1,482	2,008	1,749	1,217	16,258
1928	1,272	1,045	966	1,119	1,188	1,057	1,158	1,308	1,669	1,913	1,419	1,075	15,189
1929	1,160	814	953	1,146	1,097	977	1,166	1,156	1,572	1,787	1,405	1,104	14,337
1930	1,155	908	1,045	1,066	984	996	1,012	1,062	1,512	1,677	1,180	1,202	13,799
	RECEIPTS, CALVES												
1921	388	319	452	450	477	485	451	492	545	557	481	380	5,477
1922	406	372	477	461	520	542	456	541	595	693	581	433	6,077
1923	482	389	458	511	595	492	546	592	512	661	532	442	6,212
1924	500	415	472	590	574	502	544	536	628	640	567	555	6,523
1925	516	473	588	626	597	586	572	612	566	663	565	586	6,950
1926	526	486	578	564	616	592	541	576	570	644	625	519	6,837
1927	504	476	571	567	607	547	457	571	507	627	598	473	6,505
1928	499	471	499	566	610	501	492	521	522	629	544	435	6,289
1929	479	381	497	606	563	475	499	463	531	620	538	451	6,103
1930	484	418	502	578	533	464	499	543	596	700	517	534	6,368
	STOCKER AND FEEDER SHIPMENTS, CATTLE												
1921	200	162	228	232	207	203	119	341	375	580	449	230	3,326
1922	223	234	266	223	338	243	216	453	595	792	630	331	4,544
1923	262	199	186	221	288	220	212	459	608	734	577	338	4,304
1924	231	165	167	230	267	191	161	293	556	724	497	288	3,770
1925	194	163	213	254	198	143	234	347	409	681	449	308	3,593
1926	207	164	171	190	201	158	188	240	495	648	521	273	3,456
1927	187	162	182	184	215	157	128	252	384	626	548	278	3,303
1928	215	175	154	236	263	165	175	312	525	704	420	218	3,562
1929	159	106	146	266	266	157	159	246	394	673	459	219	3,250
1930	201	173	176	219	172	108	99	130	368	570	375	267	2,858
	STOCKER AND FEEDER SHIPMENTS, CALVES												
1921	5	4	8	6	7	6	3	14	19	42	48	16	178
1922	10	9	16	11	21	17	7	16	35	72	80	26	320
1923	19	12	13	11	12	14	11	21	23	51	47	15	249
1924	11	5	8	9	8	10	9	13	24	39	51	21	208
1925	12	13	17	17	18	11	9	13	18	37	40	25	230
1926	18	13	13	13	17	11	11	12	26	45	49	28	256
1927	18	13	18	19	20	12	10	19	22	49	67	41	306
1928	18	19	19	18	21	19	21	24	37	94	76	35	403
1929	19	12	16	26	28	19	14	20	29	85	97	37	401
1930	32	28	30	36	28	21	10	20	75	121	103	64	568

Bureau of Agricultural Economics. Compiled from data of the livestock and meat reporting service of the bureau. Earlier data in 1930 Yearbook, p. 829, Table 353.

TABLE 357.—*Cattle and calves: Receipts at principal public stockyards and at all public stockyards, 1921–1930*

Year	Chicago	Denver	East St. Louis	Fort Worth	Kansas City	Omaha	St. Joseph	South St. Paul	Sioux City	Total, 9 markets [1]	All other stockyards reporting	Total, all stockyards reporting
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1921	3,540	482	1,077	984	2,469	1,435	558	985	620	12,150	7,637	19,787
1922	3,934	656	1,400	1,084	2,983	1,744	655	1,387	747	14,590	8,628	23,218
1923	3,918	620	1,399	1,258	3,208	1,793	709	1,349	759	15,013	8,198	23,211
1924	3,997	630	1,385	1,392	3,043	1,863	720	1,323	836	15,189	8,506	23,695
1925	3,871	587	1,444	1,370	2,958	1,709	734	1,636	897	15,206	8,861	24,067
1926	4,012	529	1,526	1,185	2,617	1,815	679	1,910	969	15,242	8,630	23,872
1927	3,583	640	1,448	1,286	2,470	1,561	641	1,582	809	14,020	8,743	22,763
1928	3,267	667	1,315	1,211	2,210	1,518	598	1,490	813	13,089	8,389	21,478
1929	3,060	624	1,223	1,089	2,178	1,546	590	1,425	839	12,574	7,866	20,440
1930	2,796	593	1,203	969	2,167	1,605	560	1,339	857	12,089	8,077	20,166

Bureau of Agricultural Economics. Compiled from data of the livestock and meat-reporting service of the bureau. Receipts, 1900–1920, are available in 1924 Yearbook, p. 840, Table 435.

[1] Total of the rounded detail figures.

TABLE 358.—*Feeder cattle, inspected: Shipments from public stockyards, 1921–1930*

Origin and destination	Calendar year									
	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Market origin:										
Chicago, Ill	331	332	275	246	230	245	167	171	157	132
Denver, Colo	237	344	347	346	281	288	328	403	334	327
East St. Louis, Ill	129	184	170	136	113	110	97	90	99	86
Fort Worth, Tex	153	209	162	160	196	233	273	285	237	190
Indianapolis, Ind	51	44	59	49	55	44	29	31	27	27
Kansas City, Kans	708	1,106	1,138	901	825	706	671	684	680	650
Louisville, Ky	37	42	33	21	27	19	34	24	17	10
Oklahoma City, Okla	94	91	77	56	78	69	89	80	85	70
Omaha, Nebr	396	566	545	476	390	379	329	355	398	405
Sioux City, Iowa	214	289	281	249	247	300	237	274	286	282
South St. Joseph, Mo	64	104	97	85	71	56	51	60	61	90
South St. Paul, Minn	144	306	223	173	208	291	203	198	209	153
Wichita, Kans	128	198	198	193	200	152	198	205	164	217
All other inspected	141	224	194	185	177	195	268	344	326	312
Total	2,827	4,039	3,799	3,276	3,098	3,087	2,974	3,204	3,080	2,951
State destination:										
Colorado	96	126	159	166	131	169	180	210	184	156
Illinois	330	546	500	439	437	435	290	310	313	275
Indiana	136	151	149	137	150	167	136	113	106	94
Iowa	468	841	742	570	487	577	431	499	538	506
Kansas	336	511	511	473	468	378	423	478	463	454
Kentucky	60	54	49	25	41	43	86	59	46	24
Michigan	53	50	46	47	49	41	36	41	34	21
Minnesota	25	18	22	31	36	32	25	29	42	41
Missouri	312	395	418	285	277	255	267	229	203	192
Nebraska	378	659	648	565	427	374	386	474	447	561
Ohio	115	123	113	90	97	102	93	70	83	52
Oklahoma	152	151	115	108	168	159	170	143	155	128
Pennsylvania	39	41	27	24	31	30	31	70	44	37
South Dakota	48	63	70	57	38	32	50	64	75	91
Texas	105	111	95	128	116	151	160	196	155	123
Wisconsin	35	30	23	23	26	29	12	12	20	14
All other	139	169	112	108	119	113	198	207	172	182
Total [1]	2,827	4,039	3,799	3,276	3,098	3,087	2,974	3,204	3,080	2,951

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

[1] Includes 2 head shipped to Alaska in 1925 and 10 head in 1926.

TABLE 359.—*Feeder cattle, inspected: Shipments from public stockyards, by months, 1930*

Origin and destination	Jan.	Feb.	Mar.	Apr.	May	June
Market origin:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Chicago, Ill	6,867	7,390	4,971	6,497	7,416	4,656
Denver, Colo	28,752	8,785	12,329	12,817	29,087	3,735
East St. Louis, Ill	4,068	4,077	4,186	5,251	3,288	4,918
Fort Worth, Tex	11,784	10,168	13,121	21,913	12,656	10,263
Indianapolis, Ind	1,474	2,787	1,312	2,103	1,571	2,184
Kansas City, Kans	46,995	43,866	42,989	46,058	26,707	21,387
Louisville, Ky	500	1,451	1,177	1,218	320	793
Oklahoma City, Okla	4,710	5,681	7,246	5,593	3,385	2,677
Omaha, Nebr	27,937	26,824	23,143	16,919	11,113	8,310
Sioux City, Iowa	17,208	15,928	14,681	11,366	10,812	9,767
South St. Joseph, Mo	4,110	2,928	3,178	3,332	2,021	3,349
South St. Paul, Minn	8,688	7,702	9,090	6,789	5,449	5,516
Wichita, Kans	17,691	15,013	19,298	31,331	14,792	9,158
All other inspected	15,728	16,606	17,439	20,078	18,408	18,870
Total	196,512	169,206	174,160	191,265	147,025	105,583
State destination:						
Colorado	5,086	4,333	6,056	6,813	4,637	2,596
Illinois	16,150	11,951	10,899	14,372	9,441	9,314
Indiana	5,254	5,663	6,041	5,943	3,775	4,101
Iowa	38,797	34,093	30,344	22,621	15,917	14,334
Kansas	39,490	30,601	38,419	54,863	28,138	19,002
Kentucky	2,111	4,499	3,281	3,660	854	1,635
Michigan	873	838	765	1,435	1,653	2,198
Minnesota	738	647	1,526	1,346	1,439	1,347
Missouri	12,879	16,417	11,474	13,110	7,032	5,890
Nebraska	41,499	27,885	27,763	23,955	31,192	14,893
Ohio	2,753	2,566	3,017	2,469	2,477	2,417
Oklahoma	7,441	9,174	11,946	13,205	6,920	6,050
Pennsylvania	1,723	1,607	2,416	1,819	1,345	1,841
South Dakota	4,126	6,078	5,396	5,026	6,181	5,451
Texas	6,888	4,531	6,971	6,603	7,575	4,578
Wisconsin	774	413	690	1,365	2,077	795
All other	9,939	7,910	7,156	12,660	16,372	9,141
Total	196,512	169,206	174,160	191,265	147,025	105,583

Origin and destination	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Market origin:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Chicago, Ill	5,142	4,109	22,239	30,833	18,164	14,030	132,254
Denver, Colo	3,626	3,681	26,950	72,643	80,230	43,885	326,520
East St. Louis, Ill	6,315	6,530	12,490	15,805	10,409	8,770	86,107
Fort Worth, Tex	6,345	7,297	25,105	29,248	26,526	15,701	190,127
Indianapolis, Ind	1,434	2,538	4,014	3,839	1,854	2,219	27,329
Kansas City, Kans	21,402	37,039	87,724	132,876	77,062	65,658	649,763
Louisville, Ky	373	364	847	1,840	553	435	9,871
Oklahoma City, Okla	3,221	5,086	8,476	10,986	7,121	6,192	70,374
Omaha, Nebr	6,586	15,102	72,839	104,810	51,930	39,656	405,169
Sioux City, Iowa	7,355	13,485	49,840	64,813	42,098	25,070	282,453
South St. Joseph, Mo	2,689	4,168	19,713	22,977	12,506	8,884	89,855
South St. Paul, Minn	9,408	8,604	27,734	36,876	17,271	9,680	152,807
Wichita, Kans	4,874	7,089	20,661	28,486	27,847	20,316	216,556
All other inspected	16,836	17,213	36,847	56,117	47,417	30,357	311,916
Total	95,606	132,305	415,479	612,179	420,928	290,853	2,951,101
State destination:							
Colorado	1,335	1,993	10,681	30,371	54,177	27,871	155,949
Illinois	13,968	17,397	48,064	63,564	34,952	24,565	274,637
Indiana	2,825	5,043	14,599	22,102	11,077	7,148	93,571
Iowa	12,143	28,671	79,097	110,212	72,041	47,610	505,880
Kansas	12,875	15,614	46,622	75,166	50,906	42,094	453,790
Kentucky	567	824	1,183	3,366	1,266	1,221	24,467
Michigan	1,645	1,471	2,247	3,602	2,901	1,821	21,449
Minnesota	3,381	2,142	9,997	11,681	4,845	2,262	41,351
Missouri	6,038	8,082	27,736	38,454	26,916	17,983	192,011
Nebraska	13,171	19,234	94,126	139,424	69,419	58,191	560,752
Ohio	1,893	2,722	9,403	11,736	6,215	4,142	51,810
Oklahoma	4,943	7,514	17,236	18,763	14,509	9,907	127,608
Pennsylvania	1,711	3,916	4,846	7,239	5,933	2,987	37,383
South Dakota	3,572	4,218	14,715	18,117	10,591	7,063	90,534
Texas	5,379	4,518	15,927	22,031	23,399	14,205	122,605
Wisconsin	557	909	1,205	2,561	1,768	1,251	14,365
All other	9,603	8,037	17,795	33,790	30,013	20,532	182,939
Total	95,606	132,305	415,479	612,179	420,928	290,853	2,951,101

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

TABLE 360.—*Beef cattle: Estimated average price per 100 pounds received by producers in the United States, 1921–1930*

BEEF CATTLE AND VEAL CALVES

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	6.32	6.02	6.36	6.08	5.98	5.65	5.40	5.39	4.98	4.81	4.69	4.62	5.44
1922	4.75	5.07	5.46	5.53	5.70	5.84	5.76	5.51	5.44	5.48	5.29	5.28	5.43
1923	5.51	5.55	5.62	5.78	5.77	5.82	5.72	5.60	5.70	5.48	5.23	5.26	5.57
1924	5.38	5.47	5.63	5.82	5.94	5.79	5.65	5.67	5.53	5.52	5.43	5.35	5.59
1925	5.63	5.69	6.18	6.55	6.48	6.46	6.55	6.58	6.27	6.29	6.14	6.18	6.26
1926	6.31	6.42	6.65	6.66	6.57	6.56	6.46	6.29	6.48	6.43	6.32	6.42	6.46
1927	6.45	6.60	6.82	7.13	7.17	7.08	7.13	7.21	7.42	7.55	8.00	8.32	7.54
1928	8.48	8.72	8.81	8.92	9.09	9.10	9.19	9.51	9.96	9.63	9.27	8.94	9.18
1929	8.97	8.89	9.16	9.53	9.72	9.72	9.80	9.62	9.22	8.92	8.63	8.48	9.20
1930	8.69	8.68	8.77	8.65	8.36	8.20	7.12	6.26	6.61	6.54	6.41	6.37	7.43

VEAL CALVES

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
1921	9.34	9.08	9.05	7.73	7.55	7.43	7.37	7.31	7.67	7.61	7.20	7.14	7.81
1922	7.23	7.84	7.85	7.26	7.28	7.67	7.49	7.67	8.10	8.17	7.92	7.78	7.68
1923	8.05	8.37	8.20	7.78	7.69	7.66	8.00	8.00	8.34	8.37	7.85	7.75	7.99
1924	8.36	8.51	8.43	8.33	8.14	7.91	7.88	7.94	8.09	8.22	7.89	7.84	8.12
1925	8.50	8.87	9.21	8.80	8.35	8.18	8.65	8.80	9.07	9.52	9.16	9.17	8.85
1926	9.44	9.86	9.75	9.45	8.92	9.65	9.47	9.54	10.06	10.29	9.54	9.44	9.61
1927	9.75	10.10	10.10	9.90	9.37	9.46	9.82	10.37	10.78	11.04	10.67	10.71	10.16
1928	10.88	11.30	11.34	11.18	11.18	11.56	11.87	12.32	13.05	12.62	11.99	11.82	11.79
1929	12.20	12.17	12.51	12.10	12.11	12.06	12.40	12.39	12.52	12.16	11.80	11.69	12.18
1930	11.84	11.69	11.24	10.73	9.68	9.83	9.19	8.78	9.20	9.30	8.84	8.48	9.83

Bureau of Agricultural Economics. Based on reports of special price reporters. Monthly prices of beef cattle weighted by number of cattle Jan. 1, by States; monthly prices of veal calves weighted by number of milk cows Jan. 1, by States; yearly price obtained by weighting monthly prices by receipts at principal markets.

TABLE 361.—*Cattle, choice steers for chilled beef: Average price per 100 pounds, by months, Buenos Aires, 1909–1930*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1909	3.00	3.03	3.07	3.00	3.07	3.20	3.41	3.64	3.95	4.38	4.21	3.81	3.48
1910	3.34	3.30	3.61	3.61	3.54	3.64	3.71	3.98	4.28	4.62	4.32	3.47	3.78
1911	3.57	3.61	3.84	3.81	3.84	3.95	4.15	4.18	4.21	4.18	4.01	3.47	3.90
1912	3.58	3.78	3.62	3.73	3.72	3.71	3.71	4.05	4.15	4.15	4.15	4.08	3.87
1913	4.22	4.19	4.44	4.93	5.26	5.02	5.10	5.12	5.12	5.22	5.35	5.18	4.93
1914	4.96	5.27	5.47	5.69	5.47	5.67	5.73	6.01	6.21	6.29	5.86	5.80	5.70
1915	5.72	5.61	5.56	5.65	5.44	5.54	5.97	6.71	7.45	7.52	7.11	6.59	6.24
1916	6.93	7.15	6.91	6.93	6.84	6.31	6.42	6.54	6.84	7.16	6.95	6.74	6.81
1917	6.69	6.56	6.49	6.31	6.46	6.34	6.37	6.40	6.16	6.54	6.03	5.55	6.32
1918	5.39	5.83	5.88	6.06	6.04	5.98	6.21	7.49	8.41	8.49	8.03	8.06	6.82
1919	7.96	7.75	7.74	7.85	8.03	7.21	8.60	8.92	9.63	9.20	8.25	7.72	8.24
1920	7.96	7.97	8.20	8.06	7.88	7.56	7.47	7.42	7.15	7.27	6.28	5.98	7.43
1921	5.93	5.95	5.71	5.41	4.40	4.10	3.69	4.12	4.74	4.96	4.90	4.39	4.86
1922	4.68	4.53	3.97	3.30	3.31	3.90	4.41	4.50	4.24	3.84	3.30	3.25	3.94
1923	3.08	3.25	3.82	4.06	3.83	3.56	3.62	3.36	3.82	4.10	3.48	3.23	3.60
1924	3.19	3.40	3.61	3.50	3.56	3.76	4.51	4.93	5.15	5.95	5.62	5.42	4.38
1925	5.54	5.54	6.20	6.20	6.51	6.48	6.54	6.72	6.91	6.25	5.66	5.32	6.16
1926	5.40	5.42	5.27	5.39	5.52	5.24	5.58	5.70	5.45	4.63	4.06	4.21	5.16
1927	4.21	4.73	4.63	5.03	4.81	5.15	5.95	6.55	6.84	7.13	6.34	5.81	5.52
1928	6.11	5.86	6.21	6.33	6.65	6.99	6.79	6.60	6.67	6.38	5.61	5.32	6.29
1929	5.83	5.89	5.87	5.76	5.93	5.98	6.07	6.07	6.06	6.68	6.19	6.85	6.02
1930	5.80	5.35	5.39	5.74	5.57	5.44	5.27	5.27	5.22	4.91	4.52	3.76	5.19

Bureau of Agricultural Economics. Calculated from quotations in the Review of the River Plate. Prices prior to May, 1924, originally quoted on basis of price per head supplemented from 1916 by price per pound of dressed carcass weight. Calculations assume average dressed weight of 730 pounds or live weight of 1,259 pounds. Live-weight quotations per pound from May, 1924. Converted at average monthly rate of exchange as given in Federal Reserve Bulletins.

Table 362.—*Cattle and calves: Monthly average price per 100 pounds, Chicago, 1900–1930*

BEEF STEERS [1]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1900	5.20	4.85	4.85	4.95	5.10	5.20	5.25	5.40	5.35	5.25	5.15	5.00	5.15
1901	4.85	4.80	4.95	5.15	5.30	5.55	5.10	5.10	5.50	5.45	5.50	5.65	5.25
1902	5.70	5.55	6.05	6.45	6.60	6.95	7.10	7.05	6.65	6.20	5.20	4.80	6.20
1903	4.80	4.60	4.75	4.90	4.80	4.90	4.95	5.00	4.95	4.70	4.45	4.55	4.80
1904	4.65	4.50	4.60	4.65	4.85	5.60	5.40	5.10	5.10	5.20	4.95	4.40	4.95
1905	4.65	4.75	5.00	5.75	5.45	5.25	4.95	5.00	5.05	4.80	4.65	4.75	5.05
1906	5.00	5.05	5.15	5.05	5.20	5.20	5.40	5.45	5.50	5.60	5.60	5.50	5.30
1907	5.60	5.55	5.55	5.65	5.65	6.20	6.40	6.25	6.10	6.10	5.40	5.10	5.80
1908	5.30	5.40	6.00	6.50	6.60	6.90	6.45	6.00	5.95	5.70	5.90	6.00	6.10
1909	6.00	5.85	6.10	6.10	6.45	6.45	6.45	6.70	6.75	6.60	6.45	6.20	6.35
1910	6.20	6.35	7.35	7.55	7.50	7.50	7.10	6.85	6.80	6.60	6.20	6.00	6.80
1911	6.15	6.15	6.20	6.10	5.95	6.05	6.30	6.95	6.80	6.75	6.70	6.65	6.40
1912	6.85	6.60	7.20	7.65	7.95	8.00	7.90	8.50	8.15	7.90	8.10	7.85	7.75
1913	7.80	8.25	8.30	8.15	8.00	8.15	8.25	8.30	8.50	8.40	8.25	8.20	8.25
1914	8.45	8.30	8.35	8.50	8.40	8.60	8.80	9.10	9.35	9.05	8.60	8.35	8.65
1915	8.05	7.50	7.65	7.70	8.35	8.80	9.20	9.05	8.95	8.80	8.70	8.45	8.40
1916	8.35	8.35	8.75	9.10	9.50	9.85	9.25	9.45	9.40	9.75	10.15	10.00	9.50
1917	10.15	10.50	11.25	11.75	11.90	12.15	12.35	12.70	13.10	11.70	11.10	11.40	11.60
1918	12.10	12.00	12.60	14.70	15.40	15.85	16.05	15.75	16.00	14.80	15.05	14.90	14.65
1919	15.80	15.95	16.05	15.85	15.00	13.55	15.60	16.45	15.50	16.15	15.10	14.35	15.50
1920	13.95	13.05	13.10	12.30	12.25	14.95	15.00	14.85	15.05	14.20	12.00	10.10	13.30
1921	8.70	8.20	9.05	8.15	8.25	8.00	8.10	8.50	8.00	8.10	7.40	7.00	8.20
1922	7.23	7.62	7.87	7.90	8.21	8.76	9.42	9.52	9.84	10.23	9.16	8.76	8.65
1923	8.88	8.62	8.70	8.81	9.28	9.74	9.71	10.36	10.18	9.94	9.46	8.96	9.40
1924	8.99	8.81	9.17	9.52	9.59	9.28	9.31	9.53	9.52	9.57	8.90	8.71	9.24
1925	8.97	9.15	9.93	9.99	9.90	10.34	11.28	11.10	11.04	10.80	10.16	9.72	10.16
1926	9.48	9.42	9.42	9.11	9.07	9.51	9.44	9.30	10.00	10.00	9.48	9.43	9.47
1927	9.70	9.81	10.20	10.51	10.68	11.12	11.78	12.02	12.63	13.43	13.57	13.08	11.36
1928	13.67	13.15	12.83	13.01	13.19	13.86	15.11	15.30	15.91	14.61	13.84	12.86	13.91
1929	12.51	11.92	12.68	13.52	13.67	14.10	14.59	14.22	13.92	13.81	13.00	12.74	13.43
1930	12.62	12.46	12.33	11.88	11.15	10.59	9.42	9.48	10.95	10.64	10.47	10.17	10.95

VEAL CALVES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1901	5.85	5.95	5.75	5.15	5.25	6.00	5.75	5.25	5.85	5.90	5.60	5.00	5.65
1902	6.30	6.75	6.00	5.50	5.75	5.75	6.50	6.75	7.00	6.80	6.60	6.60	6.35
1903	7.10	7.15	6.50	5.75	5.60	6.20	5.65	6.40	6.65	6.40	5.75	4.95	6.20
1904	5.85	6.35	5.65	4.60	4.60	4.90	5.75	5.60	5.90	6.10	6.00	6.00	5.60
1905	6.15	6.50	5.70	5.10	5.25	5.85	5.75	5.90	6.00	6.00	6.00	6.60	5.75
1906	7.00	6.40	6.25	5.60	5.65	5.80	5.60	6.00	6.75	6.50	6.25	7.00	6.25
1907	7.00	6.50	6.60	6.00	6.35	6.15	6.40	6.35	6.50	6.00	6.25	6.00	6.40
1908	6.75	6.60	6.20	5.50	5.60	5.80	6.00	6.75	7.60	7.20	6.50	7.40	6.50
1909	7.60	6.85	7.00	6.30	6.35	6.50	7.00	7.50	7.60	8.10	7.40	8.25	7.10
1910	8.60	8.65	9.00	7.85	7.35	7.85	7.60	7.75	8.50	8.65	8.75	8.50	8.10
1911	8.75	8.40	7.40	6.60	7.25	7.60	7.40	8.00	8.75	8.60	8.35	7.85	7.60
1912	8.75	7.50	8.00	7.40	7.75	8.00	8.75	9.75	11.25	10.00	9.85	10.25	8.75
1913	9.75	9.85	10.50	8.50	9.25	9.75	10.40	11.50	11.25	10.50	10.35	10.75	10.10
1914	11.00	10.75	9.00	8.85	9.50	9.40	10.60	11.00	11.40	10.65	10.35	8.65	9.90
1915	9.85	10.35	10.00	8.40	9.15	9.60	10.25	11.50	11.25	10.85	10.15	9.65	10.15
1916	10.15	10.65	9.65	8.75	10.40	11.25	11.40	12.00	12.40	11.50	11.85	11.75	10.85
1917	13.40	12.65	13.40	12.50	13.25	13.40	13.00	15.15	15.00	14.85	13.50	15.25	13.75
1918	15.35	14.15	15.25	14.50	13.50	15.55	16.70	17.25	18.60	17.10	16.80	16.50	15.75
1919	15.62	15.75	15.01	14.31	14.66	16.37	17.88	19.62	20.52	18.05	17.60	16.56	16.83
1920	17.74	16.73	16.73	14.22	12.12	13.68	13.98	15.08	16.39	14.18	13.74	10.39	14.58
1921	11.49	11.02	10.33	8.12	8.66	8.72	9.73	9.39	10.71	8.68	7.70	7.81	9.36
1922	8.36	9.16	8.26	6.97	8.46	8.89	8.90	10.88	11.92	9.65	8.91	9.42	9.15
1923	10.08	10.63	9.32	8.68	9.51	9.31	10.14	10.36	10.57	9.82	8.15	9.31	9.66
1924	11.08	10.54	9.75	9.03	9.30	8.74	9.48	10.63	10.72	10.10	9.02	9.97	9.86
1925	10.72	11.94	11.24	9.49	9.42	9.56	10.91	11.94	12.18	11.19	10.60	11.30	10.87
1926	12.18	12.43	12.06	9.91	11.04	11.09	11.38	12.46	12.59	11.80	11.09	11.31	11.61
1927	12.20	12.40	11.54	10.90	11.07	11.68	13.32	14.75	15.94	14.42	13.48	13.09	12.90
1928	13.70	15.04	13.75	13.02	13.95	13.24	14.84	16.68	17.36	14.94	14.22	13.94	14.56
1929	15.83	14.74	15.50	14.43	13.39	14.22	15.30	15.81	16.64	13.76	13.70	13.82	14.76
1930	14.80	12.66	11.96	10.55	11.36	11.03	11.37	11.98	11.83	11.33	9.53	9.77	10.97

Bureau of Agricultural Economics. Beef-steer prices prior to 1922 from Chicago Drovers Journal Yearbook, general average native beef cattle. Subsequent figures are the weighted average price of all grades of beef steers sold out of first hands at Chicago. Veal-calf prices prior to 1919, from Chicago Drovers Journal Yearbook, average native veal calves. Later figures from the livestock and meat reporting service of the bureau.

[1] Western steers not included.

TABLE 363.—*Cattle and calves: Average price per 100 pounds at Chicago and Kansas City, by months, 1928–1930*

CHICAGO

Year and month	Slaughter cattle										Vealers (milk-fed)		Feeder steers, 800 pounds up	
	Beef steers						Heifers, 850 pounds down		Cows					
	1,300 to 1,500 pounds, Choice	1,100 to 1,300 pounds, Choice	950–1,100 pounds		800 pounds up									
			Choice	Good	Medium	Common	Choice	Good	Good	Common and Medium	Good and Choice	Medium	Good and Choice	Common and Medium
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
January	18.02	17.68	17.24	15.18	12.81	10.12	13.23	12.16	9.79	7.59	13.70	11.86	11.42	9.41
February	16.78	16.42	16.01	14.47	12.32	9.99	13.17	12.20	9.41	7.63	15.04	13.24	11.76	9.89
March	15.09	14.86	14.66	13.66	12.27	9.96	13.10	12.25	9.40	7.46	13.75	11.81	11.77	9.99
April	14.62	14.56	14.32	13.53	12.24	10.06	13.42	12.57	9.60	8.24	13.02	10.79	12.04	10.19
May	14.36	14.37	14.40	13.55	12.22	10.49	13.69	12.93	10.06	8.31	13.95	11.69	12.17	10.42
June	14.50	14.63	14.70	13.96	12.72	10.98	14.44	13.69	10.19	8.42	13.24	11.26	12.38	10.62
July	15.86	15.90	15.98	15.03	13.41	10.78	15.76	14.87	10.52	8.37	14.84	12.88	12.51	10.62
August	16.27	16.39	16.48	15.34	13.24	10.52	16.26	15.00	10.67	8.45	16.68	14.27	12.74	10.62
September	17.76	17.78	17.75	16.09	13.77	10.96	17.02	15.33	10.70	8.47	17.56	15.43	13.08	10.72
October	17.18	17.25	17.36	15.58	13.01	10.38	16.33	14.82	10.08	8.05	14.94	13.47	12.16	10.06
November	16.97	17.02	17.17	15.11	12.64	10.22	14.95	13.42	9.71	7.82	14.22	12.51	11.61	10.02
December	16.11	16.15	16.36	14.34	12.16	10.12	13.86	12.40	9.06	7.44	13.94	12.10	11.41	9.86
Average	16.13	16.08	16.04	14.65	12.73	10.38	14.60	13.47	9.93	8.02	14.56	12.61	12.09	10.20
1929														
January	15.39	15.58	15.89	14.31	12.32	10.36	13.20	12.10	9.19	7.58	15.83	13.71	11.34	9.80
February	14.18	14.31	14.37	13.20	11.58	9.99	12.91	11.80	9.02	7.68	14.74	12.89	10.92	9.51
March	13.89	14.08	14.30	13.42	12.41	10.63	13.40	12.62	9.49	8.03	15.50	13.08	12.02	10.36
April	14.47	14.49	14.55	13.87	12.86	11.10	14.15	13.30	9.92	8.67	14.43	11.74	12.59	10.90
May	14.55	14.62	14.72	13.94	12.96	11.64	14.35	13.47	10.47	8.83	13.39	10.64	12.91	11.07
June	15.17	15.18	15.16	14.35	13.36	11.96	14.56	13.76	10.20	8.64	14.22	11.62	12.77	11.00
July	16.05	16.02	15.85	14.41	12.76	10.91	14.74	13.69	9.81	8.09	15.30	13.21	12.76	10.78
August	16.40	16.42	16.43	14.57	12.17	9.86	14.92	13.81	9.80	7.80	15.81	13.31	11.95	9.86
September	16.02	16.08	16.13	14.34	11.98	9.79	14.88	13.80	9.74	7.76	16.64	13.90	11.21	9.32
October	15.75	15.82	15.92	14.24	12.10	9.90	14.74	13.84	8.96	7.29	13.76	11.90	10.90	9.12
November	14.38	14.96	15.27	13.81	11.73	9.70	14.66	13.57	8.46	6.81	13.70	11.56	10.28	8.73
December	14.30	15.00	15.47	13.89	11.80	9.52	14.50	12.71	8.58	6.92	13.82	11.27	10.47	9.12
Average	15.05	15.21	15.34	14.03	12.34	10.45	14.25	13.21	9.47	7.84	14.76	12.40	11.68	9.96
1930														
January	14.80	15.28	15.80	14.14	11.77	9.75	14.72	13.18	8.85	7.32	14.80	12.12	10.82	9.38
February	15.03	15.38	15.46	13.99	11.96	9.88	13.81	12.66	8.32	6.74	12.66	9.95	11.00	9.46
March	14.58	14.71	14.90	13.61	11.92	10.11	13.45	12.26	8.36	6.87	11.96	9.14	11.25	9.57
April	14.52	14.41	14.23	12.95	11.32	9.57	12.65	11.39	8.30	6.96	10.55	8.41	10.75	9.13
May	14.03	13.76	13.46	12.26	11.06	8.97	11.55	10.45	8.27	6.85	11.36	9.28	10.43	8.94
June	12.84	12.65	12.45	11.36	10.26	8.41	10.77	10.02	7.78	6.30	11.03	9.50	9.96	8.40

Year and month	1,300 to 1,500 pounds, Choice	1,100 to 1,300 pounds, Choice	900 to 1,100 pounds				550 to 850 pounds		Cows, Good	Cows, Common and Medium	Vealers, Good and Choice	Vealers, Medium	800 to 1,050 pounds	
			Choice	Good	Medium	Common	Choice	Good					Good and Choice	Common and Medium
July	10.94	11.04	11.04	10.00	8.78	6.96	10.32	9.55	6.83	5.37	11.37	10.00	8.11	6.47
August	10.62	10.73	10.95	10.01	8.90	6.98	10.81	9.92	6.22	4.99	11.98	10.29	7.25	5.87
September	11.77	12.06	12.28	11.17	9.56	7.56	12.17	10.86	6.00	4.61	11.83	9.89	7.86	6.18
October	11.60	11.94	12.66	11.24	9.35	7.19	12.38	11.03	6.16	4.76	11.33	9.16	7.98	6.14
November	11.83	12.54	13.12	11.62	9.36	7.32	12.29	10.53	5.80	4.54	9.53	7.40	7.98	6.28
December	12.69	13.19	13.48	11.51	9.18	7.15	11.84	9.89	5.73	4.58	9.77	7.72	7.87	6.23
Average	12.94	13.14	------	------	------	------	12.23	10.98	7.22	5.82	11.51	9.40	9.27	7.67

TABLE 363.—*Cattle and calves: Average price per 100 pounds at Chicago and Kansas City, by months, 1928–1930*—Continued

KANSAS CITY

Year and month	Slaughter cattle										Vealers (milk-fed)		Feeder steers, 800 pounds up	
	Beef steers						Heifers, 850 pounds down		Cows					
	1,300 to 1,500 pounds, Choice	1,100 to 1,300 pounds, Choice	950 to 1,100 pounds		800 pounds up									
			Choice	Good	Medium	Common	Choice	Good	Good	Common and Medium	Good and Choice	Medium	Good and Choice	Common and Medium
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
January	17.37	17.16	16.83	14.74	11.80	8.70	13.12	11.53	9.20	7.41	11.00	9.02	11.27	8.94
February	16.05	15.61	15.34	13.68	11.63	8.86	12.45	11.18	9.09	7.37	12.48	9.69	11.49	9.35
March	14.30	14.06	13.92	12.79	11.35	8.86	12.16	11.04	9.12	7.38	11.34	8.45	11.59	9.37
April	14.00	13.84	13.67	12.82	11.62	9.58	12.45	11.48	9.26	7.68	10.99	8.01	11.61	9.42
May	13.70	13.69	13.77	12.85	11.72	9.97	12.93	12.06	9.54	8.12	12.00	9.00	11.74	9.69
June	13.86	13.96	14.28	13.28	12.02	10.13	13.63	12.58	9.48	8.18	11.69	9.05	11.91	9.91
July	15.35	15.39	15.48	14.47	12.54	10.00	15.18	13.88	9.73	8.02	12.12	9.40	12.38	10.06
August	15.10	15.38	15.75	14.50	12.35	9.66	15.50	13.94	9.64	7.90	12.84	9.75	12.58	10.12
September	16.56	16.69	16.82	14.85	12.33	9.85	15.86	13.98	9.72	8.02	14.12	10.52	12.62	10.07
October	15.99	16.08	16.29	14.11	11.54	9.23	15.27	13.36	9.18	7.66	12.20	9.19	11.87	9.64
November	15.66	15.67	15.92	13.70	11.28	9.02	14.74	12.94	9.25	7.59	12.19	9.58	11.26	9.34
December	15.10	15.22	15.58	13.32	10.88	8.98	13.96	12.26	8.82	7.30	11.85	9.36	11.05	9.17
Average	15.25	15.23	15.30	13.76	11.76	9.40	13.94	12.52	9.34	7.72	12.07	9.25	11.78	9.59
1929														
January	14.34	14.47	14.90	12.89	11.06	9.31	13.05	11.46	8.78	7.36	13.75	10.73	11.46	9.47
February	13.08	13.22	13.58	12.15	10.73	9.13	11.97	10.74	8.50	7.42	12.98	10.28	11.10	9.32
March	13.12	13.37	13.84	12.81	11.70	10.22	12.65	11.70	9.18	7.90	14.40	11.68	12.14	10.34
April	13.68	13.86	14.08	13.30	12.25	10.56	13.24	12.35	9.80	8.46	13.36	10.45	12.42	10.67
May	13.81	13.92	14.18	13.32	12.26	10.57	13.66	12.55	10.10	8.71	12.07	9.62	12.60	10.70
June	14.52	14.55	14.54	13.47	12.41	10.54	14.02	12.76	9.92	8.33	11.71	9.30	12.60	10.55
July	15.38	15.30	15.27	13.83	12.16	9.82	14.32	12.83	9.28	7.56	12.40	9.80	12.37	10.16
August	15.50	15.48	15.46	13.38	10.84	8.46	14.23	12.41	8.79	7.15	12.16	9.32	11.44	9.18
September	15.03	15.03	15.13	13.15	10.50	8.07	14.12	12.50	8.62	6.98	13.12	10.22	10.74	8.62
October	14.57	14.59	15.02	13.18	10.52	8.37	14.07	12.61	8.31	6.90	11.58	8.98	10.39	8.54
November	13.53	13.75	14.28	12.74	10.27	8.35	13.90	12.68	8.09	6.54	11.50	9.00	10.09	8.35
December	13.30	13.67	14.29	13.02	10.82	9.00	13.83	12.46	8.01	6.49	11.40	8.70	10.50	8.67
Average	14.16	14.27	14.55	13.10	11.29	9.37	13.59	12.25	8.95	7.48	12.54	9.84	11.49	9.55
1930														
January	13.37	13.72	14.60	13.13	10.95	9.25	13.76	12.28	8.49	6.98	12.39	9.48	10.95	9.07
February	13.68	13.90	14.59	13.16	11.16	9.51	13.36	12.00	8.11	6.74	11.69	8.48	11.24	9.38
March	13.66	13.84	14.28	12.89	11.18	9.58	13.28	11.99	8.31	6.90	11.15	8.42	11.18	9.22
April	13.62	13.54	13.55	12.11	10.68	9.20	12.19	10.91	8.18	6.83	10.54	8.15	10.76	8.81
May	12.92	12.61	12.47	11.16	10.07	8.49	11.10	9.92	8.12	6.77	10.66	8.41	10.12	8.32
June	12.23	11.94	11.70	10.47	9.52	8.22	10.60	9.40	7.28	6.24	9.74	7.88	9.89	8.04
			900 to 1,100 pounds				550 to 850 pounds						800 to 1,050 pounds	
			Choice	Good	Medium	Common	Choice	Good					Good and Choice	Common and medium
July	10.29	10.34	10.46	9.37	7.93	6.28	10.13	9.26	6.27	5.00	8.59	6.54	8.16	6.21
August	9.95	10.06	10.18	9.20	7.44	5.72	10.14	9.14	5.82	4.60	9.02	6.89	7.24	5.52
September	11.35	11.60	11.91	10.37	8.29	6.22	11.37	10.30	5.79	4.57	9.48	7.42	7.62	5.62
October	10.63	11.03	11.96	10.45	8.08	5.81	11.80	10.36	5.55	4.41	9.52	7.26	7.35	5.44
November	10.56	11.12	12.35	10.70	8.33	5.86	11.72	10.06	5.58	4.42	8.50	6.31	7.71	5.63
December	11.64	12.11	12.77	10.85	8.17	6.13	11.22	9.15	5.77	4.65	8.84	6.74	7.75	5.62
Average	11.99	12.15	------	-----	-----	-----	11.71	10.40	6.94	5.68	10.01	7.66	9.16	7.24

Bureau of Agricultural Economics. Compiled from data of the livestock and meat-reporting service of the bureau. Earlier data in 1927 Yearbook, pp. 991–994.

Table 364.—*Cattle and calves: Monthly slaughter* [1] *under Federal inspection, 1907–1930*

CATTLE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1907	718	570	555	635	620	588	641	668	696	801	596	546	7,633
1908	643	527	520	463	491	525	563	640	768	821	681	637	7,279
1909	587	490	551	508	536	544	608	652	782	892	799	765	7,714
1910	632	527	599	533	551	621	615	679	796	831	780	644	7,808
1911	626	536	562	499	599	614	591	720	692	828	746	605	7,619
1912	675	515	564	522	563	511	508	632	644	808	691	620	7,253
1913	622	490	484	555	547	556	593	582	656	701	602	590	6,978
1914	585	499	476	474	474	490	505	518	650	744	658	682	6,757
1915	573	466	552	507	534	574	596	590	641	736	702	681	7,153
1916	623	550	597	476	564	648	562	743	791	941	972	844	8,310
1917	823	663	647	654	815	844	784	866	957	1,196	1,099	1,003	10,350
1918	895	785	828	915	782	830	1,020	987	1,143	1,251	1,233	1,160	11,829
1919	1,119	701	640	622	721	644	855	859	855	1,073	1,040	960	10,091
1920	832	631	683	638	626	657	661	686	825	843	859	667	8,609
1921	690	526	621	591	570	640	579	680	689	750	686	586	7,608
1922	642	569	674	590	702	724	697	761	796	884	859	779	8,678
1923	745	634	688	697	762	727	725	821	810	953	846	756	9,163
1924	812	669	665	689	773	670	764	786	870	1,016	952	926	9,593
1925	855	656	736	731	749	732	862	811	866	1,067	861	927	9,853
1926	819	695	786	766	788	852	864	811	971	996	947	887	10,180
1927	786	700	761	742	785	799	743	838	828	895	881	761	9,520
1928	711	666	665	623	723	706	662	717	764	801	762	667	8,467
1929	736	569	632	662	676	636	706	726	753	839	731	658	8,324
1930	713	561	615	635	689	654	710	700	760	836	605	692	8,170

CALVES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1907	128	99	122	205	224	204	221	206	198	187	126	104	2,024
1908	117	88	137	197	205	211	192	185	187	180	143	116	1,958
1909	135	95	149	200	228	236	213	196	205	205	171	155	2,189
1910	132	117	188	222	252	238	198	206	197	188	168	132	2,238
1911	135	121	180	218	243	232	198	207	184	180	155	128	2,184
1912	152	126	180	245	258	229	201	192	190	193	163	149	2,278
1913	139	118	142	212	205	195	182	149	159	157	124	122	1,902
1914	122	100	145	186	183	187	153	129	130	135	107	119	1,697
1915	109	96	156	199	205	197	162	141	139	148	141	125	1,819
1916	129	143	189	233	267	228	178	207	186	204	217	185	2,367
1917	203	182	212	286	345	277	277	255	272	339	281	216	3,143
1918	210	193	260	351	357	312	355	274	317	306	272	249	3,456
1919	295	210	295	383	391	327	400	319	318	375	344	312	3,969
1920	305	283	390	382	369	431	343	332	348	315	316	245	4,058
1921	282	254	360	366	367	370	324	304	321	309	292	259	3,808
1922	288	279	391	365	401	389	329	345	353	383	348	309	4,182
1923	351	297	368	400	467	388	379	403	338	416	370	324	4,500
1924	373	346	377	466	470	408	421	374	419	473	392	416	4,935
1925	394	378	466	496	481	473	473	439	422	486	398	445	5,353
1926	410	378	464	461	455	480	425	379	408	446	435	410	5,153
1927	397	377	457	454	462	430	355	389	357	413	410	376	4,877
1928	383	374	407	438	473	398	362	369	352	405	378	341	4,680
1929	369	311	409	460	427	344	363	338	365	398	358	346	4,489
1930	374	329	388	455	421	356	375	363	374	438	324	398	4,595

Bureau of Animal Industry.

[1] The figures include rejected carcasses.

TABLE 365.—*Cattle and calves, slaughter statistics: Source of supply, classification, slaughter costs, weights, and yields, calendar year, 1923–1930*

CATTLE

Year and month	Source of supply		Sex classification			Average live cost per 100 pounds	Average live weight	Dressed weight as percentage of live weight	By-product yield (on basis of live weight)		
	Stockyards	Other	Bulls and stags	Cows and heifers	Steers				Edible fat [1]	Edible offal	Hides
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Dollars*	*Pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
1923	89.86	10.14	4.04	48.06	47.90	6.82	952.89	54.13	3.84	2.80	6.79
1924	90.77	9.23	4.10	49.42	46.48	6.64	949.64	53.50	3.86	2.85	6.80
1925	90.74	9.26	3.38	51.31	45.31	7.11	954.06	53.06	3.61	2.94	6.77
1926	89.80	10.20	3.39	49.73	46.88	7.32	964.06	53.77	3.89	3.05	6.79
1927	89.90	10.10	3.72	49.27	47.01	8.62	945.99	53.57	3.71	3.03	6.84
1928	89.90	10.10	3.88	50.78	45.34	10.59	947.93	53.54	3.92	3.15	6.63
1929	88.90	11.10	3.99	47.38	48.63	10.58	954.63	54.19	4.06	3.26	6.58
1930	88.25	11.75	3.78	44.38	51.84	8.55	955.93	54.72	4.06	3.27	6.59
1930											
January	88.82	11.18	3.57	50.04	46.39	10.03	971.72	53.98	3.96	3.36	6.67
February	87.87	12.13	3.73	48.59	47.68	9.87	975.25	54.57	4.18	3.42	6.62
March	88.19	11.81	3.23	45.28	51.49	10.08	960.12	54.96	4.24	3.36	6.51
April	88.35	11.65	3.80	43.03	53.17	9.94	956.19	55.29	4.37	3.32	6.47
May	88.07	11.93	3.84	40.14	56.02	9.66	943.76	55.98	4.57	3.39	6.51
June	89.04	10.96	4.56	40.88	54.56	8.84	937.89	55.59	4.42	3.33	6.54
July	88.77	11.23	3.67	38.39	57.94	7.84	947.14	55.56	4.31	3.28	6.34
August	89.51	10.49	4.34	38.17	57.49	7.41	947.28	55.03	3.97	3.35	6.57
September	88.52	11.48	3.78	43.63	52.59	7.78	952.15	54.70	3.91	3.15	6.61
October	88.47	11.53	3.61	48.47	47.92	7.21	950.49	53.75	3.57	3.12	6.69
November	86.90	13.10	3.54	48.35	48.11	7.22	961.91	53.55	3.66	3.16	6.68
December	86.13	13.87	3.70	47.48	48.82	7.35	972.21	53.91	3.71	3.04	6.68

CALVES

Year and month	Source of supply		Average live cost per 100 pounds	Average live weight	Dressed weight as percentage of live weight	By-product yield (on basis of live weight)	
	Stockyards	Other				Edible fat [1]	Edible offal
	Per cent	*Per cent*	*Dollars*	*Pounds*	*Per cent*	*Per cent*	*Per cent*
1923	86.24	13.76	7.86	172.82	57.13	0.75	3.57
1924	87.08	12.92	7.67	176.78	57.28	.75	3.61
1925	87.18	12.82	8.66	176.03	57.51	.71	3.68
1926	85.28	14.72	9.82	176.39	58.52	.66	3.66
1927	84.18	15.82	10.58	175.94	57.31	.75	3.78
1928	85.10	14.90	12.21	175.94	56.14	.79	3.83
1929	83.45	16.55	12.48	176.31	57.25	.80	4.04
1930	81.80	18.20	9.68	174.76	57.23	.70	4.04
1930							
January	83.70	16.30	12.45	173.99	57.43	.78	4.04
February	82.40	17.60	11.69	164.10	57.93	.73	4.45
March	81.71	18.29	11.28	157.39	58.69	.67	4.38
April	82.43	17.57	10.09	152.38	58.62	.65	4.30
May	82.37	17.63	10.11	162.03	58.68	.68	4.18
June	80.95	19.05	9.66	173.61	58.42	.66	4.32
July	82.22	17.78	9.13	185.41	56.85	.66	3.99
August	83.23	16.77	8.81	195.20	56.92	.70	3.74
September	81.60	18.40	8.56	196.84	55.54	.73	3.74
October	81.19	18.81	8.75	188.59	54.53	.69	3.82
November	79.63	20.37	8.23	179.18	57.62	.75	4.06
December	79.84	20.16	8.17	173.24	57.04	.71	4.01

Bureau of Agricultural Economics. Compiled from monthly reports to the bureau from packers and slaughterers, whose slaughterings equaled 75 to 85 per cent of total slaughter under Federal inspection.

[1] Unrendered.

TABLE 366.—*Cattle: Slaughter in specified countries, average pre-war, annual, 1914–1930*

Year	Argentina, including chilling, freezing, salting, and canned-meat works [1]	Uruguay, excluding farm [2]	Australia	New Zealand [3]	Canada	United States, Federal inspected
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Average pre-war [4]	1,691	914	1,572	[5] 277	1,218	9,632
1914	1,589	663	2,092	[5] 299		8,454
1915	1,641	807	1,578			8,972
1916	2,102	798	1,373	389		10,677
1917	2,496	1,056	1,345	344		13,493
1918	3,292	1,062	1,335	358		15,285
1919	2,342	1,061	1,598	417	1,891	14,060
1920	1,715	759	1,538	371	1,776	12,667
1921	1,550	717	1,649	268	2,017	11,416
1922	2,231	1,109	1,907	359	1,899	12,860
1923	3,338	1,393	2,049	423	1,850	13,663
1924	4,321	1,173	2,505	501	1,864	14,528
1925	3,871	1,233	2,434	469	1,921	15,206
1926	3,510	1,293	2,160	413	1,902	15,333
1927	3,723	1,239	2,189	470	1,999	14,396
1928	3,189	1,272	2,200	409	1,954	13,147
1929	3,024	[6] 1,602		367	1,980	12,813
1930	2,930					12,765

Bureau of Agricultural Economics. Compiled from official sources and cabled reports from agricultural commissioners abroad.

[1] Including municipal and private slaughterhouses, the figures were as follows in thousands—averages, pre-war, 3,272, 1921–1925, 5,961. The numbers killed in freezing and chilling plants alone were as follows in thousands—1925, 3,342; 1926, 3,067; 1927, 3,234; 1928, 2,830; 1929, 2,792.
[2] Slaughtering in freezing and chilling plants alone were as follows in thousands—1925, 651; 1926, 714; 1927, 695; 1928, 697; 1929, 880; 1930, 1108.
[3] For years ended Mar. 31, following.
[4] Average for five years immediately preceding war if available, otherwise for any year or years, within that period, unless otherwise stated.
[5] Excluding farm slaughter which averaged only 7,493 for the 10 years 1917–1926.
[6] Preliminary estimate.

TABLE 367.—*Beef, frozen, cured, and in process of cure: Stocks in cold-storage warehouses and meat-packing establishments, United States, 1921–1930*

Kind and Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Beef, frozen:												
1921	120,245	119,965	122,402	114,063	100,672	88,836	76,523	66,262	50,204	44,296	49,014	63,188
1922	68,495	61,522	55,785	50,772	45,341	37,548	31,593	27,727	28,210	34,611	47,929	73,027
1923	91,805	89,272	75,604	65,292	54,522	41,207	34,385	24,112	24,625	27,590	43,772	71,024
1924	82,984	79,944	76,769	68,075	52,941	41,784	37,028	29,435	29,135	28,599	45,857	76,731
1925	114,034	111,947	101,599	87,684	67,271	46,887	36,452	26,970	22,879	19,755	27,008	50,436
1926	59,850	55,705	51,498	43,528	32,372	26,649	23,997	23,509	21,311	25,267	38,079	59,603
1927	72,352	67,431	60,659	50,945	39,712	28,719	23,261	18,552	17,241	19,456	26,696	45,567
1928	54,968	50,673	44,017	37,625	28,253	20,654	17,256	18,896	17,603	22,463	41,635	60,189
1929	77,051	72,117	67,486	60,664	51,442	39,878	35,759	31,085	32,122	38,996	51,902	70,390
1930	77,230	72,692	69,800	64,146	57,273	49,913	46,819	45,830	42,433	43,515	47,221	54,894
Beef, cured and in process of cure:												
1921	22,567	22,926	24,006	24,282	21,516	20,716	19,697	17,829	17,130	15,526	14,472	17,144
1922	16,313	16,774	17,997	18,744	19,166	19,304	19,113	19,304	20,081	18,961	19,884	22,602
1923	24,450	24,841	24,987	25,210	24,013	23,816	22,835	21,781	21,416	20,597	19,649	22,142
1924	22,593	22,711	23,238	25,199	25,482	24,285	22,390	20,377	19,771	18,939	21,387	23,508
1925	28,930	28,758	29,210	28,634	28,952	27,731	25,102	22,704	22,335	20,964	20,473	23,128
1926	25,146	24,833	26,192	27,253	27,606	25,930	24,691	22,539	20,386	20,983	23,119	26,374
1927	28,521	27,823	27,361	26,214	23,216	21,694	20,495	17,170	16,205	16,422	17,220	19,778
1928	21,979	20,978	19,732	19,631	17,941	16,558	14,982	13,546	13,462	14,760	16,401	19,444
1929	21,862	21,873	21,285	20,943	19,272	17,437	16,296	14,845	15,892	17,438	20,157	23,054
1930	26,653	26,328	25,798	24,597	23,347	21,643	20,072	18,761	17,322	16,508	16,641	18,498

Bureau of Agricultural Economics. Compiled from reports made by cold-storage establishments.

TABLE 368.—*Beef and beef products: International trade, average 1911–1913, annual 1927–1929*

Country	Calendar year							
	Average 1911–1913		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Argentina	144	940, 300	109	1, 838, 428	[1] 227	1, 309, 080	[1] 224	1, 233, 513
Uruguay	152	119, 675	0	349, 970	0	224, 706	0	215, 404
Australia [2]	[3] 437	[3] 301, 882	847	206, 356	2, 292	244, 022	1, 050	276, 292
Netherlands	256, 296	326, 176	170, 819	250, 270	128, 389	235, 390	117, 779	205, 520
United States	17, 668	213, 722	42, 574	154, 043	81, 029	119, 779	69, 268	126, 438
Brazil	48, 980	171	2, 532	76, 263	9, 198	148, 694	--------	8, 871
New Zealand	398	80, 543	588	105, 300	602	85, 295	796	90, 949
Denmark	18, 815	43, 485	14, 824	9, 978	10, 725	10, 857	10, 873	12, 649
Canada	3, 091	6, 448	400	59, 130	2, 560	50, 622	5, 264	32, 819
Poland	(4)	(4)	2, 234	16, 256	2, 395	13, 222	1, 446	12, 908
Rumania	4	2, 566	[1] 6	[1] 10, 464	--------	[1] 11, 446	--------	--------
Union of South Africa	17, 622	292	10, 395	14, 471	9, 109	17, 793	9, 141	25, 950
China	85	8, 787	597	4, 624	2, 205	4, 968	1, 865	3, 050
Hungary	[5] 12, 933	[5] 3, 762	35	3, 247	53	2, 561	50	4, 128
PRINCIPAL IMPORTING COUNTRIES								
United Kingdom	1, 252, 292	27, 595	1, 834, 663	45, 381	1, 749, 138	29, 178	1, 630, 516	4, 175
Germany	212, 150	942	464, 089	2, 563	332, 852	4, 887	253, 740	8, 656
France	41, 318	62, 361	173, 419	30, 997	68, 515	45, 712	57, 145	39, 691
Belgium	6, 034	1, 577	128, 271	27, 925	83, 253	31, 866	76, 711	18, 977
Japan	9, 002	0	74, 504	0	68, 918	0	68, 059	0
Cuba	37, 822	0	43, 897	0	45, 773	1, 076	43, 418	258
Italy	131	--------	26, 243	275	24, 060	236	16, 833	324
Norway	20, 203	2, 337	14, 446	1, 750	12, 741	2, 434	11, 295	2, 633
Sweden	12, 912	17, 285	17, 253	3, 697	14, 228	5, 660	13, 811	6, 091
Czechoslovakia	(4)	(4)	5, 153	797	2, 738	529	5, 018	410
Spain	966	38	18, 787	30	16, 170	220	[1] 199	[1] 240
Irish Free State	(4)	(4)	10, 996	5, 535	5, 529	14, 478	4, 518	9, 515
British India	7, 434	773	10, 525	1, 114	9, 279	1, 390	10, 969	1, 219
Philippine Islands	15, 837	0	11, 465	0	10, 321	0	10, 849	0
Switzerland	9, 052	440	5, 883	902	6, 530	611	7, 401	963
British Malaya	--------	--------	6, 913	650	7, 607	679	7, 114	748
Egypt	476	--------	4, 330	12	5, 416	16	5, 981	5
Finland	14, 755	9	6, 010	123	5, 814	62	4, 858	0
Chile	6, 636	298	800	1	780	129	2, 711	175
Total 33 countries	2, 023, 704	2, 161, 464	3, 103, 607	3, 220, 552	2, 753, 446	2, 617, 598	2, 448, 908	2, 342, 601

Bureau of Agricultural Economics. Official sources. This table includes fresh, pickled, or salted, and canned beef; tallow, oleo oil, oleo stock, oleo stearin, and oleomargarine.

* Preliminary.
[1] International Yearbook of Agricultural Statistics.
[2] Year ended June 30.
[3] Calendar year.
[4] Figures for pre-war years are included in the countries of the pre-war boundaries.
[5] Average for Austria-Hungary.

TABLE 369.—*Cattle-tick eradication: Progress and status of the work June 30, 1930*

State	Quarantined counties		Released counties June 30, 1930			Released counties tick-free on—			Cattle inspected and dipped, year ended June 30 1930	
	July 1, 1906	June 30, 1930	Tick-free	With one or more infested herds	Total counties released	Nov. 1, 1927	Nov. 1, 1928	Nov. 1, 1929	Herds	Cattle
Alabama	67	0	63	4	67	57	59	63	209, 742	1, 195, 631
Arkansas	75	20	45	10	55	44	45	45	210, 467	1, 045, 302
California	15	0	15	0	15	15	15	15	0	0
Florida	67	37	30	0	30	14	22	30	119, 037	1, 763, 550
Georgia	158	0	155	3	158	153	154	155	7, 169	99, 082
Kentucky	2	0	2	0	2	2	2	2	0	0
Louisiana	64	42	3	19	22	4	8	3	79, 893	824, 909
Mississippi	82	17	55	10	65	46	45	55	292, 212	1, 650, 838
Missouri	4	0	4	0	4	4	4	4	0	0
North Carolina	73	0	73	0	73	71	73	73	1, 002	7, 239
Oklahoma	61	0	60	1	61	54	54	60	3, 769	76, 444
South Carolina	46	0	46	0	46	44	46	46	5, 935	41, 051
Tennessee	42	0	42	0	42	42	42	42	0	0
Texas	198	68	94	36	130	77	79	94	529, 531	9, 417, 838
Virginia	31	0	30	1	31	26	29	30	1, 818	14, 643
Total	985	184	717	84	801	653	677	717	1, 460, 575	16, 136, 527

Bureau of Animal Industry. More than 14,000 dipping vats were in use for official dipping during the year.

TABLE 370.—*Cattle and calves: Shipments and slaughter, by States, average 1924–1928, annual 1929*

State and division	Average, 1924–1928										1929 [1]									
	Shipments and local slaughter				Inshipments, stocker, feeding, breeding, and dairy		Farm slaughter				Shipments and local slaughter				Inshipments, stocker, feeding, breeding, and dairy		Farm slaughter			
	Cattle		Calves				Cattle		Calves		Cattle		Calves				Cattle		Calves	
	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight
	Thousands	*Pounds*	*Thousands*	*Pounds*	*Thousands*	*Pounds*	*Thousands*	*Pounds*	*Thousands*	*Pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*
Maine	30	805	58	121	1	800	9	760	24	125	23	18,640	47	5,425	3	2,400	7	4,900	18	2,250
New Hampshire	18	814	40	121	1	819	2	805	7	128	12	9,800	32	3,560	3	2,460	3	2,400	6	780
Vermont	43	810	150	122	2	818	10	785	14	125	41	33,450	141	16,375	5	4,100	11	7,700	16	2,000
Massachusetts	35	812	84	123	16	828	4	806	4	125	29	23,420	73	8,460	15	12,750	3	2,400	4	480
Rhode Island	4	818	14	124	2	823	0.6	810	----	----	4	3,260	12	1,475	3	2,490	----	----	----	----
Connecticut	19	811	71	125	4	833	3	809	3	125	18	14,620	69	8,575	10	8,300	1	800	2	250
New York	216	842	726	151	33	823	36	834	62	150	209	178,741	644	93,490	40	33,000	27	22,977	50	7,800
New Jersey	26	900	83	142	17	850	3	912	3	160	31	27,900	76	11,780	22	18,700	1	900	2	320
Pennsylvania	192	875	462	150	93	750	51	850	59	150	222	194,250	406	60,900	108	81,000	32	28,000	44	6,600
North Atlantic	583	847	1,687	143	170	786	118	831	176	143	589	504,081	1,500	210,040	209	165,200	85	70,077	142	20,480
Ohio	312	850	481	160	100	700	33	825	24	200	256	217,600	406	64,960	90	63,000	20	17,000	22	3,520
Indiana	390	900	337	150	181	725	17	812	20	250	341	306,900	306	45,900	148	107,300	17	13,175	18	4,500
Illinois	970	943	464	148	540	766	19	825	41	200	803	746,790	418	59,330	539	401,555	18	14,850	35	7,000
Michigan	242	841	382	159	52	636	28	800	55	164	226	186,450	329	50,995	40	24,000	27	21,330	78	11,544
Wisconsin	469	999	1,058	113	53	721	14	900	82	125	403	400,500	1,051	115,610	83	63,080	10	9,000	102	12,750
Minnesota	694	871	698	143	205	702	37	844	67	200	638	568,320	667	93,380	208	145,600	33	28,050	64	12,800
Iowa	1,785	967	356	154	691	719	22	811	37	224	1,553	1,469,950	284	44,600	691	476,790	25	21,000	25	5,000
Missouri	1,018	895	346	150	458	657	14	775	19	250	846	760,325	357	53,550	492	329,640	16	12,400	12	3,000
North Dakota	360	828	102	155	45	700	21	780	22	200	271	226,285	79	11,060	67	46,900	15	11,700	23	4,600
South Dakota	659	865	91	230	93	700	14	865	17	268	542	468,830	75	17,250	130	89,700	12	10,380	13	3,900
Nebraska	1,462	948	175	281	706	716	27	840	21	310	1,251	1,190,565	167	47,788	702	491,400	21	17,640	21	6,300
Kansas	1,643	914	285	260	989	701	29	795	15	316	1,389	1,277,880	212	55,120	815	517,525	25	21,750	14	3,040
North Central	10,005	920	4,776	156	4,111	711	274	821	421	200	8,519	7,820,395	4,351	659,543	4,005	2,756,490	239	198,275	427	78,554

Delaware	3	800	23	135	1	714			1	135	3	2,400	25	3,375	1	700			1	135
Maryland	34	850	116	135	14	690	4	850	3	135	30	25,500	113	15,255	12	8,400	3	2,550	3	405
Virginia	137	897	162	135	20	593	13	757	10	135	110	99,650	140	18,900	20	11,000	9	6,975	10	1,350
West Virginia	113	888	86	176	16	640	12	767	10	176	85	73,725	83	14,525	20	12,700	8	6,600	8	1,400
North Carolina	73	700	68	125	0.6	700	18	600	18	131	44	30,800	61	7,625	1	700	18	10,800	19	2,375
South Carolina	68	700	35	125	1	700	9	600	9	125	37	25,900	27	3,375	1	700	6	3,600	11	1,375
Georgia	157	496	78	150	4	500	33	500	33	175	91	44,590	80	13,200	7	3,430	30	14,700	28	5,320
Florida	89	526	62	127	1	700	15	492	6	134	42	19,950	49	5,635	1	700	13	6,175	6	690
South Atlantic	674	709	631	139	59	631	103	600	89	153	442	322,515	578	81,890	63	38,330	87	51,400	86	13,050
Kentucky	274	827	215	159	141	700	10	750	11	220	222	183,500	201	32,460	75	52,500	8	6,000	8	1,760
Tennessee	189	818	136	144	14	700	14	790	19	175	177	143,280	120	16,200	18	12,600	8	5,800	9	2,250
Alabama	163	525	61	150	10	462	21	489	18	175	116	60,900	60	9,000	11	4,400	23	10,350	25	4,375
Mississippi	230	601	90	150	2	500	13	540	11	160	144	86,400	73	10,950	7	3,500	8	4,320	12	1,920
Arkansas	159	659	45	175	5	500	23	543	17	200	120	74,375	43	7,525	9	4,500	13	6,175	18	3,600
Louisiana	147	600	71	140	15	390	12	495	13	170	94	56,400	67	9,380	17	5,950	16	7,520	13	2,340
Oklahoma	666	768	185	250	295	695	15	700	20	302	648	495,720	159	39,750	329	222,075	8	5,600	16	4,000
Texas	1,425	790	843	280	219	742	36	650	77	280	1,059	836,610	704	197,120	329	240,170	25	16,250	75	21,000
South Central	3,253	748	1,646	229	703	698	144	612	186	236	2,580	1,937,185	1,427	322,385	795	545,695	109	62,015	176	41,245
Montana	383	900	44	200	47	750	18	900	8	226	327	294,300	35	7,000	35	26,250	12	10.320	15	3,750
Idaho	163	896	38	180	9	700	6	800	22	190	142	127,800	35	6,300	29	20,300	6	4,800	17	3,230
Wyoming	217	850	18	340	23	650	8	880	3	345	231	196,350	20	6,800	40	26,000	5	4,400	6	2,070
Colorado	592	862	87	254	244	796	14	771	15	292	561	475,100	76	20,900	231	180,180	12	9,000	15	4,500
New Mexico	412	699	115	270	91	638	17	642	5	287	338	236,600	117	35,100	111	71,040	10	6,750	9	2,700
Arizona	332	684	88	270	71	698	10	694	4	250	193	132,756	99	26,730	97	67,124	6	3,912	10	2,500
Utah	107	941	38	206	13	750	7	841	9	206	99	92,250	40	8,000	3	2,250	4	3,400	6	1,200
Nevada	104	938	23	227	17	800	6	750	4	231	70	64,250	16	3,520	7	5,600	4	3,000	2	440
Washington	95	902	80	180	11	750	20	807	44	155	85	76,500	70	12,600	7	5,250	13	10,400	41	6,355
Oregon	161	925	58	183	8	750	15	757	42	143	139	134,830	49	9,800	16	12,000	12	9,360	40	6,200
California	761	983	355	219	502	868	25	890	25	200	796	747,700	350	79,500	400	320,000	15	13,500	25	5,250
Western	3,326	866	943	227	1,034	803	145	800	179	190	2,981	2,578,436	907	216,250	976	735,994	99	78,842	186	38,195
United States	17,841	868	9,683	172	6,076	726	784	751	1,051	191	15,111	13,162,612	8,763	1,490,108	6,048	4,241,709	619	460,609	1,017	191,524

Bureau of Agricultural Economics. Estimates Division Crop and Livestock Estimates.

[1] Preliminary.

TABLE 371.—*Cattle and calves: Value of production and income, average 1924–1928, annual 1929*

State and division	Average, 1924–1928				1929 [1]			
	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	154	3, 188	3, 342	2, 752	132	2, 650	2, 782	2, 972
New Hampshire	46	1, 717	1, 763	1, 421	59	1, 397	1, 456	1, 599
Vermont	176	4, 349	4, 524	4, 243	237	4, 880	5, 117	5, 256
Massachusetts	111	1, 825	1, 937	2, 173	119	1, 467	1, 586	2, 416
Rhode Island	11	242	253	308	----	35	35	283
Connecticut	67	1, 994	2, 061	1, 874	35	1, 342	1, 377	1, 989
New York	1, 162	23, 057	24, 219	24, 826	1, 154	24, 499	25, 653	31, 132
New Jersey	76	1, 789	1, 865	2, 269	44	1, 643	1, 687	2, 989
Pennsylvania	1, 688	17, 880	19, 567	19, 587	1, 475	21, 703	23, 178	26, 542
North Atlantic	3, 491	56, 040	59, 531	59, 453	3, 255	59, 616	62, 871	75, 178
Ohio	1, 544	25, 514	27, 058	25, 647	1, 256	25, 632	26, 888	31, 145
Indiana	926	24, 022	24, 948	23, 730	1, 132	28, 487	29, 619	30, 890
Illinois	1, 103	48, 623	49, 726	44, 407	1, 310	46, 286	47, 596	54, 385
Michigan	1, 037	21, 148	22, 186	21, 942	1, 413	25, 026	26, 439	28, 759
Wisconsin	523	40, 322	40, 846	38, 480	709	46, 490	47, 199	50, 274
Minnesota	2, 298	40, 740	43, 037	42, 250	2, 834	51, 645	54, 479	59, 757
Iowa	1, 892	112, 962	114, 854	104, 651	2, 265	113, 386	115, 651	120, 812
Missouri	637	51, 486	52, 124	47, 482	800	49, 341	50, 141	54, 743
North Dakota	1, 009	17, 155	18, 164	16, 702	1, 125	16, 310	17, 435	22, 039
South Dakota	1, 094	39, 167	40, 261	35, 392	1, 220	40, 132	41, 352	42, 104
Nebraska	2, 105	85, 171	87, 256	77, 920	2, 216	87, 065	89, 281	93, 432
Kansas	1, 605	70, 517	72, 121	68, 536	1, 839	80, 744	82, 583	87, 421
North Central	15, 774	576, 806	592, 580	547, 149	18, 119	610, 544	628, 663	675, 761
Delaware	5	553	558	620	6	621	627	804
Maryland	100	3, 245	3, 346	3, 600	104	3, 676	3, 780	4, 603
Virginia	316	10, 248	10, 564	9, 801	320	10, 829	11, 149	13, 167
West Virginia	277	8, 269	8, 546	7, 637	275	8, 003	8, 278	9, 749
North Carolina	281	4, 108	4, 389	4, 080	385	4, 122	4, 507	5, 294
South Carolina	81	2, 866	2, 947	2, 383	86	2, 247	2, 333	2, 509
Georgia	281	5, 269	5, 550	4, 662	348	5, 219	5, 567	5, 915
Florida	80	3, 057	3, 137	2, 247	90	2, 094	2, 184	2, 173
South Atlantic	1, 421	37, 615	39, 036	35, 031	1, 614	36, 811	38, 425	44, 214
Kentucky	288	12, 870	13, 158	12, 502	302	16, 495	16, 797	16, 231
Tennessee	294	10, 317	10, 611	9, 911	252	13, 029	13, 281	13, 939
Alabama	214	4, 224	4, 438	3, 715	354	5, 077	5, 431	5, 216
Mississippi	118	6, 543	6, 661	5, 826	135	6, 385	6, 520	8, 019
Arkansas	216	5, 735	5, 950	5, 657	213	5, 881	6, 094	7, 364
Louisiana	206	5, 049	5, 255	4, 812	349	4, 951	5, 300	5, 534
Oklahoma	517	20, 149	20, 666	22, 653	425	25, 284	25, 709	33, 114
Texas	1, 352	70, 914	72, 266	67, 798	1, 620	69, 735	71, 355	85, 827
South Central	3, 204	135, 800	139, 005	132, 874	3, 650	146, 837	150, 487	175, 244
Montana	759	22, 329	23, 088	21, 558	817	26, 053	26, 870	26, 926
Idaho	191	9, 827	10, 018	9, 029	218	10, 189	10, 407	11, 489
Wyoming	415	12, 362	12, 777	12, 393	479	16, 518	16, 997	16, 177
Colorado	619	25, 599	26, 219	23, 786	727	32, 246	32, 973	29, 844
New Mexico	562	17, 708	18, 270	14, 929	652	19, 515	20, 167	20, 643
Arizona	349	12, 953	13, 302	8, 511	405	7, 711	8, 116	11, 419
Utah	285	6, 949	7, 234	6, 655	214	8, 591	8, 805	7, 940
Nevada	245	6, 289	6, 534	5, 428	208	5, 478	5, 686	4, 843
Washington	506	8, 107	8, 612	8, 108	520	9, 639	10, 159	10, 533
Oregon	341	12, 352	12, 693	11, 256	389	13, 772	14, 161	14, 061
California	1, 181	33, 693	34, 774	30, 812	1, 046	50, 941	51, 987	42, 290
Western	5, 452	168, 069	173, 521	152, 485	5, 675	200, 653	206, 328	196, 165
United States	29, 343	974, 331	1, 003, 674	926, 992	32, 313	1, 054, 461	1, 086, 774	1, 166, 562

Bureau of Agricultural Economics. Estimates Division Crop and Livestock Estimates.

[1] Preliminary.

TABLE 372.—*Hogs: Numbers and value per head in the United States, 1840, 1850, 1860, 1867–1931*

Year	Hogs on farms: Number [1]	Hogs on farms: Value per head Jan. 1 [2]	Hogs on farms and elsewhere Jan. 1 [3]	Year	Hogs on farms: Number [1]	Hogs on farms: Value per head Jan. 1 [4]	Hogs on farms and elsewhere Jan. 1 [3]
	Thousands	*Dollars*	*Thousands*		*Thousands*	*Dollars*	*Thousands*
1840 [5]	*26,301*			1900 [6]	37,079		54,418
1850 [5]	*30,354*		31,200	1900 [5]	*62,868*		
1860 [5]	*33,513*		34,500	1900	52,600	5.28	
1867	24,694	4.03	28,200	1901	53,200	6.55	55,041
1868	24,317	3.29	28,300	1902	46,800	7.43	48,419
1869	23,316	4.65	27,600	1903	47,200	8.22	48,833
1870 [5]	*25,135*			1904	49,500	6.50	51,213
1870	26,751	5.80	32,300	1905	52,000	6.33	53,799
1871	29,458	5.61	36,400	1906	54,600	6.53	56,489
1872	31,796	4.01	40,100	1907	57,300	8.05	59,283
1873	32,632	3.67	42,100	1908	61,300	6.39	63,421
1874	30,861	3.98	40,700	1909	57,000	6.92	58,972
1875	28,062	4.80	37,800	1910 [5]	*58,186*		
1876	25,727	6.00	35,500	1910	49,300	9.69	50,588
1877	28,077	5.66	39,500	1911	55,700	9.90	57,627
1878	32,262	4.85	46,500	1912	55,700	8.46	57,627
1879	34,766	3.18	51,200	1913	54,000	10.42	55,868
1880 [5]	*47,682*			1914	51,800	10.99	53,592
1880	34,034	4.28	51,200	1915	57,000	10.43	58,972
1881	36,248	4.70	53,100	1916	59,700	8.88	61,766
1882	44,122	5.97	62,900	1917	56,700	12.42	58,662
1883	43,270	6.75	60,000	1918	61,200	20.65	63,318
1884	44,201	5.57	59,600	1919	63,800	23.28	66,007
1885	45,143	5.02	59,300	1920 [5]	*59,346*		
1886	46,092	4.26	58,900	1920	59,959	20.00	62,597
1887	44,613	4.48	55,500	1921	58,602	13.65	61,180
1888	44,347	4.98	53,600	1922	59,559	10.59	62,179
1889	50,302	5.79	59,200	1923	69,044	12.31	72,082
1890 [5]	*57,410*			1924	66,361	10.30	69,281
1890	51,603	4.72	59,100	1925 [5]	*50,854*		
1891	50,625	4.15	59,400	1925	55,568	13.20	58,013
1892	52,398	4.60	62,900	1926	52,148	15.80	54,443
1893	46,095	6.41	56,700	1927	54,788	17.25	57,199
1894	45,206	5.98	57,000	1928	60,617	13.20	63,028
1895	44,166	4.97	57,000	1929	57,410	13.05	59,821
1896	42,843	4.35	56,600	1930	53,238	13.76	55,649
1897	40,600	4.10	55,000	1931 [7]	52,323	11.66	54,734
1898	39,760	4.39	55,100				
1899	38,652	4.40	54,900				

Bureau of Agricultural Economics.

[1] Prior to 1900 estimates for each 10-year period represent an index of annual changes applied to census as base on first report after census data were available: 1900–1919 are tentative revised estimates of the Bureau of Agricultural Economics as first published in 1927 Yearbook.

[2] Series for 1867–1899 are values of all hogs as reported.

[3] Data for swine on farms and elsewhere as of Jan. 1 prior to 1900 estimated by the Bureau of Animal Industry. Census figures prior to 1920 were adjusted to a Jan. 1 basis and to include all ages and all animals in towns, villages, and ranges, as well as on farms. For methods see Department Circular 241. Figures from 1900–1927 are the estimates of the Bureau of Agricultural Economics of swine on farms plus an estimate made by the Bureau of Animal Industry of swine in towns and villages; 1928–1931 are estimates of Bureau of Agricultural Economics.

[4] Data for 1900–1925 are an old series for all hogs as reported, adjusted on basis average relationship between the new and the old series from 1926 to 1928. Old series was shown in 1928 Yearbook. Conversion factor was 1.057 (base was old series). Data for 1926–1931 are a new series, referred to above, of average values by age and sex classification weighted by numbers in each class.

[5] Italic figures are from the census. Figures for census years 1880 and 1890 exclude estimate of unenumerated swine on ranges as follows: 1880, 2,093,970; 1890, 17,276. Census dates were June 1 from 1840 to 1900; Apr. 15, 1910; Jan. 1, 1920 and 1925.

[6] Original estimate of the Bureau of Agricultural Economics.

[7] Preliminary.

TABLE 373.—*Hogs, including pigs: Estimated number on farms and value per head, by States, January 1, 1927–1931*

State and division	Number					Value per head [1]				
	1927	1928	1929	1930	1931 [2]	1927	1928	1929	1930	1931 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	67	70	51	47	43	16. 80	15. 00	14. 80	16. 00	14. 30
New Hampshire	23	29	24	18	15	16. 60	16. 10	13. 60	15. 20	12. 50
Vermont	53	56	38	30	26	15. 90	14. 90	13. 60	14. 80	12. 30
Massachusetts	84	97	81	90	83	18. 00	15. 30	16. 00	15. 90	13. 60
Rhode Island	4	5	5	5	4	19. 20	18. 60	18. 00	17. 60	17. 00
Connecticut	21	24	28	23	25	20. 50	20. 20	18. 80	17. 20	14. 80
New York	284	341	290	232	195	17. 40	15. 10	14. 20	15. 40	12. 40
New Jersey	60	63	77	72	72	20. 10	14. 90	15. 70	16. 70	13. 30
Pennsylvania	731	841	715	615	578	17. 50	14. 70	13. 90	14. 60	12. 60
North Atlantic	1, 327	1, 526	1, 309	1, 132	1, 041	17. 54	14. 98	14. 36	15. 12	12. 83
Ohio	2, 439	2, 537	2, 309	2, 078	1, 974	17. 10	12. 50	11. 50	12. 30	10. 00
Indiana	2, 961	3, 227	3, 066	2, 637	2, 505	17. 70	13. 00	12. 30	13. 10	11. 10
Illinois	4, 709	5, 133	4, 671	4, 204	4, 204	19. 20	13. 70	13. 80	14. 40	12. 30
Michigan	845	862	759	630	523	16. 80	12. 40	12. 20	12. 40	10. 80
Wisconsin	1, 826	1, 720	1, 479	1, 361	1, 415	17. 00	12. 90	14. 20	14. 30	12. 40
Minnesota	3, 786	3, 710	3, 560	3, 810	3, 886	20. 30	15. 10	15. 70	16. 90	13. 60
Iowa	10, 060	10, 900	10, 246	10, 041	10, 543	20. 20	14. 40	15. 10	15. 80	13. 40
Missouri	3, 991	4, 270	4, 313	3, 810	3, 543	16. 10	11. 70	12. 20	11. 70	9. 20
North Dakota	572	652	717	681	708	17. 40	13. 80	14. 50	14. 40	12. 50
South Dakota	2, 183	2, 882	2, 880	2, 914	2, 996	19. 40	15. 30	15. 20	16. 00	13. 60
Nebraska	4, 597	5, 492	5, 327	5, 086	5, 137	19. 50	15. 50	15. 00	16. 30	14. 00
Kansas	2, 109	2, 531	3, 006	2, 826	2, 713	16. 60	13. 70	12. 80	13. 50	11. 00
North Central	40, 078	43, 916	42, 333	40, 078	40, 147	18. 75	13. 94	14. 06	14. 81	12. 46
Delaware	24	26	24	23	21	11. 30	12. 00	10. 80	11. 60	10. 80
Maryland	192	221	199	189	161	15. 20	12. 30	10. 80	11. 00	10. 50
Virginia	558	642	565	520	468	12. 20	11. 20	9. 90	10. 10	8. 20
West Virginia	202	232	190	173	142	13. 40	12. 80	11. 60	11. 10	9. 10
North Carolina	849	1, 050	945	803	827	14. 20	12. 90	11. 70	11. 70	10. 20
South Carolina	443	509	433	390	382	12. 20	11. 20	9. 00	9. 50	8. 60
Georgia	1, 187	1, 365	1, 228	1, 154	1, 154	10. 10	9. 40	8. 20	9. 40	8. 20
Florida	485	543	516	490	470	7. 50	7. 60	8. 10	7. 50	6. 10
South Atlantic	3, 940	4, 588	4, 100	3, 742	3, 625	11. 60	10. 77	9. 61	9. 95	8. 58
Kentucky	965	1, 032	826	661	529	14. 40	9. 90	8. 50	9. 60	7. 80
Tennessee	968	1, 026	872	741	667	13. 20	10. 20	8. 60	9. 50	7. 90
Alabama	854	982	874	804	724	10. 60	10. 40	9. 50	10. 50	7. 90
Mississippi	744	878	729	620	620	9. 90	8. 90	8. 70	9. 30	7. 00
Arkansas	946	1, 041	885	708	531	10. 20	8. 60	8. 50	8. 90	6. 80
Louisiana	511	460	437	415	394	10. 10	9. 20	9. 70	9. 10	7. 40
Oklahoma	883	1, 104	1, 215	1, 008	907	14. 10	11. 10	9. 60	9. 10	7. 60
Texas	1, 250	1, 375	1, 210	1, 028	884	14. 90	11. 50	9. 70	9. 70	8. 20
South Central	7, 121	7, 898	7, 048	5, 985	5, 256	12. 48	10. 11	9. 13	9. 49	7. 63
Montana	240	288	328	302	272	16. 40	14. 30	13. 10	12. 70	12. 40
Idaho	318	353	300	255	268	15. 20	12. 90	11. 70	11. 40	11. 00
Wyoming	110	138	130	117	117	15. 40	13. 50	12. 50	12. 50	11. 20
Colorado	443	509	550	495	520	16. 00	13. 10	12. 10	12. 00	11. 10
New Mexico	64	77	73	73	66	14. 10	10. 40	10. 70	10. 90	9. 40
Arizona	18	19	19	19	19	13. 70	13. 10	13. 30	13. 50	10. 30
Utah	75	98	80	70	63	13. 50	11. 50	10. 20	10. 70	9. 70
Nevada	26	29	26	23	25	14. 00	12. 30	12. 50	12. 20	10. 60
Washington	198	238	214	182	173	17. 00	14. 10	12. 70	13. 20	11. 80
Oregon	245	270	230	195	189	14. 20	12. 20	10. 50	11. 60	10. 90
California	585	670	670	570	542	15. 00	13. 60	12. 60	12. 10	11. 50
Western	2, 322	2, 689	2, 620	2, 301	2, 254	15. 37	13. 22	12. 14	12. 08	11. 30
United States	54, 788	60, 617	57, 410	53, 238	52, 323	17. 25	13. 20	13. 05	13. 76	11. 66

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Sum of total value of subgroups (classified by age and sex), divided by total number and rounded to nearest dime for States. Division and United States averages not rounded. State figures are new weighted value series not comparable to State figures previously published years prior to 1925.

[2] Preliminary.

TABLE 374.—*Hogs: Numbers in countries having 150,000 and over, averages 1909–1913 and 1921–1925, annual 1926–1930*

Country	Month of estimate	Average 1909–1913 [1]	Average 1921–1925 [1]	1926	1927	1928	1929	1930
North and Central America and West Indies:		*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Canada	June	3,350	4,344	4,360	4,695	4,497	4,382	4,000
United States	January	53,300	61,827	52,148	54,788	60,617	57,410	53,238
Mexico	June	[2,3] 811	[4] 1,125	2,903				
Guatemala		188	57	92	70	89	72	
Salvador		220						
Cuba								591
Dominican Republic	May		866					
Haiti				170	185	200	220	
Estimated total [5]		59,800	69,800					
South America:								
Colombia		[6] 711	1,352	1,400	1,366			1,434
Venezuela		195	512					
Ecuador			150				153	
Peru	February–April		449				470	
Bolivia		114	362	498	268		336	
Chile		172	255					
Brazil	September	18,401	[3,7] 16,169					
Uruguay		[3,8] 180	278					
Argentina	December [8]	[3,10] 2,901	[3,11] 1,437					[3,10] 3,764
Estimated total [5]		23,400	21,100					
Europe:								
England and Wales	June	2,390	2,658	2,200	2,692	2,971	2,367	2,306
Isle of Man	do	4	4	3	4	4	13	
Scotland	do	150	167	145	197	196	162	142
Northern Ireland	do	215	134	159	236	229	192	216
Irish Free State	do	1,046	947	884	1,178	1,183	945	1,044
Norway [12]	do	[13] 334	216	303	300	283	289	
Sweden	do	1,023	1,056		1,369			
Denmark	July	2,715	2,314	3,122	3,731	3,363	3,616	4,928
Netherlands	May–June	1,305	1,519					[3] 1,990
Belgium	December [9]	1,533	1,081	1,152	1,144	1,124	1,139	1,237
France	do [9]	7,529	5,302	5,793	5,777	6,019	6,017	
Spain	do [9]	2,544	4,500	5,267	5,032			
Portugal		[3,14] 1,111	1,019					
Italy	March–April	2,685	2,630	[15] 2,850				
Switzerland	April	[3] 570	[3] 640	635				
Germany	December [9]	22,533	15,776	16,200	19,424	22,899	20,106	19,944
Austria	do [9]	1,932	1,399					
Czechoslovakia	do [9]	2,516	2,201	2,539				
Hungary	April and July	3,322	2,424	2,520	2,387	2,662	2,582	2,362
Yugoslavia	January	3,956	2,875	2,806	2,770	2,663	2,675	
Greece	December [9]	346	390	452	510	453	419	
Bulgaria	do [9]	546	832		1,002			
Rumania	do [9]	3,262	2,976	3,088	3,168	3,076	2,832	2,412
Poland	November	5,487	5,287		6,333		4,829	
Lithuania	Spring	1,358	1,521	1,441	1,010	1,060	944	
Latvia	June	557	465	521	535	535	[15] 388	
Estonia	July	252	299	333	354	327	279	
Finland	September	422	378	391	418	435	426	
Russia, European and Asiatic [16]	Summer	[17] 20,336	21,124	20,920	23,202	26,120	20,533	13,200
Estimated total excluding Russia [5]		71,800	61,100					
Africa:								
Union of South Africa	April–August	[3] 1,082	888	932	870	857	[18] 536	
Madagascar	February	600	369	386	335	328	412	
Estimated total [5]		2,200	1,900					
Asia:								
China (including Turkestan and Manchuria)		76,819						
Japan	December [9]	297	590	673	621	677	764	
Chosen	do [9]	629	1,078	1,150	1,221	1,244	1,277	1,328

See footnotes at end of table.

TABLE 374.—*Hogs: Numbers in countries having 150,000 and over, averages 1909–1913 and 1921–1925, annual 1926–1930*—Continued

Country	Month of estimate	Average 1909–1913	Average 1921–1925	1926	1927	1928	1929	1930
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Asia—Continued.								
Taiwan	December	1,293	1,302	1,435	1,543	1,643	1,718	1,754
French-Indo China		2,663	2,767	2,361	2,361	2,621	2,782	
Siam	March	749	864					
Straits Settlements		139	267					
Philippine Islands	December [9]	1,763	5,768	8,885	9,298	9,798		
Dutch East Indies—Outer possessions	do		783		833			
Estimated total excluding Russia [5]		85,400	90,100					
Oceania:								
Australia	December [9]	910	918	1,128	989	878	910	
New Zealand	January	[3] 349	396	473	520	587	557	488
Estimated total [5]		1,300	1,300					
Total countries reporting all periods, including Russia:								
Pre-war to 1929 (29) [19]		137,014	135,587	127,571	137,050	149,640	136,734	
Pre-war to 1930 (15) [19]		116,423	118,548	109,956	120,126	132,411	119,818	108,599
Estimated world total including Russia [5]		264,236	266,424					

Bureau of Agricultural Economics. Official estimates and International Institute of Agriculture unless otherwise stated.

[1] Average for 5-year period if available, otherwise for any year or years within that period unless otherwise stated. In countries having changed boundaries, the figures are estimated for one year only for numbers within present boundaries. For the pre-war average the years immediately preceding the war have been used.
[2] Year 1902.
[3] Census figure.
[4] Incomplete.
[5] These totals include interpolations for a few countries not reporting each year, and rough estimates for some others.
[6] Year 1915.
[7] Year 1920.
[8] Year 1908.
[9] Estimates reported as of December have been considered as of Jan. 1 of the following year, i. e., the figure for the number of swine in France as of Dec. 31, 1925, has been put in the 1926 column.
[10] June, 1914 and 1930.
[11] Year 1922.
[12] Number in rural communities.
[13] September.
[14] Year 1906.
[15] Unofficial.
[16] Year 1916, from the Soviet Union Review, April, 1928, p. 52. Years 1924–1926, Statistical Review, October, 1928. Year, 1927, Agricultural Statistics of the U. S. S. R., Lenin Academy, 1927–30. Planned Economy No. 12, 1930 State Planning Board.
[17] Year 1916.
[18] Number in towns assumed to be same as in 1927, i. e., 22,000, and added in for purposes of comparison with preceding years.
[19] Comparable totals for the number of countries indicated.

TABLE 375.—*Hogs: Results of spring and fall pig surveys for the Corn Belt and the United States, 1923–1931*

Crop and year	June survey comparisons				December survey comparisons			
	Sows for farrow as compared to preceding spring		Pigs saved		Sows for farrow as compared to preceding fall		Pigs saved	
	Intended [1]	Actual	Compared to preceding spring	Per litter	Intended [1]	Actual	Compared to preceding fall	Per litter
	Per cent	*Per cent*	*Per cent*	*Number*	*Per cent*	*Per cent*	*Per cent*	*Number*
Corn Belt, 1923	115.9	108.1	105.0	4.84	125.5	93.9	96.2	5.02
United States, 1923	113.1	103.9	100.9	4.98	128.3	91.3	93.2	5.07
Corn Belt, 1924	94.6	79.7	82.9	5.20	88.6	69.4	76.6	5.47
United States, 1924	98.8	78.8	80.2	5.17	94.1	71.8	77.8	5.45
Corn Belt, 1925	89.6	80.1	89.4	5.78	100.9	85.4	87.8	5.72
United States, 1925	94.3	81.2	91.3	5.79	104.5	84.6	88.1	5.73
Corn Belt, 1926	111.1	103.5	99.5	5.54	136.4	104.8	104.3	5.68
United States, 1926	111.9	101.7	98.8	5.58	139.0	102.4	103.0	5.77
Corn Belt, 1927	108.9	101.8	101.8	5.55	123.1	109.3	111.3	5.88
United States, 1927	113.2	103.0	103.5	5.62	129.9	110.2	111.0	5.86
Corn Belt, 1928	101.3	91.0	93.0	[2] 5.64	109.1	96.0	98.6	6.04
United States, 1928	105.8	92.3	92.9	[2] 5.63	111.7	93.3	94.7	5.96
Corn Belt, 1929	103.3	92.3	93.9	5.72	117.1	102.8	103.7	6.05
United States, 1929	105.4	90.3	91.6	5.67	117.8	98.1	99.8	6.02
Corn Belt, 1930	105.1	92.8	97.1	5.99	115.5	[3] 100.9	[3] 102.4	[3] 6.14
United States, 1930	106.0	90.3	94.3	5.97	118.2	97.4	98.8	6.09
Corn Belt, 1931	109.9							
United States	112.2							

Bureau of Agricultural Economics.

[1] As shown by preceding survey. [2] Revised June, 1929 [3] North Central States

TABLE 376.—*Hogs: Receipts at all public stockyards, 1921–1930*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1921	4,700	4,009	3,386	3,229	3,328	3,579	2,727	2,656	2,655	3,214	3,687	3,931	41,101
1922	4,278	3,613	3,411	3,067	3,737	3,776	2,980	3,037	3,062	3,682	4,421	5,004	44,068
1923	5,306	4,492	4,927	4,318	4,524	4,204	4,181	3,714	3,607	4,816	5,416	5,825	55,330
1924	6,253	5,335	4,833	4,374	4,321	4,296	4,091	3,197	3,216	3,990	4,904	6,604	55,414
1925	6,105	4,558	3,528	3,247	3,283	3,507	2,798	2,549	2,741	3,390	3,843	4,380	43,929
1926	4,304	3,372	3,579	3,135	3,037	3,143	2,854	2,804	2,819	3,261	3,554	3,910	39,772
1927	4,252	3,308	3,754	3,142	3,613	3,775	3,046	3,042	2,565	3,039	3,666	4,209	41,411
1928	5,306	5,267	4,639	3,483	3,723	3,548	2,924	2,523	2,600	3,666	4,075	4,773	46,527
1929	5,133	4,000	3,436	3,582	3,431	3,275	3,297	2,964	3,089	3,701	3,933	4,256	44,097
1930	4,720	3,781	3,294	3,255	3,293	3,215	2,918	2,617	2,799	3,441	3,439	4,002	40,774

Bureau of Agricultural Economics. Compiled from data of the livestock and meat reporting service of the bureau. Earlier data in 1930 Yearbook, p. 850, Table 376.

TABLE 377.—*Hogs: Monthly average live weight, Chicago, 1921–1930*

Year beginning October	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Average Oct.–Mar.[1]	Apr.	May	June	July	Aug.	Sept.	Average Apr.–Sept.[1]
1921	243	225	226	231	236	244	234	246	244	247	259	268	265	255
1922	243	231	234	239	241	247	239	249	242	242	250	253	254	248
1923	247	234	231	227	229	237	234	239	239	241	251	255	254	246
1924	235	220	214	220	222	229	223	235	236	238	249	256	253	244
1925	242	228	225	231	235	245	234	244	247	255	271	281	267	261
1926	232	217	220	226	229	240	227	239	243	248	257	265	261	252
1927	235	215	217	225	230	235	226	233	234	239	251	257	251	244
1928	247	238	231	228	228	238	235	241	239	247	257	265	259	251
1929	242	223	224	228	231	235	230	234	238	245	257	255	244	246
1930	227	221	226											

Bureau of Agricultural Economics. Livestock and meat reporting service. Weighted average of packer and shipper purchases. Data for 1900–1920 are available in 1924 Yearbook, p. 909, Table 506.

[1] Simple average.

TABLE 378.—*Hogs: Results of spring and fall pig surveys, by States, 1929–30*

State and division	Sows farrowed				Pigs saved per litter				Intended farrowings			
	Spring, 1929, compared with spring, 1928	Fall, 1929, compared with fall, 1928	Spring, 1930, compared with spring, 1929	Fall, 1930, compared with fall, 1929	Spring, 1929	Fall, 1929	Spring, 1930	Fall, 1930	In fall, 1929, compared with actual, 1928	In spring, 1930, compared with actual, 1929	In fall, 1930, compared with actual, 1929	In spring, 1931, compared with actual, 1930
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Number*	*Number*	*Number*	*Number*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Maine	67.1	95.5	79.1	105.2	6.6	6.8	6.0	6.2	100.7	89.2	139.6	100.6
New Hampshire	62.5	112.1	95.7	76.6	6.4	7.1	6.3	7.3	132.2	92.0	132.7	112.5
Vermont	79.9	86.4	74.1	81.6	7.3	7.4	7.2	7.7	113.4	107.6	110.8	107.0
Massachusetts	93.8	101.0	78.3	90.8	5.2	[1] 6.1	5.3	6.3	89.8	102.8	104.0	109.0
Rhode Island	74.4	111.1	81.6	150.0	6.4	6.0	6.3	6.3	110.8	144.4	115.2	100.0
Connecticut	68.8	132.0	80.6	140.6	7.2	6.6	6.8	7.0	117.9	158.8	88.9	119.4
New York	70.4	90.7	89.1	91.4	7.2	6.8	7.0	7.2	101.9	89.5	115.6	108.0
New Jersey	88.2	83.6	94.1	106.4	5.9	6.0	6.0	6.4	115.6	96.9	109.6	107.6
Pennsylvania	75.4	94.7	75.5	91.4	6.7	6.5	6.6	6.6	99.4	97.5	104.6	99.6
North Atlantic	75.0	93.3	80.4	91.4	7.00	6.67	6.63	6.60	98.9	96.4	109.0	103.1
Ohio	91.7	91.7	87.5	96.0	6.7	6.5	6.6	6.6	106.3	98.5	108.9	104.6
Indiana	89.8	89.2	86.8	96.1	6.3	6.3	6.4	6.4	103.7	100.6	104.3	108.4
Illinois	88.6	103.3	93.6	101.5	5.9	6.2	6.1	6.3	115.2	107.0	117.2	112.9
Michigan	79.0	89.9	71.7	88.7	6.8	6.8	6.9	6.8	102.2	91.1	100.6	110.7
Wisconsin	90.2	105.6	98.5	109.7	6.3	6.4	6.5	6.6	127.0	107.5	124.8	117.0
Minnesota	94.7	108.2	95.9	103.2	5.7	5.9	5.9	5.8	136.1	106.5	118.9	109.9
Iowa	92.9	123.6	96.4	111.1	5.5	5.7	5.8	6.0	120.0	107.2	116.8	109.7
Missouri	93.7	86.7	84.5	91.3	5.8	6.2	6.4	6.0	109.7	97.1	110.3	102.3
North Dakota	98.3	116.4	80.4	98.5	5.5	5.7	5.8	5.7	205.9	104.7	141.2	127.8
South Dakota	90.7	97.3	95.4	95.2	5.4	5.3	5.6	5.4	166.3	110.7	117.5	109.8
Nebraska	91.4	106.3	93.7	103.8	5.3	5.9	5.6	5.8	114.3	104.8	121.6	108.6
Kansas	101.7	106.0	87.8	95.7	5.5	6.0	5.9	6.2	119.0	106.3	126.1	109.2
North Central	92.4	103.0	92.4	100.9	5.71	6.04	5.99	6.14	118.3	105.1	115.9	109.9
Delaware	100.7	88.9	83.9	110.3	6.6	6.9	6.8	6.9	113.4	109.0	102.2	100.0
Maryland	103.5	94.0	85.5	102.7	6.0	[1] 6.7	6.3	6.4	110.2	98.7	115.4	100.8
Virginia	77.8	96.7	85.1	95.9	6.6	6.7	6.6	6.4	106.7	101.7	110.8	101.1
West Virginia	88.4	93.8	80.7	81.8	7.0	6.7	6.9	6.7	135.8	93.0	108.8	100.6
North Carolina	80.8	83.4	83.5	91.3	5.4	5.8	6.0	6.1	104.0	104.1	120.2	112.8
South Carolina	89.8	80.9	101.8	91.7	[2] 5.0	5.7	5.6	5.6	147.1	122.0	151.4	133.8
Georgia	90.1	87.7	95.1	97.9	5.7	5.7	5.9	5.8	132.8	125.4	144.6	147.5
Florida	89.8	86.4	102.1	77.0	5.1	5.1	5.1	5.2	114.1	132.6	127.3	116.9
South Atlantic	85.7	88.5	93.8	92.7	5.57	5.95	6.00	5.95	120.4	115.7	129.6	124.4
Kentucky	73.0	83.2	76.9	79.9	6.4	6.4	6.4	6.4	101.8	96.1	110.0	103.1
Tennessee	79.5	82.4	74.7	84.9	6.2	6.5	6.3	6.3	111.8	106.4	109.7	113.0
Alabama	89.4	87.2	90.5	81.9	5.4	5.3	5.5	5.1	125.8	116.6	153.5	135.8
Mississippi	84.5	92.2	91.0	84.9	5.4	5.5	5.6	5.4	128.3	129.4	139.9	113.7
Arkansas	73.2	74.3	78.7	70.7	5.1	5.3	5.5	5.6	132.8	107.1	121.1	113.2
Louisiana	88.2	81.4	89.7	70.5	4.8	5.4	5.2	5.4	151.6	114.9	113.9	129.4
Oklahoma	78.1	83.9	67.0	75.3	5.7	6.0	5.5	5.6	120.4	105.3	124.7	110.4
Texas	70.1	73.5	60.6	72.9	5.2	5.5	5.7	5.8	109.2	103.1	117.5	116.9
South Central	78.3	81.5	75.7	77.7	5.30	5.82	5.70	5.80	117.6	108.6	122.9	116.5
Montana	95.0	106.2	70.2	91.8	6.0	6.5	6.2	6.4	132.1	91.6	99.0	141.7
Idaho	84.3	80.4	81.6	103.4	6.1	6.2	6.5	6.3	130.1	96.4	119.6	131.0
Wyoming	113.4	135.7	88.3	177.6	3.4	5.1	5.9	6.5	112.2	113.0	153.2	102.2
Colorado	98.6	116.6	95.0	117.5	5.3	5.6	5.6	5.8	131.4	113.5	135.4	141.1
New Mexico	96.4	81.7	99.5	48.0	5.4	6.0	5.7	6.0	143.6	106.5	116.9	159.1
Arizona	117.1	87.4	100.0	105.3	5.6	6.1	5.6	7.6	121.6	116.8	122.5	147.1
Utah	70.0	96.4	93.0	95.0	6.3	6.3	6.1	6.3	144.1	147.0	128.7	192.1
Nevada	96.2	95.5	90.0	114.5	5.4	6.2	6.6	6.3	142.4	126.5	122.3	187.7
Washington	89.2	88.3	86.3	106.1	6.1	6.8	6.7	6.7	106.2	93.5	126.8	121.5
Oregon	89.5	96.2	79.3	113.9	7.0	7.1	6.6	6.5	101.3	109.3	125.0	134.6
California	84.6	84.1	85.8	95.3	6.2	5.9	5.7	6.0	110.4	96.9	116.9	116.1
Western	93.0	100.4	83.7	110.2	5.67	6.14	6.00	6.08	119.4	103.2	123.3	131.9
United States	90.3	98.1	90.3	97.4	5.67	6.02	5.97	6.09	117.8	106.0	118.2	112.2

Bureau of Agricultural Economics.

[1] Revised December, 1930.   [2] Revised, June, 1930.

TABLE 379.—*Hogs: Receipts at principal public stockyards and all public stockyards, 1921–1930*

Year	Chicago	Denver	East St. Louis	Fort Worth	Kansas City	Omaha	St. Joseph	South St. Paul	Sioux City	Total 9 markets [1]	All other stockyards reporting	Total all stockyards reporting
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1921	8,148	334	3,330	382	2,205	2,665	1,785	2,210	1,739	22,798	18,303	41,101
1922	8,156	395	3,606	510	2,655	2,839	2,061	2,523	1,856	24,601	19,467	44,068
1923	10,460	495	4,831	486	3,615	3,649	2,457	3,338	2,989	32,320	23,010	55,330
1924	10,443	569	4,580	392	2,933	3,978	2,234	3,751	3,732	32,612	22,802	55,414
1925	7,996	467	3,512	312	2,067	3,355	1,673	3,637	3,396	26,415	17,514	43,929
1926	7,093	497	3,536	217	2,036	2,647	1,462	3,451	2,475	23,414	16,358	39,772
1927	7,724	457	3,710	338	1,904	2,631	1,425	3,105	2,322	23,616	17,795	41,411
1928	8,539	567	4,036	432	2,391	3,179	1,724	2,902	2,754	26,524	20,003	46,527
1929	8,193	539	3,865	402	2,476	3,166	1,627	2,869	2,313	25,450	18,647	44,097
1930	7,870	512	3,459	279	2,015	3,363	1,446	2,759	2,317	24,020	16,754	40,774

Bureau of Agricultural Economics. Compiled from data of the livestock and meat reporting service of the bureau. Receipts, 1900–1920, are available in 1924 Yearbook, p. 902, Table 500.

[1] Total of the rounded detail figures.

TABLE 380.—*Feeder hogs, inspected: Shipments from public stockyards, 1921–1930*

Origin and destination	Calendar year									
	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Market origin:										
Denver, Colo	4	3	12	9	7	7	9	8	6	5
East St. Louis, Ill	30	41	33	22	24	27	37	30	26	26
Fort Worth, Tex	45	38	24	9	13	14	16	11	14	5
Indianapolis, Ind	18	17	16	15	14	22	14	14	8	7
Kansas City, Kans	78	151	265	119	55	97	86	95	104	72
Los Angeles, Calif		2	13	1	5	1	2	2	2	2
Oklahoma City, Okla	10	20	28	10	10	10	10	16	16	14
Omaha, Nebr	7	7	15	21	15	15	36	38	26	14
Portland, Oreg	11	17	19	20	18	20	16	19	20	19
Sioux City, Iowa	12	7	10	5	5	13	6	3	1	1
South St. Joseph, Mo	1		2	2	15	23	20	26	17	12
South St. Paul, Minn	97	112	136	118	157	357	301	197	157	121
Wichita, Kans	11	16	31	27	14	5	7	7	3	26
All other inspected	47	62	38	36	44	56	76	74	72	83
Total	371	493	642	414	396	667	636	540	472	407
State destination:										
California		9	17	2	4	3	4	4	2	5
Colorado			10	6	7	6	7	7	6	5
Illinois	40	63	96	44	47	106	64	41	37	28
Indiana	28	47	25	20	34	101	62	31	20	16
Iowa	76	120	176	74	33	75	78	75	74	36
Kansas	32	29	26	17	18	16	28	55	37	46
Michigan		10	10	15	20	31	23	17	20	17
Minnesota	25	34	34	40	40	51	42	41	50	36
Missouri	36	46	70	37	32	46	56	47	46	31
Nebraska	15	23	63	34	24	20	85	87	33	25
Ohio	12	11	11	8	23	77	35	6	8	8
Oklahoma	24	24	14	11	10	10	13	14	13	12
Oregon	10	12	18	19	17	19	15	18	18	18
Tennessee			6	5	6	11	6	5	6	13
Texas	12	11	19	26	23	27	18	14	14	12
All other	61	54	47	56	58	68	100	78	88	99
Total [1]	371	493	642	414	396	667	636	540	472	407

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

[1] Includes other shipments as follows: To Alaska, 543 head in 1923, 785 head in 1924, 577 head in 1925, 713 head in 1926, 869 head in 1927, 693 head in 1928, 538 head in 1929, and 512 head in 1930; to Hawaii, 412 head in 1923; to Cuba, 248 head in 1928.

TABLE 381.—*Feeder hogs, inspected: Shipments from public stockyards, by months, 1930*

Origin and destination	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Market origin:													
Denver, Colo	366	257	376	1,209	745	184	136	204	519	308	143	600	5,047
East St. Louis, Ill	1,018	2,488	2,991	2,685	2,191	3,754	2,406	3,090	1,984	1,391	916	795	25,709
Fort Worth, Tex	453	619	------	788	559	326	435	696	463	326	289	379	5,333
Indianapolis, Ind	500	425	400	900	605	450	1,100	580	507	514	350	410	6,741
Kansas City, Kans	4,295	13,803	9,919	10,093	8,572	4,190	2,020	4,366	5,796	3,882	2,954	2,510	72,400
Los Angeles, Calif	64	292	350	335	81	58	233	37	300	60	28	542	2,380
Oklahoma City, Okla	1,425	1,603	1,688	1,785	1,581	672	611	1,297	1,416	504	509	1,126	14,217
Omaha, Nebr	814	2,066	1,013	887	1,364	1,267	911	921	1,262	812	960	1,707	13,984
Portland, Oreg	1,082	1,746	2,430	1,745	1,519	1,818	1,430	1,782	1,176	1,839	1,251	1,176	18,994
Sioux City, Iowa	19	74	47	222	79	160	19	------	------	------	------	------	620
South St. Joseph, Mo	815	838	689	716	656	556	491	520	1,246	1,332	2,775	1,650	12,284
South St. Paul, Minn	10,582	8,837	10,496	11,765	10,874	9,262	4,719	3,640	10,964	14,721	13,679	11,231	120,770
Wichita, Kans	1,607	3,357	4,168	3,379	2,317	2,272	1,134	1,459	1,781	1,493	1,289	1,603	25,859
All other inspected	6,675	10,078	9,175	8,883	6,534	5,071	5,826	8,073	8,074	4,124	5,563	4,178	82,254
Total	29,715	46,483	43,742	45,392	37,677	30,040	21,471	26,665	35,488	31,306	30,706	27,907	406,592
State destination:													
California	64	292	350	335	81	495	233	273	929	1,410	287	542	5,291
Colorado	366	257	476	962	745	184	136	204	829	308	143	600	5,210
Illinois	1,513	3,798	2,376	4,025	2,353	3,789	1,700	2,069	1,960	1,411	1,479	1,538	28,011
Indiana	1,126	843	1,961	2,043	1,553	739	1,842	886	1,543	1,414	1,144	1,235	16,329
Iowa	4,157	6,786	5,042	4,758	4,140	1,954	946	1,360	1,753	731	2,423	2,016	36,066
Kansas	3,415	6,333	7,082	6,507	3,699	3,196	2,159	2,764	2,711	2,900	3,206	2,360	46,332
Michigan	1,017	625	1,951	1,954	1,238	2,419	975	137	2,189	1,872	1,760	431	16,568
Minnesota	2,603	2,232	3,112	4,525	4,032	2,233	1,531	1,678	2,868	2,704	4,868	3,783	36,169
Missouri	1,153	5,464	4,848	3,335	2,101	1,328	1,543	1,913	2,024	2,524	3,052	2,027	31,312
Nebraska	1,876	3,208	3,137	3,881	1,579	1,092	665	662	2,570	2,506	1,079	2,879	25,134
Ohio	607	1,189	395	677	1,597	1,643	153	487	443	340	361	167	8,059
Oklahoma	1,572	1,181	1,073	1,304	1,178	672	611	1,215	1,452	386	518	1,126	12,288
Oregon	1,025	1,558	2,184	2,077	1,028	1,473	1,295	1,268	1,576	1,948	1,789	911	18,132
Tennessee	929	2,610	1,061	1,161	913	810	1,096	1,776	951	438	936	481	13,162
Texas	1,352	1,050	294	866	1,147	728	944	1,475	1,730	833	602	827	11,848
All other	6,940	9,057	8,359	6,819	10,061	7,222	5,639	8,498	9,950	9,581	7,059	6,984	96,169
Total [1]	29,715	46,483	43,742	45,392	37,677	30,040	21,471	26,665	35,488	31,306	30,706	27,907	406,592

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

[1] Totals include shipments to Alaska as follows: March, 41 head; April, 163; May, 232; June, 63; July, 3; and September, 10 head.

TABLE 382.—*Hogs: Estimated average price per 100 pounds received by producers in the United States, 1921–1930*

Year beginning November	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	6.66	6.52	6.89	8.24	9.08	8.83	9.05	9.11	9.12	8.54	8.23	8.33	8.10
1922	7.78	7.63	7.77	7.65	7.52	7.45	7.13	6.37	6.68	6.85	7.81	7.23	7.34
1923	6.66	6.39	6.59	6.54	6.63	6.70	6.68	6.55	6.60	8.54	8.50	9.45	7.06
1924	8.62	8.39	9.31	9.62	11.83	11.64	10.78	10.82	12.02	12.19	11.50	11.16	10.46
1925	10.66	10.51	10.99	11.76	11.65	11.49	11.97	12.80	12.69	11.66	12.07	12.06	11.63
1926	11.45	10.97	10.97	11.19	10.89	10.41	9.41	8.40	8.58	9.24	9.78	10.16	10.21
1927	8.99	8.14	7.81	7.62	7.48	7.75	8.82	8.70	9.64	10.01	11.17	9.55	8.67
1928	8.51	7.93	8.18	8.88	10.00	10.20	9.96	9.80	10.33	10.28	9.53	9.10	9.27
1929	8.54	8.53	8.80	9.48	9.57	9.17	8.99	9.10	8.38	8.51	9.44	8.79	8.93
1930	8.20	7.44	------	------	------	------	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of hogs Jan. 1, by States; yearly price obtained by weighting monthly prices by Federal inspected slaughter. For previous data see 1930 or earlier Yearbooks.

TABLE 383.—*Hogs: Average price per 100 pounds at Chicago, by months, 1901–1930*

Year beginning October	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Simple average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1901	6.10	5.65	5.95	6.20	6.10	6.35	6.95	7.00	7.35	7.65	7.15	7.55	6.67
1902	7.00	6.30	6.20	6.40	6.75	7.30	7.20	6.45	6.00	5.55	5.45	5.85	6.37
1903	5.55	4.65	4.45	4.90	5.15	5.35	5.10	4.65	5.05	5.40	5.30	5.75	5.11
1904	5.40	4.80	4.50	4.65	4.85	5.15	5.45	5.40	5.35	5.65	5.95	5.50	5.22
1905	5.25	4.85	4.90	5.40	6.00	6.30	6.55	6.45	6.55	6.65	6.25	6.25	5.95
1906	6.40	6.20	6.25	6.60	7.05	6.65	6.65	6.40	6.10	6.05	6.00	6.00	6.36
1907	6.15	4.90	4.70	4.40	4.45	5.00	5.85	5.50	5.80	6.50	6.55	6.85	5.55
1908	5.95	5.80	5.65	6.10	6.35	6.70	7.20	7.30	7.65	7.85	7.75	8.20	6.88
1909	7.75	8.00	8.35	8.55	9.05	10.55	9.90	9.55	9.45	8.75	8.35	8.90	8.93
1910	8.50	7.60	7.65	7.95	7.40	6.85	6.25	6.00	6.25	6.70	7.30	6.90	7.11
1911	6.45	6.30	6.40	6.25	6.20	7.10	7.80	7.65	7.50	7.65	8.25	8.45	7.17
1912	8.75	7.75	7.40	7.45	8.15	8.90	9.05	8.55	8.65	9.05	8.35	8.30	8.36
1913	8.20	7.75	7.70	8.30	8.60	8.70	8.65	8.45	8.20	8.70	9.00	8.85	8.42
1914	7.65	7.50	7.10	6.90	6.80	6.75	7.30	7.60	7.60	7.25	6.90	7.25	7.22
1915	7.90	6.65	6.40	7.20	8.20	9.65	9.75	9.85	9.70	9.80	10.30	10.70	8.84
1916	9.80	9.60	9.95	10.90	12.45	14.80	15.75	15.90	15.50	15.20	16.90	18.20	13.75
1917	17.15	17.40	16.85	16.30	16.65	17.10	17.45	17.45	16.60	17.75	19.00	19.65	17.45
1918	17.70	17.70	17.55	17.60	17.65	19.10	20.40	20.60	20.40	21.85	20.00	17.45	19.00
1919	14.35	14.20	13.60	14.97	14.55	14.94	14.79	14.28	14.68	14.84	14.74	15.88	14.65
1920	14.17	11.83	9.55	9.41	9.42	10.00	8.50	8.35	8.19	9.69	9.26	7.61	9.66
1921	7.72	7.01	6.92	8.02	9.90	10.43	10.31	10.48	10.33	9.70	8.51	8.75	9.01
1922	8.80	8.07	8.18	8.29	8.02	8.18	8.08	7.53	6.92	7.04	7.65	8.35	7.93
1923	7.42	6.85	6.87	7.10	7.06	7.35	7.36	7.34	7.04	7.68	9.38	9.57	7.58
1924	9.91	8.97	9.38	10.38	11.06	13.55	12.55	12.06	12.57	13.46	12.66	12.52	11.59
1925	11.31	11.28	10.97	12.02	12.45	12.20	12.33	13.55	14.01	12.51	11.48	12.03	12.18
1926	12.72	11.80	11.57	11.06	11.73	11.28	10.69	9.59	8.78	9.05	9.03	10.22	10.70
1927	10.39	8.92	8.32	8.25	8.08	8.08	9.28	9.67	9.91	10.65	11.53	11.89	9.58
1928	9.57	8.83	8.61	9.22	10.19	11.44	11.41	10.81	10.72	11.20	10.52	9.85	10.20
1929	9.38	9.06	9.34	9.78	10.67	10.17	10.00	10.02	9.52	8.73	9.58	9.76	9.67
1930	9.34	8.55	7.92	------	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Monthly figures prior to 1920 are general average hog prices as published in the Chicago Drovers Journal Yearbook; subsequent figures compiled from reports of packer and shipper purchases; such purchases do not include pigs, boars, stags, extremely rough sows, or cripples. The yearly figures are the simple average of the October to September prices.

TABLE 384.—*Hogs: Monthly slaughter [1] under Federal inspection, 1907–1930*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1907	3,410	2,921	2,665	2,667	3,317	3,241	2,929	2,301	1,988	2,219	2,135	3,094	32,885
1908	4,961	3,890	3,111	2,304	3,088	3,094	2,416	2,231	2,231	3,368	3,803	4,147	38,643
1909	3,876	2,653	3,013	2,343	2,629	2,719	2,097	1,822	1,955	2,397	2,800	3,090	31,395
1910	2,693	2,324	1,891	1,778	2,206	2,612	1,988	1,824	1,564	1,851	2,456	2,827	26,014
1911	2,742	2,633	2,973	2,589	3,008	3,462	2,560	2,032	2,172	2,720	3,639	3,603	34,133
1912	4,147	3,302	2,700	2,412	2,844	2,835	2,354	1,875	1,701	2,455	3,020	3,407	33,053
1913	3,708	2,844	2,334	2,487	3,046	3,057	2,557	2,268	2,133	2,681	3,165	3,919	34,199
1914	3,489	2,723	2,548	2,312	2,569	2,926	2,260	1,799	1,907	2,682	3,047	4,271	32,532
1915	4,274	3,885	3,446	2,563	2,869	3,246	2,493	2,041	1,890	2,494	3,739	5,442	38,381
1916	5,387	4,276	3,430	2,853	3,275	3,163	2,530	2,517	2,287	3,327	4,771	5,267	43,084
1917	4,629	3,484	2,985	2,645	3,084	2,685	2,411	1,705	1,322	2,195	3,043	3,723	33,910
1918	3,961	3,998	3,926	3,290	3,092	2,783	2,940	2,283	1,980	3,018	4,280	5,662	41,214
1919	5,846	4,266	3,443	3,208	3,743	3,728	2,884	1,949	1,997	2,686	3,270	4,790	41,812
1920	5,078	3,103	3,482	2,590	3,585	3,566	2,644	2,191	1,979	2,487	3,329	3,985	38,019
1921	4,347	3,799	3,047	3,003	3,274	3,618	2,821	2,530	2,422	2,866	3,447	3,807	38,932
1922	3,985	3,480	3,350	2,946	3,716	4,046	3,104	2,888	2,747	3,332	4,318	5,201	43,114
1923	5,134	4,231	4,838	4,179	4,325	4,303	3,983	3,556	3,212	4,328	5,341	5,904	53,334
1924	5,911	5,006	4,536	4,073	4,278	4,288	4,114	3,070	2,857	3,498	4,641	6,600	52,873
1925	5,979	4,447	3,299	3,037	3,186	3,732	2,819	2,453	2,598	3,314	3,646	4,533	43,043
1926	4,501	3,351	3,562	3,105	3,131	3,430	3,127	2,834	2,616	2,976	3,610	4,394	40,635
1927	4,514	3,395	3,837	3,330	3,766	4,253	3,431	3,050	2,534	2,969	3,688	4,869	43,633
1928	5,479	5,780	5,140	3,446	3,884	4,078	2,984	2,545	2,508	3,713	4,455	5,782	49,795
1929	5,738	4,478	3,645	3,761	3,798	3,756	3,597	3,130	3,104	3,857	4,499	5,083	48,445
1930	5,001	4,034	3,392	3,480	3,823	3,689	3,187	2,724	2,773	3,492	4,024	4,647	44,266

Bureau of Animal Industry.

[1] The figures include rejected carcasses.

TABLE 385.—*Hogs: Average price per 100 pounds at Chicago and Omaha, by months, 1928–1930*

Year and month	Chicago: Butcher, bacon, and shipper hogs: Heavyweight, 250 to 350 pounds, Medium to Choice	Chicago: Butcher, bacon, and shipper hogs: Medium weight, 200 to 250 pounds, Medium to Choice	Chicago: Butcher, bacon, and shipper hogs: Lightweight, 160 to 200 pounds, Medium to Choice	Chicago: Butcher, bacon, and shipper hogs: Lightlights, 130 to 160 pounds, Medium to Choice	Chicago: Packing sows, rough and smooth, all weights	Chicago: Average cost, packer and shipper hogs	Omaha: Butcher, bacon, and shipper hogs: Heavyweight, 250 to 350 pounds, Medium to Choice	Omaha: Butcher, bacon, and shipper hogs: Medium weight, 200 to 250 pounds, Medium to Choice	Omaha: Butcher, bacon, and shipper hogs: Lightweight, 160 to 200 pounds, Medium to Choice	Omaha: Packing sows, rough and smooth, all weights	Omaha: Feeder and stocker pigs, 70 to 130 pounds, Medium to Choice	Omaha: Average cost, packer and shipper hogs
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
January	8.26	8.34	8.17	7.89	7.25	8.25	8.02	8.06	7.91	7.10	7.17	7.98
February	7.99	8.21	8.12	7.76	7.15	8.08	7.63	7.81	7.78	6.75	6.46	7.66
March	7.99	8.23	8.10	7.58	7.14	8.08	7.66	7.88	7.78	6.82	6.50	7.74
April	9.10	9.32	9.22	8.65	8.04	9.28	8.72	8.95	8.87	7.76	7.16	8.82
May	9.62	9.76	9.37	8.70	8.71	9.67	9.18	9.39	9.10	8.38	7.39	9.21
June	10.04	10.06	9.74	9.07	9.01	9.91	9.66	9.68	9.26	8.68	7.43	9.42
July	10.84	10.94	10.77	10.28	9.77	10.65	10.60	10.68	10.16	9.26	8.19	10.20
August	11.64	11.86	11.69	11.36	10.63	11.53	11.18	11.42	11.06	10.16	9.28	10.89
September	12.14	12.26	11.98	11.60	11.02	11.89	11.56	11.81	11.54	10.56	10.14	11.35
October	9.73	9.77	9.63	9.28	8.84	9.57	9.37	9.40	9.17	8.48	8.59	9.16
November	8.92	8.92	8.74	8.44	8.18	8.83	8.55	8.57	8.34	7.92	7.33	8.52
December	8.65	8.66	8.56	8.20	7.97	8.61	8.20	8.22	7.97	7.71	6.63	8.25
Average	9.58	9.69	9.51	9.07	8.64	9.22	9.19	9.32	9.08	8.30	7.69	8.87
1929												
January	9.11	9.20	9.20	8.92	8.37	9.22	8.79	8.82	8.76	8.15	7.38	8.84
February	10.31	10.37	10.32	9.87	9.60	10.19	9.90	9.94	9.85	9.35	7.98	9.83
March	11.45	11.54	11.44	10.95	10.58	11.44	10.00	11.06	10.80	10.36	9.54	11.04
April	11.40	11.48	11.38	10.92	10.42	11.41	10.96	11.01	10.86	10.19	9.58	10.98
May	10.75	10.95	10.79	10.57	9.78	10.81	10.23	10.41	10.22	9.37	9.23	10.28
June	10.69	10.91	10.86	10.72	9.58	10.72	10.28	10.55	10.44	9.27	9.56	10.31
July	11.23	11.69	11.78	11.57	10.03	11.20	10.74	11.18	11.10	9.75	9.92	10.69
August	10.70	11.29	11.52	11.20	9.27	10.52	10.13	10.74	10.79	8.90	9.54	9.86
September	9.97	10.53	10.48	9.98	8.68	9.85	9.50	9.99	9.86	8.28	8.24	9.20
October	9.42	9.68	9.71	9.51	8.29	9.38	8.89	9.22	9.11	7.84	8.42	8.78
November	9.06	9.14	9.02	8.84	8.24	9.06	8.62	8.74	8.65	7.80	7.62	8.56
December	9.40	9.44	9.38	9.20	8.32	9.34	8.92	9.00	8.88	8.07	7.44	8.96
Average	10.29	10.52	10.49	10.19	9.26	10,16	9.83	10.06	9.94	8.94	8.70	9.84
1930												
January	9.59	9.84	9.93	9.79	8.54	9.78	9.25	9.49	9.43	8.22	7.92	9.48
February	10.44	10.82	10.88	10.38	9.14	10.67	9.91	10.26	10.19	8.81	8.61	10.11
March	9.92	10.42	10.49	10.31	8.86	10.17	9.42	9.86	9.82	8.59	8.73	9.66
April	9.88	10.09	10.10	9.94	9.10	10.00	9.33	9.63	9.61	8.76	8.53	9.51
May	9.94	10.10	10.10	9.98	9.24	10.02	9.47	9.68	9.64	8.90	8.54	9.57
June	9.63	9.76	9.76	9.63	8.79	9.52	9.26	9.44	9.40	8.50	8.50	9.18
Average, 6 months	9.90	10.17	10.21	10.00	8.94	10.02	9.44	9.73	9.68	8.63	8.47	9.60
	Good and Choice	Good and Choice	Good and Choice	140–160 lbs., Good and Choice	275–500 lbs., Medium and Good		Good and Choice	Good and Choice	Good and Choice	275–500 lbs., Medium and Good	Good and Choice	
July	8.94	9.38	9.54	9.42	7.72	8.73	8.50	8.88	8.92	7.44	7.71	8.27
August	9.96	10.49	10.60	10.23	8.35	9.58	9.37	9.97	10.00	8.15	7.83	8.87
September	10.62	10.82	10.56	9.98	8.63	9.76	9.88	10.27	9.94	8.24	7.64	9.08
October	9.78	9.76	9.58	9.37	8.28	9.34	9.11	9.30	9.06	7.88	7.66	8.80
November	8.64	8.63	8.56	8.56	7.71	8.55	8.19	8.28	8.11	7.40	7.47	8.13
December	7.84	8.02	8.14	8.17	7.02	7.92	7.62	7.76	7.76	6.72	7.19	7.66
Average, 6 months	9.30	9.52	9.50	9.29	7.95	8.91	8.78	9.08	8.96	7.64	7.58	8.42

Bureau of Agricultural Economics. Compiled from data of the livestock and meat-reporting service of the bureau. Earlier data in 1927 Yearbook, pp. 1012–1014.

TABLE 386.—*Hogs, slaughter statistics: Source of supply, classification, slaughter costs, weights, and yields, calendar year, 1923-1930*

Year and month	Source of supply		Sex classification			Average live cost per 100 pounds	Average live weight	Dressed weight as percentage of live weight	By-product yield (on basis of live weight)			
	Stockyards	Other	Sows	Barrows	Stags and boars				Lard[1]	Edible offal	Trimmings	Inedible grease[1]
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Dollars*	*Pounds*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
1923	76.07	23.93	52.42	46.86	0.72	7.59	225.33	76.72	16.49	2.14	4.53	1.37
1924	77.95	22.05	52.34	46.96	.70	8.04	222.31	75.33	16.45	2.18	4.59	1.35
1925	75.99	24.01	52.73	46.65	.62	11.79	225.50	75.67	15.04	2.49	5.08	1.29
1926	72.85	27.15	51.58	47.78	.64	12.47	235.06	76.42	15.89	2.69	5.50	1.31
1927	67.63	32.37	50.31	49.10	.59	10.06	233.33	76.27	15.36	2.73	5.64	1.22
1928	64.56	35.44	51.38	48.04	.58	9.20	229.26	75.41	15.40	2.98	5.53	1.19
1929	59.79	40.21	51.76	47.68	.56	10.08	231.72	75.32	15.75	3.17	6.24	1.18
1930	59.86	40.14	51.77	47.65	.58	9.40	231.20	75.61	14.90	3.14	6.42	1.17
1930												
January	58.21	41.79	47.27	52.21	.52	9.68	229.28	76.44	15.50	3.23	6.10	1.12
February	60.49	39.51	46.04	53.54	.42	10.39	231.02	75.86	15.89	3.19	6.01	1.19
March	61.77	38.23	47.01	52.37	.62	10.17	230.25	75.76	15.94	3.21	6.27	1.16
April	61.46	38.54	50.00	49.13	.87	9.80	228.16	76.19	15.61	3.17	6.26	1.26
May	58.98	41.02	51.46	47.85	.69	9.86	229.86	75.91	15.50	3.15	6.29	1.19
June	63.35	36.65	55.88	43.43	.69	9.57	239.48	75.40	15.16	3.06	5.99	1.19
July	60.45	39.55	60.48	38.83	.69	8.68	249.90	75.98	15.28	3.04	6.37	1.19
August	62.31	37.69	64.12	35.33	.55	9.35	245.22	75.21	14.75	3.07	6.64	1.23
September	62.36	37.64	59.36	40.13	.51	9.89	230.81	74.06	13.80	3.14	7.00	1.19
October	61.80	38.20	52.89	46.47	.64	9.27	221.95	74.49	13.16	3.25	7.20	1.17
November	55.81	44.19	49.95	49.55	.50	8.52	220.55	75.18	13.48	3.05	6.62	1.12
December	55.31	44.69	46.91	52.70	.39	7.92	226.48	76.03	14.34	3.02	6.61	1.10

Bureau of Agricultural Economics. Compiled from monthly reports to the bureau from packers and slaughterers, whose slaughterings equaled 75 to 85 per cent of total slaughter under Federal inspection.

[1] Rendered.

TABLE 387.—*Hogs: Slaughter in specified countries, average pre-war and annual, 1914-1930*

Year	United States, Federal inspected	Germany, inspected slaughter	Denmark, in export slaughterhouses	England and Wales, sold off farms for slaughter[1]	Scotland, sold off farms for slaughter[1]	Ireland, purchased by Irish bacon curers	Canada	Netherland receipts at 21 markets
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Average pre-war[2]	31,759	16,406	2,503	3,487		1,282	4,280	875
1914	32,532	(3)	2,858					1,085
1915	38,381	(3)	2,594					842
1916	43,084	(3)	2,542					850
1917	33,910	(3)	2,479					600
1918	41,214	(3)	324					217
1919	41,812	1,368	456			874	5,526	422
1920	38,019	3,024	930	2,700	146	898	4,834	648
1921	38,982	6,825	1,641	3,471	173	1,030	5,297	1,362
1922	43,114	6,923	2,215	3,229	176	926	5,382	865
1923	53,334	5,830	3,414	3,691	245	955	6,056	906
1924	52,873	10,527	4,024	4,500	242	1,110	6,625	1,068
1925	43,043	12,090	3,766	3,588		911	5,720	1,045
1926	40,636	13,072	3,838	3,074		910	5,636	1,025
1927	43,633	17,279	5,098	3,680		1,050	5,965	1,151
1928	49,795	19,391	5,373	4,109		1,264	5,880	1,068
1929	48,445	17,252	4,994	3,245		1,142	5,747	
1930 preliminary	44,266	17,994	5,900			1,037		

Bureau of Agricultural Economics. Compiled from official sources and cabled reports from agricultural commissioners abroad.

[1] For years ended May 31 following.
[2] Average for five years immediately preceding war period if available, otherwise for any year or years within that period unless otherwise stated. In countries having changed boundaries, the figures are estimates for one year only for numbers within present boundaries.
[3] Not available for present boundaries. For former boundaries, the numbers slaughtered are as follows in thousands—1914, 19,441; 1915, 13,293; 1916, 6,548; 1917, 5,795; 1918, 2,430.

TABLE 388.—*Lard and pork: Stocks in cold-storage warehouses and meat-packing establishments, United States, 1921–1930* [1]

Product and year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Lard:												
1921	59, 319	83, 549	117, 690	128, 614	152, 428	181, 992	204, 301	194, 490	149, 886	85, 115	48, 850	42, 001
1922	47, 541	61, 202	61, 297	86, 031	96, 055	123, 798	154, 254	143, 084	119, 755	75, 338	36, 750	32, 506
1923	48, 808	56, 266	59, 101	66, 743	85, 251	84, 530	123, 896	143, 579	115, 860	72, 608	35, 225	35, 327
1924	49, 340	54, 130	68, 610	85, 722	102, 317	127, 949	152, 520	149, 672	124, 676	84, 198	31, 706	35, 713
1925	61, 049	112, 704	151, 927	150, 182	151, 499	138, 295	145, 919	145, 924	114, 724	71, 626	37, 256	33, 710
1926	42, 478	64, 187	76, 145	93, 108	98, 365	106, 824	120, 527	153, 572	151, 233	105, 558	72, 355	46, 744
1927	49, 992	69, 576	77, 103	92, 069	99, 611	111, 976	147, 318	179, 136	167, 018	118, 174	72, 121	46, 154
1928	54, 855	84, 007	121, 082	164, 506	173, 088	186, 073	214, 479	204, 939	177, 888	126, 890	83, 474	67, 257
1929	85, 217	140, 526	173, 864	179, 428	184, 748	183, 490	199, 699	203, 010	180, 085	153, 690	99, 845	68, 517
1930	82, 098	92, 171	111, 914	105, 067	104, 905	115, 270	120, 322	118, 353	88, 868	59, 732	36, 211	31, 582
Dry salt cured, and in process of cure:												
1921	144, 997	202, 909	251, 893	255, 390	246, 443	240, 610	250, 752	231, 511	200, 291	149, 974	108, 611	96, 731
1922	111, 071	128, 690	139, 281	145, 183	142, 030	157, 689	186, 948	179, 856	165, 668	122, 783	85, 671	83, 017
1923	121, 125	155, 922	178, 024	206, 429	227, 728	214, 453	217, 862	221, 716	191, 711	146, 974	108, 850	110, 824
1924	148, 121	167, 507	178, 258	192, 934	191, 882	206, 009	212, 158	202, 618	180, 127	135, 702	81, 460	78, 871
1925	118, 718	136, 125	150, 819	142, 950	145, 548	142, 292	162, 518	164, 374	152, 555	128, 599	106, 011	96, 746
1926	119, 617	138, 005	144, 071	151, 286	140, 324	136, 801	148, 164	168, 882	172, 766	143, 572	98, 521	66, 765
1927	68, 203	86, 135	101, 156	124, 676	129, 637	143, 143	173, 256	185, 920	178, 107	140, 420	100, 922	77, 240
1928	97, 335	119, 751	160, 609	178, 012	173, 652	169, 663	174, 906	164, 473	156, 462	125, 899	101, 123	102, 440
1929	143, 011	167, 561	179, 776	178, 595	185, 580	171, 450	163, 805	172, 308	160, 519	139, 256	111, 092	88, 782
1930	107, 782	116, 288	123, 740	115, 653	110, 303	105, 913	108, 171	114, 095	97, 237	71, 143	43, 194	48, 931
Pickled,[2] cured, and in process of cure:												
1921	294, 993	316, 328	376, 376	367, 553	355, 041	366, 291	366, 346	346, 623	320, 190	257, 245	212, 528	221, 345
1922	252, 822	284, 487	321, 950	347, 276	348, 305	363, 395	391, 474	385, 692	369, 187	313, 517	278, 812	302, 708
1923	377, 107	412, 806	451, 279	469, 130	499, 119	483, 673	473, 569	449, 441	413, 798	367, 374	325, 456	384, 604
1924	434, 030	468, 892	530, 784	512, 190	506, 683	483, 372	473, 914	443, 918	408, 928	351, 485	283, 710	299, 868
1925	398, 521	443, 025	483, 302	468, 099	467, 395	425, 481	407, 610	373, 227	338, 156	284, 485	256, 684	261, 128
1926	294, 642	319, 726	345, 661	346, 049	338, 905	320, 305	333, 305	340, 687	330, 326	293, 106	257, 726	266, 222
1927	306, 904	352, 681	392, 642	420, 037	435, 967	432, 965	450, 172	440, 744	407, 239	341, 460	289, 553	276, 916
1928	320, 436	370, 916	461, 264	496, 322	480, 069	459, 878	454, 826	408, 994	351, 936	235, 309	265, 988	292, 626
1929	375, 217	424, 921	473, 916	453, 612	452, 868	443, 044	430, 317	412, 649	382, 750	342, 038	304, 400	316, 180
1930	368, 126	392, 123	443, 882	430, 926	411, 705	392, 403	396, 810	380, 182	329, 074	283, 979	249, 485	285, 636
Frozen:												
1921	93, 990	150, 594	208, 889	219, 964	200, 706	194, 486	182, 163	149, 435	103, 486	64, 682	38, 517	37, 513
1922	51, 203	71, 722	86, 219	98, 765	103, 907	114, 571	128, 962	117, 903	84, 815	46, 796	30, 688	33, 774
1923	72, 278	120, 196	154, 377	189, 115	213, 224	210, 645	217, 074	195, 002	148, 753	98, 795	71, 640	82, 068
1924	126, 718	164, 491	199, 044	227, 284	215, 767	201, 728	186, 566	164, 049	121, 816	77, 986	42, 561	48, 781
1925	130, 125	199, 642	231, 234	218, 508	201, 246	180, 645	168, 527	131, 935	93, 078	54, 294	29, 910	27, 153
1926	57, 960	98, 311	120, 115	129, 259	124, 569	117, 366	120, 707	133, 104	119, 994	77, 673	49, 376	55, 241
1927	97, 650	150, 255	177, 876	193, 733	204, 608	211, 742	220, 847	214, 607	181, 072	126, 887	76, 644	65, 666
1928	105, 654	164, 971	264, 043	323, 403	306, 951	289, 825	285, 628	245, 714	173, 617	103, 879	66, 049	66, 696
1929	151, 811	245, 798	291, 050	289, 754	285, 110	256, 291	247, 815	229, 397	176, 131	119, 204	75, 910	84, 667
1930	145, 078	178, 695	217, 942	206, 417	189, 692	176, 851	174, 240	157, 167	124, 648	92, 305	64, 127	77, 137

Bureau of Agricultural Economics. Compiled from reports made by cold-storage establishments.

[1] Lard includes all prime steam, kettle-rendered, neutral, and other pure lards. It does not include lard substitutes nor compounds.

[2] Pickled pork includes sweet-pickled, plain-brine, and barreled pork.

TABLE 389.—*Lard: International trade, average 1911–1913, annual 1926–1929*

Country	Calendar year									
	Average, 1911–1913		1926		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Australia [1]	--------	--------	245	1, 954	575	1, 316	712	1, 360	421	1, 599
Canada	9, 004	121	2, 525	5, 838	739	4, 845	1, 183	1, 003	297	1, 504
China	0	7, 000	0	11, 706	0	8, 659	0	8, 229	0	9, 880
Denmark	1, 385	9, 166	1, 512	20, 954	1, 350	29, 213	1, 315	30, 851	1, 381	28, 435
Hungary	(2)	(2)	2	22, 651	2	9, 932	69	3, 785	0	2, 863
Irish Free State	(2)	(2)	708	3, 461	609	3, 921	625	4, 491	879	3, 794
Madagascar	--------	--------	0	2, 620	0	1, 180	0	2, 140	0	1, 376
Netherlands	81, 879	58, 897	3, 317	58, 081	9, 928	74, 652	11, 619	65, 244	4, 727	49, 112
United States	0	527, 901	0	698, 961	0	681, 303	0	759, 722	0	829, 328
PRINCIPAL IMPORTING COUNTRIES										
Austria	[3] 6, 994	[3] 60	20, 906	1, 196	27, 474	906	30, 839	403	39, 036	230
Belgium	22, 057	13, 524	14, 772	1, 516	16, 034	2, 974	14, 168	2, 049	19, 268	3, 379
Brazil	844	278	1, 034	17	232	175	335	45	--------	858
British Malaya	--------	--------	3, 624	1, 192	3, 517	1, 071	4, 084	1, 346	3, 526	824
Cuba	63, 738	0	89, 913	0	87, 935	0	86, 885	0	81, 025	0
Czechoslovakia	(2)	(2)	69, 476	67	62, 354	6	60, 248	12	66, 500	2
Dominican Republic	--------	--------	3, 924	0	4, 483	0	5, 373	0	6, 284	0
Finland	--------	--------	7, 539	82	6, 113	0	7, 837	0	6, 284	--------
France	32, 917	21, 507	30, 170	479	48, 750	394	29, 278	359	28, 305	465
Germany	227, 832	85	239, 354	52	213, 283	[4] 705	192, 956	[4] 890	212, 780	[4] 483
Italy	6, 574	773	3, 653	2, 442	4, 892	726	11, 652	156	11, 902	298
Norway	4, 027	18	1, 970	1	2, 092	1	1, 777	0	1, 496	--------
Peru	5, 338	19	14, 742	0	11, 999	18	9, 406	0	9, 464	10
Philippine Islands	2, 467	0	4, 188	0	5, 225	0	4, 896	0	5, 859	0
Poland	(2)	(2)	15, 704	37	33, 443	11	44, 601	109	35, 143	32
Sweden	2, 009	311	3, 216	1, 048	2, 080	2, 403	2, 382	1, 601	2, 182	1, 339
Switzerland	4, 229	9	5, 846	22	5, 818	15	5, 638	14	6, 783	13
United Kingdom	209, 761	978	249, 771	932	267, 501	878	272, 469	959	292, 681	524
Yugoslavia	(2)	(2)	113	2, 859	142	1, 540	677	88	3, 280	15
Total, 28 countries	681, 055	640, 647	788, 224	838, 168	816, 570	826, 844	801, 024	884, 856	839, 503	936, 413

Bureau of Agricultural Economics. Official sources.

* Preliminary.
[1] Year ended June 30.
[2] Figures for pre-war years are included in the countries of the pre-war boundaries.
[3] Average for Austria-Hungary.
[4] Includes oleomargarine.

TABLE 390.—*Pork and pork products: International trade, average 1911–1913, annual 1927–1929*

Country	Calendar year: Average, 1911–1913 Imports	Average, 1911–1913 Exports	1927 Imports	1927 Exports	1928 Imports	1928 Exports	1929* Imports	1929* Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	171	1,019,561	14,524	1,002,690	12,866	1,101,968	8,515	1,208,089
Denmark	7,124	298,086	3,569	616,322	2,713	650,462	2,864	596,417
Netherlands	88,143	139,916	13,863	306,312	15,623	274,177	8,166	202,634
Canada	29,189	47,694	11,492	87,427	15,227	53,357	21,982	40,462
Irish Free State	(1)	(1)	52,976	95,045	48,509	115,957	50,579	95,774
Sweden	6,736	19,445	7,330	61,255	6,863	51,426	7,894	44,693
Poland	(1)	(1)	40,318	38,388	57,292	46,987	44,540	21,972
China	-------	7,679	595	10,801	442	10,089	343	12,019
Hungary	(1)	(1)	19	20,576	85	10,605	3	14,085
New Zealand	248	1,049	9	12,764	6	18,893	5	19,788
Australia [2]	[3] 923	[3] 6,294	1,683	3,631	3,181	3,052	3,115	3,219
Argentina	1,977	9	32	8,266	32	10,591	[4] 28	10,772
PRINCIPAL IMPORTING COUNTRIES								
United Kingdom	875,929	15,820	1,358,270	6,186	1,431,846	6,256	1,382,870	5,432
Germany	265,669	3,532	296,743	5,039	240,873	4,832	275,581	6,159
Cuba	85,973	0	129,019	0	130,418	0	123,812	0
France	59,824	24,668	162,736	3,734	101,821	3,229	57,958	1,739
Czechoslovakia	(1)	(1)	75,439	3,772	71,629	3,263	78,552	3,036
Mexico	[2] 15,374	[2] 8	48,319	0	61,602	0	-------	-------
Austria	[5] 14,338	[5] 3,343	27,789	907	31,093	404	39,304	280
Belgium	22,232	16,254	17,398	10,100	19,935	6,810	35,807	3,931
Italy	74,861	-------	6,489	3,606	30,147	1,108	28,812	1,277
Norway	9,751	26	4,516	7	8,298	4	6,722	[4] 57
Finland	-------	-------	11,256	115	13,865	181	11,302	330
Peru	-------	-------	11,999	18	9,406	0	9,464	10
Switzerland	21,976	105	6,657	23	6,496	37	7,528	30
Philippine Islands	4,414	0	7,516	0	7,359	0	8,203	0
Spain	553	641	2,931	2,499	3,562	761	[4] 4,479	[4] 892
Union of South Africa	8,249	30	1,343	526	1,476	617	1,482	635
Brazil	3,767	278	500	260	636	1,928	-------	858
Chile	3,195	9	591	0	254	94	181	437
Total 30 countries	1,600,616	1,604,447	2,315,921	2,300,269	2,333,555	2,377,088	2,220,091	2,295,027

Bureau of Agricultural Economics. Official sources, except where otherwise noted. This table includes fresh, pickled and cured, and canned pork; bacon and Cumberland sides, hams and shoulders, and Wiltshire sides; lard and neutral lard.

*Preliminary.
[1] Figures for pre-war years are included in the countries of the pre-war boundaries.
[2] Year ended June 30.
[3] Calendar year.
[4] International Yearbook of Agricultural Statistics.
[5] Average for Austria-Hungary.

TABLE 391.—*Lard, refined: Average price per 100 pounds, Chicago, by months, 1921–1930*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	16.03	14.91	14.48	13.07	11.88	12.03	13.94	13.65	13.51	12.16	11.62	11.25	13.21
1922	11.19	12.59	13.50	12.62	13.15	13.22	13.06	13.30	13.00	14.12	13.78	13.31	13.07
1923	13.20	13.25	13.87	13.42	13.12	13.18	12.84	12.83	15.06	15.22	15.72	15.04	13.90
1924	14.52	13.03	12.84	12.50	12.19	12.13	13.65	15.94	16.25	18.05	16.68	18.00	14.65
1925	17.59	17.03	18.25	17.07	16.50	18.13	18.42	18.94	18.95	18.75	18.50	16.67	17.90
1926	16.81	16.44	16.70	16.75	17.13	18.48	18.00	17.38	17.50	16.75	15.75	15.25	16.91
1927	13.59	13.72	14.38	14.32	14.12	13.35	12.25	12.54	14.25	14.50	13.60	13.25	13.66
1928	12.50	11.60	11.50	12.50	13.10	13.50	14.00	14.70	15.25	14.40	13.62	12.88	13.30
1929	12.75	12.75	13.31	13.25	12.85	12.85	13.22	13.56	13.81	13.17	12.21	11.04	12.97
1930	11.45	12.38	12.12	11.65	11.50	11.00	10.50	12.44	14.25	13.94	12.31	10.70	12.02

Bureau of Agricultural Economics. Compiled from data of the livestock and meat reporting service of the bureau. Prices, 1905 to December, 1920, available in 1927 Yearbook, p. 1018.

TABLE 392.—*Lard, American prime western steam: Average price per pound in Liverpool, 1921–1930*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	23.4	[1] 23.3	15.7	13.2	11.7	12.1	13.6	13.4	13.2	12.2	12.6	11.7	14.7
1922	11.3	12.9	13.1	12.8	13.6	13.5	13.2	13.3	12.7	13.2	14.1	13.6	13.1
1923	13.3	13.0	13.7	13.6	12.9	13.0	12.7	12.7	14.0	14.5	15.7	15.1	13.7
1924	14.8	13.1	12.8	12.7	12.3	12.2	13.7	15.8	15.8	18.1	17.2	18.1	14.7
1925	18.0	17.5	18.7	17.8	17.6	19.1	19.3	19.2	19.2	17.9	17.8	16.6	18.2
1926	17.2	16.5	16.5	16.0	17.6	18.4	17.8	17.0	16.6	15.8	14.2	14.3	16.5
1927	14.3	14.4	14.4	14.3	14.1	14.4	14.3	13.8	14.6	14.4	14.0	13.5	14.2
1928	13.6	12.9	13.0	13.3	13.4	13.3	13.7	13.9	14.4	13.9	13.4	13.2	13.5
1929	13.4	13.5	13.9	13.5	13.4	13.5	13.9	13.8	13.5	12.7	12.1	11.8	13.2
1930	11.9	12.2	11.8	11.8	11.8	11.3	11.2	12.3	13.2	13.2	12.5	11.3	12.0

Bureau of Agricultural Economies. Compiled form Manchester Guardian. An average of Friday quotations. Converted at monthly average rate of exchange as given in Federal Reserve Bulletins to 1925, inclusive; subsequently at par of exchange.

[1] Government control of prices ended on Feb. 28, 1921.

TABLE 393.—*Bacon, Wiltshire sides,[1] green, firsts: Average price per pound at Bristol, England, 1909–1930*

Year and month	American	Canadian	Danish	Irish	British
	Cents	*Cents*	*Cents*	*Cents*	*Cents*
1909	13.6	14.3	15.0	15.9	16.7
1910	15.2	15.6	15.9	16.6	17.8
1911	12.8	13.1	14.3	14.8	15.8
1912	13.8	14.5	15.9	15.8	16.3
1913	15.8	16.3	17.1	17.4	18.4
1914	15.5	15.7	16.4	17.6	18.2
1915	17.0	18.4	20.4	20.8	21.4
1916	19.8	22.0	24.0	24.7	26.0
1917	30.1	------	------	33.0	33.6
1918	38.5	------	------	------	30.3
1919	37.1	37.9	------	38.4	38.4
1920	31.6	33.1	34.2	41.7	42.8
1921	21.8	26.5	32.8	34.7	36.2
1922	21.2	25.2	29.7	32.5	33.3
1923	17.5	20.9	23.6	25.8	27.0
1924	16.6	19.2	21.3	22.8	23.5
1925	23.0	24.7	27.5	29.7	30.0
1926	------	------	27.8	30.6	32.3
1927	------	------	21.1	25.5	26.9
1928	17.9	------	21.2	23.7	25.8
1929	------	------	24.5	26.6	28.3
1930	19.3	------	20.8	25.1	27.6
1929					
January	17.4	------	21.1	22.8	25.3
February	17.4	------	22.9	25.0	28.1
March	23.9	------	24.7	26.8	29.4
April	25.2	------	27.2	30.1	31.0
May	------	------	25.2	28.2	30.0
June	21.8	------	24.7	28.2	29.2
July	23.5	------	27.2	28.8	30.0
August	23.8	------	27.4	28.2	30.0
September	21.1	------	23.6	24.5	26.5
October	22.8	------	23.5	24.3	26.1
November	------	------	23.2	25.4	26.6
December	------	------	23.9	26.1	27.8
1930					
January	18.9	------	24.1	28.5	31.7
February	20.1	------	24.3	29.3	31.7
March	21.6	------	24.3	29.8	32.2
April	21.7	------	24.3	30.0	31.3
May	20.4	------	21.9	25.2	28.0
June	20.0	------	22.2	24.8	26.8
July	18.2	------	20.2	22.0	25.3
August	18.1	------	20.4	22.6	26.8
September	18.6	------	18.5	21.4	24.2
October	17.9	------	15.4	21.2	23.8
November	19.8	------	18.1	24.8	26.8
December	16.5	------	15.3	21.6	23.1

Bureau of Agricultural Economics. Compiled from Agricultural Market Report, Ministry of Agriculture and Fisheries, Great Britain. Average for the last week of each month 1909–1923. Average of weekly averages 1924–1930. Converted at monthly average rate of exchange as given in Federal Reserve Bulletins to December, 1925, inclusive; subsequently at par of exchange.

[1] Entire half of hog in one piece, head off, backbone out, ribs in.

NOTE.—A table similar to Table 396, 1928 Yearbook, British pork prices, is omitted.

TABLE 394.—*Hogs: Cholera-control work by Bureau of Animal Industry, 1918–1929*

Year beginning July 1, and State	Bureau veterinarians engaged in work [1]	Premises investigated	Demonstrations		Autopsies performed	Farms quarantined or carded	Farms cleaned and disinfected	Outbreaks reported
			Number	Hogs treated				
1918	180	93, 512	----------	233, 987	53, 586	9, 564	4, 382	12, 336
1919	140	46, 145	3, 037	347, 702	10, 963	6, 129	2, 099	9, 788
1920	54	29, 433	3, 420	67, 295	3, 888	2, 268	656	7, 951
1921	80	47, 137	4, 343	88, 846	5, 390	1, 401	439	7, 920
1922	71	52, 348	5, 234	108, 562	5, 247	1, 772	741	7, 204
1923	45	29, 443	3, 178	78, 007	3, 686	1, 634	847	7, 225
1924	34	24, 060	2, 353	51, 331	2, 383	886	470	3, 437
1925	35	20, 599	2, 579	69, 230	2, 446	854	247	4, 558
1926	36. 96	25, 004	4, 863	97, 917	3, 741	1, 832	744	11, 555
1927	38. 42	25, 156	4, 444	106, 906	3, 368	1, 117	522	6, 941
1928	37. 41	28, 939	2, 648	56, 023	3, 326	1, 481	489	7, 029
1929	36. 5	26, 858	1, 740	35, 158	2, 505	677	345	4, 162
1929								
Alabama	1	985	25	432	11	----------	----------	7
Arkansas	1. 33	653	14	226	71	----------	15	312
California	. 33	24	1	10	17	4	2	8
Colorado	1	287	9	601	49	----------	----------	33
Florida	1. 5	848	253	6, 965	54	----------	3	86
Georgia	1. 33	1, 203	98	2, 149	45	----------	----------	186
Idaho	. 33	908	25	1, 093	61	21	10	26
Illinois	3	2, 373	32	1, 466	635	173	269	615
Indiana	2	1, 279	----------	----------	206	17	----------	160
Iowa	2	521	5	311	125	----------	----------	450
Kansas	1	1, 332	3	28	25	----------	----------	67
Kentucky	2	1, 956	7	366	157	----------	16	83
Louisiana	1	1, 077	96	2, 013	21	----------	----------	55
Maryland	2	2, 516	10	191	124	101	----------	307
Michigan	2	944	25	2, 056	79	5	----------	241
Mississippi	1. 03	1, 231	489	4, 319	35	----------	----------	35
Missouri	1	852	6	348	100	----------	----------	165
Montana	. 05	144	----------	----------	20	33	6	37
Nebraska	1	219	----------	----------	108	----------	----------	43
North Carolina	1	599	138	3, 568	77	147	2	67
Ohio	1	688	13	580	115	----------	----------	380
Oklahoma	1. 5	902	5	166	21	33	----------	34
Oregon	. 5	137	14	369	6	4	4	4
South Carolina	1	435	362	5, 948	19	----------	----------	154
South Dakota	1	85	1	41	106	----------	----------	65
Tennessee	1	875	20	602	45	79	----------	285
Texas	1	509	4	143	21	7	17	109
Virginia	1	2, 192	3	83	28	----------	----------	23
Washington	1. 1	727	5	459	30	11	----------	33
West Virginia	. 5	114	72	470	10	15	----------	46
Wisconsin	1	193	5	156	84	27	1	46

Bureau of Animal Industry.

[1] Fractions in the number of veterinarians engaged denote part time devoted to hog-cholera-control work.

TABLE 395.—*Hogs: Shipments and slaughter, by States, average 1924–1928, annual, 1929*

State and division	Average 1924–1928						1929 [1]					
	Shipments and local slaughter		In shipments, stocker, feeding, and breeding		Farm slaughter		Shipments and local slaughter		In shipments stocker, feeding, and breeding		Farm slaughter	
	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Total weight	Head	Total weight	Head	Total weight
	Thousands	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*
Maine	36	257	0.4	100	41	258	30	7,800	1	100	37	9,990
New Hampshire	9	257	.8	100	13	258	11	2,860	2	200	14	3,780
Vermont	26	252	------	------	38	250	27	7,020	------	------	40	10,400
Massachusetts	50	257	2	100	42	254	92	23,920	8	800	45	11,700
Rhode Island	4	250	------	------	3	250	4	1,000	------	------	4	1,000
Connecticut	5	255	------	------	20	254	15	3,900	------	------	20	5,200
New York	110	245	3	100	302	250	120	27,600	4	400	241	57,358
New Jersey	42	200	11	125	42	247	45	9,000	23	2,875	39	8,970
Pennsylvania	407	230	3	100	524	260	489	112,470	3	300	495	128,700
North Atlantic	688	235	20	114	1,025	256	833	195,570	41	4,675	935	237,098
Ohio	2,663	220	30	110	658	258	2,466	554,850	8	880	673	168,250
Indiana	3,604	226	51	120	576	254	3,785	870,550	20	2,400	580	145,000
Illinois	5,681	235	60	105	680	250	5,580	1,334,120	37	4,255	690	172,500
Michigan	892	203	25	104	272	240	780	156,000	20	2,000	270	62,100
Wisconsin	2,090	217	2	100	448	233	1,926	433,350	2	200	465	106,950
Minnesota	4,647	217	49	107	380	240	4,542	1,000,320	50	5,000	380	87,400
Iowa	12,139	237	107	106	518	250	12,570	2,954,650	90	10,350	500	120,000
Missouri	4,340	217	43	92	810	244	4,639	1,043,775	46	5,060	850	212,500
North Dakota	805	226	.8	100	218	238	943	216,890	1	100	200	48,000
South Dakota	3,001	226	8	109	164	239	3,073	706,790	8	920	170	39,950
Nebraska	5,588	246	79	110	272	251	5,908	1,477,000	100	10,000	260	66,300
Kansas	2,641	222	27	108	353	252	3,345	738,100	37	4,255	350	87,500
North Central	48,089	229	483	107	5,347	2474	9,5571	1,486,395	419	45,420	5,388	1,316,450
Delaware	17	190	------	------	17	192	20	3,800	------	------	16	3,200
Maryland	78	160	------	------	154	231	119	19,040	------	------	145	34,800
Virginia	235	197	2	100	484	216	190	40,450	2	200	514	123,360
West Virginia	89	170	2	102	202	220	105	17,750	1	100	190	47,500
North Carolina	145	200	------	------	907	228	190	38,000	------	------	837	184,140
South Carolina	144	200	------	------	432	208	80	16,000	------	------	385	80,850
Georgia	416	150	.4	100	997	220	470	70,500	------	------	1,005	216,175
Florida	260	131	------	------	321	146	190	27,100	------	------	325	45,500
South Atlantic	1,383	167	4	101	3,514	214	1,364	232,640	3	300	3,417	735,425
Kentucky	707	190	9	75	620	250	550	97,875	7	525	620	155,000
Tennessee	502	186	7	125	770	211	431	89,400	6	750	615	159,900
Alabama	153	186	1	150	720	230	220	37,600	2	300	676	135,200
Mississippi	110	150	.8	130	618	200	80	12,000	3	420	620	124,000
Arkansas	202	150	2	100	659	200	223	33,450	2	200	491	98,200
Louisiana	118	170	4	119	331	160	84	12,600	4	600	301	48,160
Oklahoma	610	204	12	82	441	252	857	173,900	13	1,300	425	106,250
Texas	624	211	21	100	777	254	828	174,540	14	1,400	764	198,640
South Central	3,026	192	56	98	4,935	223	3,273	631,365	51	5,495	4,512	1,025,350
Montana	246	200	1	100	122	220	282	56,400	------	------	130	28,600
Idaho	329	190	.6	117	66	247	250	47,500	------	------	70	16,450
Wyoming	105	182	.8	100	32	234	129	24,510	------	------	31	7,130
Colorado	500	226	8	100	88	240	554	125,575	6	600	88	21,120
New Mexico	38	200	.4	100	31	234	40	8,000	------	------	30	6,000
Arizona	18	200	.2	100	10	198	17	3,400	------	------	10	1,900
Utah	55	163	2	100	47	200	76	11,400	3	300	39	7,800
Nevada	29	175	------	------	12	200	27	4,980	------	------	15	3,000
Washington	163	210	17	100	106	228	169	35,815	18	1,800	109	23,980
Oregon	242	200	17	125	96	218	249	49,710	18	1,800	98	20,580
California	592	187	4	100	112	209	700	127,200	3	300	120	24,000
Western	2,316	200	50	109	721	223	2,493	494,490	48	4,800	740	160,560
United States	55,502	225	614	107	15,542	2315	7,520	13,040,460	562	60,690	14,992	3,474,883

Bureau of Agricultural Economics. Estimates Division of Crop and Livestock Estimates.

[1] Preliminary.

TABLE 396.—*Hogs: Value of production and income, average 1924–1928, annual 1929*

State and division	Average 1924–1928				1929 [1]			
	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	573	1,687	2,260	2,069	525	1,446	1,971	1,666
New Hampshire	168	466	633	617	178	523	701	522
Vermont	434	1,281	1,715	1,541	494	1,432	1,926	1,645
Massachusetts	582	2,107	2,689	2,601	597	3,121	3,718	3,213
Rhode Island	40	152	192	173	57	188	245	217
Connecticut	292	486	778	704	303	800	1,103	916
New York	4,435	7,476	11,912	10,682	3,218	6,191	9,409	7,691
New Jersey	712	1,362	2,074	1,906	602	1,131	1,733	1,578
Pennsylvania	10,020	16,353	26,373	23,862	9,140	17,739	26,879	23,868
North Atlantic	17,257	31,370	48,627	44,155	15,114	32,571	47,685	41,316
Ohio	15,146	61,905	77,051	74,558	14,638	58,227	72,865	66,390
Indiana	13,974	82,338	96,312	94,572	13,485	88,099	101,584	97,470
Illinois	15,116	131,520	146,636	143,250	14,904	129,757	144,661	139,616
Michigan	4,211	20,480	24,690	23,091	3,916	17,648	21,564	19,271
Wisconsin	7,954	45,658	53,612	52,453	7,871	42,405	50,276	46,708
Minnesota	7,389	95,791	103,179	102,256	6,915	92,958	99,873	98,042
Iowa	12,188	270,760	282,947	278,298	11,054	276,903	287,957	280,992
Missouri	17,479	92,443	109,921	109,057	18,177	99,900	118,077	109,563
North Dakota	4,181	16,775	20,957	20,594	3,669	18,681	22,350	21,487
South Dakota	3,445	62,653	66,098	64,333	3,453	64,457	67,910	64,979
Nebraska	6,197	126,461	132,658	131,831	6,045	137,991	144,036	142,018
Kansas	8,016	56,421	64,437	64,944	7,649	69,666	77,315	72,954
North Central	115,296	1,063,204	1,178,500	1,159,237	111,776	1,096,692	1,208,468	1,159,490
Delaware	227	534	761	706	209	580	789	738
Maryland	3,061	2,242	5,304	5,055	2,988	2,929	5,917	5,537
Virginia	8,904	7,033	15,936	15,128	10,034	6,613	16,647	15,278
West Virginia	3,682	2,835	6,517	6,185	3,903	3,182	7,085	6,549
North Carolina	18,439	7,241	25,680	24,299	16,748	7,908	24,656	22,201
South Carolina	8,525	3,518	12,043	10,879	7,600	2,230	9,830	9,175
Georgia	17,993	8,253	26,246	25,068	16,724	8,478	25,202	23,661
Florida	2,440	5,008	7,448	6,841	2,184	4,061	6,245	5,580
South Atlantic	63,272	36,663	99,935	94,162	60,390	35,981	96,371	88,719
Kentucky	13,457	15,734	29,191	27,696	13,080	11,977	25,057	23,161
Tennessee	13,527	11,647	25,174	23,479	12,514	10,703	23,217	20,978
Alabama	12,672	5,108	17,780	17,127	9,534	5,072	14,606	13,399
Mississippi	8,849	3,892	12,741	11,891	8,134	3,242	11,376	9,682
Arkansas	8,950	5,047	13,997	13,509	6,603	4,608	11,211	9,943
Louisiana	3,694	2,790	6,484	5,969	3,316	2,022	5,338	4,838
Oklahoma	9,394	11,689	21,083	21,073	8,689	15,718	24,407	20,932
Texas	16,061	14,554	30,615	29,281	15,033	17,534	32,567	29,770
South Central	86,605	70,461	157,066	150,024	76,903	70,876	147,779	132,703
Montana	1,852	5,237	7,089	6,999	1,978	5,944	7,922	7,655
Idaho	1,362	6,221	7,583	7,330	1,344	4,797	6,141	5,410
Wyoming	547	1,802	2,349	2,371	508	2,278	2,786	2,696
Colorado	1,662	10,885	12,547	12,368	1,648	12,177	13,825	13,137
New Mexico	518	789	1,307	1,279	423	793	1,216	1,213
Arizona	120	446	567	535	121	435	556	535
Utah	687	1,103	1,791	1,728	546	1,241	1,787	1,617
Nevada	200	577	777	758	234	530	764	719
Washington	1,434	4,855	6,289	6,001	1,370	4,841	6,211	5,482
Oregon	1,254	5,735	6,989	6,697	1,238	5,978	7,216	6,415
California	1,840	12,759	14,599	14,696	1,797	14,102	15,899	14,701
Western	11,478	50,409	61,888	60,763	11,207	53,116	64,323	59,580
United States	293,908	1,252,107	1,546,016	1,508,342	275,390	1,289,236	1,564,626	1,481,808

Bureau of Agricultural Economics. Estimates Division Crop and Livestock Estimates.

[1] Preliminary.

TABLE 397.—*Sheep and lambs: Number and value per head in the United States in 1840, 1850, 1860, 1867–1931*

Year	On farms: Number [1]	On farms: Value per head, Jan. 1	On farms and elsewhere, Jan. 1 [2]	Year	On farms: Number [1]	On farms: Value per head, Jan. 1	On farms and elsewhere, Jan. 1 [2]
	Thous.	*Dollars*	*Thous.*		*Thous.*	*Dollars*	*Thous.*
1840 [3]	*19,311*			1900 [4]	41,883		48,100
1850 [3]	*21,723*		29,100	1900 [3]	*61,504*		
1860 [3]	*22,471*		27,600	1900	44,573	2.93	44,804
1867	39,385	2.50	38,100	1901	46,155	2.98	46,395
1868	38,992	1.82	37,600	1902	46,667	2.65	46,910
1869	37,724	1.64	36,200	1903	45,180	2.63	45,415
1870 [3]	*28,478*			1904	42,439	2.59	42,660
1870	40,853	1.96	39,000	1905	40,268	2.82	40,477
1871	31,851	2.14	38,900	1906	42,454	3.54	42,675
1872	31,679	2.61	38,600	1907	44,518	3.84	44,749
1873	33,002	2.71	40,100	1908	46,557	3.88	46,799
1874	33,938	2.43	41,100	1909	48,382	3.43	48,634
1875	33,784	2.55	40,800	1910 [3]	*52,448*		
1876	35,935	2.37	43,300	1910	47,072	4.12	47,463
1877	35,804	2.13	43,000	1911	47,349	3.91	47,742
1878	35,740	2.21	42,800	1912	43,279	3.46	43,638
1879	38,124	2.07	45,500	1913	40,700	3.94	41,038
1880 [3]	*35,192*			1914	37,773	4.02	38,087
1880	40,766	2.21	48,500	1915	36,287	4.50	36,588
1881	43,570	2.39	51,200	1916	36,543	5.17	36,846
1882	45,016	2.37	52,300	1917	36,700	7.13	37,005
1883	49,237	2.53	56,600	1918	39,000	11.82	39,324
1884	50,627	2.37	57,500	1919	41,000	11.63	41,340
1885	50,360	2.14	56,500	1920 [3]	*35,034*		
1886	48,322	1.91	53,600	1920	40,243	10.46	40,694
1887	44,759	2.01	49,100	1921	38,690	6.28	39,123
1888	43,545	2.05	47,200	1922	36,186	4.80	36,591
1889	42,599	2.13	45,700	1923	36,212	7.53	36,618
1890 [3]	*35,935*			1924	36,876	7.91	37,289
1890	44,336	2.27	47,000	1925 [3]	*35,590*		
1891	43,431	2.50	46,400	1925	38,112	9.70	38,539
1892	44,938	2.58	48,400	1926	39,730	10.51	40,175
1893	47,274	2.66	51,300	1927	41,881	9.71	42,350
1894	45,048	1.98	49,300	1928	44,795	10.24	45,264
1895	42,294	1.58	46,700	1929	47,704	10.62	48,173
1896	38,299	1.70	42,600	1930	50,503	8.92	50,972
1897	36,819	1.82	41,300	1931 [5]	51,911	5.35	52,380
1898	37,657	2.46	42,600				
1899	39,114	2.75	44,600				

Bureau of Agricultural Economics.

[1] Prior to 1900 estimates for each 10-year period represent an index of annual changes applied to census as base on first report after census data were available. Figures for 1900–1919 are tentative revised estimates of the Bureau of Agricultural Economics as first published in 1927 Yearbook.

[2] Data for sheep on farms and elsewhere as of Jan. 1, prior to 1900, estimated by the Bureau of Animal Industry. Census figures prior to 1920 were adjusted to a Jan. 1 basis and to include all ages and all animals in towns, villages, and ranges, as well as on farms. For methods see Department Circular 241. Figures from 1900–1927 are the estimates of the Bureau of Agricultural Economics of sheep on farms plus an estimate made by the Bureau of Animal Industry of sheep in towns and villages; 1928–1931 are estimates of the Bureau of Agricultural Economics.

[3] Italic figures are from the census. Figures for census years 1860, 1880, and 1890 exclude an estimated number of unenumerated sheep on ranges, as follows: 1860, 1,505,810; 1880, 7,000,000; 1890, 4,940,948. Censuses prior to 1900 excluded lambs. Census dates were June 1 from 1840 to 1900; Apr. 15, 1910; Jan. 1, 1920 and 1925.

[4] Original estimate of the Bureau of Agricultural Economics.

[5] Preliminary.

TABLE 398.—*Sheep and lambs: Estimated number on farms and value per head, by States, January 1, 1927–1931*

State and division	Number					Value per head [1]				
	1927	1928	1929	1930	1931 [2]	1927	1928	1929	1930	1931 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	92	92	84	82	82	8.30	8.50	8.40	8.50	5.70
New Hampshire	20	21	19	20	18	9.00	9.50	9.60	9.40	6.20
Vermont	43	44	42	41	42	9.40	9.30	9.00	9.30	5.70
Massachusetts	11	11	12	13	13	9.80	10.60	10.00	9.60	7.30
Rhode Island	2	2	2	2	2	10.00	10.50	11.00	11.50	7.50
Connecticut	7	8	8	7	8	10.40	10.80	11.90	11.40	7.90
New York	477	491	452	461	433	10.80	11.10	11.40	10.60	6.30
New Jersey	6	6	6	6	6	11.80	12.20	11.50	11.70	7.70
Pennsylvania	400	437	441	467	481	9.40	9.50	9.60	9.60	5.90
North Atlantic	1,058	1,112	1,066	1,099	1,085	9.98	10.14	10.28	9.95	6.06
Ohio	2,133	2,005	2,005	2,105	2,021	8.50	8.90	9.00	8.50	4.60
Indiana	731	705	724	769	800	10.10	11.00	11.20	10.50	5.60
Illinois	800	630	680	693	678	10.00	10.60	10.80	10.00	5.80
Michigan	1,314	1,314	1,380	1,352	1,257	10.40	10.90	10.90	10.10	5.20
Wisconsin	469	430	440	493	542	9.60	10.20	10.40	9.00	5.30
Minnesota	628	666	745	865	995	9.70	10.50	10.80	9.50	5.10
Iowa	1,047	939	1,049	1,131	1,109	10.20	10.80	11.00	9.90	5.50
Missouri	986	942	1,131	1,146	1,116	9.70	10.10	10.70	9.10	5.00
North Dakota	460	529	620	720	814	10.20	10.80	11.10	9.70	5.00
South Dakota	749	854	970	1,139	1,230	9.90	10.60	10.60	9.00	5.00
Nebraska	684	905	1,050	1,208	966	8.70	9.10	9.50	8.20	4.70
Kansas	475	512	632	659	741	9.40	9.30	9.20	8.40	4.50
North Central	10,476	10,431	11,426	12,280	12,269	9.59	10.11	10.31	9.24	5.06
Delaware	2	2	2	2	2	10.00	12.00	11.50	11.50	7.00
Maryland	98	101	108	111	109	10.30	11.60	11.50	11.50	6.90
Virginia	380	426	452	470	470	10.30	11.50	11.80	11.00	6.70
West Virginia	500	565	593	629	654	10.10	11.10	11.40	10.00	6.00
North Carolina	80	85	94	88	92	7.40	9.10	9.10	8.70	5.80
South Carolina	14	15	15	15	14	4.90	4.90	4.90	4.90	4.50
Georgia	51	46	48	49	51	3.60	3.80	4.00	4.20	3.80
Florida	59	59	59	56	56	3.20	3.60	4.30	4.00	3.20
South Atlantic	1,184	1,299	1,371	1,420	1,448	9.31	10.49	10.73	9.89	6.09
Kentucky	871	958	996	996	936	10.70	11.20	11.40	10.40	6.50
Tennessee	300	345	352	366	384	10.10	9.70	9.80	9.60	5.80
Alabama	53	66	72	68	64	3.70	4.40	4.20	4.40	3.40
Mississippi	76	45	38	34	34	3.30	3.40	3.30	3.50	2.90
Arkansas	54	54	50	50	52	5.80	6.10	6.50	5.90	3.40
Louisiana	102	107	110	115	118	3.00	3.00	3.30	3.40	2.70
Oklahoma	84	117	152	167	184	9.20	8.60	9.90	8.90	4.60
Texas	4,065	4,715	5,187	5,550	6,050	7.80	8.40	8.80	6.90	4.10
South Central	5,605	6,407	6,957	7,346	7,822	8.23	8.67	9.09	7.49	4.44
Montana	3,053	3,358	3,727	4,200	4,326	10.50	11.10	11.40	9.30	5.00
Idaho	1,974	2,110	2,216	2,260	2,373	10.80	11.40	11.90	9.80	6.10
Wyoming	3,100	3,193	3,480	3,515	3,866	10.20	10.60	11.60	9.20	5.80
Colorado	1,938	2,960	2,980	3,495	3,047	9.40	9.60	10.60	9.00	5.50
New Mexico	2,250	2,362	2,362	2,527	2,780	8.70	9.00	10.40	7.90	4.80
Arizona	1,230	1,132	1,177	1,189	1,261	9.10	9.30	9.60	8.10	4.80
Utah	2,650	2,730	2,785	2,813	2,926	10.80	11.20	11.60	9.60	6.40
Nevada	1,198	1,234	1,172	1,088	1,175	10.60	11.00	10.80	9.20	6.30
Washington	526	580	638	657	683	11.00	11.60	12.10	9.70	6.10
Oregon	2,247	2,359	2,501	2,576	2,731	10.40	11.30	11.50	9.00	5.30
California	3,392	3,528	3,846	4,038	4,119	10.00	11.40	10.80	9.00	6.20
Western	23,558	25,546	26,884	28,358	29,287	10.12	10.68	11.16	9.07	5.65
United States	41,881	44,795	47,704	50,503	51,911	9.71	10.24	10.62	8.92	5.35

Bureau of Agricultural Economics. Estimates of crop-reporting board.

[1] Sum of total value of classes divided by total number and rounded to nearest dime for States. Division and United States averages not rounded.

[2] Preliminary.

TABLE 399.—*Sheep: Number in countries having 100,000 and over, average 1909–1913 and 1921–1925, annual 1926–1930*

Country	Month or estimate	Average 1909–1913 [1]	Average 1921–1925 [1]	1926	1927	1928	1929	1930
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
North America and West Indies:								
Canada	June	2,208	3,027	3,142	3,263	3,416	3,636	3,696
United States	January	43,235	37,215	39,730	41,881	44,795	47,704	50,503
Mexico	June	[2] [3] 3,424	[4] 1,362	2,698				
Guatemala		514	153	148	216	241	189	
Cuba							102	
Dominican Republic		(134)	148					
Estimated total [5]		49,800	42,300					
South America:								
Colombia		[6] 246	776	800	771			810
Venezuela		177	113					
Ecuador		(200)	(1,000)	700			[7] 1,500	
Peru		(6,000)	11,363		[7] 12,000		[7] 12,500	
Bolivia	December [8]	1,750	3,436	4,200	4,151		5,552	
Chile		3,477	4,332	[9] 4,094				
Brazil	September	10,550	[10] 7,933					
Uruguay		[3] [11] 26,286	[3] 14,443				[7] 19,358	
Paraguay	December [8]	[12] 600	(600)					
Argentina	do	[3] [13] 43,225	[3] [14] 36,209					[3] [13] 44,413
Falkland Islands		711	649	606	607	631	613	
Estimated total [5]		93,200	80,900					
Europe:								
Iceland		589	565	590	600	627		
England and Wales	June	18,346	14,385	16,859	17,072	16,390	16,105	16,328
Isle of Man	do	79	77	90	91	89	92	
Scotland	do	7,028	6,827	7,203	7,536	7,579	7,556	7,622
North Ireland	do	364	456	529	600	624	654	703
Irish Free State	do	3,423	2,804	3,003	3,120	3,264	3,375	3,515
Norway [15]	do	1,398	1,380	1,595	1,608	1,654	1,533	1,588
Sweden	June–September	1,205	1,384		806			
Denmark	July	533	380	233			191	
Faroe Islands		112	66					
Netherlands	May–June	842	668					[3] 484
Belgium	December [8]	189	126			[7] 122		
France	do	16,176	9,777	10,537	10,775	10,693	10,415	
Spain	do	15,778	19,229	20,067	20,529		[3] 19,950	
Portugal		[3] [16] 3,073	3,684		[7] 4,450	[7] 4,900		
Italy	March–April	11,615	12,014	[7] 12,350	[7] 12,500			
Switzerland	April	161	245	169				
Germany	December [8]	4,988	5,889	4,753	4,080	3,819	3,635	3,480
Austria	do	301	526	[17] 313			[7] 500	
Czechoslovakia	do	1,322	[3] [10] 986	861				
Hungary	April	2,406	1,661	1,804	1,611	1,566	1,573	1,464
Yugoslavia	January	10,496	7,728	7,933	7,736	7,722	7,736	
Greece	December [8]	5,884	5,965	6,636	6,951	6,442	6,920	
Bulgaria	do	8,551	8,186		[3] 8,739	8,427	7,986	
Rumania	do	11,128	11,660	12,950	13,582	12,941	12,801	12,406
Poland	November	4,473	2,193		1,918		2,523	
Lithuania		1,152	1,314	1,573	1,365	1,468	1,125	
Latvia	June	996	1,240	1,153	1,128	1,090	[7] 900	
Estonia	July	486	654	666	667	659	476	467
Finland	September	1,330	1,526	1,414	1,368	1,319	1,310	
Russia (European and Asiatic).[18]	Summer	[6] 111,051	93,569	113,865	126,835	133,592	134,000	100,600
Estimated total excluding Russia [5]		134,400	123,600					
Africa:								
Abysinnia (Ethiopia)		(1,500)	(2,000)				4,000	
Morocco		3,175	7,533	9,250	7,712	8,035	8,848	
Algeria	September	8,757	5,943	6,786	5,083	5,614	6,196	
Libia (Italian)		996	1,043			822		
Tunis	December [8]	705	1,794	1,329	2,172	2,142	2,173	2,461
French West Africa		(3,500)	3,742	4,365	3,968	4,037	4,823	
French Sudan		(2,000)	2,173		2,400	2,424		
Gold Coast		250	373	325	350	400	400	
Nigeria including British Cameroons		(1,900)	1,711	1,840	1,902	1,755	2,100	
Egypt	September	816	1,013	1,144	1,232	1,180	1,003	
Anglo-Egyptian Sudan		(1,500)	1,638	2,000	2,201	2,201	2,200	
British Somaliland		(1,500)	(2,000)	2,000	2,000	3,000	3,500	
Italian Somaliland	March 31	(1,500)	1,666			[3] 1,039	855	
Eritrea (Italian) [19]		1,585	1,701		1,842	[3] 1,897		
Kenya Colony	March–June	5,469	2,600	2,756	2,805	2,847	2,905	
French Cameroon [19]		(200)	287	410	456	441	441	
Uganda	December [8]	612	386	604	866	911	967	806
Belgian Congo		300	304	300	285	270	348	
Ruanda Urundi		(150)	150	125	125	110	125	

See footnotes at end of table.

TABLE 399.—*Sheep: Number in countries having 100,000 and over, average 1909–1913 and 1921–1925, annual 1926–1930*—Continued

Country	Month or estimate	Average 1909–1913	Average 1921–1925	1926	1927	1928	1929	1930
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Africa—Continued.								
British Southwest Africa		555	954	1, 069	1, 252	1, 524	1, 497	
Bechuanaland		358	125	132	152	152		
Union of South Africa.	August	30, 657	32, 561	39, 020	40, 271	42, 662	[20] 45, 174	[21] 49, 240
Basutoland		1, 369	1, 954	2, 100	2, 149	2, 100	2, 150	
Rhodesia, Southern	December [8]	300	333	349	332	352	359	
Tanganyika Territory.[19]		3, 596	3, 893	4, 462	4, 779	5, 062	5, 041	
Madagascar		318	110	116	66	142	201	
Estimated total [5]		73, 800	78, 300					
Asia:								
Arabia		(3, 500)	(3, 500)		[7] 3, 500			
Cyprus	March	279	237	207	260	264	273	
Turkey, European and Asiatic.		19, 713	10, 458	12, 872	13, 512	12, 124	[7] 11, 243	
Iraq (Mesopotamia)[19]	February	(5, 000)	5, 270	5, 055				
Palestine	March	(230)	271	291	243	227	232	
Persia		(16, 000)	16, 562	16, 562	[7] 14, 280	[7] 15, 000	[7] [8] 16, 000	
Syria and Lebanon		(2, 000)	1, 797	1, 400	1, 334	2, 079		
India, British	December–April	23, 164	22, 412	23, 201	23, 237	23, 350	23, 336	
Native States	do	8, 038	12, 299	11, 848	12, 353	12, 156		
China		25, 951					[17] 35, 000	
Philippines	December [8]	96	260	344	369	368	360	
Dutch East Indies—Java and Madura.	do	(800)	915		1, 292			
Outer Possessions	do	(110)	115		121			
Estimated total exclusive of Russia.[5]		115, 200	119, 400					
Oceania:								
Australia	December [8]	90, 706	85, 556	103, 563	104, 267	100, 827	103, 431	106, 117
New Zealand	April	23, 996	23, 382	24, 905	25, 649	27, 134	29, 051	30, 841
Estimated total [5]		114, 700	109, 000					
Total countries reporting all periods including Russia—								
Pre-war to 1929 (50).[22]		483, 570	436, 498	498, 616	514, 067	524, 225	536, 725	
Pre-war to 1930 (17).[22]		352, 737	323, 206	378, 520	395, 080	403, 975	413, 944	391, 837
Estimated world total, including Russia.[5]		692, 200	647, 100					

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture unless otherwise stated. Figures in parentheses are interpolated.

[1] Average for 5-year period if available, otherwise for any year or years within this period except as otherwise stated. In countries having changed boundaries the pre-war figures are estimates for 1 year only of numbers within present boundaries. For the pre-war average the years immediately preceding the war have been used.
[2] Year 1902.
[3] Census figures.
[4] Incomplete.
[5] These totals include countries with less than 100,000 interpolations for a few countries not reporting each year and rough estimates for some others.
[6] Year 1916.
[7] Unofficial.
[8] Countries reporting as of Dec. 31, are considered as of Jan. 1, of the following year, i. e., figures for number of sheep in France as of Dec. 31, 1925, have been placed in 1926 column.
[9] Year 1925.
[10] Year 1920.
[11] Year 1908.
[12] Year 1915.
[13] June, 1914 and 1930.
[14] December, 1922.
[15] In rural communities only.
[16] 1906.
[17] For Austria average of range from 300,000 to 325,000 and for China average of range from 25,000,000 to 45,000,000.
[18] Year 1916 from Soviet Union Review April, 1928, p. 62. Years 1924–1926. Statistical Review, October, 1928, p. 6. Year 1927. Agriculture Statistics of the U. S. S. R. Lenin Academy, 1927–1930. Planned Economy number 12, 1930. State Planning Board.
[19] Goats included.
[20] Number in towns assumed to be same as in 1927, i. e., 162,000 and added for purposes of comparison with preceding years.
[21] Estimate based on increase reported in June, 1930, compared with June, 1929.
[22] Comparable totals for number of countries indicated.

TABLE 400.—*Sheep: Receipts at principal public stockyards and at all public stockyards, 1921–1930*

Year	Chicago	Denver	East St. Louis	Fort Worth	Kansas City	Omaha	South St. Joseph	South St. Paul	Sioux City	Total nine markets [1]	All other stockyards reporting	Total all stockyards reporting
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1921	4,734	1,468	636	357	1,780	2,753	931	633	288	13,580	10,588	24,168
1922	3,874	1,867	628	325	1,574	2,533	730	499	223	12,253	10,111	22,364
1923	4,098	1,857	561	386	1,671	2,970	979	454	216	13,192	8,833	22,025
1924	4,192	2,040	489	373	1,569	2,844	1,089	476	310	13,382	8,819	22,201
1925	3,969	2,357	559	314	1,500	2,420	1,143	545	360	13,167	8,933	22,100
1926	4,405	1,826	636	445	1,762	2,780	1,303	773	449	14,379	9,489	23,868
1927	3,829	1,908	574	445	1,616	2,604	1,348	705	527	13,556	10,383	23,939
1928	3,868	2,295	510	458	1,767	3,037	1,580	891	568	14,974	10,623	25,597
1929	3,785	2,290	534	540	1,753	3,031	1,636	1,139	840	15,548	11,320	26,868
1930	4,335	2,062	584	432	2,016	3,410	1,634	1,354	1,188	17,015	12,793	29,808

Bureau of Agricultural Economics. Compiled from data of the livestock and meat-reporting service of the bureau. Receipts, 1900–1920, are available in 1924 Yearbook, p. 933, Table 540.

[1] Total of the rounded detail figures.

TABLE 401.—*Sheep: Receipts and stocker and feeder shipments at all public stockyards, 1921–1930*

RECEIPTS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1921	1,792	1,516	1,750	1,677	1,916	1,849	1,776	2,500	2,618	3,042	2,068	1,664	24,168
1922	1,835	1,399	1,465	1,227	1,692	1,700	1,677	1,951	2,303	3,311	2,288	1,516	22,364
1923	1,636	1,366	1,430	1,447	1,794	1,426	1,661	1,800	2,659	3,464	1,816	1,526	22,025
1924	1,697	1,412	1,367	1,348	1,344	1,550	1,672	2,005	3,027	3,295	1,879	1,605	22,201
1925	1,467	1,388	1,504	1,541	1,689	1,603	1,699	2,064	2,627	3,198	1,712	1,608	22,100
1926	1,548	1,486	1,694	1,502	1,717	1,913	1,739	2,277	3,279	3,090	1,917	1,706	23,868
1927	1,740	1,501	1,558	1,486	2,013	1,816	1,676	2,209	2,848	3,587	1,896	1,609	23,939
1928	1,705	1,669	1,520	1,591	1,952	1,913	1,898	2,362	3,386	3,938	2,053	1,610	25,597
1929	1,877	1,544	1,527	2,012	2,173	1,752	2,119	2,545	3,355	4,093	2,168	1,703	26,868
1930	1,903	1,803	2,151	2,230	2,334	2,230	2,296	2,583	3,580	3,784	2,607	2,307	29,808

STOCKER AND FEEDER SHIPMENTS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1921	88	62	84	107	123	89	139	404	555	731	511	202	3,095
1922	183	169	143	97	145	191	204	350	534	1,138	757	256	4,167
1923	171	169	114	82	216	117	188	341	897	1,489	540	154	4,478
1924	149	106	83	105	118	152	226	444	973	1,438	676	206	4,676
1925	138	119	94	109	178	137	193	421	857	1,392	475	219	4,332
1926	155	107	83	124	130	238	260	567	1,093	1,150	493	223	4,623
1927	207	136	140	118	259	257	215	389	943	1,560	497	174	4,895
1928	116	101	95	133	205	278	234	564	1,080	1,466	544	193	5,011
1929	188	115	122	210	218	226	231	639	1,027	1,831	575	183	5,565
1930	126	101	99	134	142	216	206	465	907	1,024	761	282	4,463

Bureau of Agricultural Economics. Compiled from data of livestock and meat-reporting service of bureau. Earlier data in 1930 Yearbook, p. 867, Table 399.

TABLE 402.—*Feeder sheep inspected: Shipments from public stockyards, 1921–1930*

Origin and destination	Calendar year									
	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Market origin:										
Chicago, Ill	530	709	683	730	590	784	517	441	532	368
Denver, Colo	576	954	1,002	1,092	1,022	764	1,133	1,004	1,083	760
East St. Louis, Ill	13	21	18	18	27	43	20	13	17	13
Fort Worth, Tex	41	65	39	61	62	87	63	106	91	83
Kansas City, Kans	251	243	281	280	215	282	283	280	184	183
Louisville, Ky	25	42	34	18	27	61	51	42	17	8
Ogden, Utah	------	------	------	------	------	------	------	85	121	106
Omaha, Nebr	722	768	863	867	611	894	885	882	973	8[illegible]6
Salt Lake City, Utah	------	------	------	------	------	------	------	132	72	46
Sioux City, Iowa	50	35	48	59	57	79	96	98	215	257
South St. Joseph, Mo	39	32	61	103	52	78	106	130	142	133
South St. Paul, Minn	66	46	73	52	49	62	57	69	110	139
All other inspected	67	96	75	75	72	120	130	114	108	99
Total	2,380	3,011	3,177	3,355	2,784	3,254	3,341	3,396	3,665	3,051
State destination:										
Colorado	325	679	727	715	610	358	722	730	875	482
Illinois	198	227	256	280	248	320	193	216	229	189
Indiana	135	104	150	166	186	270	162	104	162	123
Iowa	292	282	405	403	302	476	381	457	513	479
Kansas	93	141	120	183	179	189	234	256	220	235
Kentucky	32	56	39	23	33	63	58	44	20	11
Michigan	189	359	314	341	266	342	203	172	149	90
Minnesota	43	22	32	28	33	40	34	24	46	44
Missouri	181	172	190	198	138	172	177	171	126	145
Nebraska	639	692	736	780	608	705	909	864	949	884
Ohio	83	81	52	32	26	85	33	22	50	36
South Dakota	11	10	14	14	11	22	43	43	53	52
Texas	22	35	16	31	25	61	41	64	50	60
Wisconsin	43	31	40	55	41	50	34	58	68	72
All other	94	120	86	106	78	101	117	171	155	149
Total	2,380	3,011	3,177	[1] 3,355	2,784	3,254	3,341	3,396	3,665	3,051

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

[1] Includes 41 head shipped to Alaska.

TABLE 403.—*Feeder sheep, inspected: Shipments from public stockyards, by months, 1930*

Origin and destination	Jan.	Feb.	Mar.	Apr.	May	June
Market origin:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Chicago, Ill	19, 026	17, 092	11, 268	12, 652	5, 521	7, 392
Denver, Colo	4, 916	2, 772	4, 497	2, 471	2, 122	1, 332
East St. Louis, Ill	26	306	6	586	855	3, 161
Fort Worth, Tex	2, 640	4, 465	5, 090	5, 460	9, 226	10, 477
Kansas City, Kans	6, 575	9, 284	9, 937	5, 811	3, 994	6, 061
Louisville, Ky	----------	----------	242	150	58	1, 119
Ogden, Utah	9, 829	185	97	310	42	687
Omaha, Nebr	26, 634	20, 035	24, 574	38, 895	27, 624	26, 122
Salt Lake City, Utah	674	205	----------	----------	----------	1, 030
Sioux City, Iowa	11, 105	9, 854	9, 320	3, 177	1, 199	2, 755
South St. Joseph, Mo	6, 361	1, 103	1, 152	1, 841	867	2, 849
South St. Paul, Minn	7, 552	5, 945	3, 887	2, 261	336	506
All other inspected	2, 356	2, 227	2, 585	1, 498	4, 379	7, 122
Total	97, 694	73, 473	72, 655	75, 112	56, 223	70, 613
State destination:						
Colorado	10, 042	1, 459	1, 668	2, 048	2, 235	2, 750
Illinois	7, 893	4, 500	3, 159	5, 133	4, 732	4, 479
Indiana	2, 040	662	2, 363	2, 843	2, 893	5, 346
Iowa	10, 922	7, 608	7, 333	3, 527	3, 941	9, 943
Kansas	9, 063	5, 623	4, 557	1, 914	2, 310	3, 168
Kentucky	----------	----------	522	290	410	2, 168
Michigan	7, 108	8, 594	5, 628	3, 828	757	1, 260
Minnesota	618	1, 817	382	102	84	506
Missouri	2, 887	3, 975	2, 849	4, 178	2, 156	4, 498
Nebraska	32, 691	22, 534	29, 639	39, 960	27, 518	24, 655
Ohio	1, 359	570	854	472	33	796
South Dakota	2, 567	3, 995	1, 427	124	211	176
Texas	1, 211	2, 548	5, 083	4, 571	4, 474	5, 958
Wisconsin	3, 942	5, 486	3, 028	3, 324	644	700
All other	5, 351	4, 102	4, 163	2, 798	3, 825	4, 210
Total	97, 694	73, 473	72, 655	75, 112	56, 223	70, 613

Origin and destination	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Market origin:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Chicago, Ill	18, 567	43, 126	70, 877	104, 348	36, 982	21, 585	368, 436
Denver, Colo	4, 543	12, 084	133, 614	266, 525	243, 573	81, 954	760, 403
East St. Louis, Ill	1, 514	1, 047	2, 535	1, 681	600	223	12, 540
Fort Worth, Tex	6, 216	5, 852	12, 678	10, 464	4, 786	5, 393	82, 747
Kansas City, Kans	6, 722	15, 231	36, 622	60, 377	13, 173	8, 764	182, 551
Louisville, Ky	1, 568	1, 765	2, 864	555	106	----------	8, 427
Ogden, Utah	1, 124	1, 975	25, 453	33, 606	24, 429	8, 480	106, 217
Omaha, Nebr	49, 820	131, 677	258, 078	180, 072	33, 521	38, 972	856, 024
Salt Lake City, Utah	----------	----------	6, 909	26, 064	8, 069	2, 980	45, 931
Sioux City, Iowa	7, 634	23, 326	48, 561	103, 858	22, 151	13, 630	256, 570
South St. Joseph, Mo	4, 543	9, 137	37, 342	31, 743	20, 322	15, 611	132, 871
South St. Paul, Minn	1, 536	7, 264	24, 799	50, 995	23, 135	10, 555	138, 771
All other inspected	11, 710	11, 944	21, 321	16, 535	10, 535	6, 953	99, 165
Total	115, 497	264, 428	681, 653	886, 823	441, 382	215, 100	3, 050, 653
State destination:							
Colorado	3, 923	4, 766	32, 253	143, 348	200, 400	76, 938	481, 830
Illinois	8, 933	31, 506	46, 609	49, 467	18, 031	4, 421	188, 863
Indiana	13, 075	22, 653	31, 655	31, 191	6, 067	2, 674	123, 462
Iowa	27, 169	101, 999	167, 412	106, 044	21, 640	11, 376	478, 914
Kansas	4, 018	5, 318	63, 834	87, 166	31, 542	16, 252	234, 765
Kentucky	1, 573	1, 882	3, 666	623	106	4	11, 244
Michigan	2, 876	2, 949	11, 453	18, 258	13, 709	13, 390	89, 810
Minnesota	619	5, 103	11, 771	16, 225	5, 161	1, 488	43, 876
Missouri	4, 761	10, 298	36, 302	38, 525	16, 891	17, 847	145, 167
Nebraska	33, 248	57, 863	207, 890	271, 571	93, 009	43, 414	883, 992
Ohio	677	3, 269	3, 540	16, 507	6, 233	1, 959	36, 269
South Dakota	1, 609	5, 702	10, 627	19, 238	2, 474	3, 444	51, 594
Texas	5, 251	3, 366	11, 007	8, 902	3, 160	4, 390	59, 921
Wisconsin	1, 919	2, 999	8, 341	28, 063	7, 442	6, 470	72, 358
All other	5, 846	4, 755	35, 293	51, 695	15, 517	11, 033	148, 588
Total	115, 497	264, 428	681, 653	886, 823	441, 382	215, 100	3, 050, 653

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

TABLE 404.—*Farm prices of sheep, per head, by ages, United States, January 1, 1912–1931*

Jan. 1—	Under 1 year old	Ewes 1 year and over	Wethers 1 year and over	Rams	Jan. 1—	Under 1 year old	Ewes 1 year and over	Wethers 1 year and over	Rams
	Dollars	*Dollars*	*Dollars*	*Dollars*		*Dollars*	*Dollars*	*Dollars*	*Dollars*
1912	2.64	3.45	3.43	8.26	1922	4.25	4.83	4.05	11.31
1913	3.11	3.98	3.93	8.80	1923	6.80	7.67	5.90	14.30
1914	3.22	4.09	4.06	8.49	1924	6.97	8.10	5.98	15.55
1915	3.62	4.59	4.48	9.01	1925	8.53	10.02	7.13	16.91
1916	4.13	5.35	5.02	10.32	1926	9.04	11.01	7.32	18.45
1917	5.63	7.48	6.78	13.62	1927	7.91	10.32	6.60	18.73
1918	9.06	12.70	11.26	20.84	1928	8.45	10.86	7.23	19.63
1919	8.82	12.44	11.02	21.90	1929	8.93	11.19	7.64	20.27
1920	8.07	11.04	9.64	21.94	1930	7.85	9.13	6.41	19.48
1921	5.33	6.38	5.94	15.13	1931	4.64	5.45	3.39	13.00

Bureau of Agricultural Economics. Based on returns from special price reporters. Average price, by States, weighted by estimated numbers each age group.

TABLE 405.—*Sheep: Estimated average price per 100 pounds received by producers, United States, 1921–1930*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	5.30	5.01	5.27	5.11	5.11	4.74	4.34	4.38	4.11	3.96	3.84	4.10	4.65
1922	4.57	5.71	6.51	6.43	6.65	6.09	6.11	5.98	5.70	5.93	6.02	6.27	5.96
1923	6.88	6.83	7.06	7.20	6.92	6.43	6.43	6.22	6.57	6.33	6.20	6.39	6.65
1924	6.71	6.82	7.22	7.45	7.33	7.09	6.60	6.32	6.30	6.32	6.39	6.84	6.81
1925	7.86	8.41	8.20	8.42	7.53	7.04	7.17	7.32	7.27	7.31	7.51	7.79	7.70
1926	7.95	8.20	7.66	7.67	7.78	7.56	7.09	6.92	7.13	6.93	6.75	6.95	7.43
1927	6.87	7.16	7.41	7.40	7.68	7.27	7.16	7.13	7.06	7.05	7.42	7.38	7.26
1928	7.52	7.60	7.85	8.11	8.09	7.84	7.56	7.53	7.58	7.50	7.50	7.29	7.68
1929	7.84	7.98	8.36	8.40	8.09	7.86	7.25	7.32	7.01	6.83	6.75	6.61	7.55
1930	6.91	6.84	6.59	6.44	5.86	5.52	4.65	4.13	4.21	3.93	3.98	3.96	5.36

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of sheep Jan. 1, by States; yearly price obtained by weighting monthly prices by Federal inspected slaughter. For previous data see 1930 or earlier yearbooks.

TABLE 406.—*Lambs: Estimated average price per 100 pounds received by producers, United States, 1921–1930*

Year beginning June	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	7.59	7.37	6.99	6.27	5.98	6.12	6.60	7.33	8.87	10.21	10.54	10.39	7.83
1922	9.87	9.55	9.39	9.43	10.06	10.30	10.49	10.69	10.83	11.01	10.69	11.00	10.30
1923	10.72	10.60	9.96	10.28	10.17	10.01	10.10	10.19	10.53	11.22	11.32	11.43	10.54
1924	11.21	10.50	10.15	10.18	10.35	10.55	10.96	12.69	13.13	13.48	12.22	11.99	11.45
1925	11.62	11.71	11.80	11.95	12.04	12.20	12.67	12.79	12.02	11.56	11.32	11.78	11.98
1926	12.07	11.52	11.12	11.32	11.31	11.11	10.92	10.65	10.84	11.55	11.97	11.92	11.36
1927	11.95	11.44	11.15	11.14	11.22	11.42	11.39	11.34	11.90	12.31	12.73	13.03	11.76
1928	13.18	12.25	11.88	11.97	11.57	11.50	11.41	12.23	12.60	13.12	13.36	12.79	12.31
1929	12.31	11.90	11.46	11.08	10.97	10.74	10.76	11.10	10.46	9.63	9.02	8.92	10.71
1930	9.02	8.08	6.82	6.67	6.15	6.21	6.18	-----	-----	-----	-----	-----	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of lambs Jan. 1, by States; yearly price obtained by weighted monthly prices by receipts at principal markets. For previous data see 1930 or earlier yearbooks.

TABLE 407.—*Sheep and lambs: Average price per 100 pounds at Chicago, by months, 1905–1930*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average [1]
						SHEEP							
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1905	5.15	5.55	5.50	5.08	4.75	4.72	5.10	4.95	4.72	5.10	5.10	5.25	5.08
1906	5.40	5.12	5.28	5.35	5.55	5.45	5.25	4.98	5.15	4.90	5.05	5.08	5.21
1907	5.15	5.20	5.50	5.65	5.78	5.90	5.32	5.32	5.18	4.82	4.38	4.18	5.20
1908	4.80	5.10	5.90	5.70	5.40	4.65	4.05	3.80	3.75	4.05	4.20	4.30	4.64
1909	4.90	5.00	5.25	5.65	6.15	5.30	4.70	4.60	4.65	4.30	4.55	4.85	4.99
1910	5.55	6.50	7.60	7.60	6.55	5.10	4.20	4.20	4.25	3.95	3.70	3.90	5.26
1911	4.10	4.15	4.70	4.20	4.45	3.80	3.95	3.50	3.80	3.65	3.45	3.55	3.94
1912	4.30	4.15	5.30	5.90	6.15	4.50	4.25	4.05	4.15	4.00	4.05	4.45	4.60
1913	5.35	5.90	6.40	6.45	5.85	5.05	4.50	4.35	4.30	4.55	4.60	4.95	5.19
1914	5.50	5.70	5.95	6.25	5.65	5.10	5.40	5.55	5.30	5.20	5.65	5.40	5.56
1915	5.80	6.45	7.45	7.70	7.35	5.50	6.05	6.25	5.75	6.00	5.85	6.20	6.36
1916	7.20	7.75	8.25	8.15	8.20	7.35	7.25	7.35	7.80	7.50	8.00	9.00	7.82
1917	10.00	11.25	11.70	12.10	13.00	10.00	9.10	9.75	11.15	11.65	11.25	11.50	11.04
1918	12.20	12.35	13.60	15.65	14.75	13.40	12.65	13.15	11.80	10.45	9.85	9.40	12.44
1919	10.35	11.35	14.05	14.50	12.25	9.30	9.70	9.75	8.30	8.15	8.30	9.60	10.47
1920	11.80	13.35	13.40	14.25	12.25	8.50	8.90	7.70	6.85	6.45	5.75	4.70	9.49
1921	5.07	4.90	6.14	6.58	6.33	4.46	5.08	4.53	4.49	4.71	4.40	4.92	5.13
1922	7.26	8.28	9.17	9.33	7.35	5.59	6.12	5.63	6.05	6.25	7.48	7.28	7.15
1923	7.72	8.08	8.64	8.90	6.74	5.00	5.16	7.09	7.25	6.35	6.89	7.37	7.10
1924	8.16	9.12	10.50	10.21	8.11	5.82	5.66	6.18	5.46	6.60	6.62	8.45	7.57
1925	10.33	9.69	9.22	7.84	7.96	6.25	7.48	6.83	6.95	7.64	8.16	9.57	8.16
1926	9.72	9.18	8.82	8.87	7.97	5.85	5.97	6.50	6.25	6.12	5.88	5.86	7.25
1927	6.94	8.03	8.88	9.62	7.44	5.88	6.25	6.47	6.14	6.00	6.40	6.41	7.04
1928	7.03	8.96	9.47	10.16	8.53	6.12	6.28	6.72	6.34	6.18	5.84	7.03	7.39
1929	9.32	8.78	9.72	10.34	6.77	6.28	5.85	5.34	4.56	4.70	5.38	5.41	6.87
1930	6.50	5.53	5.59	5.66	5.31	3.38	3.12	3.53	3.50	3.10	3.34	3.22	4.32
						LAMBS							
1905	7.15	7.40	7.05	6.80	6.25	5.90	6.30	7.05	7.00	7.05	6.90	7.25	6.84
1906	7.25	6.75	6.40	6.20	6.65	6.75	6.90	7.00	7.15	6.95	6.90	7.10	6.83
1907	7.30	7.30	7.55	8.05	7.80	7.20	7.05	6.90	6.90	6.80	6.05	5.70	7.05
1908	6.80	6.70	7.20	7.25	6.65	5.75	6.20	6.05	5.35	5.50	5.85	6.70	6.33
1909	7.35	7.50	7.65	7.85	8.25	7.60	7.70	7.35	6.80	6.50	7.10	7.50	7.43
1910	8.30	8.65	9.40	9.10	8.40	7.60	7.10	6.70	6.80	6.65	6.25	6.10	7.59
1911	6.20	6.05	6.10	5.50	5.85	6.10	6.30	6.35	5.70	5.75	5.45	5.75	5.92
1912	6.50	6.15	7.30	7.95	8.30	6.90	7.25	7.10	7.00	6.75	7.15	7.75	7.18
1913	8.55	8.50	8.60	8.40	7.40	6.85	7.55	7.40	7.15	7.05	7.25	7.60	7.69
1914	7.90	7.60	7.65	7.60	8.10	7.95	8.45	8.15	7.80	7.60	8.75	8.30	7.99
1915	8.40	8.75	9.55	9.65	10.10	9.20	8.75	8.90	8.75	8.75	8.80	9.00	9.05
1916	10.30	10.90	11.10	10.45	10.75	9.55	10.55	10.75	10.60	10.15	11.40	12.70	10.77
1917	13.85	14.30	14.25	14.40	16.90	15.25	15.65	15.50	17.50	17.40	16.75	16.45	15.68
1918	17.20	16.60	17.55	19.20	18.00	16.85	18.50	17.50	17.25	15.35	15.10	14.60	16.98
1919	16.25	17.40	19.05	18.15	16.25	14.05	17.10	16.75	14.85	15.00	14.50	16.40	16.31
1920	19.50	19.95	18.80	18.80	17.40	14.25	15.55	13.20	13.30	12.35	11.70	11.20	15.50
1921	10.72	9.07	9.91	9.69	11.07	10.67	10.09	9.46	8.86	8.66	9.25	10.86	9.86
1922	12.67	14.49	15.39	14.10	12.95	12.42	13.04	12.51	13.53	13.94	14.17	14.93	13.68
1923	14.69	14.85	14.56	14.42	14.12	14.81	14.22	12.89	13.52	12.93	12.75	12.96	13.89
1924	13.53	14.95	16.06	16.22	15.23	14.12	13.79	13.57	13.38	13.52	14.03	16.47	14.57
1925	18.28	17.59	16.28	14.85	13.06	15.86	15.11	14.88	15.19	15.20	15.44	16.15	15.66
1926	15.28	13.78	13.48	14.38	15.30	16.66	14.31	14.20	14.05	13.88	13.25	12.57	14.26
1927	12.64	13.28	15.27	15.87	14.75	15.66	14.25	13.68	13.46	13.70	13.80	13.14	14.12
1928	13.16	15.39	16.26	16.81	16.10	16.84	15.61	14.72	14.29	13.12	13.31	14.31	14.99
1929	16.37	16.53	17.07	16.82	13.62	15.35	14.38	13.50	13.19	12.72	12.72	13.22	14.62
1930	13.28	11.03	10.28	9.38	9.73	12.28	10.18	9.39	8.24	7.72	7.34	7.43	9.69

Bureau of Agricultural Economics. Figures prior to 1921 are from the Chicago Drovers Journal Yearbook, average native and western sheep and average aged lambs. Subsequent figures are bulk of sales prices from data of the livestock and meat reporting service of the bureau. For lamb prices 1901–1904, see 1927 Yearbook, p. 1031.

[1] Simple average of monthly prices.

TABLE 408.—*Sheep and lambs: Average price per 100 pounds at Chicago and Omaha, by months, 1928–1930*

Year and month	Chicago							Omaha						
	Lambs		Yearling wethers, 110 pounds down, Medium to Choice	Ewes		Feeder lambs		Lambs		Yearling wethers, 110 pounds down, Medium to Choice	Ewes		Feeder lambs	
	84 pounds down, Good and Choice	All weights, Cull and Common		120 pounds down, Medium to Choice	All weights, Cull and Common	Good and Choice	Medium	84 pounds down, Good and Choice	All weights Cull and Common		120 pounds down, Medium to Choice	All weights Cull and Common	Good and Choice	Medium
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
January	13.35	10.81	10.78	6.49	3.74	12.88	12.04	12.85	10.22	9.24	6.28	3.47	12.45	11.58
February	15.39	12.88	13.23	8.43	5.17	14.68	13.94	14.93	12.18	11.56	7.81	4.65	14.21	12.89
March	16.36	13.88	14.32	8.87	5.46	15.45	14.47	15.80	13.36	12.28	8.60	5.21	15.02	13.70
April	16.78	14.04	14.21	9.78	6.06	16.01	14.88	16.20	13.76	12.90	8.80	5.26	15.38	14.12
May	16.19	12.87	13.42	8.26	4.72	------	------	15.49	13.02	12.71	7.70	4.16	------	------
June	16.65	13.01	12.40	6.62	3.74	------	------	15.88	12.74	12.63	5.76	3.03	12.92	12.00
July	15.39	11.86	11.27	6.21	3.54	13.37	12.74	14.67	11.35	10.76	5.75	3.25	13.09	12.24
August	14.50	10.48	10.68	6.43	3.58	13.78	13.19	13.94	10.43	10.35	6.15	3.45	13.47	12.70
September	14.12	10.08	10.26	6.06	3.44	14.03	13.20	13.73	10.01	9.78	6.21	3.50	13.25	12.38
October	13.10	9.68	9.84	5.77	3.38	12.85	11.91	12.83	9.35	9.28	6.00	3.36	12.82	11.94
November	13.30	10.07	10.00	5.89	3.40	12.86	11.89	12.67	9.67	9.03	5.77	3.19	12.39	11.54
December	14.17	10.46	10.78	6.77	3.96	13.52	12.28	13.46	10.34	9.84	6.38	3.74	12.96	11.92
Average	14.94	11.68	11.77	7.13	4.18	------	------	14.37	11.37	10.86	6.77	3.86	------	------
1929														
January	16.39	12.27	12.44	9.14	5.87	14.69	13.12	15.70	11.91	11.82	8.32	5.34	14.82	13.54
February	16.64	12.89	12.95	8.76	5.89	15.23	13.62	16.01	12.29	12.00	8.62	5.50	15.18	13.98
March	16.99	13.34	13.29	9.63	6.28	15.58	13.88	16.26	12.66	12.29	9.25	5.92	15.26	13.84
April	16.87	13.74	13.28	10.20	6.52	15.87	14.11	16.56	13.35	12.66	9.56	6.05	15.34	13.75
May	13.78	10.78	10.88	6.88	4.33	------	------	13.27	10.84	10.29	6.52	3.80	------	------
June	15.32	12.23	10.16	6.22	4.05	13.03	12.00	14.80	12.25	10.12	6.15	3.68	12.92	11.82
		Common							Common					
July	14.31	11.34	10.17	6.06	3.94	13.12	12.00	13.91	11.25	10.19	6.01	3.60	12.93	11.70
August	13.49	10.20	9.68	5.62	3.69	13.08	11.92	12.79	9.84	9.14	5.50	3.42	12.78	11.63
September	13.21	9.89	9.44	4.87	3.38	12.72	11.55	12.70	9.48	8.84	4.75	3.00	12.51	11.45
October	12.71	9.99	9.19	4.79	3.19	12.63	11.43	12.22	9.40	8.43	4.79	3.00	12.32	11.28
November	12.77	10.02	9.46	5.19	3.40	12.45	11.30	12.07	9.41	8.38	5.03	3.00	12.00	10.90
December	13.19	10.38	9.88	5.47	3.66	12.23	11.12	12.28	9.75	8.62	5.12	3.00	11.92	10.80
Average	14.64	------	10.90	6.90	4.52	------	------	14.05	------	10.23	6.64	4.11	------	------
1930														
January	13.35	10.99	10.49	6.33	4.23	12.19	11.03	12.56	10.28	9.71	5.73	3.64	12.27	11.18
February	11.41	9.55	8.64	5.65	3.64	10.30	9.32	10.80	8.45	8.42	5.12	3.26	9.88	9.02
March	10.57	9.07	8.22	5.66	3.76	9.75	8.95	9.93	8.16	7.87	5.22	3.24	8.92	8.08
April	9.56	8.11	7.65	5.64	3.79	8.70	8.20	9.24	7.77	7.27	5.25	3.23	8.21	7.50
May	9.82	8.22	7.66	5.12	3.18	------	------	9.78	8.34	7.19	5.06	3.18	8.70	7.94
June	12.23	8.53	8.48	3.69	2.12	------	------	11.50	8.84	8.06	3.22	1.82	8.40	7.63
Average, 6 months	11.16	9.08	8.52	5.35	3.45	------	------	10.64	8.64	8.09	4.95	3.06	9.40	8.56
	90 lbs. down		90–110 lbs.	90–120 lbs.				90 lbs. down		90–110 lbs.	90–120 lbs.			
July	10.13	6.89	7.43	3.28	1.85	7.22	6.52	9.54	6.58	6.12	2.72	1.50	6.80	5.91
August	9.40	6.20	6.44	3.47	2.01	6.89	6.12	8.93	5.86	5.47	3.24	1.75	6.61	5.66
September	8.49	5.64	6.14	3.60	2.22	7.12	6.16	7.78	5.40	5.62	2.98	1.64	6.73	5.76
October	8.06	5.60	5.60	3.20	1.79	7.00	6.08	7.56	5.29	5.03	2.51	1.40	6.50	5.56
November	7.95	5.46	5.93	3.38	1.88	7.06	6.09	7.50	5.48	5.44	3.17	1.74	6.74	5.69
December	7.97	5.50	5.70	3.12	1.76	7.12	6.12	7.63	5.22	5.40	3.22	1.86	6.92	5.90
Average, 6 months	8.67	5.88	6.21	3.34	1.92	7.07	6.18	8.16	5.64	5.51	2.97	1.65	6.72	5.75

Bureau of Agricultural Economics. Compiled from data of the livestock and meat-reporting service of the bureau. Earlier data in 1927 Yearbook, pp. 1032–1034.

TABLE 409.—*Sheep and lambs: Monthly slaughter under Federal inspection, 1907–1930*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1907	1,017	837	842	861	769	735	865	900	892	973	793	769	10,252
1908	872	725	677	664	732	842	891	932	1,064	1,048	928	930	10,305
1909	906	806	903	839	712	843	964	1,019	1,153	1,169	1,029	1,000	11,343
1910	903	771	727	693	796	927	967	1,095	1,154	1,206	1,125	1,044	11,408
1911	1,130	1,019	1,059	974	1,085	1,146	1,150	1,268	1,257	1,428	1,304	1,200	14,020
1912	1,383	1,151	1,106	971	963	1,028	1,181	1,390	1,440	1,723	1,424	1,220	14,979
1913	1,192	961	883	1,049	1,127	1,135	1,273	1,243	1,486	1,514	1,258	1,284	14,406
1914	1,297	1,113	1,143	1,150	1,085	1,113	1,171	1,169	1,379	1,131	1,112	1,167	14,229
1915	1,196	946	986	830	739	883	984	1,139	1,220	1,116	1,132	1,041	12,212
1916	976	904	861	769	854	990	930	1,173	1,158	1,172	1,121	1,033	11,941
1917	956	819	861	777	632	710	688	766	740	822	764	809	9,345
1918	780	655	736	614	659	737	869	937	1,029	1,194	1,139	971	10,320
1919	1,004	754	738	808	894	931	1,160	1,234	1,292	1,414	1,227	1,235	12,691
1920	955	828	788	714	671	818	1,048	1,042	1,151	1,068	968	932	10,982
1921	1,068	958	1,075	1,041	985	1,116	1,060	1,237	1,249	1,285	1,040	890	13,005
1922	954	776	837	739	872	1,028	964	1,024	1,013	981	882	858	10,929
1923	1,021	836	977	960	972	914	962	957	990	1,046	915	978	11,529
1924	1,083	912	868	860	959	975	1,051	1,063	1,150	1,148	950	972	11,991
1925	990	854	984	1,012	1,030	999	1,071	1,031	1,086	1,083	879	981	12,001
1926	1,039	988	1,163	994	959	1,081	1,042	1,093	1,224	1,167	1,039	1,172	12,961
1927	1,115	1,006	1,027	960	992	1,058	1,014	1,168	1,185	1,194	1,071	1,094	12,883
1928	1,151	1,048	1,016	918	1,016	1,109	1,076	1,196	1,307	1,409	1,189	1,053	13,488
1929	1,150	953	1,006	1,119	1,202	1,108	1,255	1,298	1,317	1,365	1,159	1,091	14,023
1930	1,225	1,187	1,358	1,387	1,370	1,295	1,411	1,413	1,591	1,727	1,306	1,427	16,696

Bureau of Animal Industry.

TABLE 410.—*Sheep and lambs, slaughter statistics: Source of supply, classification, slaughter costs, weights, and yields, calendar year, 1923–1930*

Year and month	Source of supply		Age classification		Average live cost per 100 pounds	Average live weight	Dressed weight as percentage of live weight	By-product yield (on basis of live weight)	
	Stockyards	Other	Sheep	Lambs and yearlings				Edible fat [1]	Edible offal
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Dollars*	*Pounds*	*Per cent*	*Per cent*	*Per cent*
1923	85.97	14.03	13.16	86.84	12.63	80.80	48.07	2.85	1.94
1924	83.60	16.40	10.66	89.34	12.77	80.14	47.53	2.76	1.95
1925	82.44	17.56	10.30	89.70	14.22	81.58	47.82	2.74	2.24
1926	84.64	15.36	9.62	90.38	12.86	81.34	47.62	2.68	2.35
1927	85.42	14.58	8.91	91.09	12.97	81.66	47.74	2.64	2.44
1928	86.31	13.69	8.26	91.74	13.53	81.93	47.36	2.52	2.49
1929	83.99	16.01	8.77	91.23	13.24	82.57	47.19	2.43	2.51
1930	84.71	15.29	6.06	93.94	8.98	82.35	47.31	2.20	2.61
1930									
January	89.11	10.89	8.30	91.70	12.12	88.55	46.41	2.33	2.45
February	88.12	11.88	6.79	93.21	10.41	89.53	46.68	2.36	2.41
March	87.85	12.15	4.84	95.16	9.65	89.87	46.33	2.35	2.47
April	86.08	13.92	4.70	95.30	9.24	86.39	46.45	2.27	2.54
May	78.11	21.89	6.78	93.22	9.98	81.38	47.91	2.29	2.72
June	83.41	16.59	7.10	92.90	10.08	76.68	48.64	2.09	2.76
July	85.61	14.39	4.58	95.42	9.13	76.35	48.17	2.10	2.79
August	86.03	13.97	5.08	94.92	8.39	77.14	48.00	1.97	2.76
September	84.34	15.66	6.30	93.70	7.45	78.03	47.81	2.13	2.59
October	83.21	16.79	5.31	94.69	7.35	79.18	47.64	2.11	2.61
November	83.09	16.91	6.64	93.36	7.18	83.45	47.09	2.11	2.66
December	82.30	17.70	7.23	92.77	7.47	84.55	46.87	2.32	2.57

Bureau of Agricultural Economics. Compiled from monthly reports to the bureau from packers and slaughterers, whose slaughterings equaled 75 to 85 per cent of total slaughter under Federal inspection.

[1] Unrendered.

TABLE 411.—*Mutton and lamb, frozen: Cold-storage holdings, United States, 1921–1930*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1921	68, 032	78, 082	59, 304	38, 520	25, 129	15, 877	8, 714	6, 751	5, 903	5, 993	6, 840	7, 520
1922	6, 444	3, 914	2, 863	2, 878	2, 071	2, 310	3, 720	3, 308	3, 376	3, 473	3, 458	3, 633
1923	4, 523	5, 980	5, 758	6, 635	5, 774	4, 445	3, 556	2, 752	1, 785	1, 719	1, 997	2, 014
1924	2, 493	2, 306	2, 173	1, 719	2, 093	2, 273	2, 917	2, 257	2, 230	2, 525	3, 166	3, 326
1925	2, 949	2, 336	2, 294	2, 090	1, 998	1, 913	1, 535	1, 349	1, 339	1, 112	1, 435	1, 549
1926	1, 820	2, 354	3, 346	3, 289	2, 393	1, 697	1, 871	1, 813	1, 929	2, 234	2, 814	3, 166
1927	4, 556	4, 447	4, 074	2, 940	1, 862	1, 210	1, 360	1, 161	1, 302	1, 991	2, 958	3, 790
1928	4, 408	4, 404	4, 020	3, 252	1, 828	1, 276	1, 947	1, 822	1, 691	2, 113	4, 321	5, 472
1929	5, 623	4, 009	3, 252	3, 109	2, 533	2, 461	3, 061	2, 639	3, 159	4, 113	4, 992	5, 194
1930	5, 317	4, 667	5, 408	5, 174	5, 190	4, 639	4, 820	4, 476	3, 977	4, 320	4, 326	4, 628

Bureau of Agricultural Economics. Compiled from reports made by cold-storage establishments.

NOTE.—A table similar to Table 414, 1928 Yearbook, livestock and meat situation, is omitted.

TABLE 412.—*Mutton and lamb: International trade, average 1911–1913, annual 1926–1929*

Country	Calendar year									
	Average 1911–1913		1926		1927		1928		1929 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
New Zealand	0	235, 509	0	279, 731	0	311, 135	0	317, 539	0	305, 951
Argentina	0	148, 457	0	148, 213	0	183, 260	0	171, 108	0	177, 576
Australia [1]	[2] 7	[2] 149,958	2	85, 682	6	93, 520	4	46, 363	24	84, 929
Uruguay	0	3, 262	0	50, 358	0	52, 102	0	31, 304	0	48, 990
Netherlands	76	17, 212	1, 472	14, 308	1, 255	16, 084	759	14, 380	692	12, 859
Irish Free States	(3)	(3)	400	55	275	1, 478	312	2, 359	246	2, 771
Union of South Africa	1, 914	75	0	175	52	133	47	201	0	160
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	596, 899	0	613, 633	0	627, 303	0	640, 414	0	642, 726	0
Canada	4, 717	48	1, 673	1, 274	1, 946	1, 889	2, 333	1, 128	4, 041	573
France	930	334	20, 385	146	29, 822	274	15, 173	306	21, 280	126
United States	185	4, 146	3, 365	1, 171	9, 544	937	9, 202	1, 024	11, 395	835
Germany	1, 046	350	8, 217	361	10, 083	622	9, 909	79	9, 129	3
Norway	0	0	4, 263	0	4, 902	0	4, 358	0	4, 715	0
Belgium	------	------	3, 130	475	3, 914	839	3, 970	445	4, 896	1, 125
Denmark	3, 828	344	2, 214	2	2, 232	5	2, 397	1	2, 588	------
Sweden	1, 218	100	1, 148	7	1, 371	29	1, 089	45	953	38
Total 16 countries	610, 820	559, 795	659, 902	581, 958	692, 705	662, 307	689, 967	586, 282	702, 685	635, 936

Bureau of Agricultural Economics. Official sources.

[1] Year ended June 30.
[2] Calendar year.
[3] Figures for pre-war years are included in the countries of the pre-war boundaries.

TABLE 413.—*Sheep and lambs: Value of production and income, average 1924–1928, annual 1929*

State and division	Average 1924–1928				1929 [1]			
	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	12	353	365	359	13	249	262	273
New Hampshire	6	76	82	82	5	68	73	67
Vermont	5	187	192	185	5	172	177	173
Massachusetts	1	50	51	47	1	51	52	50
Rhode Island		9	9	9		9	9	9
Connecticut	1	41	42	40	1	53	54	43
New York	29	2, 592	2, 621	2, 627	36	2, 187	2, 223	2, 243
New Jersey	2	31	32	32		18	18	18
Pennsylvania	16	1, 803	1, 819	1, 812	16	1, 630	1, 646	1, 801
North Atlantic	71	5, 142	5, 213	5, 193	77	4, 437	4, 514	4, 677
Ohio	40	7, 541	7, 580	7, 950	48	7, 569	7, 617	8, 125
Indiana	13	3, 428	3, 442	3, 969	14	3, 982	3, 996	4, 510
Illinois	32	3, 446	3, 478	4, 124	32	3, 902	3, 934	4, 418
Michigan	32	5, 941	5, 973	6, 938	30	7, 900	7, 930	7, 621
Wisconsin	44	1, 939	1, 983	2, 279	47	2, 409	2, 456	2, 745
Minnesota	74	2, 549	2, 623	3, 225	90	4, 517	4, 607	5, 127
Iowa	63	4, 689	4, 752	5, 465	102	4, 555	4, 657	5, 767
Missouri	49	5, 146	5, 195	5, 581	48	5, 606	5, 654	5, 552
North Dakota	57	1, 301	1, 358	2, 021	66	2, 848	2, 914	3, 174
South Dakota	57	2, 702	2, 759	3, 171	58	3, 282	3, 340	4, 193
Nebraska	27	3, 934	3, 959	4, 804	25	4, 907	4, 932	6, 227
Kansas	15	2, 121	2, 135	2, 846	15	3, 771	3, 786	3, 530
North Central	501	44, 737	45, 238	52, 372	575	55, 248	55, 823	60, 989
Delaware		8	8	8		6	6	6
Maryland	8	689	697	721	8	825	833	855
Virginia	45	2, 750	2, 796	2, 963	55	3, 255	3, 310	3, 449
West Virginia	37	2, 919	2, 956	3, 767	66	3, 573	3, 639	3, 722
North Carolina	15	221	236	260	16	301	317	373
South Carolina	1	31	33	32	3	33	36	32
Georgia	8	85	93	86	11	61	72	75
Florida		50	50	48		54	54	54
South Atlantic	115	6, 752	6, 867	7, 886	159	8, 108	8, 267	8, 566
Kentucky	51	5, 417	5, 468	5, 935	73	7, 012	7, 085	7, 098
Tennessee	33	1, 764	1, 796	1, 900	44	2, 305	2, 349	2, 460
Alabama	6	80	86	94	8	108	116	91
Mississippi	11	156	167	94	5	57	62	40
Arkansas	7	150	157	143	5	132	137	135
Louisiana	13	99	112	105	19	70	89	117
Oklahoma	14	185	199	312	23	408	431	538
Texas	93	5, 568	5, 661	8, 529	95	7, 903	7, 998	10, 993
South Central	229	13, 418	13, 647	17, 112	272	17, 995	18, 267	21, 472
Montana	102	8, 925	9, 026	11, 763	138	13, 200	13, 338	15, 058
Idaho	103	9, 700	9, 803	10, 969	105	10, 785	10, 890	11, 739
Wyoming	101	8, 960	9, 062	10, 709	111	8, 240	8, 351	6, 980
Colorado	147	8, 281	8, 427	9, 276	145	5, 786	5, 931	10, 348
New Mexico	475	4, 871	5, 346	5, 893	579	4, 375	4, 954	6, 254
Arizona	687	2, 841	3, 528	3, 511	531	3, 316	3, 847	4, 358
Utah	231	8, 902	9, 133	9, 749	309	8, 801	9, 110	6, 773
Nevada	121	4, 002	4, 123	4, 309	94	2, 589	2, 683	2, 135
Washington	30	2, 735	2, 765	3, 096	34	3, 136	3, 170	3, 355
Oregon	87	8, 395	8, 481	9, 424	85	8, 732	8, 817	8, 780
California	137	12, 366	12, 503	13, 965	213	17, 145	17, 358	17, 494
Western	2, 220	79, 977	82, 197	92, 662	2, 344	86, 105	88, 449	93, 274
United States	3, 136	150, 026	153, 162	175, 224	3, 427	171, 893	175, 320	188, 978

Bureau of Agricultural Economics. Estimates Division Crop and Livestock Estimates.

[1] Preliminary.

TABLE 414.—*Sheep and lambs: Shipments and slaughter, by States, average 1924–1928, annual 1929*

State and division	Average 1924–1928											
	Shipments and local slaughter				Inshipments, stocker, feeding, and breeding				Farm slaughter			
	Sheep		Lambs		Sheep		Lambs		Sheep		Lambs	
	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head
	Thousands	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*
Maine	9	110	33	65					3	110	3	65
New Hampshire	2	110	5	65					1	110	2	65
Vermont	6	111	19	65					1	111	2	67
Massachusetts	2	114	3	68							1	68
Rhode Island			1	66								
Connecticut	1	110	2	65							1	65
New York	53	115	252	75	2	100	47	60	8	115	25	75
New Jersey			4	69			0. 8	59	0. 8	120		
Pennsylvania	49	105	164	70			2	60	5	124	9	71
North Atlantic	123	110	483	72	2	100	50	60	19	116	43	72
Ohio	161	115	810	70	8	100	46	65	3	120	4	80
Indiana	36	120	513	85	18	100	195	68	1	137	1	84
Illinois	58	120	622	85	29	96	331	69	1	120	3	85
Michigan	79	120	825	85	26	100	317	68	2	122	7	84
Wisconsin	48	110	298	80	12	110	116	70	4	120	3	80
Minnesota	55	110	303	79	30	100	61	61	2	110	8	80
Iowa	85	120	794	80	27	100	394	64	4	122	4	81
Missouri	89	110	798	77	42	105	276	65	2	116	5	75
North Dakota	33	110	181	80	45	100	20	65	3	120	4	80
South Dakota	41	110	302	75	8	110	26	68	2	110	5	75
Nebraska	68	110	1, 164	90	50	100	1, 109	65	1	110	2	75
Kansas	52	110	480	89	47	110	359	66	1	110	1	81
North Central	805	114	7, 090	82	343	102	3, 250	66	27	118	47	80
Delaware			1	65								
Maryland	11	110	62	80	3	110	3	62	1	110	1	80
Virginia	22	120	276	79	10	96			2	120	7	80
West Virginia	48	110	283	80	3	110			5	110	3	80
North Carolina	5	85	30	55					3	86	2	55
South Carolina	2	90	3	45					0. 2	90	1	45
Georgia	5	85	11	50					2	85	1	50
Florida	6	85	4	50								
South Atlantic	98	108	671	78	15	101	3	62	13	103	16	72
Kentucky	74	110	581	75	49	100	5	75	5	114	5	75
Tennessee	33	110	182	75	6	110	3	65	2	110	4	75
Alabama	7	80	11	50	3	80			2	80	1	50
Mississippi	23	80	14	50	0. 6	80			3	80	2	50
Arkansas	6	100	23	60	0. 2	80	0. 2	50	2	100	1	60
Louisiana	12	90	8	50	0. 6	90			3	90	2	50
Oklahoma	13	105	46	65	12	100	23	50	1	107	1	75
Texas	474	104	376	61	26	100	15	63	5	103	10	70
South Central	642	103	1, 242	69	97	100	47	58	23	99	26	67
Montana	374	110	1, 015	75	165	110	101	75	9	116	7	75
Idaho	272	115	1, 317	80	159	110	277	65	7	115	8	80
Wyoming	227	104	981	67	29	100	31	67	10	105	4	70
Colorado	174	105	2, 107	80	193	100	1, 569	65	9	105	9	80
New Mexico	136	100	574	66	13	100	15	70	52	100	14	70
Arizona	52	105	311	67					69	105	25	70
Utah	149	110	961	72	2	110	12	70	12	109	21	74
Nevada	83	105	473	67	9	105	1	65	6	103	13	68
Washington	40	110	329	80	15	100	30	70	2	112	7	80
Oregon	238	109	769	76	4	110			11	110	5	76
California	416	100	1, 674	70	56	98	497	76	11	108	11	75
Western	2, 161	107	10, 517	74	645	105	2, 533	67	198	105	125	73
United States	3, 830	108	20, 001	77	1, 102	104	5, 882	66	280	107	258	74

TABLE 414.—*Sheep and lambs: Shipments and slaughter, by State, average 1924–1928, annual 1929*—Continued

State and division	1929 [1]											
	Shipments and local slaughter				Inshipments, stocker, feeding, and breeding				Farm slaughter			
	Sheep		Lambs		Sheep		Lambs		Sheep		Lambs	
	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight
	Thousands	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 lbs.*
Maine	7	700	24	1,440	-	-	-	-	2	200	5	300
New Hampshire	2	200	5	300	-	-	-	-	1	100	2	120
Vermont	5	550	16	1,040	-	-	-	-	1	110	2	130
Massachusetts	2	220	4	260	-	-	-	-	-	-	1	65
Rhode Island	-	-	1	65	-	-	-	-	-	-	-	-
Connecticut	2	220	3	195	-	-	-	-	-	-	1	65
New York	50	2,850	202	14,342	2	200	43	2,580	7	819	35	2,485
New Jersey	-	-	2	140	-	-	-	-	-	-	-	-
Pennsylvania	44	4,620	150	10,500	-	-	2	120	5	550	9	675
North Atlantic	112	12,360	407	28,282	2	200	45	2,700	16	1,779	55	3,840
Ohio	178	20,470	795	55,650	4	400	48	3,120	3	360	5	400
Indiana	51	6,120	474	40,290	17	1,700	154	10,010	1	125	1	80
Illinois	53	6,360	561	47,685	10	1,000	246	17,220	1	120	3	255
Michigan	97	11,640	799	67,915	12	1,200	145	9,860	5	600	5	375
Wisconsin	60	6,600	337	26,960	10	1,100	132	9,240	4	500	3	270
Minnesota	64	7,080	446	37,910	18	1,800	70	4,200	3	360	9	765
Iowa	79	9,480	861	68,880	46	4,600	468	30,420	6	750	6	492
Missouri	95	10,450	839	62,925	32	3,360	315	20,475	2	240	5	375
North Dakota	53	5,830	333	24,975	6	600	19	1,235	4	480	5	400
South Dakota	49	5,390	380	28,500	10	1,100	43	3,225	2	220	5	375
Nebraska	65	7,150	1,423	128,050	59	5,900	1,460	94,900	2	220	1	75
Kansas	66	7,260	603	54,255	27	2,970	408	26,520	1	110	1	84
North Central	910	103,830	7,851	643,995	251	25,730	3,508	230,425	34	4,085	49	3,946
Delaware	-	-	1	65	-	-	-	-	-	-	-	-
Maryland	8	880	75	6,000	2	220	3	195	1	110	1	80
Virginia	20	2,400	322	25,760	4	360	-	-	3	360	8	640
West Virginia	78	8,580	315	25,200	2	220	-	-	5	550	9	720
North Carolina	6	510	39	2,145	-	-	-	-	2	180	3	165
South Carolina	1	90	3	135	-	-	-	-	1	90	1	45
Georgia	1	85	8	400	-	-	-	-	2	170	2	100
Florida	6	510	5	250	-	-	-	-	-	-	-	-
South Atlantic	120	13,055	768	59,955	8	800	3	195	14	1,460	24	1,750
Kentucky	73	8,150	723	54,225	16	1,600	8	600	6	720	7	525
Tennessee	30	3,300	219	16,425	3	330	1	70	3	330	5	375
Alabama	5	400	13	650	-	-	-	-	2	160	2	100
Mississippi	6	480	4	200	-	-	-	-	1	80	1	50
Arkansas	7	735	15	900	-	-	1	40	1	105	1	60
Louisiana	4	372	6	300	1	90	-	-	3	279	3	150
Oklahoma	10	1,050	65	4,225	1	100	20	1,000	2	220	2	130
Texas	581	55,195	532	33,930	11	1,100	5	300	5	450	10	700
South Central	716	69,682	1,577	110,855	32	3,220	35	2,010	23	2,344	31	2,090
Montana	287	31,570	1,311	98,325	10	1,000	7	525	12	1,440	10	750
Idaho	230	26,450	1,411	112,880	150	16,500	270	17,550	7	805	8	640
Wyoming	272	28,832	856	60,776	50	5,000	96	6,528	10	1,100	5	355
Colorado	133	13,965	2,209	176,720	54	5,400	2,117	133,371	9	945	9	720
New Mexico	85	8,500	588	38,220	10	1,000	22	1,540	60	6,000	20	1,400
Arizona	56	5,992	315	23,625	-	-	-	-	55	5,885	15	1,125
Utah	277	29,639	860	60,200	-	-	34	2,380	28	2,996	16	1,200
Nevada	93	9,740	310	20,150	10	1,050	30	1,950	10	1,000	5	340
Washington	36	3,960	369	29,520	5	500	35	2,450	2	240	8	640
Oregon	219	23,433	836	63,536	10	1,100	-	-	10	1,100	6	456
California	326	32,600	2,360	177,500	150	13,500	700	56,000	15	1,500	20	1,500
Western	2,014	214,681	11,425	861,452	449	45,050	3,311	222,294	218	23,011	122	9,126
United States	3,872	413,608	22,028	1,704,539	742	75,000	6,902	457,624	305	32,679	281	20,752

Bureau of Agricultural Economics. Estimates of Division of Crop and Livestock Estimates.

[1] Preliminary.

TABLE 415.—*Wool, shorn: Estimated production, by States, 1927–1930*

State and division	Production				Weight per fleece [1]				Number of fleeces [2]			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Maine	546	542	490	484	6.5	6.3	6.2	6.2	84	86	79	78
New Hampshire	117	115	112	113	6.5	6.4	6.2	6.3	18	18	18	18
Vermont	285	280	270	270	7.3	7.0	7.1	7.1	39	40	38	38
Massachusetts	63	66	65	78	6.3	6.6	6.5	6.5	10	10	10	12
Rhode Island	12	13	13	13	6.2	6.4	6.4	6.4	2	2	2	2
Connecticut	36	42	42	35	6.0	6.0	6.0	5.8	6	7	7	6
New York	2,956	2,966	2,765	2,815	7.3	7.2	7.2	7.2	405	412	384	391
New Jersey	32	30	30	30	6.3	6.1	6.1	6.1	5	5	5	5
Pennsylvania	2,730	2,948	3,017	3,192	7.5	7.5	7.6	7.6	364	393	397	420
North Atlantic	6,777	7,002	6,804	7,030	7.3	7.2	7.2	7.2	933	973	940	970
Ohio	15,662	14,776	14,426	15,066	8.2	8.2	8.1	8.1	1,910	1,802	1,781	1,860
Indiana	4,088	4,307	4,500	4,810	7.3	7.3	7.2	7.2	560	590	625	668
Illinois	4,162	3,724	4,380	4,650	7.5	7.6	7.3	7.4	555	490	600	630
Michigan	8,272	8,520	8,580	8,502	8.0	8.0	7.8	7.8	1,034	1,065	1,100	1,090
Wisconsin	2,774	2,808	2,795	3,157	7.6	7.8	7.7	7.7	365	360	363	410
Minnesota	4,211	4,661	5,143	5,772	7.9	7.9	7.9	7.8	533	590	651	740
Iowa	5,896	5,960	6,423	6,802	8.0	8.0	7.9	7.9	737	745	813	861
Missouri	5,523	5,962	6,859	6,728	7.0	7.2	7.1	6.9	789	828	966	975
North Dakota	3,469	3,984	4,649	5,330	8.3	8.3	8.2	8.2	418	480	567	650
South Dakota	5,160	6,009	6,352	7,428	8.0	8.3	7.7	8.3	645	724	825	895
Nebraska	2,442	2,370	2,850	3,081	6.6	7.9	7.6	7.8	370	300	375	395
Kansas	1,986	2,442	2,690	3,270	7.3	7.4	7.2	7.4	272	330	375	440
North Central	63,645	65,523	69,647	74,596	7.8	7.9	7.7	7.8	8,188	8,304	9,041	9,614
Delaware	12	12	12	12	6.0	6.0	6.0	6.1	2	2	2	2
Maryland	504	518	573	580	6.3	6.1	6.3	6.3	80	85	91	92
Virginia	1,710	1,895	2,116	2,132	5.0	5.0	5.2	5.1	342	379	407	418
West Virginia	2,457	2,684	2,798	2,855	5.4	5.4	5.3	5.2	455	497	528	549
North Carolina	350	357	400	362	4.8	4.7	4.7	4.7	73	76	85	77
South Carolina	50	52	52	52	4.2	4.0	4.0	4.0	12	13	13	13
Georgia	148	126	125	139	3.6	3.4	3.3	3.3	41	37	38	42
Florida	144	153	150	144	3.0	3.0	3.0	3.0	48	51	50	48
South Atlantic	5,375	5,797	6,226	6,276	5.1	5.1	5.1	5.1	1,053	1,140	1,214	1,241
Kentucky	3,845	4,051	4,305	4,580	4.8	4.7	4.7	5.0	801	862	916	916
Tennessee	1,174	1,287	1,312	1,432	4.3	4.1	4.1	4.3	273	314	320	333
Alabama	155	184	201	184	3.6	3.4	3.4	3.4	43	54	59	54
Mississippi	198	115	96	87	3.2	3.1	3.1	3.1	62	37	31	28
Arkansas	220	207	202	193	4.9	4.6	4.8	4.6	45	45	42	42
Louisiana	286	282	306	322	3.4	3.2	3.4	3.5	84	88	90	92
Oklahoma	562	615	942	1,001	7.7	7.5	7.3	7.7	73	82	129	130
Texas	32,725	38,200	41,300	41,600	8.5	8.5	8.5	8.2	3,850	4,500	4,859	5,073
South Central	39,165	44,941	48,664	49,399	7.5	7.5	7.5	7.4	5,231	5,982	6,446	6,668
Montana	24,166	26,626	28,733	33,440	8.6	8.6	8.6	8.8	2,810	3,096	3,341	3,800
Idaho	15,840	17,885	17,829	18,768	8.8	9.2	8.8	9.2	1,800	1,944	2,026	2,040
Wyoming	25,317	26,488	26,000	30,360	8.7	8.8	8.3	9.2	2,910	3,010	3,130	3,300
Colorado	8,118	9,956	9,979	10,800	7.3	7.6	7.2	7.5	1,112	1,310	1,386	1,440
New Mexico	12,600	13,683	14,600	16,167	6.0	6.4	6.8	6.9	2,100	2,138	2,147	2,343
Arizona	6,240	5,760	6,120	5,940	6.0	6.0	6.0	6.0	1,040	960	1,020	990
Utah	19,975	22,072	19,011	21,600	8.5	8.9	8.1	9.0	2,350	2,480	2,347	2,400
Nevada	8,015	8,580	7,423	7,745	7.3	7.5	7.2	7.8	1,098	1,144	1,031	993
Washington	4,753	5,270	5,040	5,510	9.8	10.0	9.0	9.5	485	527	560	580
Oregon	18,128	20,332	18,849	21,375	8.8	9.2	8.3	9.0	2,060	2,210	2,271	2,375
California	23,800	23,800	25,636	27,001	7.0	6.8	6.8	6.7	3,400	3,500	3,770	4,030
Western	166,952	180,452	179,220	198,706	7.9	8.1	7.8	8.2	21,165	22,319	23,029	24,291
United States	281,914	303,715	310,561	336,007	7.7	7.8	7.6	7.9	36,570	38,718	40,670	42,784

Bureau of Agricultural Economics.

[1] In State where sheep are shorn twice a year, principally Texas and California, this figure covers wool per head of sheep shorn and not weight per fleece.

[2] Include fleeces taken at commercial feeding plants. California figure includes some fleeces taken from early lambs.

TABLE 416.—*Wool: Production, imports, exports, and amount available for consumption, United States, 1910–1930*

Calendar year	Production			Imports [1]	Reexports [1]	Exports of domestic wool	Net imports [2]	Available for consumption
	Shorn	Pulled	Total					
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1910	281, 363	40, 000	321, 363	180, 135	9, 055	[3] 48	171, 032	492, 395
1911	277, 548	41, 000	318, 548	155, 923	3, 511	(4)	152, 412	470, 960
1912	262, 543	41, 500	304, 043	238, 118	1, 816	(5)	236, 302	540, 345
1913	252, 675	43, 500	296, 175	151, 581	3, 860	[3] 77	147, 644	443, 819
1914	247, 192	43, 000	290, 192	256, 501	6, 342	[3] 335	249, 823	540, 015
1915	245, 726	40, 000	285, 726	402, 611	2, 081	[3] 8, 158	392, 372	678, 098
1916	244, 890	43, 600	288, 490	442, 650	2, 128	3, 919	436, 603	725, 093
1917	241, 892	40, 000	281, 892	416, 137	1, 272	1, 827	413, 038	694, 930
1918	256, 870	42, 000	298, 870	447, 426	452	407	446, 567	745, 437
1919	249, 958	48, 300	298, 258	438, 782	5, 134	2, 840	430, 807	729, 065
1920	244, 179	42, 900	287, 079	254, 905	12, 393	8, 845	233, 666	520, 745
1921	235, 129	48, 500	283, 629	316, 605	1, 552	1, 927	313, 126	596, 755
1922	221, 713	42, 000	263, 713	366, 538	4, 225	453	361, 861	625, 574
1923	225, 696	42, 500	268, 196	388, 345	23, 557	535	364, 253	632, 449
1924	235, 575	43, 800	279, 375	262, 655	27, 476	309	234, 869	514, 244
1925	245, 562	46, 800	292, 362	336, 646	7, 087	273	329, 286	621, 648
1926	260, 976	49, 600	310, 576	299, 451	14, 082	292	285, 077	595, 653
1927	281, 914	50, 100	332, 014	264, 507	10, 710	323	253, 474	585, 488
1928	303, 715	51, 900	355, 615	240, 360	4, 435	485	235, 440	591, 055
1929	310, 561	54, 500	365, 061	277, 204	2, 380	239	274, 585	639, 646
1930 [6]	336, 007	61, 900	397, 907	162, 276	1, 715	162	160, 399	558, 306

Bureau of Agricultural Economics. Production figures 1910–1913 from the National Association of Wool Manufacturers; 1914–1928 from the bureau; imports and exports from the Bureau of Foreign and Domestic Commerce.

[1] Hair of Angora goat, alpaca, and other like animals included in imports and reexports prior to 1914 and in exports for all years.
[2] Total imports minus domestic exports and reexports.
[3] Exports for fiscal years ended June 30 of the years shown.
[4] Included in all other articles.
[5] No transactions.
[6] Preliminary.

TABLE 417.—*Wool, shorn: Estimated average price per pound, received by producers United States, 1910–1930*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	24. 5	24. 6	24. 9	22. 3	22. 8	19. 5	19. 0	19. 5	17. 7	18. 1	17. 9	17. 8	20. 5
1911	17. 3	17. 3	16. 8	15. 7	14. 7	15. 5	15. 4	16. 0	15. 6	15. 5	15. 6	15. 5	15. 6
1912	16. 2	16. 3	16. 9	17. 3	17. 8	18. 7	18. 9	18. 8	18. 7	18. 5	18. 6	18. 6	18. 1
1913	18. 6	18. 7	18. 4	17. 7	16. 3	15. 6	15. 9	15. 8	15. 8	15. 5	15. 6	16. 1	16. 4
1914	15. 7	15. 7	16. 4	16. 8	17. 2	18. 4	18. 5	18. 7	18. 6	18. 0	18. 1	18. 6	17. 7
1915	18. 6	20. 2	22. 8	22. 7	22. 0	23. 7	24. 2	23. 8	23. 3	22. 7	22. 7	23. 3	22. 8
1916	23. 3	24. 2	25. 9	26. 3	28. 0	28. 7	28. 6	29. 0	28. 4	28. 7	29. 4	30. 8	27. 9
1917	31. 8	32. 7	36. 7	38. 8	43. 7	49. 8	54. 3	54. 8	54. 2	55. 5	55. 9	58. 2	47. 8
1918	58. 1	57. 1	60. 0	60. 0	58. 2	57. 4	57. 5	57. 4	57. 7	57. 7	56. 4	56. 2	57. 9
1919	55. 2	51. 1	51. 3	47. 9	48. 0	50. 5	51. 8	52. 2	51. 3	50. 6	51. 0	51. 6	50. 3
1920	53. 3	52. 5	51. 5	51. 3	50. 3	38. 6	29. 5	28. 3	28. 0	27. 5	24. 9	21. 9	39. 1
1921	19. 6	19. 8	18. 9	17. 9	16. 0	15. 4	15. 5	15. 4	15. 5	15. 8	15. 6	16. 9	16. 4
1922	18. 0	22. 3	25. 0	24. 8	29. 0	32. 8	32. 5	31. 6	31. 6	32. 2	33. 2	35. 3	29. 8
1923	35. 3	35. 3	37. 3	39. 2	41. 7	41. 5	38. 3	37. 0	37. 1	36. 9	36. 4	36. 2	38. 9
1924	36. 6	37. 5	38. 2	38. 4	37. 4	36. 0	34. 3	33. 5	35. 5	37. 3	40. 1	42. 2	36. 9
1925	42. 8	43. 2	43. 0	40. 8	36. 9	35. 7	39. 4	38. 1	37. 8	37. 2	37. 8	39. 5	38. 5
1926	38. 9	37. 7	34. 7	33. 2	32. 0	31. 4	31. 9	31. 9	32. 6	31. 6	31. 6	30. 1	32. 5
1927	30. 9	31. 1	31. 3	30. 4	30. 1	30. 2	30. 7	31. 2	31. 2	30. 9	31. 1	32. 0	30. 7
1928	33. 2	34. 4	35. 4	35. 6	37. 0	38. 7	37. 6	37. 0	36. 5	36. 0	35. 9	35. 6	36. 7
1929	35. 9	35. 9	35. 5	33. 8	31. 3	30. 2	29. 4	29. 2	29. 0	28. 6	28. 5	27. 8	30. 9
1930	27. 4	25. 9	23. 7	21. 4	19. 6	19. 2	19. 2	19. 8	20. 2	19. 6	19. 0	18. 4	20. 3

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of sheep Jan. 1, by States; yearly price obtained by using estimates of the division of crop and livestock estimates and the division of statistical and historical research.

TABLE 418.—*Wool: International trade, average 1909–1913, annual 1927–1929*

Country	Calendar year—							
	Average 1909–1913		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Australia	324	676,679	[1] 5,565	[1] 763,656	[1] 6,286	[1] 715,028	[1] 3,819	[1] 764,760
Argentina	214	328,204	417	346,010	[1] 236	276,463	0	282,844
New Zealand	168	194,801	35	220,501	89	226,805	73	234,956
Union of South Africa	7	164,635	563	271,016	943	261,211	701	296,917
Uruguay	0	139,178	0	151,790	0	117,773	0	[1] 112,620
China	0	42,685	391	57,510	421	73,623	444	59,864
British India	23,721	56,496	32,191	57,292	32,693	57,649	26,128	56,774
Chile	1,247	28,223	419	27,407	584	26,689	[1] 554	25,900
Algeria	2,445	19,871	3,212	26,662	3,816	26,526	[1] 3,646	[1] 14,481
Morocco	0	8,607	0	16,074	0	13,038	[1] 0	[1] 8,336
Irish Free State	(2)	(2)	1,640	16,469	865	12,284	1,043	13,116
Spain	2,446	28,505	4,123	17,153	6,509	7,523	[1] 5,288	[1] 10,520
Peru	[3] 3	9,333	0	11,057	0	12,411	65	10,569
Hungary	(2)	(2)	2,133	9,897	1,925	9,148	2,245	12,402
Persia [4]	[3] 2,753	10,023	1,354	9,952	974	12,192	---	---
Brazil	---	[5] 2,959	---	11,055	---	10,160	---	11,391
PRINCIPAL IMPORTING COUNTRIES								
France	601,628	84,973	686,796	59,151	612,072	59,924	688,379	64,740
United Kingdom	506,155	41,164	506,463	62,021	462,691	48,007	503,002	51,984
United States	203,298	[6] 46	267,287	323	244,553	485	280,371	239
Germany	481,988	42,817	424,775	22,814	380,649	26,542	376,315	34,973
Belgium	300,367	196,440	146,875	156	144,701	34,778	171,261	35,966
Italy	30,145	3,933	88,744	7,786	106,919	8,258	120,248	6,398
Japan	17,921	0	99,589	0	116,194	0	107,429	0
Czechoslovakia	(2)	(2)	39,009	3,586	37,922	3,195	43,455	3,166
Poland	(2)	(2)	36,019	971	30,487	1,545	35,002	908
Russia	106,184	32,406	27,207	[1] 3,426	34,354	[1] 4,109	[1] 86,429	[1] 7,976
Canada	7,794	1,323	14,354	11,357	14,271	8,351	12,086	6,090
Austria	63,942	9,622	17,160	879	16,411	853	[1] 19,321	[1] 420
Switzerland	11,211	338	18,887	46	17,202	35	17,827	47
Netherlands	31,991	26,362	11,839	3,413	10,457	2,924	12,119	3,244
Yugoslavia	(2)	(2)	7,843	89	3,017	243	4,578	142
Sweden	7,267	149	11,623	310	11,829	375	12,512	274
Bulgaria	[5] 1,485	[5] 117	2,199	3	2,715	[1] 11	[1] 3,760	[1] 0
Finland	1,794	30	3,533	---	3,531	---	2,525	---
Norway	3,644	123	2,127	554	1,717	1,113	1,541	641
Denmark	2,337	1,124	3,287	381	2,730	534	3,575	268
Greece	281	294	2,066	862	2,387	529	2,615	616
Rumania	2,473	3,538	[1] 7,351	[1] 1,099	---	[1] 1,636	---	---
Total 38 countries	2,415,233	2,154,998	2,477,076	2,182,728	2,312,150	2,061,970	2,548,356	2,133,542

Bureau of Agricultural Economics. Official sources except where otherwise noted. "Wool" in this table includes washed, unwashed, scoured, pulled wool, and slipe, also hair—camel's, mohair, angora goat, cashmere goat, and alpaca. The following items have been considered as not within this classification: Carded, combed, dyed wool, flocks; sheep, lamb, and goatskins with hair on; mill waste, noils, and tops.

* Preliminary.

[1] International Yearbook of Agricultural Statistics.

[2] Figures for pre-war years are included in the countries of the pre-war boundaries.

[3] 3-year average.

[4] Figures for Persia are for 12 months ended Mar. 21 of the year following year shown.

[5] 4-year average.

[6] 1 year only.

TABLE 419.—*Wool: Estimated production, in specified countries, average 1909–1913, annual 1925–1930*

Country	Average 1909–1913 [1]	1925	1926	1927	1928	1929	1930 *
SOUTHERN HEMISPHERE	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*
Australia	727. 7	833. 7	924. 4	888. 1	968. 2	910. 0	[2] 875. 0
New Zealand [3]	179. 9	200. 2	202. 4	229. 0	239. 0	242. 0	[4] 237. 0
Argentina [5]	332. 3	319. 0	363. 0	344. 0	352. 0	324. 0	[6] 333. 0
Uruguay [5]	133. 1	116. 0	129. 0	131. 0	139. 0	[2] 150. 0	[2] 154. 0
Union of South Africa [5] [7]	157. 7	235. 1	249. 2	273. 0	283. 0	307. 0	337. 0
Total 5 Southern Hemisphere countries pre-war to 1930	1, 530. 7	1, 704. 0	1, 868. 0	1, 865. 1	1, 981. 2	1, 933. 0	1, 936. 0
NORTHERN HEMISPHERE							
United States:							
Shorn	272. 2	245. 6	261. 0	281. 9	303. 7	310. 6	336. 0
Pulled	41. 4	46. 8	49. 6	50. 1	51. 9	54. 5	61. 9
Total	313. 6	292. 4	310. 6	332. 0	355. 6	365. 1	397. 9
Canada	13. 2	15. 6	18. 0	18. 7	19. 6	20. 3	21. 0
United Kingdom [8]	136. 0	109. 9	114. 6	118. 5	119. 7	117. 9	117. 9
France	74. 8	45. 0	46. 5	47. 6	47. 2	[9] 47. 0	----------
Spain	78. 0	90. 8	98. 7	88. 2	80. 0	73. 0	75. 0
Germany	43. 9	50. 2	41. 8	35. 9	33. 6	31. 9	[9] 30. 6
Norway	5. 2	5. 9	6. 2	6. 2	5. 4	5. 2	[9] 5. 4
Hungary	16. 8	13. 2	13. 2	11. 8	11. 5	10. 0	[9] 13. 0
Rumania	45. 6	54. 9	53. 1	55. 7	53. 1	52. 5	[9] 50. 9
Estonia	1. 4	2. 2	2. 1	2. 1	2. 0	1. 5	[9] 1. 5
Tunis	2. 4	4. 7	5. 7	2. 8	3. 2	3. 8	[9] 4. 3
Total 10 Northern Hemisphere countries reporting all periods	656. 1	639. 8	664. 0	671. 9	683. 7	681. 2	717. 5
Total 15 Northern and Southern Hemisphere countries reporting all periods	2, 186. 8	2, 343. 8	2, 532. 0	2, 537. 0	2, 664. 9	2, 614. 2	2, 653. 5
Estimated world total excluding Russia and China [10]	2, 756. 0	2, 899. 0	3, 077. 0	3, 079. 0	3, 209. 0	3, 164. 0	----------
Russia	[11] 330. 3	315. 0	351. 0	369. 0	385. 0	394. 2	310. 8
China [12]	37. 3	56. 8	27. 8	48. 0	64. 8	50. 0	----------

Bureau of Agricultural Economics. Includes wool shorn in the spring in the Northern Hemisphere and that shorn in the last few months of the same calendar year in the Southern Hemisphere. Includes small quantities of pulled wool in certain countries. For table showing all countries up to 1930 see Foreign Crops and Markets, Mar. 23, 1931, and for current information see World Wool Prospects, issued monthly by the Bureau of Agricultural Economics.

* Preliminary.

[1] Average for 5 years whenever available, otherwise for any year or years within this period for which estimates are available.

[2] Estimate furnished by cable from the International Institute of Agriculture.

[3] Estimates of Dalgety & Co.

[4] Estimate of total production based on an estimated decrease of 2 per cent in wool shorn on farms only, as furnished by the International Institute of Agriculture. In addition to the wool shorn on farms there is the wool pulled from slaughtered sheep to be considered as well as that exported on skins.

[5] Estimates based on exports, stocks, and domestic consumption.

[6] Estimate of Buenos Aires branch of the First National Bank of Boston.

[7] Includes some wool imported from neighboring colonies.

[8] Estimates of the Yorkshire Observer. These figures have been used instead of official estimates, as comparable figures are available up to 1930.

[9] Estimate based on sheep numbers at the date nearest shearing time.

[10] Totals subject to revision. Few countries published official wool production estimates. In the absence of official figures for most countries, various estimates have been used. Some have been supplied by Government representatives abroad; others by multiplying official sheep numbers by an average weight per fleece. For some principal exporting countries, exports alone, or exports, stocks, and domestic consumption have been used as representing production. In the case of some Asiatic countries, rough commercial estimates have been used, while the figures of the U. S. Department of Commerce or the National Association of Wool Manufacturers have been used for some other countries.

[11] Year 1916.

[12] Exports.

TABLE 420.—*Wool: Boston market: Average price per pound, 1900–1930*

SCOURED BASIS, TERRITORY, GRADES 64S, 70S, 80S (FINE STRICTLY COMBING)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1900	64	64	61	59	58	56	54	52	51	51	50	50	56
1901	50	49	46	46	46	46	46	46	46	46	46	48	47
1902	48	49	50	50	50	50	50	50	52	52	52	55	51
1903	56	56	56	56	54	54	54	54	54	54	54	54	55
1904	54	54	52	52	54	57	58	60	64	65	68	69	59
1905	69	69	68	69	72	73	74	74	74	74	74	74	72
1906	74	72	72	72	72	72	70	70	70	70	70	70	71
1907	70	70	70	70	70	70	70	72	72	72	70	69	70
1908	68	66	64	62	54	56	56	57	57	58	60	62	60
1909	63	64	64	65	66	70	74	76	76	76	76	75	70
1910	78	76	72	68	64	64	62	64	64	64	65	64	67
1911	61	60	57	54	55	56	57	61	60	58	60	61	58
1912	61	62	62	62	62	63	61	68	66	66	66	66	64
1913	65	64	59	56	56	56	55	55	54	54	54	52	57
1914	53	57	59	59	60	62	63	63	62	61	64	63	60
1915	64	72	73	71	69	70	72	73	73	72	72	74	71
1916	76	79	80	80	82	84	86	87	88	92	99	110	87
1917	117	124	132	136	144	170	175	179	181	181	182	182	159
1918	185	186	184	186	180	180	(1)	(1)	(1)	(1)	(1)	(1)	------
1919	142	150	149	166	168	174	180	188	188	188	193	197	174
1920	200	210	210	210	205	176	169	163	144	116	104	86	166
1921	83	90	88	88	86	82	82	82	82	82	84	89	85
1922	97	110	110	109	127	134	135	131	130	134	139	140	125
1923	143	144	144	149	153	150	144	137	132	130	130	134	141
1924	139	139	142	138	135	129	130	137	142	147	154	164	141
1925	168	164	153	138	126	130	137	132	129	128	131	131	139
1926	127	124	118	116	112	110	116	116	116	116	114	110	116
1927	110	110	110	109	108	108	111	111	111	112	112	112	110
1928	116	116	116	117	119	120	120	115	112	112	113	114	116
1929	114	111	108	104	100	97	94	94	93	90	88	84	96
1930	82	79	78	76	75	76	76	76	76	75	73	72	76

SCOURED BASIS, TERRITORY, GRADE 56S (THREE-EIGHTHS BLOOD STRICTLY COMBING)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1900	54	54	52	49	48	46	46	45	44	43	43	42	47
1901	42	41	39	39	38	36	36	37	38	38	39	39	39
1902	39	39	39	39	39	41	41	41	42	42	42	43	41
1903	43	43	43	43	42	42	42	42	42	42	42	42	43
1904	44	45	45	45	48	50	50	52	52	54	56	59	50
1905	59	59	58	58	62	64	66	67	68	68	66	66	63
1906	65	64	64	64	64	64	64	62	62	62	62	62	63
1907	61	61	61	61	61	61	61	61	61	61	56	54	60
1908	51	48	46	44	42	42	42	42	42	44	47	50	45
1909	52	53	54	54	56	60	64	66	66	66	66	65	60
1910	69	61	60	57	56	56	56	57	57	56	54	53	58
1911	54	54	52	49	49	50	50	52	52	48	46	48	50
1912	51	52	51	51	51	52	58	58	58	58	58	58	55
1913	58	58	55	50	49	48	48	48	48	47	46	45	50
1914	43	47	47	47	50	52	52	49	48	49	51	53	49
1915	56	63	66	66	66	66	66	68	68	68	67	69	66
1916	70	71	71	71	72	74	76	78	79	80	87	90	77
1917	91	100	102	110	118	132	132	138	146	148	148	148	126
1918	148	149	152	152	142	142	(1)	(1)	(1)	(1)	(1)	(1)	------
1919	126	121	121	110	118	120	128	137	138	127	130	135	126
1920	135	135	131	130	125	112	99	95	88	74	65	56	104
1921	53	55	55	54	53	50	51	52	52	52	54	58	53
1922	63	76	77	74	83	88	88	90	92	95	99	98	85
1923	100	103	105	107	111	111	109	105	103	101	104	108	106
1924	113	116	116	113	109	97	100	109	113	117	122	133	113
1925	136	136	125	109	96	99	105	101	102	102	108	109	111
1926	103	99	93	91	89	89	90	90	91	93	93	91	92
1927	90	90	90	90	88	88	90	91	91	94	94	94	91
1928	97	99	100	106	107	108	107	103	104	104	104	104	104
1929	104	104	101	95	89	88	88	90	90	89	87	82	92
1930	75	70	67	64	62	62	62	62	62	60	59	58	64

[1] No quotations.

TABLE 420.—*Wool: Boston market: Average price per pound, 1900–1930*—Con.

GREASE BASIS, OHIO AND SIMILAR, GRADE 56S (THREE-EIGHTHS BLOOD STRICTLY COMBING)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1900	29	28	27	27	26	25	25	24	24	24	23	24	26
1901	24	23	23	23	22	20	20	20	21	21	21	22	22
1902	22	22	22	22	22	22	22	22	22	23	23	24	22
1903	25	25	25	23	23	24	24	24	26	26	26	26	25
1904	25	26	26	26	26	28	28	28	29	29	31	32	28
1905	32	31	30	31	35	36	36	35	35	35	35	34	34
1906	34	33	33	33	33	33	33	33	33	34	34	34	33
1907	34	34	34	33	32	32	33	33	33	33	31	30	33
1908	31	31	30	29	25	26	25	25	26	26	27	28	27
1909	29	30	31	33	34	35	36	36	37	37	37	37	34
1910	36	36	36	34	31	28	28	28	28	29	30	30	31
1911	30	29	28	25	25	25	25	25	25	25	25	25	26
1912	27	30	29	28	27	29	30	30	30	30	30	30	29
1913	31	31	30	26	24	24	24	24	24	24	23	24	26
1914	24	24	24	25	26	28	28	28	28	28	29	30	27
1915	31	35	37	37	36	36	38	38	37	36	37	38	36
1916	38	40	40	40	40	41	42	42	42	43	45	48	42
1917	49	54	56	59	63	70	74	75	76	76	76	77	67
1918	78	77	78	78	76	76	(1)	(1)	(1)	(1)	(1)	(1)	------
1919	70	65	65	61	61	63	70	71	70	68	69	70	67
1920	70	70	70	69	66	57	52	49	45	40	37	30	55
1921	29	30	30	30	29	26	26	26	26	26	28	32	28
1922	36	39	40	38	42	47	46	46	47	49	53	54	45
1923	55	56	56	56	56	57	56	54	53	52	53	54	55
1924	55	56	57	55	53	49	48	53	55	59	63	69	56
1925	70	69	66	55	46	49	53	52	50	52	54	54	56
1926	54	53	49	46	44	43	44	44	44	45	46	45	46
1927	45	45	45	44	42	42	43	44	45	46	47	48	45
1928	50	52	52	53	55	57	56	55	55	55	56	56	54
1929	56	55	54	50	45	44	45	45	45	45	44	42	48
1930	39	36	34	32	29	30	30	30	30	30	29	28	31

Bureau of Agricultural Economics. 1900–1909 prices from quarterly reports of the National Association of Wool Manufacturers, 1910–1923 average of weekly range quotations from the Boston Commercial Bulletin, and 1924–1930 prices from the livestock and meat reporting service of the bureau.

[1] No quotations.

TABLE 421.—*Wool, grades, 56s–64s, 67s: Average price per pound at London, scoured basis, 1921–1930*

GRADE 56s

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	43.60	45.40	38.00	36.00	40.00	36.40	31.60	35.05	38.50	39.00	36.70	39.30	38.30
1922	45.90	46.00	47.00	50.35	53.70	48.20	50.20	51.00	55.40	66.60	68.30	69.60	54.35
1923	73.00	71.90	73.45	80.00	80.90	77.00	76.60	77.10	77.60	77.60	76.20	80.00	76.78
1924	80 90	84.20	85.00	83.75	82.50	82.00	81.50	87.15	92.80	101.00	105.00	111.30	89.76
1925	105.00	90.80	89.00	80 90	72.80	73.85	74.90	70.75	66.60	66.60	66.60	66.60	77.03
1926	60.80	60.80	60.80	59.80	58.30	56.80	58.80	59.80	60.80	59.80	57.00	58.80	59.36
1927	58.80	68.00	71.00	66.00	66.90	67.40	67.90	68.40	68.90	70.95	73.00	75.00	68.52
1928	77.00	80.00	81.10	79.55	78.00	77.50	77.00	74.00	71.00	70.00	73.00	74.00	76.01
1929	75.00	69.95	63.90	61.80	58.80	56.75	54.70	52.70	50.69	46.64	50.69	50.69	57.69
1930	40.55	40.55	34.47	35.48	37.51	37.00	36.00	34.50	32.44	30.42	26.36	26.36	34.30

GRADES 64s–67s

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1921	78.65	71.02	63.40	54.00	60.00	61.70	52.50	57.10	61.70	75.10	73.15	75.00	65.28
1922	82.00	84.30	84.60	90.00	95.40	94.55	96.00	102.00	101.60	107.30	108.95	106.30	96.08
1923	112.40	107.00	107.70	106.40	115.50	110.70	111.00	111.30	111.60	112.50	112.60	113.70	111.03
1924	117.90	121.80	121.60	122.00	123.15	122.68	122.20	130.75	139.30	138.00	148.40	150.30	129.84
1925	140.10	130.00	119.70	115.95	112.20	112.60	113.00	110.00	107.00	108.90	111.00	101.00	115.12
1926	97.30	97.30	97.30	98.10	97.70	97.30	94.30	94.80	95.30	93.30	92.75	90.75	95.51
1927	89.20	94.00	95.30	94.30	95.30	95.80	96.30	96.85	97.40	98.40	99.40	99.40	95.97
1928	101.40	102.00	103.40	102.40	101.40	101.40	101.40	98.35	95.30	90.00	93.30	91.20	98.46
1929	91.20	90.00	85.20	83.00	79.00	76.25	73.50	70.00	66.91	64.88	63.87	62.86	75.55
1930	54.75	54.75	50.69	52.72	55.76	54.70	52.70	51.70	50.69	50.69	44.61	41.57	51.28

Bureau of Agricultural Economics. These data were obtained from prices given by Kreglinger and Fernau for the opening and closing of each series of the London wool sales. For months when no sales were held the figures are interpolations of nearest actual prices. Conversions at monthly average rate of exchange as given in Federal Reserve Bulletins to December, 1925, inclusive; subsequently at par.

TABLE 422.—*Goats and mohair: Estimates[1] of goats clipped, mohair clipped, and average clip per goat (principal producing States), 1920–1930*

GOATS CLIPPED

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Texas[2]	1,834	1,984	1,750	1,797	2,008	1,857	2,367	2,579	2,800	3,000	3,140
New Mexico	124	128	110	110	127	120	135	165	170	173	188
Arizona[2]	145	145	152	160	165	162	165	185	185	214	214
California	72	74	59	57	57	58	56	52	45	46	43
Oregon	113	115	105	103	101	110	115	115	125	120	120
Missouri	58	60	55	53	60	67	61	63	66	66	75
Total	2,346	2,506	2,231	2,280	2,518	2,374	2,899	3,159	3,391	3,619	3,780

MOHAIR (INCLUDING KID HAIR) PRODUCED

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Texas	6,786	7,607	6,838	7,352	7,996	8,519	9,887	11,312	12,330	13,500	13,800
New Mexico	397	422	352	374	457	444	473	611	629	640	658
Arizona	464	479	517	560	611	599	578	685	684	750	750
California	230	244	207	211	217	220	207	203	176	175	163
Oregon	452	460	431	422	414	462	483	483	525	468	456
Missouri	145	150	143	148	162	188	171	176	178	172	179
Total	8,474	9,362	8,488	9,067	9,857	10,432	11,799	13,470	14,522	15,705	16,006

AVERAGE CLIP PER GOAT CLIPPED[3]

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
Texas	3.7	3.8	3.9	4.1	4.0	4.6	4.2	4.4	4.4	4.5	4.4
New Mexico	3.2	3.3	3.2	3.4	3.6	3.7	3.5	3.7	3.7	3.7	3.5
Arizona	3.2	3.3	3.4	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.5
California	3.2	3.3	3.5	3.7	3.8	3.8	3.7	3.9	3.9	3.8	3.8
Oregon	4.0	4.0	4.1	4.1	4.1	4.2	4.2	4.2	4.2	3.9	3.8
Missouri	2.5	2.5	2.6	2.8	2.7	2.8	2.8	2.8	2.7	2.6	2.4
Average, 6 States	3.6	3.7	3.8	4.0	3.9	4.4	4.1	4.3	4.3	4.3	4.2

Bureau of Agricultural Economics.

[1] Figures for 1923, 1924, and 1925 are revisions of department's estimates previously published.
[2] Most goats clipped twice a year. In Texas, kids are clipped in the fall of year of birth. Figures include both goats and kids clipped.
[3] In States where goats are clipped twice a year figures include both spring and fall clip.

TABLE 423.—*Imported meat and meat products, inspected and passed, 1914–15 to 1929–30*

Year beginning July	Chilled and frozen fresh meats: Beef	Chilled and frozen fresh meats: Other	Canned and cured meats	Other meat products	Total weight
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1914–15	188,615,553	28,035,136	23,191,058	5,181,690	245,023,437
1915–16	82,884,003	23,324,276	2,743,278	1,562,919	110,514,476
1916–17	15,563,160	7,686,064	4,847,296	1,043,476	29,138,996
1917–18	18,830,429	5,659,182	23,236,737	11,299,136	59,025,484
1918–19	31,375,776	10,804,563	129,916,112	7,814,691	179,911,142
1919–20	31,978,859	36,217,858	3,398,990	6,185,622	77,781,329
1920–21	35,097,070	116,865,751	5,667,167	4,412,639	162,042,627
1921–22	16,875,389	18,938,148	5,101,764	998,195	41,913,496
1922–23	25,999,968	12,871,364	9,635,315	1,341,067	49,847,714
1923–24	18,105,128	8,489,138	10,648,605	1,391,060	38,633,931
1924–25	5,612,600	11,827,557	12,857,043	2,877,640	33,174,840
1925–26	9,975,359	12,402,230	19,258,401	3,144,968	44,780,958
1926–27	14,956,143	22,508,681	43,714,607	5,454,741	86,634,172
1927–28	38,168,121	18,880,547	63,189,480	12,102,635	132,340,783
1928–29	53,085,288	15,704,658	89,511,853	11,563,215	169,865,014
1929–30	23,909,708	6,783,637	98,128,169	8,065,195	136,886,709

Bureau of Animal Industry.

TABLE 424.—*Livestock: Number of animals slaughtered at Federal-inspected plant and number of whole carcasses condemned,[1] 1906–7 to 1929–30*

Year beginning July—	Cattle		Calves		Sheep		Goats		Swine		Horses		Total slaughter
	Slaughter	Condemned	Slaughter	Condemned	Slaughter	Condemned	Slaughter	Condemned	Slaughter	Condemned	Slaughter	Condemned	
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1906–7	7, 622	27. 9	1, 764	6. 4	9, 682	9. 5	52	0. 0	31, 816	105. 9	------	------	50, 935
1907–8	7, 116	33. 2	1, 996	5. 9	9, 703	8. 1	46	. 0	35, 113	127. 9	------	------	53, 973
1909–9	7, 325	35. 1	2, 047	8. 2	10, 803	10. 7	69	. 1	35, 428	86. 9	------	------	55, 672
1909–10	7, 962	42. 4	2, 295	7. 5	11, 150	11. 1	116	. 2	27, 656	52. 4	------	------	49, 189
1910–11	7, 781	39. 4	2, 220	7. 7	13, 006	10. 8	54	. 1	29, 916	59. 5	------	------	52, 977
1911–12	7, 532	50. 4	2, 243	8. 9	14, 209	15. 4	64	. 1	34, 966	129. 0	------	------	59, 014
1912–13	7, 156	50. 8	2, 098	9. 2	14, 724	16. 7	57	. 1	32, 288	173. 9	------	------	56, 323
1913–14	6, 724	48. 4	1, 815	6. 7	14, 959	20. 6	122	. 7	33, 290	204. 9	------	------	56, 909
1914–15	6, 965	52. 5	1, 736	5. 9	12, 909	17. 6	166	. 7	36, 248	213. 9	------	------	58, 023
1915–16	7, 404	57. 6	2, 048	6. 7	11, 986	15. 1	180	. 7	40, 483	195. 1	------	------	62, 101
1916–17	9, 299	78. 7	2, 680	10. 1	11, 343	16. 7	175	1. 3	40, 211	158. 5	------	------	63, 708
1917–18	10, 938	68. 2	3, 323	8. 1	8, 769	12. 6	150	. 4	35, 449	113. 1	------	------	58, 630
1918–19	11, 242	59. 5	3, 674	9. 2	11, 268	14. 4	126	. 3	44, 398	128. 8	------	------	70, 709
1919–20	9, 710	58. 6	4, 228	13. 8	12, 335	20. 0	77	. 1	38, 982	133. 5	1	0. 1	65, 332
1920–21	8, 180	46. 9	3, 896	7. 7	12, 452	12. 7	20	. 0	37, 703	122. 6	1	. 0	62, 252
1921–22	7, 871	55. 2	3, 924	11. 4	11, 968	10. 5	14	. 0	39, 416	160. 1	2	. 0	63, 196
1922–23	9, 030	73. 3	4, 338	11. 8	11, 404	13. 3	25	. 1	48, 600	196. 3	1	. 0	73, 398
1923–24	9, 189	83. 9	4, 668	12. 7	11, 505	12. 9	31	. 3	54, 416	232. 7	5	. 0	79, 814
1924–25	9, 774	92. 1	5, 185	11. 1	12, 203	12. 7	27	. 1	48, 460	180. 4	12	. 0	75, 660
1925–26	10, 098	103. 6	5, 312	11. 9	12, 354	14. 5	43	. 1	40, 443	143. 0	40	. 1	68, 289
1926–27	10, 050	83. 5	5, 080	10. 6	12, 894	16. 4	30	. 1	42, 650	173. 6	43	. 2	70, 747
1927–28	9, 040	69. 4	4. 774	9. 9	12, 984	15. 4	20	. 1	48, 347	154. 2	107	. 3	75, 273
1928–29	8, 284	61. 9	4, 526	8. 9	13, 769	20. 1	21	. 1	47, 164	139. 4	117	. 4	73, 881
1929–30	8, 281	59. 5	4, 491	9. 5	15, 307	22. 9	22	. 1	46, 689	135. 4	136	. 5	74, 926

Bureau of Animal Industry.

[1] The numbers of condemned carcasses are expressed in thousands and tenths; that is, the last figure represents hundredths.

TABLE 425.—*Meat and meat products prepared under Federal inspection, 1906–7 to 1929–30*

Year beginning July	Pork placed in cure	Sausage chopped	Canned meats	Lard	Lard compounds and substitutes	Oleo products	Oleomargarine	All other products	Total
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1906–7[1]	2, 248, 886	267, 760	105, 196	1, 003, 602	353, 549	283, 971	55, 694	145, 555	4, 464, 213
1907–8	2, 876, 390	416, 249	92, 512	1, 433, 779	436, 155	293, 714	79, 536	329, 974	5, 958, 308
1908–9	2, 686, 051	457, 095	123, 810	1, 308, 986	488, 249	295, 889	91, 068	1, 340, 289	6, 791, 437
1909–10	2, 216, 446	487, 366	127, 239	949, 184	671, 220	290, 486	139, 158	1, 334, 444	6, 215, 543
1910–11	2, 568, 149	488, 813	144, 943	1, 185, 503	672, 845	328, 932	117, 848	1, 427, 217	6, 934, 250
1911–12	2, 634, 752	523, 893	153, 871	1, 309, 359	648, 443	297, 038	128, 367	1, 584, 874	7, 280, 597
1912–13	2, 545, 358	531, 626	115, 237	1, 222, 857	670, 802	264, 705	145, 356	1, 598, 869	7, 094, 810
1913–14	2, 568, 335	542, 017	120, 473	1, 187, 963	590, 410	274, 625	143, 999	1, 605, 474	7, 033, 296
1914–15	2, 913, 328	502, 675	235, 963	1, 277, 734	520, 899	273, 049	145, 932	1, 663, 490	7, 533, 070
1915–16	2, 922, 381	565, 047	177, 836	1, 277, 870	397, 088	287, 048	152, 388	1, 695, 337	7, 474, 995
1916–17	2, 918, 211	635, 860	283, 339	1, 119, 315	466, 198	279, 197	225, 074	1, 753, 897	7, 681, 091
1917–18	3, 132, 549	624, 826	459, 420	943, 851	463, 208	263, 577	265, 345	1, 752, 409	7, 905, 185
1918–19	3, 717, 838	667, 602	632, 259	1, 256, 043	469, 732	266, 809	251, 170	1, 906, 989	9, 169, 042
1919–20	2, 903, 854	662, 519	211, 521	1, 317, 060	328, 567	364, 993	217, 562	1, 749, 082	7, 755, 158
1920–21	2, 501, 885	583, 777	86, 253	1, 487, 820	339, 366	253, 397	151, 638	1, 723, 684	7, 127, 820
1921–22	2, 725, 031	568, 626	109, 481	1, 659, 331	312, 014	268, 034	118, 197	1, 666, 403	7, 427, 117
1922–23	3, 366, 258	679, 317	160, 282	2, 017, 763	336, 851	278, 137	129, 768	1, 920, 171	8, 888, 547
1923–24	3, 502, 368	707, 323	183, 260	2, 110, 660	363, 320	259, 008	142, 881	2, 136, 020	9, 404, 840
1924–25	3, 176, 714	736, 877	214, 650	1, 733, 933	458, 518	287, 271	133, 836	2, 170, 278	8, 912, 077
1925–26	2, 850, 675	771, 741	214, 166	1, 598, 754	543, 913	275, 636	148, 331	2, 007, 854	8, 411, 070
1926–27	2, 920, 206	765, 074	248, 459	1, 691, 344	535, 175	280, 641	148, 384	1, 971, 827	8, 561, 110
1927–28	3, 036, 063	778, 311	255, 379	1, 846, 796	472, 839	237, 506	152, 085	2, 201, 933	8, 980, 912
1928–29	2, 992, 898	785, 463	285, 808	1, 817, 601	467, 077	228, 531	158, 881	2, 210, 438	8, 946, 697
1929–30	2, 981, 864	783, 629	303, 094	1, 807, 144	433, 495	223, 889	159, 413	2, 268, 407	8, 960, 935

Bureau of Animal Industry. The above figures do not represent production, as a product may be inspected more than once in course of further manufacture.

[1] 9 months only.

TABLE 426.—*Meat and meat products: International trade, average 1911–1913, annual 1927–1929*

Country	Calendar year							
	Average 1911–1913		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Argentina	3, 487	1, 173, 461	513	2, 280, 405	593	1, 745, 009	[1] 252	1, 697, 696
Australia [2]	[3] 1, 967	[3] 507, 143	5, 349	321, 643	8, 332	310, 436	7, 647	374, 900
Brazil	54, 012	1, 520	3, 459	93, 510	10, 106	175, 205		192, 697
Canada	43, 327	60, 242	18, 287	159, 297	26, 462	114, 864	39, 670	81, 155
Chile	11, 738	19, 728	1, 391	37, 730	1, 104	46, 562	2, 942	44, 991
China	85	64, 684	3, 040	47, 348	4, 385	44, 153	4, 001	41, 082
Denmark	32, 184	368, 188	33, 205	682, 919	28, 549	721, 893	27, 805	679, 040
Hungary	(4)	(4)	9, 504	25, 787	10, 644	14, 864	4, 309	19, 701
Irish Free State	(4)	(4)	66, 667	105, 423	57, 194	135, 551	59, 541	110, 625
Netherlands	359, 864	497, 402	216, 180	608, 075	180, 100	558, 807	158, 485	458, 530
New Zealand	960	326, 539	943	441, 127	1, 062	436, 639	1, 198	428, 201
Rumania	321	3, 546	[1] 9	[1] 13, 692		[1] 11, 780		
Sweden	24, 215	39, 768	31, 635	73, 202	28, 917	65, 576	29, 318	60, 025
Union of South Africa	31, 103	404	18, 329	15, 568	16, 610	19, 090	15, 670	27, 495
United States	18, 719	1, 277, 524	161, 302	1, 290, 979	194, 161	1, 335, 802	215, 612	1, 448, 797
Uruguay	[5] 702	196, 911	0	428, 056	0	334, 156	0	336, 537
Yugoslavia	(4)	(4)	9, 670	23, 731	10, 494	21, 205	12, 985	22, 364
PRINCIPAL IMPORTING COUNTRIES								
Austria	[6] 49, 268	[6] 12, 420	118, 728	7, 721	127, 251	11, 412	121, 201	9, 920
Belgium	179, 120	127, 057	215, 234	52, 734	168, 075	56, 402	184, 671	39, 908
British India	14, 775	2, 024	12, 482	1, 114	11, 158	1, 390	12, 813	1, 249
British Malaya	9, 703	0	15, 266	2, 256	16, 529	2, 565	15, 938	2, 155
Cuba	128, 362	0	181, 505	0	177, 609	1, 466	168, 102	2, 285
Czechoslovakia	(4)	(4)	94, 459	10, 054	85, 941	10, 544	93, 908	8, 836
Egypt	4, 689	0	6, 246	110	7, 737	122	8, 452	104
Finland	14, 973	2, 081	19, 917	3, 905	26, 477	1, 819	19, 361	1, 086
France	111, 496	98, 281	402, 140	58, 250	229, 425	77, 572	175, 031	72, 885
Germany	559, 752	19, 525	899, 275	37, 320	703, 269	48, 022	670, 475	55, 142
Italy	104, 619	15, 708	198, 584	18, 339	215, 228	13, 027	230, 547	12, 662
Japan	11, 727	0	74, 539	0	68, 918	368	68, 059	208
Mexico	31, 267	220	58, 465	0	71, 585	0		
Norway	42, 416	3, 365	29, 542	2, 644	33, 640	3, 552	25, 877	3, 153
Peru	7, 859	110	12, 924	155	10, 707	1, 180	10, 888	1, 194
Philippine Islands	21, 902	0	20, 578	0	19, 767	0	21, 607	0
Poland	(4)	(4)	48, 872	63, 266	68, 364	64, 673	46, 837	67, 722
Spain	37, 974	3, 200	36, 017	3, 664	31, 084	3, 512	[1] 4, 678	[1] 1, 132
Switzerland	60, 174	3, 169	31, 242	3, 218	30, 850	3, 335	31, 468	3, 258
United Kingdom	2, 843, 605	117, 226	3, 854, 368	148, 826	3, 846, 918	114, 738	3, 686, 515	64, 137
Total 37 countries	4, 816, 365	4, 941, 446	6, 909, 866	7, 062, 068	6, 529, 245	6, 507, 291	6, 175, 863	6, 370, 872
Totals by kinds of meat:								
Beef	2, 023, 704	2, 161, 464	3, 103, 607	3, 220, 552	2, 753, 446	2, 617, 598	2, 448, 908	2, 342, 601
Mutton	610, 820	559, 795	692, 705	662, 307	689, 967	586, 282	702, 685	635, 936
Pork	1, 600, 616	1, 604, 447	2, 315, 921	2, 300, 260	2, 333, 555	2, 377, 088	2, 220, 091	2, 295, 027
Other	581, 225	615, 740	797, 633	878, 940	752, 277	926, 323	804, 179	1, 097, 308
Total	4, 816, 365	4, 941, 446	6, 909, 866	7, 062, 068	6, 529, 245	6, 507, 291	6, 175, 863	6, 370, 872

Bureau of Agricultural Economics. Official sources.

* Preliminary.
[1] International Yearbook of Agricultural Statistics.
[2] Year ended June 30.
[3] Calendar year.
[4] Figures for pre-war years are included in the countries of the pre-war boundaries.
[5] 1 year only.
[6] Average for Austria-Hungary.

TABLE 427.—*Meats, western dressed, fresh and smoked: Average wholesale price per 100 pounds at Chicago and New York, by months, July, 1928, to December, 1930*

BEEF AND VEAL

Year and month	Chicago							New York						
	Steer beef					Cow beef, Good	Vealers,[1] Good	Steer beef					Cow beef, Good	Vealers,[1] Good
	Choice		Good		Medium, 500 pounds up			Choice		Good		Medium, 500 pounds up		
	700 pounds up	550 to 700 pounds	700 pounds up	550 to 700 pounds				700 pounds up	550 to 700 pounds	700 pounds up	550 to 700 pounds			
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
July	23. 22	23. 71	22. 21	22. 67	20. 74	18. 85	22. 84	23. 50	23. 74	22. 71	22. 84	20. 03	19. 39	22. 42
August	23. 48	24. 33	22. 48	23. 13	20. 50	18. 50	25. 48	25. 41	25. 94	24. 41	24. 34	20. 46	19. 85	26. 00
September	25. 01	25. 90	24. 09	24. 48	21. 24	18. 62	26. 68	26. 99	27. 39	25. 26	25. 14	20. 65	19. 66	26. 89
October	24. 53	25. 30	23. 06	23. 30	18. 91	16. 52	23. 24	26. 34	26. 54	24. 12	23. 98	19. 78	17. 61	24. 65
November	23. 40	24. 44	21. 83	22. 49	19. 24	16. 74	21. 70	24. 64	25. 19	22. 41	22. 90	19. 70	17. 15	22. 96
December	22. 78	23. 55	20. 55	21. 21	18. 22	15. 85	20. 84	23. 68	24. 20	21. 26	21. 64	19. 01	17. 12	19. 95
Average, 6 months	23. 74	24. 54	22. 37	22. 88	19. 81	17. 51	23. 46	25. 09	25. 50	23. 36	23. 47	19. 94	18. 46	23. 81
1929														
January	22. 17	23. 11	20. 18	20. 96	18. 34	17. 08	24. 01	22. 02	22. 91	20. 17	20. 79	18. 70	17. 49	26. 10
February	19. 91	20. 26	18. 31	18. 48	16. 99	16. 06	23. 38	20. 64	20. 96	18. 94	19. 09	17. 54	16. 61	23. 70
March	20. 28	21. 19	19. 18	19. 90	18. 60	16. 86	23. 52	20. 96	21. 42	19. 62	19. 94	18. 46	17. 36	23. 50
April	20. 75	21. 55	19. 75	20. 51	19. 09	17. 89	20. 65	22. 35	22. 70	21. 56	21. 68	20. 30	19. 05	21. 68
May	21. 70	22. 70	21. 20	21. 92	20. 67	19. 49	22. 92	22. 65	22. 97	21. 92	22. 21	20. 67	19. 87	21. 26
June	22. 25	23. 22	21. 50	22. 48	21. 25	19. 70	23. 65	23. 48	23. 66	22. 76	22. 94	21. 55	20. 55	24. 68
July	23. 54	24. 07	22. 54	23. 01	21. 54	19. 08	24. 05	24. 94	24. 99	24. 07	24. 00	21. 22	20. 79	26. 04
August	23. 48	23. 75	22. 74	22. 79	19. 40	17. 56	24. 72	24. 88	25. 12	23. 28	23. 28	19. 04	17. 75	26. 08
September	23. 05	23. 45	21. 80	22. 26	18. 45	16. 87	24. 24	24. 64	24. 72	22. 77	22. 77	18. 72	16. 98	26. 32
October	22. 44	23. 36	21. 21	21. 78	17. 69	16. 02	21. 51	23. 81	23. 85	21. 40	21. 40	17. 57	16. 20	23. 44
November	21. 95	22. 40	20. 25	20. 34	17. 65	15. 24	20. 29	22. 30	22. 38	20. 36	20. 14	17. 16	15. 76	22. 98
December	21. 68	3. 01	19. 86	20. 71	17. 79	15. 56	21. 38	22. 80	22. 90	20. 98	20. 98	19. 10	16. 85	23. 24
Average	21. 93	22. 67	20. 71	21. 26	18. 96	17. 28	22. 86	22. 96	23. 22	21. 49	21. 60	19. 17	17. 94	24. 08
1930														
January	22. 07	22. 96	20. 24	20. 61	18. 57	16. 33	22. 39	22. 89	22. 99	20. 93	21. 03	19. 86	16. 97	25. 24
February	21. 90	22. 35	19. 70	19. 70	18. 25	15. 75	20. 45	21. 94	22. 19	19. 98	20. 19	18. 88	16. 48	22. 60
March	21. 11	21. 61	19. 14	19. 14	17. 76	16. 11	18. 70	21. 76	21. 95	19. 95	20. 05	18. 41	16. 65	21. 35
April	20. 24	20. 76	18. 55	18. 58	16. 95	15. 96	16. 72	21. 21	21. 57	19. 69	20. 07	18. 07	17. 50	18. 68
May	19. 81	20. 06	17. 94	17. 94	16. 09	14. 98	17. 60	20. 50	20. 62	18. 84	18. 96	17. 36	16. 81	20. 00
June	19. 08	19. 22	17. 55	17. 55	16. 48	14. 75	16. 80	18. 69	18. 78	17. 72	17. 74	16. 81	15. 61	18. 20
July	16. 15	16. 68	15. 00	15. 26	14. 25	12. 40	17. 22	16. 16	16. 34	15. 33	15. 41	13. 24	12. 68	20. 17
August	15. 79	16. 22	14. 48	14. 82	13. 18	11. 62	18. 11	16. 26	16. 70	14. 78	15. 54	12. 58	11. 82	21. 00
September	17. 95	19. 10	16. 60	17. 25	13. 99	12. 24	18. 78	19. 34	19. 84	17. 04	17. 44	13. 83	13. 51	22. 06
October	17. 03	18. 71	15. 67	16. 32	13. 15	11. 60	17. 62	18. 66	19. 18	17. 10	17. 33	13. 82	12. 75	20. 10
November	17. 65	19. 13	15. 74	16. 40	12. 21	10. 73	15. 50	18. 68	19. 83	16. 64	17. 47	12. 55	11. 70	17. 18
December	17. 17	18. 86	15. 33	15. 85	13. 16	11. 73	14. 90	18. 29	19. 40	16. 26	16. 74	13. 87	12. 27	18. 08
Average	18. 83	19. 64	17. 16	17. 45	15. 34	13. 68	17. 90	19. 53	19. 95	17. 86	18. 16	15. 77	14. 56	20. 39

[1] Hide on.

TABLE 427.—*Meats, western dressed, fresh and smoked: Average wholesale price per 100 pounds at Chicago and New York, by months, July, 1928, to December, 1930*—Continued

PORK CUTS

Year and month	Chicago						New York					
	Fresh pork			Cured pork and lard			Fresh pork			Cured pork and lard		
	Hams, 10 to 14 pounds	Loins, 12 to 15 pounds	Shoulders New York style, skinned, 8 to 12 pounds	Hams, smoked, regular, No. 2, 14 to 16 pounds	Bacon, No. 1, smoked, dry cure, 6 to 8 pounds	Lard, refined, (hardwood tubs)	Hams, 10 to 14 pounds	Loins, 12 to 15 pounds	Shoulders, New York style, skinned, 8 to 12 pounds	Hams, smoked, regular, No. 2, 10 to 12 pounds	Bacon, No. 1, smoked, sweet-pickle cure, 8 to 10 pounds	Lard, refined, (hardwood tubs)
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
August	23.60	25.56	19.55	26.00	31.00	14.70	23.70	25.28	20.34	25.00	22.30	14.77
September	23.80	27.69	22.64	26.00	31.75	15.25	25.00	28.02	22.32	25.44	24.25	14.81
October	20.20	20.58	17.96	24.86	31.40	14.40	22.90	21.94	20.80	25.60	25.30	15.00
November	18.21	19.14	15.16	24.00	29.10	13.62	20.00	20.58	16.32	24.47	22.27	14.00
December	18.85	15.19	12.82	23.88	28.00	12.88	19.00	15.75	14.25	23.64	20.55	13.50
Average 5 months	20.93	21.63	17.63	24.95	30.25	14.17	22.12	22.31	18.81	24.83	22.93	14.42
1929												
January	19.76	17.40	14.07	23.50	28.00	12.75	21.00	17.13	15.02	22.44	19.20	13.65
February	20.42	18.18	14.71	23.38	28.38	12.75	21.50	18.46	16.34	21.58	19.22	13.62
March	21.78	23.38	17.35	23.50	29.25	13.31	24.50	23.25	18.59	22.88	20.82	14.00
April	22.90	22.41	17.04	24.25	30.38	13.25	25.25	22.25	18.65	23.25	21.00	13.50
May	21.64	22.20	16.37	24.16	30.16	12.85	24.05	22.18	17.84	23.45	21.20	13.50
June	23.00	20.44	15.66	24.62	30.52	12.85	24.25	21.05	17.78	24.81	22.70	13.50
July	23.68	22.09	17.28	26.14	31.96	13.22	25.00	23.32	18.80	27.25	24.00	13.50
August	23.05	24.32	17.68	26.25	32.12	13.56	25.50	25.01	19.70	27.18	24.00	14.25
September	23.05	24.31	17.34	25.08	31.75	13.81	24.25	25.80	19.40	25.32	24.75	14.25
October	20.22	22.86	16.20	23.95	31.42	13.17	21.98	23.30	17.89	23.98	24.14	13.80
November	17.60	18.30	14.86	22.68	29.23	12.21	20.88	20.22	16.70	22.38	23.50	13.75
December	18.40	18.16	14.30	21.65	28.80	11.94	19.25	17.90	15.91	22.00	22.00	13.03
Average	21.29	21.17	16.07	24.10	30.16	12.97	23.12	21.66	17.72	23.88	22.21	13.70
1930												
January	20.16	18.87	15.23	21.70	28.80	11.45	21.60	19.64	16.59	21.80	21.35	12.70
February	22.92	19.51	16.25	24.75	31.50	12.38	22.12	18.92	16.94	23.38	21.75	12.38
March	22.15	22.75	17.04	23.75	30.00	12.12	23.62	21.58	17.88	23.72	22.85	12.25
April	20.98	20.79	16.65	22.08	28.50	11.65	22.92	21.04	17.68	23.12	22.12	12.25
May	20.90	20.24	16.00	22.12	28.75	11.50	23.00	21.70	17.48	23.10	23.19	12.28
June	19.42	19.10	15.76	23.25	30.50	11.00	22.85	20.14	17.02	23.25	24.75	11.87
July	18.50	17.52	14.82	22.90	30.65	10.50	22.78	19.53	16.40	23.15	23.95	11.62
August	20.30	21.46	15.78	24.06	31.50	12.44	22.50	22.20	16.75	22.38	23.75	12.12
September	19.58	22.12	16.48	24.50	32.88	14.25	22.50	22.84	17.40	22.44	24.25	13.50
October	20.18	21.44	15.23	23.00	33.60	13.94	21.90	22.95	16.68	22.25	25.00	13.75
November	15.44	16.33	13.14	23.12	30.75	12.31	21.39	17.37	15.05	22.00	24.75	13.75
December	15.36	15.24	11.92	21.75	29.50	10.70	21.58	16.88	15.01	21.06	22.97	12.40
Average	19.66	19.61	15.36	23.08	30.58	12.02	22.40	20.40	16.74	22.64	23.39	12.57

TABLE 427.—*Meats, western dressed, fresh and smoked: Average wholesale price per 100 pounds at Chicago and New York, by months, July, 1928, to December, 1930*—Continued

LAMB AND MUTTON

Year and month	Chicago							New York						
	Lamb						Mutton, Good, 70 pounds down	Lamb						Mutton, Good, 70 pounds down
	Choice		Good		Medium, 38 pounds down	Common, 38 pounds down		Choice		Good		Medium, 38 pounds down	Common, 38 pounds down	
	38 pounds down	39 to 45 pounds	38 pounds down	39 to 45 pounds				38 pounds down	39 to 45 pounds	38 pounds down	39 to 45 pounds			
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
July	30.20	29.92	28.50	28.22	25.25	22.18	16.00	28.89	28.00	27.44	26.88	24.89	21.90	15.16
August	28.04	27.64	26.40	26.00	23.94	20.94	15.72	27.38	27.38	26.32	26.32	24.26	21.74	15.06
September	27.05	27.08	25.72	25.72	23.28	20.79	14.55	28.08	28.08	26.98	26.98	25.26	22.95	14.45
October	23.66	23.64	22.56	22.54	20.88	18.80	12.52	25.14	25.14	23.84	23.84	22.30	20.40	12.92
November	23.49	23.49	22.30	22.30	20.52	18.50	12.20	24.18	24.18	22.78	22.75	21.00	18.92	12.12
December	24.12	24.12	23.05	23.05	21.64	19.94	12.98	24.30	24.10	22.68	22.58	21.03	19.06	12.54
Average, 6 months	26.09	25.98	24.76	24.64	22.58	20.19	14.00	26.33	26.15	25.01	24.89	23.12	20.83	13.71
1929														
January	29.11	29.07	28.12	28.08	27.10	25.82	16.48	30.42	29.66	29.29	28.59	27.70	25.84	16.40
February	28.35	28.08	27.30	27.02	26.30	25.30	15.40	30.14	29.26	29.01	28.26	27.71	26.41	15.48
March	30.02	29.65	29.02	28.65	27.55	26.25	18.80	30.75	29.65	29.55	28.65	28.10	26.65	20.00
April	30.15	29.80	29.00	28.75	27.90	26.65	20.65	31.48	30.48	30.45	29.45	28.95	27.45	20.30
May	29.85	29.38	28.65	28.24	26.70	24.86	16.64	30.90	29.42	29.51	28.36	27.22	25.58	14.14
June	29.62	29.15	28.50	27.88	25.48	22.65	13.85	29.42	28.30	27.95	26.68	25.65	23.00	13.80
July	29.18	29.13	28.08	27.88	25.36	21.59	14.18	30.34	29.88	29.16	28.64	26.56	24.14	14.89
August	27.60	27.60	26.48	26.48	24.05	20.80	13.30	26.90	26.55	25.12	24.95	22.52	20.15	12.79
September	25.38	25.38	24.38	24.38	22.00	18.85	11.45	26.08	25.92	24.12	23.98	21.56	20.00	11.55
October	23.80	23.78	22.40	22.18	20.74	18.80	11.64	25.09	24.22	23.92	23.00	22.45	20.86	11.23
November	24.20	23.95	22.75	22.75	21.20	19.40	12.40	25.44	24.50	24.38	23.53	23.41	21.11	12.80
December	25.52	24.35	24.20	23.35	22.05	19.90	12.56	26.00	25.20	25.00	24.20	23.82	22.12	12.39
Average	27.73	27.44	26.57	26.30	24.70	22.57	14.78	28.58	27.75	27.29	26.52	25.47	23.61	14.65
1930														
January	26.88	25.68	25.88	24.68	23.86	21.68	13.84	27.58	26.68	26.46	25.64	25.46	24.12	14.00
February	23.92	21.65	21.95	20.68	20.42	18.88	12.44	22.98	22.10	21.72	20.88	20.65	18.92	11.64
March	23.45	21.70	21.90	20.35	19.88	17.40	12.48	22.90	21.88	21.75	20.92	20.68	19.90	13.52
April	20.18	19.44	18.56	18.18	16.06	13.76	12.23	20.84	19.72	19.66	18.64	18.36	17.28	12.50
May	21.42	21.42	20.18	20.22	18.18	16.22	12.15	22.28	21.92	21.28	20.28	19.92	18.51	12.50
June	24.75	24.75	22.28	22.28	18.78	14.85	9.38	25.65	24.72	24.05	23.42	21.72	19.58	10.84
July	22.88	22.88	21.00	21.00	17.66	13.22	10.98	23.54	22.87	22.18	21.84	18.76	15.60	11.64
August	20.50	20.50	18.45	18.45	15.59	12.11	11.22	22.80	22.80	21.72	21.72	18.90	15.20	11.55
September	18.80	18.80	16.92	16.92	14.75	12.39	10.28	19.59	19.50	18.69	18.44	16.65	14.26	10.39
October	17.57	17.57	16.20	16.20	14.68	12.84	8.84	18.22	18.22	17.22	17.22	15.52	13.86	9.01
November	16.85	16.85	15.70	15.70	13.91	11.82	8.06	17.70	17.36	16.90	16.85	15.30	13.28	9.32
December	17.02	17.02	15.92	15.92	14.20	11.89	8.04	18.42	18.30	17.38	17.14	16.10	14.46	9.07
Average	21.18	20.69	19.58	19.22	17.33	14.76	10.83	21.88	21.34	20.75	20.25	19.00	17.08	11.33

Bureau of Agricultural Economics. Compiled from data of the livestock and meat-reporting service of the bureau. Earlier data in 1927 Yearbook, pp. 1050-1055 and in 1928 Yearbook, pp. 964-966.

TABLE 428.—*Hides, packer: Average price per pound at Chicago, 1921–1930*

Calendar year	Steers					Cows			Bulls	
	Heavy native	Heavy Texas	Light Texas	Butt branded	Colorados	Heavy native	Light native	Branded	Native	Branded
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	13.88	13.10	11.43	12.83	11.85	12.41	11.37	10.00	8.40	7.13
1922	17.83	16.57	15.29	16.51	15.59	16.10	15.16	13.47	11.96	10.15
1923	16.46	14.79	13.77	14.89	13.86	14.21	12.94	11.11	11.69	9.89
1924	14.67	13.82	12.80	13.80	12.79	12.95	12.29	10.41	10.14	8.79
1925	15.96	15.08	14.06	15.16	14.12	14.82	14.62	13.30	11.98	10.29
1926	14.08	13.38	12.67	13.34	12.82	12.71	13.11	12.05	9.98	8.50
1927	19.28	18.21	17.49	18.23	17.74	18.08	18.66	17.26	14.09	12.88
1928	23.85	22.91	22.26	22.95	22.26	22.96	22.63	21.79	17.64	16.62
1929	16.98	16.08	15.16	16.11	15.39	15.86	15.75	14.86	11.42	10.17
1930	13.87	13.76	12.55	13.73	13.18	11.78	11.71	11.19	8.30	7.30
1930										
January	16.30	15.70	14.30	15.70	14.70	13.50	13.70	13.30	9.85	8.85
February	14.87	14.62	13.50	14.50	13.87	12.37	12.75	12.50	9.69	8.69
March	14.00	14.00	13.00	14.00	13.50	12.00	12.50	12.00	9.00	8.00
April	14.00	14.00	13.00	14.00	13.50	12.00	12.50	12.00	9.25	8.00
May	14.10	14.10	13.10	14.10	13.60	12.10	12.60	12.10	9.05	8.05
June	15.00	14.90	13.75	14.75	14.25	12.87	13.25	12.75	9.19	8.12
July	14.12	13.87	12.87	13.87	13.37	11.87	12.12	11.62	8.56	7.81
August	13.50	13.50	12.50	13.50	13.00	11.50	10.80	10.20	7.00	6.00
September	14.39	14.25	13.25	14.12	13.62	12.50	11.50	10.75	7.69	6.62
October	13.62	13.62	12.12	13.63	13.12	11.87	10.87	10.37	7.56	6.56
November	11.80	11.80	10.30	11.80	11.30	9.90	9.60	8.70	6.85	5.85
December	10.75	10.75	9.00	10.87	10.37	8.87	8.37	8.00	5.94	5.12

Bureau of Agricultural Economics. Compiled from annual reports of the Chicago Board of Trade. Data 1893–1919 available in 1925 Yearbook, p. 1199, Table 610.

TABLE 429.—*Hides, country: Average price per pound at Chicago, 1921–1930*

Calendar year	Extremes	Heavy steers	Heavy cows	No. 1 buffs	No. 2 buffs	Bulls	Country packer brands	Country brands	No. 1 calfskins	No. 1 kipskins
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	8.95	9.35	7.32	7.10	5.77	5.43	7.43	5.33	18.57	15.58
1922	12.93	12.03	10.85	10.86	9.52	8.23	12.53	8.42	18.95	17.29
1923	11.65	11.39	10.43	10.45	9.26	8.93	10.12	8.70	17.18	15.42
1924	11.86	11.31	9.24	9.63	8.63	7.86	9.81	8.23	20.39	16.62
1925	14.41	12.94	11.64	12.26	11.25	9.46	12.52	10.54	21.88	18.12
1926	13.46	11.63	9.54	10.70	9.70	8.03	10.52	9.00	18.02	16.12
1927	18.60	16.02	14.85	16.26	15.26	11.49	15.54	13.89	20.47	19.96
1928	22.04	18.53	18.05	19.71	18.71	14.88	19.18	17.38	27.84	25.23
1929	14.98	12.09	11.55	12.82	11.82	8.92	11.88	10.80	20.72	18.72
1930	11.18	8.50	8.40	9.14	8.14	5.90	9.49	7.73	17.43	15.92
1930										
January	13.65	10.75	10.75	11.70	10.70	7.65	11.50	9.75	18.90	17.50
February	12.37	9.87	9.87	10.37	9.37	6.81	10.81	8.87	17.62	16.62
March	12.50	9.94	9.75	10.56	9.56	6.75	10.75	8.75	16.87	15.94
April	12.37	9.69	9.56	10.19	9.19	6.62	10.50	8.75	16.87	16.00
May	12.30	9.50	9.45	10.10	9.10	6.50	10.25	8.75	18.00	16.00
June	12.19	9.31	9.19	9.87	8.87	6.50	10.25	8.56	18.75	17.00
July	11.25	8.37	8.25	8.75	7.75	6.12	9.62	7.69	18.00	16.75
August	9.75	6.95	6.95	7.75	6.75	4.90	8.45	6.45	16.35	15.15
September	10.62	7.69	7.62	8.62	7.62	5.31	8.75	7.19	17.44	15.75
October	10.00	7.31	7.12	8.00	7.00	5.00	8.37	6.62	18.00	15.75
November	9.20	6.65	6.40	7.30	6.30	4.65	7.65	5.90	16.80	14.90
December	7.94	5.94	5.94	6.50	5.50	4.00	6.94	5.44	15.56	13.75

Bureau of Agricultural Economics. Compiled from annual reports of the Chicago Board of Trade. Data 1893–1919 available in 1925 Yearbook, p. 1199, Table 611.

Table 430.—*Horses and mules: Number and value on farms, United States, January 1, 1910–1931*

Jan. 1—	Horses			Mules		
	Number	Value per head	Farm value	Number	Value per head	Farm value
	Thousands	*Dollars*	*1,000 dollars*	*Thousands*	*Dollars*	*1,000 dollars*
1910 (Apr. 15)	*19,833*	108.03	2,142,524	*4,210*	120.20	506,049
1911	20,277	111.46	2,259,981	4,323	125.92	544,359
1912	20,509	105.94	2,172,694	4,362	120.51	525,657
1913	20,567	110.77	2,278,222	4,386	124.31	545,245
1914	20,962	109.32	2,291,638	4,449	123.85	551,017
1915	21,195	103.33	2,190,102	4,479	112.36	503,271
1916	21,159	101.60	2,149,786	4,593	113.83	522,834
1917	21,210	102.89	2,182,307	4,723	118.15	558,006
1918	21,555	104.24	2,246,970	4,873	128.81	627,679
1919	21,482	98.45	2,114,897	4,954	135.83	672,922
1920	19,848	96.52	1,915,653	5,475	148.46	812,828
1921	19,134	84.57	1,618,120	5,586	117.52	656,455
1922	18,564	71.18	1,321,396	5,638	89.14	502,563
1923	17,943	70.65	1,267,624	5,702	87.17	497,044
1924	17,222	65.48	1,127,619	5,730	85.90	492,209
1925	16,470	64.29	1,058,912	5,725	82.73	473,646
1926	15,830	65.50	1,036,843	5,740	81.49	467,760
1927	15,133	64.14	970,703	5,652	74.57	421,467
1928	14,495	67.18	973,812	5,504	79.82	439,320
1929	13,897	70.11	974,290	5,389	82.33	443,652
1930	13,364	70.69	944,709	5,279	82.97	438,019
1931 [1]	12,803	61.36	785,624	5,131	68.60	351,994

Bureau of Agricultural Economics. Estimates of the crop-reporting board. Figures in italics are census returns. Figures for earlier years are shown in 1923 Yearbook.

[1] Preliminary.

Table 431.—*Horses and mules: Farm value per head, by age groups, United States, January 1, 1922–1931*

Jan. 1—	Horses			Mules		
	Under 1 year old	1 and under 2 years	2 years and over	Under 1 year old	1 and under 2 years	2 years and over
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1922	26.50	41.07	75.61	35.55	52.82	94.81
1923	26.51	40.48	74.53	34.35	50.94	92.14
1924	24.68	37.36	68.64	31.83	47.06	90.42
1925	23.80	37.09	66.83	30.65	46.63	86.20
1926	24.82	37.75	68.18	31.30	47.88	84.76
1927	23.75	37.37	66.75	29.41	43.91	77.36
1928	25.13	38.84	69.88	31.18	46.48	82.62
1929	26.65	40.65	72.94	32.59	48.49	84.96
1930	26.57	41.01	73.58	32.78	48.92	85.35
1931	22.06	34.69	63.97	27.45	41.21	70.38

Bureau of Agricultural Economics. Based on returns from special-price reporters. Average value, by States, weighted by estimated numbers each age group. For previous data see 1930 or earlier Yearbooks.

TABLE 432.—*Horses and horse colts: Estimated number on farms and value per head, by States, January 1, 1927–1931*

State and division	Number					Value per head [1]				
	1927	1928	1929	1930	1931 [2]	1927	1928	1929	1930	1931 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	78	74	67	63	60	130.00	135.00	140.00	143.00	115.00
New Hampshire	28	26	23	21	19	105.00	120.00	121.00	127.00	113.00
Vermont	57	54	56	53	51	110.00	119.00	124.00	131.00	109.00
Massachusetts	39	37	29	26	24	119.00	135.00	130.00	135.00	133.00
Rhode Island	5	5	4	4	4	120.00	135.00	130.00	140.00	135.00
Connecticut	32	29	24	22	20	128.00	140.00	145.00	147.00	137.00
New York	401	389	382	374	363	109.00	116.00	124.00	128.00	115.00
New Jersey	54	52	42	39	36	109.00	109.00	114.00	124.00	111.00
Pennsylvania	374	359	349	346	336	99.00	112.00	116.00	121.00	108.00
North Atlantic	1,068	1,025	976	948	913	108.06	117.36	122.40	126.98	112.91
Ohio	568	542	520	504	489	95.00	101.00	105.00	106.00	93.00
Indiana	540	522	491	471	447	80.00	82.00	82.00	82.00	76.00
Illinois	929	874	839	814	790	74.00	74.00	77.00	78.00	69.00
Michigan	444	426	409	401	393	89.00	98.00	110.00	111.00	98.00
Wisconsin	579	567	561	555	549	95.00	98.00	102.00	102.00	91.00
Minnesota	819	803	787	771	756	77.00	79.00	82.00	82.00	70.00
Iowa	1,111	1,089	1,046	1,025	1,004	74.00	75.00	79.00	80.00	68.00
Missouri	636	604	574	563	546	48.00	50.00	53.00	54.00	45.00
North Dakota	673	633	600	594	570	53.00	54.00	53.00	52.00	44.00
South Dakota	643	617	598	574	551	47.00	53.00	57.00	53.00	45.00
Nebraska	815	788	772	757	742	56.00	60.00	61.00	61.00	52.00
Kansas	840	798	758	728	677	41.00	43.00	49.00	48.00	39.00
North Central	8,597	8,263	7,955	7,757	7,514	67.84	70.60	73.95	74.15	64.32
Delaware	21	20	19	18	17	69.00	79.00	90.00	95.00	84.00
Maryland	104	100	97	95	90	78.00	89.00	92.00	97.00	83.00
Virginia	224	206	198	190	184	66.00	70.00	78.00	83.00	68.00
West Virginia	133	128	124	118	114	74.00	84.00	89.00	90.00	79.00
North Carolina	112	105	98	89	80	83.00	87.00	86.00	85.00	76.00
South Carolina	45	42	36	31	27	76.00	81.00	82.00	82.00	68.00
Georgia	46	41	39	35	33	74.00	78.00	78.00	76.00	63.00
Florida	27	26	25	24	23	82.00	83.00	87.00	88.00	77.00
South Atlantic	712	668	636	600	568	73.51	80.27	84.48	86.96	74.34
Kentucky	293	270	258	248	231	47.00	53.00	56.00	59.00	51.00
Tennessee	219	210	202	192	179	54.00	60.00	60.00	64.00	55.00
Alabama	82	73	65	57	51	63.00	66.00	66.00	64.00	50.00
Mississippi	118	106	100	96	86	56.00	61.00	58.00	57.00	45.00
Arkansas	157	146	136	128	115	40.00	43.00	41.00	43.00	32.00
Louisiana	113	107	102	97	92	49.00	52.00	53.00	51.00	45.00
Oklahoma	565	537	510	479	455	35.00	38.00	39.00	39.00	33.00
Texas	788	748	718	661	602	44.00	45.00	47.00	45.00	35.00
South Central	2,335	2,197	2,091	1,958	1,811	44.41	47.47	48.22	48.61	39.61
Montana	547	531	515	469	446	30.00	31.00	31.00	30.00	26.00
Idaho	221	214	202	194	184	52.00	51.00	54.00	51.00	44.00
Wyoming	194	190	180	171	166	31.00	31.00	32.00	35.00	34.00
Colorado	331	324	308	299	287	44.00	43.00	47.00	45.00	41.00
New Mexico	170	163	155	150	142	33.00	31.00	35.00	33.00	28.00
Arizona	101	98	98	84	84	50.00	49.00	51.00	52.00	44.00
Utah	104	102	97	95	91	61.00	61.00	63.00	62.00	55.00
Nevada	44	42	40	39	38	53.00	60.00	58.00	54.00	48.00
Washington	218	209	196	186	175	62.00	65.00	68.00	63.00	55.00
Oregon	201	191	181	166	158	62.00	65.00	65.00	62.00	54.00
California	290	278	267	248	226	76.00	74.00	78.00	78.00	69.00
Western	2,421	2,342	2,239	2,101	1,997	47.94	47.93	50.01	48.45	42.70
United States	15,133	14,495	13,897	13,364	12,803	64.14	67.18	70.11	70.69	61.36

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Sum of total value of subgroups (classified by age), divided by total number and rounded to nearest dollar for States. Division and United States averages not rounded.
[2] Preliminary.

TABLE 433.—*Mules and mule colts: Estimated number on farms and value per head, by States, January 1, 1927–1931*

State and division	Number					Value per head [1]				
	1927	1928	1929	1930	1931 [2]	1927	1928	1929	1930	1931 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New York	7	7	6	6	6	120.00	125.00	120.00	127.00	127.00
New Jersey	5	5	4	4	3	118.00	118.00	123.00	130.00	130.00
Pennsylvania	52	51	51	51	49	110.00	121.00	127.00	128.00	116.00
North Atlantic	64	63	61	61	58	111.77	120.98	125.75	127.74	117.62
Ohio	33	33	32	31	31	94.00	102.00	101.00	107.00	93.00
Indiana	101	101	96	91	91	86.00	86.00	88.00	88.00	83.00
Illinois	160	150	144	137	130	85.00	82.00	86.00	87.00	78.00
Michigan	8	8	7	6	6	86.00	93.00	102.00	110.00	93.00
Wisconsin	7	7	7	7	7	86.00	95.00	95.00	92.00	79.00
Minnesota	14	14	14	15	15	81.00	83.00	83.00	81.00	71.00
Iowa	100	98	93	88	84	83.00	84.00	86.00	88.00	75.00
Missouri	347	330	313	300	300	66.00	68.00	75.00	75.00	63.00
North Dakota	10	10	10	9	9	55.00	57.00	55.00	55.00	46.00
South Dakota	22	22	21	20	19	57.00	63.00	63.00	61.00	53.00
Nebraska	118	110	101	93	88	69.00	75.00	76.00	77.00	68.00
Kansas	237	213	185	167	155	57.00	60.00	65.00	65.00	54.00
North Central	1,157	1,096	1,023	964	935	71.37	73.57	77.74	78.59	68.11
Delaware	9	9	9	9	9	91.00	95.00	96.00	104.00	100.00
Maryland	30	29	28	28	28	101.00	113.00	111.00	116.00	104.00
Virginia	103	105	105	107	105	86.00	92.00	97.00	100.00	85.00
West Virginia	14	14	14	13	13	78.00	81.00	86.00	93.00	81.00
North Carolina	279	279	276	276	270	107.00	119.00	124.00	119.00	113.00
South Carolina	185	179	174	167	160	95.00	105.00	105.00	109.00	92.00
Georgia	347	347	344	344	337	95.00	105.00	109.00	105.00	87.00
Florida	43	43	42	39	37	117.00	119.00	124.00	124.00	105.00
South Atlantic	1,010	1,005	992	983	959	98.28	107.97	111.44	109.89	96.10
Kentucky	301	264	256	256	246	58.00	67.00	69.00	76.00	63.00
Tennessee	352	341	327	320	314	69.00	75.00	80.00	88.00	72.00
Alabama	315	321	327	330	333	84.00	95.00	95.00	92.00	74.00
Mississippi	343	336	336	343	343	79.00	87.00	85.00	87.00	65.00
Arkansas	329	332	339	339	332	59.00	64.00	65.00	66.00	48.00
Louisiana	169	167	169	171	171	79.00	85.00	89.00	84.00	73.00
Oklahoma	365	347	333	313	297	51.00	52.00	58.00	58.00	47.00
Texas	1,031	1,021	1,021	1,001	951	69.00	71.00	71.00	71.00	54.00
South Central	3,205	3,129	3,108	3,073	2,987	68.06	73.06	74.62	75.97	59.84
Montana	11	11	11	11	11	45.00	47.00	47.00	45.00	37.00
Idaho	8	7	7	7	7	60.00	55.00	60.00	57.00	47.00
Wyoming	6	5	5	5	5	49.00	55.00	55.00	60.00	49.00
Colorado	36	33	32	31	29	55.00	56.00	58.00	57.00	51.00
New Mexico	34	34	34	34	34	45.00	45.00	50.00	46.00	37.00
Arizona	12	12	12	12	12	77.00	77.00	82.00	77.00	66.00
Utah	4	4	4	4	4	62.00	61.00	67.00	67.00	56.00
Nevada	4	4	4	4	4	60.00	61.00	62.00	57.00	47.00
Washington	28	29	28	27	26	72.00	73.00	74.00	68.00	56.00
Oregon	20	20	19	18	18	70.00	72.00	71.00	66.00	52.00
California	53	52	49	45	42	89.00	85.00	88.00	90.00	78.00
Western	216	211	205	198	192	66.36	66.16	68.20	65.64	55.20
United States	5,652	5,504	5,389	5,279	5,131	74.57	79.82	82.33	82.97	68.60

Bureau of Agricultural Economics. Estimates of crop-reporting board.

[1] Sum of total value of subgroups (classified by age) divided by total number and rounded to nearest dollar for States. Divisions and the United States averages not rounded.

[2] Preliminary.

TABLE 434.—*Horses: Number in countries having 80,000 and over, avearage 1909–1913 and 1921–1925, annual 1926–1930*

Country	Month of estimate	Average, 1909–1913 [1]	Average, 1921–1925 [1]	1926	1927	1928	1929	1930
North America, Central America, and West Indies:		*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Canada	June	2, 664	3, 627	3, 398	3, 422	3, 376	3, 376	3, 295
United States—								
On farms	Jan. 1	20, 430	17, 867	15, 830	15, 133	14, 595	13, 897	13, 364
Not on farms		[2] 3, 183	[2] 1, 706					
Mexico		[3] 859	[4] 930	1, 036				
Guatemala	July	64	70	94	75	53	59	
Costa Rica		60	105	127	126	102	85	
Cuba	December [5]	562	844	685	747	716	634	758
Dominican Republic	April	[6] (136)	136					
Haiti				110	115	125	125	
Estimated total [7]		28, 300	25, 600					
South America:								
Columbia		[5] 526	971	980	978			
Venezuela		191	168					
Peru		[6] (100)	156					
Bolivia	December [5]	97	[6] (150)	204	320		376	
Chile		402	482					
Brazil	September	7, 290	[2, 4] 5, 254					
Uruguay		[2, 9] 556	[2, 10] 555					
Paraguay	December [5]	[5] 478	[11] 490					
Argentina	June and December.[5]	[2] 8, 324	9, 432					[2] 9, 858
Estimated total [7]		18, 000	17, 700					
Europe:								
England and Wales	June	1, 335	1, 280	1, 129	1, 077	1, 038	999	961
Scotland	do	206	202	179	172	166	163	157
North Ireland [12]	do	96	98	91	89	87	86	87
Irish Free State [12]	do	520	332	327	319	321	319	448
Norway [13]	do	[14] 168	[15] 188	183	183	182	177	177
Sweden	do	660	664		628			
Denmark	July	605	564	548	525	519	521	516
Netherlands	May–June	330	[2] 364					[2] 297
Belgium	December [5]	273	230	250	250	256	253	249
France	do.[5]	3, 359	2, 765	2, 880	2, 894	2, 927	2, 936	
Spain	do.[5]	534	634	698	719			
Portugal	October–March	[2, 16] 88	80					
Italy	March	[17] 983	1, 008		1, 050			
Switzerland	April	144	134	140				
Germany	December [5]	[18] 3, 807	3, 690	3, 917	3, 873	3, 810	3, 718	3, 617
Austria	do.[5]	319	268					
Czechoslovakia	do.[5]	692	591	[2] 740				
Hungary	Spring or summer	896	814	885	903	918	892	860
Yugoslavia	January	1, 188	1, 067	1, 117	1, 120	1, 109	1, 140	
Greece	December [5]	204	208	270	281	277	290	
Bulgaria	do.[5]	425	[2] 342					
Rumania	do.[5]	1, 911	1, 729	1, 815	1, 877	1, 942	1, 945	1, 959
Poland	November	3, 496	3, 290		4, 127		4, 047	
Lithuania	Spring	451	470	535	617	611	588	
Latvia	do	320	324	365	369	365	360	
Estonia	Spring or summer	165	210	226	230	228	205	204
Finland	September	366	399	400	396	394	395	
Russia, European and Asiatic.	Spring	35, 523	24, 611	28, 428	31, 538	33, 506	34, 606	31, 158
Estimated total [7]		23, 400	22, 100					
Africa:								
Morocco		[6] (80)	174	196	194	187	197	
Algeria	March	[14] 225	161	167	162	164	163	
Tunis	December [5]	36	73	72	87	92	88	89
French West Africa and French Sudan.		[6] (50)	148	196	207	205		
Nigeria, Northern		[6] (170)	173	182	182	203		
Union of South Africa	Spring or summer.	[2] 719	925	888				
Basutoland		[2] 88	166	244	250	250	205	
Estimated total [7]		1, 600	2, 000					

See footnotes at end of table.

TABLE 434.—*Horses: Number in countries having 80,000 and over, average 1909–1913 and 1921–1925, annual 1926–1930*—Continued

Country	Month of estimate	Average, 1909–1913 [1]	Average, 1921–1925 [1]	1926	1927	1928	1929	1930
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Asia:								
Turkey, European and Asiatic	Summer	950	452	537	459	485	497	
Persia		[6] (1,500)	[15, 19] 1,500					
India—								
British	December–April	1,564	1,747	1,684	1,691	1,726	1,728	
Native States	do	159	502	445	466	464		
China, including Manchuria		4,934	[5] (4,500)				[15] 4,500	
Japan	December	1,571	1,545	1,553	1,486	1,495		
French Indo-China		[10] 70	107	97	98	97	97	
Siam	Mar. 31	[4] 81	183	247	265	283	298	
Philippine Islands [19]	December [5]	156	281	294	309	318	322	
Dutch East Indies—								
Java and Madura	do	418	273	267	259	258	248	252
Outer possessions	do	[8] 323	443	463	452	451	458	456
Estimated total [7]		11,800	11,700					
Oceania:								
Australia	December [5]	2,280	2,373	2,250	2,123	2,041	1,943	
New Zealand	Jan. 31	[2] 404	328	315	304	307	299	297
Estimated total [7]		2,700	2,700					
Total, all countries reported, all periods, including Russia—								
Pre-war to 1929 [20] (36)		81,848	68,455	70,512	72,869	74,057	74,205	
Pre-war to 1930 [20] (18)		70,342	57,403	59,008	61,440	62,668	62,892	58,980
Estimated world total [7]		121,300	106,400					

Bureau of Agricultural Economics. Compiled from official sources or the International Institute of Agriculture.

[1] Average for 5-year period if available, otherwise for any year or years within this period except as otherwise stated. In countries having changed boundaries the pre-war figures are estimates for one year only of numbers within present boundaries. For the pre-war average the years immediately preceding the war have been used.
[2] Census.
[3] 1903.
[4] 1920.
[5] Estimates for countries reporting as of December have been considered as of Jan. 1 of the following year, i. e., horses as reported in France for Dec. 31, 1926, have been placed in the 1927 column.
[6] Interpolated.
[7] Includes interpolations for a few countries not reporting each year and rough estimates for some others.
[8] 1915.
[9] 1908.
[10] 1916.
[11] 1918.
[12] Incomplete. Refers to horses used in agriculture only for Northern Ireland and Irish Free State.
[13] Rural communities only.
[14] September.
[15] Unofficial.
[16] 1906.
[17] Estimated for present boundaries. Estimates for former boundaries were as follows: Mar. 19, 1908, 955,878, and for April 6, 1918, 989,876.
[18] Includes army hourses.
[19] Includes mules and asses.
[20] Comparable totals for the number of countries indicated.

Table 435.—*Mules: Number in countries having 20,000 and over, average 1909–1913 and 1921–1925, annual 1926–1930*

Country	Month of estimate	Average, 1909–1913 [1]	Average, 1921–1925 [1]	1926	1927	1928	1929	1930
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
North America, Central America, and West Indies:								
United States—								
On farms	January	4,346	5,676	5,740	5,652	5,504	5,389	5,279
Not on farms		[2] 270	[2 3] 378					
Mexico		[4] 334	330	686				
Cuba	December [5]	48	74	72	72	73	68	92
Dominican Republic	April	(65)	44					
Porto Rico		[2 6] 5	20					
Haiti				23	23	23	25	
Estimated total [7]		5,100	6,600					
South America:								
Colombia		[8] 201	354	360	346			
Venezuela		59	55					
Bolivia	December [5]	45	(150)	155	175			
Chile		33	42					
Argentina	December [5]	[2 9] 565	623					
Estimated total [7]		900	1,200					
Europe:								
Total Ireland		31	25	21	19	19	18	
France	December [5]	188	188	188	185	183	166	
Spain	do	917	1,129	1,286	1,295			
Portugal	October	[2 10] 58	88					
Italy	March	392	500	520				
Germany	December [5]	(11)	(11)	(11)			(11)	
Yugoslavia	January	24	28	15	15	15	15	
Greece	December [5]	121	128	138	148	135	150	
Bulgaria	do	24	26					
Estimated total [7]		1,800	2,200					
Africa:								
Morocco		(40)	64	78	84	86	92	
Algeria	March	191	213	165	164	164	165	
Tunis	December [5]	20	31	33	37	38	40	41
Egypt	September	27	21	23	21	23	22	
Union of South Africa	April–August	94	131	138				
Estimated total [7]		400	500					
Asia:								
Turkey, Europe, and Asiatic		163	91	23	30	37		
Syria and Lebanon		(10)	20	25	19	20		
India, British	December–April	113	75	69	70	71	71	
Kwantung	December [5]	13	16	17	19	20	20	
Estimated total [7]		400	300					
Total all countries reported all periods, pre-war to 1929 [12]		5,162	6,539	6,559	6,486	6,331	6,216	
Estimated world total [7]		8,600	10,800					

Bureau of Agricultural Economics. Compiled from official sources and the International Institute of Agriculture. Figures in parenthesis are interpolated.

[1] Average for 5-year period if available. Otherwise for any year or years within this period except as otherwise stated. In countries having changed boundaries the pre-war figures are estimates for 1 year only of numbers within present boundaries. For the pre-war average the years immediately preceding the war have been used.

[2] Census.

[3] 1920.

[4] 1902.

[5] Estimates for countries reporting as of December have been considered as of Jan. 1, of the following year—i. e., mules reporting as of Dec. 31, 1926, in France have been placed in 1927 column.

[6] April.

[7] Includes interpolations for a few countries not reporting each year and rough estimates for some others. It is probable that mules are found in many other countries for which no estimates at all are available and for which no estimates are included in these totals.

[8] 1915.

[9] June.

[10] 1906.

[11] Included with asses.

[12] Comparable totals for the number of countries indicated.

TABLE 436.—*Asses: Number in countries having 20,000 and over, average 1909–1913, and 1921–1925, annual 1926–1930*

Country	Month of estimate	Average, 1909–1913 [1]	Average, 1921–1925 [1]	1926	1927	1928	1929	1930
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
North America, Central America, and West Indies:								
United States, on farms		[2] 106	[2] 72					
Mexico		[3] 288	[4] 521	850				
Guatemala		33	(30)			27	34	
Dominican Republic	April	(80)	122					
Haiti				170	210	240	240	
Estimated total [5]		600	800					
South America:								
Colombia		[6] 139	149	140	157			
Venezuela		227	200					
Bolivia	December [7]	173	(185)	189	190			
Chile		31	30					
Brazil	September [7]	[8] 3,208	[2 8] 1,865					
Paraguay	December [7]	[6] 18	20					
Argentina	do.[7]	[2 9] 260	289					
Estimated total [5]		4,100	2,800					
Europe:								
Irish Free State			210	199	197	196	185	
Ireland, total	June	244	224	208	206	204	194	
France	December [7]	358	290	273	264	260	250	
Spain	do.[7]	846	1,067	1,077	1,138			
Portugal	October	[2 10] 144	236					
Italy		872	969	980				
Germany	December [7]	[8] 10	[8] 32	[8] 30			[8] 24	[8] 21
Yugoslavia	January	99	90	96	98	104	106	
Greece	December [7]	250	250	299	319	328	343	
Bulgaria	do.[7]	147	122					
Estimated total [5]		3,000	3,500					
Africa:								
Morocco		[6] 226	490	565	508	497	541	
Algeria	March	275	207	285	275	279	296	
Libia (Italian)		39	40					
Tunis	December [7]	88	138	119	154	162	159	161
French West Africa and French Sudan.		(200)	334	407	428	458	498	
Nigeria and British Cameroon		410	499	510	516	538	548	
Egypt	September	682	653	739	750	762	759	
Kenya colony			34	36	36	36	37	
Anglo-Egyptian Sudan		(200)	296	345	348	349	350	
Eritrea (Italian)		34	47					
French Equatorial Africa		(20)	47	57				
British Southwest Africa		(20)	36	45	52	58	61	
Union of South Africa	April–August	337	780	796				
Rhodesia, South [8]	December [7]	18	25	33	38	42	45	
Tanganyika Territory		22	24	36	40	43	50	
Estimated total [5]		2,600	3,700					
Asia:								
Cyprus	March	(55)	45	43	42	52	54	
Turkey (Europe and Asia)		1,411	556	949	930	928	849	
Syria and Lebanon		(87)	91	100	102	119		
India, British	December–April	1,340	1,382	1,408	1,409	1,443	1,442	
Native States	do	[8] 171	348	307	306	308		
Kwantung	December [7]	28	29	28	27	27	28	
Estimated total [5]		7,500	6,900					
Total, all countries reported, all periods, prewar to 1929.[11]		5,926	5,568	6,388	6,404	6,534	6,573	
Estimated world total [5]		17,300	17,500					

Bureau of Agricultural Economics. Compiled from official sources and the International Institute of Agriculture. Figures in parentheses are interpolated.

[1] Average for 5-year period if available. Otherwise, for any year or years within this period except as otherwise stated. In countries having changed boundaries the pre-war figures are estimates for 1 year only of numbers within present boundaries. For the pre-war average the years immediately preceding the war have been used.
[2] Census.
[3] 1902.
[4] Incomplete.
[5] Includes interpolations for a few countries not reporting each year and rough estimates for some others.
[6] 1915.
[7] Estimates for countries reporting as of Dec. 31, have been considered as of Jan. 1 of the following year—i. e., asses reported as of Dec. 31, 1926, in France have been placed in 1927 column.
[8] Asses and mules.
[9] June.
[10] 1906.
[11] Comparable totals for number of countries indicated.

TABLE 437.—*Horses: Price per head received by producers, United States, 1921–1930*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	96	98	101	100	98	98	94	93	89	85	82	81	92
1922	82	84	86	87	89	88	88	86	84	81	79	79	84
1923	81	85	85	86	88	87	85	83	82	80	78	75	82
1924	73	74	75	76	78	77	77	79	78	77	76	73	76
1925	73	78	81	83	82	81	81	80	77	76	75	74	78
1926	75	80	82	84	84	83	82	80	78	77	75	73	79
1927	73	77	79	80	81	80	80	80	78	76	75	75	78
1928	77	82	85	85	86	86	85	84	82	80	79	78	82
1929	77	79	83	85	85	84	84	82	82	79	78	77	81
1930	77	77	78	79	79	77	73	70	69	68	66	64	80

Bureau of Agricultural Economics. Based on returns from special-price reporters. Monthly prices weighted by number of horses Jan. 1, by States; yearly prices obtained by weighting monthly prices by receipts at public stockyards. For previous data see 1930 or earlier Yearbooks.

TABLE 438.—*Mules: Price per head received by producers, United States, 1926–1930*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
1926	92	96	97	100	99	99	96	95	94	90	85	85	94
1927	83	88	91	92	91	92	91	90	90	90	91	91	90
1928	93	97	100	102	102	102	101	100	96	96	94	93	96
1929	94	96	99	101	101	100	99	96	96	96	94	93	96
1930	93	94	95	96	95	94	88	80	78	78	77	74	91

Bureau of Agricultural Economics. Based on returns of special-price reporters. Monthly prices weighted by number of horses Jan. 1, by States; yearly prices obtained by weighting monthly prices by receipts at public stockyards.

TABLE 439.—*Honey: Monthly average price in producing sections and at consuming markets, 1921–1930*

EXTRACTED HONEY, PER POUND

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
CALIFORNIA WHITE ORANGE												
F. o. b. southern California shipping points: [1]	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	16¼	13¾	13	12	11¼	11¼	9¼	10½	11	11¾	12¼	11½
1922	11½	11½	11	------	8½	9	9½	9½	9½	10¼	10¾	10¾
1923	10¾	10½	10¼	10¼	11¾	------	12	------	------	------	------	13¼
1924	13	------	14	14½	11¾	13¼	12	12½	13	13¼	14½	14¼
1925	14¼	------	15	------	13½	13	11¾	11¾	------	14½	15½	------
1926	12¼	11¾	11½	10½	9½	8¾	8¾	------	------	8½	------	------
1927	------	7¾	9	8¾	8	8¼	8¾	9	9¼	9½	9½	10
1928	10	10	10	9½	8¾	8¾	9	9¼	9¼	9½	9¾	9½
1929	9¾	9¾	9½	9½	10	10¼	11	11¼	11	11	12	------
1930	12¾	12½	13½	10½	8¼	8	7½	7½	7¼	7½	7½	7¾
New York City: [2]												
1921	17½	14¾	12¼	11	11½	12	11½	11	12¼	12½	12¾	12¾
1922	13½	13	13¼	12½	13	12	11¾	11¾	11¾	12	12½	12¾
1923	12¾	12¾	12¾	12¾	13	13½	13¾	13¾	14½	14	15	16
1924	15½	16	15	15½	15½	13½	14½	14	------	13¾	13½	------
1925	------	------	------	------	------	14¼	------	14½	14¼	13½	14	14½
1926	15¼	15	14½	------	------	------	11¼	11	11½	11¾	11¾	12½
1927	12½	12½	11	------	11	11¼	11½	12¾	13	12¾	13	13
1928	------	------	------	------	12½	12½	12½	12½	12¾	13	12¾	12½
1929	12½	12½	12½	12½	12½	12½	12½	12¾	13	13½	13½	13½
1930	13½	13½	13½	13½	------	12¼	12¼	12⅜	12⅝	12½	12¼	12

[1] Price to beekeepers or other shippers in car lots to July, 1923; thereafter, price in large lots, mostly less than car lots.
[2] Sales by original receivers to bottlers, confectioners, bakers, and jobbers.

Table 439.—*Honey: Monthly average price in producing sections and at consuming markets, 1921–1930*—Continued

EXTRACTED HONEY, PER POUND—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
INTERMOUNTAIN WHITE SWEET CLOVER AND ALFALFA												
F. o. b. intermountain points: [3]	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	------	------	------	8¼	7¾	7½	7¼	7¾	7¾	7¾	8	8½
1922	8½	8½	8½	8½	8½	8¾	9¼	------	8	8	8	8
1923	7¾	8	7¼	7½	7½	7¾	8½	8¾	8	9	9	9
1924	9	9¼	9¼	9¼	9¼	9	8¾	9	9	9	9	9¼
1925	9½	9¼	9¼	9¼	9	------	8½	8½	8½	8½	8½	8½
1926	8	8¼	8	7¾	7½	7½	7½	7	6¾	6¾	6¾	6¾
1927	6¾	6½	6	5¾	5¾	6	6	6¾	7	7½	7¾	7¼
1928	7¼	7½	7¼	7¼	7¼	7	7¼	7	7¼	7¼	7	7
1929	7⅛	7⅛	7⅜	7⅝	7¾	7½	7	7⅜	7¼	7⅛	7¼	7⅛
1930	7¼	7¼	7	6⅞	6½	5¾	6¼	6½	5¾	5½	5⅜	5¾
WHITE CLOVER												
F. o. b. New York and North Central States: [4]												
1921	------	------	------	------	------	------	------	------	9¾	9¾	9¾	10¾
1922	10½	10	10¾	10¾	10½	11¼	11½	11	11	11	10¾	11
1923	11	10¾	10	10	10½	11	11	11¾	11¼	10¾	10¾	10¾
1924	10¾	10¾	10¾	11	11	10¾	10½	11	10¾	10¾	11¼	11
1925	11¼	11¼	11¼	11¼	11½	11½	11½	10¾	11	11	10¾	10½
1926	9¾	10	9¼	9¾	9	9½	10¼	10	9½	9½	10	9½
1927	10¼	10	9½	9½	9¼	8¾	8½	9	8½	8½	8¾	8½
1928	8½	8¼	8	8	8	8½	9¼	9	8¾	8½	9	8½
1929	8¾	8¾	9	9¼	8¾	9	9½	8¾	8½	8¼	8¼	8
1930	8¼	8¼	8¼	8¼	8⅛	7¾	7¾	8	7¾	7¼	7⅜	7½
NORTHEASTERN BUCKWHEAT												
F. o. b. New York and Pennsylvania points: [4]												
1921	------	------	------	------	------	------	------	------	9	8¼	7½	8
1922	7	8	7½	7½	------	8	8½	6½	7¾	8	8	8
1923	7¾	8	8½	------	------	8	------	9	9	9¼	9	9
1924	9	9	8½	8¾	8½	8½	8¼	------	9	9¼	9	9
1925	8¾	9	10	9	------	------	------	9¼	9	8½	8½	8¾
1926	8	7¾	7½	7	6½	6½	6	6½	7	7	7	8
1927	8¼	7	7¼	------	8½	------	------	8	7½	7¼	7¼	7½
1928	7¼	7¼	7¼	6¾	------	------	------	8	7¾	7½	7½	7¼
1929	7¾	7½	7	7¼	7½	7½	------	8½	7⅞	8	7⅝	7¼
1930	7¾	6½	6¾	7⅜	------	7	------	8	6½	6½	5½	6

COMB HONEY, 24-SECTION CASES

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
WHITE CLOVER COMB, NO. 1 AND FANCY												
F. o. b. New York and North Central States: [4]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	------	------	------	------	------	------	------	------	5.10	5.00	5.10	4.65
1922	5.00	5.10	5.00	4.50	------	------	4.45	5.00	4.55	4.90	4.70	4.70
1923	4.75	4.75	------	------	4.00	------	5.00	5.00	5.25	5.10	4.75	5.15
1924	4.75	4.75	5.05	4.80	5.50	------	4.80	4.85	4.95	4.80	5.10	4.95
1925	4.95	4.95	4.75	4.90	5.25	4.50	5.10	5.20	5.00	5.00	4.65	4.45
1926	4.25	4.25	4.25	4.00	4.00	4.00	4.25	4.75	4.50	4.25	4.25	4.25
1927	4.50	5.25	5.25	5.25	------	5.00	5.00	4.75	4.25	4.75	4.50	4.80
1928	4.80	4.80	4.50	4.80	4.50	4.25	4.50	4.50	4.50	4.50	4.80	4.50
1929	4.80	4.50	4.25	4.25	4.50	4.25	4.50	4.50	4.25	4.00	4.00	4.00
1930	4.25	4.00	4.00	4.00	4.25	4.00	4.00	4.25	4.25	4.00	4.00	3.75

Bureau of Agricultural Economics.

[3] Price to beekeepers and other shippers, in car lots.
[4] Price to beekeepers in large lots, mostly less than car lots.

DAIRY AND POULTRY STATISTICS

TABLE 440.—*Milk cows and dairy cattle: Numbers and value per head in the United States, 1850, 1860, 1867–1931*

Year	Milk cows on farms		Dairy cattle on farms and elsewhere, Jan. 1 [3]	Year	Milk cows on farms		Dairy cattle on farms and elsewhere, Jan. 1 [3]
	Number [1]	Value per head, Jan. 1 [2]			Number [1]	Value per head, Jan. 1 [2]	
	Thousands	*Dollars*	*Thousands*		*Thousands*	*Dollars*	*Thousands*
1850 [4]	*6,385*		10,100	1899	15,990	29.66	26,800
1860 [4]	*8,586*		13,500	1900 [4]	*17,136*		
1867	8,349	28.74	12,000	1900	16,292	30.18	24,965
1868	8,692	26.56	12,400	1901	16,834	28.65	25,863
1869	9,248	29.15	13,000	1902	16,697	27.91	26,711
1870 [4]	*8,935*			1903	17,111	28.85	27,864
1870	10,096	32.70	14,000	1904	17,420	27.90	28,915
1871	10,023	33.89	14,100	1905	17,572	26.21	28,975
1872	10,304	29.45	14,700	1906	19,794	28.12	29,437
1873	10,576	26.72	15,400	1907	20,968	29.60	28,490
1874	10,705	25.63	15,800	1908	21,194	29.29	28,505
1875	10,907	25.74	16,300	1909	21,720	30.90	28,763
1876	11,085	25.61	16,900	1910 [4]	*20,625*		
1877	11,261	25.47	17,400	1910	20,625	33.70	28,945
1878	11,300	25.74	17,700	1911	20,823	38.17	28,877
1879	11,826	21.71	18,900	1912	20,699	37.62	29,183
1880 [4]	*12,443*			1913	20,497	42.99	29,836
1880	12,027	23.27	19,500	1914	20,737	51.51	31,601
1881	12,369	23.95	20,100	1915	21,262	52.84	33,381
1882	12,612	25.89	20,500	1916	22,108	51.49	34,392
1883	13,126	30.21	21,300	1917	22,894	56.95	35,727
1884	13,501	31.37	21,900	1918	23,310	67.37	35,467
1885	13,905	29.70	22,600	1919	23,475	74.68	34,481
1886	14,235	27.40	23,100	1920 [4]	*19,675*		
1887	14,522	26.08	23,600	1920	21,427	81.51	33,990
1888	14,856	24.65	24,100	1921	21,408	61.19	33,618
1889	15,299	23.94	24,900	1922	21,788	48.68	33,944
1890 [4]	*16,512*			1923	22,063	48.67	34,469
1890	15,953	22.14	25,900	1924	22,255	49.94	34,708
1891	16,020	21.62	26,100	1925 [4]	*20,900*		
1892	16,416	21.40	26,900	1925	22,481	48.39	35,188
1893	16,424	21.75	27,000	1926	22,188	55.02	34,329
1894	16,487	21.77	27,100	1927	21,801	59.58	33,992
1895	16,505	21.97	27,300	1928	21,828	73.93	34,019
1896	16,138	22.55	26,800	1929	21,849	84.57	34,040
1897	15,942	23.16	26,500	1930	22,443	83.43	34,634
1898	15,841	27.45	26,400	1931 [5]	22,975	57.57	35,166

Bureau of Agricultural Economics.

[1] Prior to 1920, estimates for each 10-year period represent an index of annual changes applied to the census as a base on first report after census data were available. Figures for 1920 to date are revised estimates of the Bureau of Agricultural Economics for numbers on Jan. 1.

[2] Values for 1867–1899 relate to "milk cows." Data for 1900–1925 are an old series of values of "milk cows" adjusted to relate to "milk cows and heifers, 2 years old and over" on basis of relationship between the 2 series from 1926 to 1928. Conversion factor was 0.955 (base is old series). Data for 1926–1931 are values relating to "milk cows and heifers 2 years old and over."

[3] Data for dairy cattle, including young animals and bulls of that type on farms and elsewhere as of Jan. 1, estimated by the Bureau of Animal Industry. Census figures for milk and dairy cows were adjusted to a Jan. 1 basis and to include all ages and all animals in towns, villages, and ranges, as well as on farms. For methods see Department Circular 241. Revisions have been made by the Bureau of Animal Industry for 1900–1927; 1928–1931 estimates of the Bureau of Agricultural Economics.

[4] Italic figures are from the census. Figures for census years 1850–1890 represent "milk cows"; 1900, "cows kept for milk 2 years and over"; 1910, "cows and heifers kept for milk, born before Jan. 1, 1909" (15½ months and over); 1920, "dairy cattle 2 years old and over kept mainly for milk production." For comparison with 1920 the number of dairy cows and heifers 2 years old and over on Jan. 1, 1910, has been estimated by the census as 17,125,471; 1925, number of cows milked. Census dates were June 1 from 1850 to 1900; Apr. 15, 1910; Jan. 1, 1920 and 1925.

[5] Preliminary.

TABLE 441.—*Milk cows and heifers: Estimated number on farms and value per head, by States, January 1, 1927–1931*

State and division	Cows and heifers 2 years old and over kept for milk									
	Number					Value per head [1]				
	1927	1928	1929	1930	1931 [2]	1927	1928	1929	1930	1931 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	146	139	131	132	135	66.00	76.00	87.00	96.00	70.00
New Hampshire	77	75	74	75	76	80.00	100.00	113.00	118.00	90.00
Vermont	286	286	269	275	286	75.00	97.00	100.00	101.00	79.00
Massachusetts	136	135	129	129	130	98.00	125.00	130.00	140.00	122.00
Rhode Island	21	20	20	20	20	105.00	132.00	142.00	150.00	123.00
Connecticut	110	108	96	98	100	97.00	130.00	140.00	141.00	110.00
New York	1,318	1,330	1,343	1,383	1,424	90.00	111.00	124.00	120.00	86.00
New Jersey	119	122	114	116	117	103.00	120.00	135.00	155.00	125.00
Pennsylvania	845	855	855	889	916	75.00	97.00	111.00	112.00	80.00
North Atlantic	3,058	3,070	3,031	3,117	3,204	84.27	105.72	117.63	117.96	86.95
Ohio	926	908	890	926	945	67.00	83.00	93.00	93.00	59.00
Indiana	679	679	693	721	743	63.00	75.00	85.00	84.00	53.00
Illinois	988	968	958	987	1,007	67.00	76.60	89.00	89.00	64.00
Michigan	841	849	849	866	901	70.00	87.00	99.00	99.00	62.00
Wisconsin	2,014	1,984	1,964	2,043	2,125	70.00	86.00	97.00	97.00	64.00
Minnesota	1,513	1,498	1,483	1,499	1,514	57.00	72.00	85.00	82.00	56.00
Iowa	1,314	1,314	1,314	1,340	1,353	64.00	76.00	86.00	85.00	59.00
Missouri	827	827	827	860	903	48.00	61.00	74.00	70.00	44.00
North Dakota	472	472	477	506	526	48.00	61.00	75.00	73.00	50.00
South Dakota	513	518	523	539	544	52.00	68.00	77.00	78.00	52.00
Nebraska	613	613	619	625	619	55.00	71.00	84.00	79.00	56.00
Kansas	715	701	704	725	747	51.00	62.00	75.00	74.00	48.00
North Central	11,415	11,331	11,301	11,637	11,927	61.36	75.33	86.95	85.71	57.09
Delaware	35	36	37	37	36	70.00	92.00	110.00	112.00	80.00
Maryland	178	185	187	193	195	65.00	85.00	97.00	100.00	75.00
Virginia	357	360	374	396	404	44.00	58.00	70.00	72.00	43.00
West Virginia	207	215	219	230	235	45.00	65.00	75.00	76.00	47.00
North Carolina	297	294	285	285	299	45.00	59.00	64.00	64.00	48.00
South Carolina	150	144	140	140	140	39.00	47.00	55.00	54.00	46.00
Georgia	343	343	343	350	360	32.00	42.00	49.00	49.00	36.00
Florida	78	78	74	78	74	38.00	37.00	46.00	55.00	47.00
South Atlantic	1,645	1,655	1,659	1,709	1,743	43.89	57.58	66.89	68.27	47.71
Kentucky	469	493	493	498	493	45.00	60.00	65.00	64.00	40.00
Tennessee	425	438	447	456	465	38.00	53.00	60.00	60.00	39.00
Alabama	350	350	350	354	358	30.00	40.00	46.00	48.00	33.00
Mississippi	379	390	390	410	435	28.00	40.00	45.00	47.00	30.00
Arkansas	375	375	382	390	386	30.00	42.00	48.00	48.00	27.00
Louisiana	210	204	202	206	212	33.00	36.00	49.00	47.00	36.00
Oklahoma	581	610	610	634	666	45.00	56.00	64.00	59.00	36.00
Texas	936	936	955	974	1,003	41.00	57.00	61.00	56.00	36.00
South Central	3,725	3,796	3,829	3,922	4,018	37.87	50.84	56.95	55.03	35.06
Montana	181	177	186	188	188	51.00	63.00	79.00	77.00	55.00
Idaho	168	170	173	178	185	67.00	75.00	86.00	80.00	65.00
Wyoming	70	72	73	70	69	57.00	70.00	86.00	84.00	65.00
Colorado	240	242	244	244	244	56.00	69.00	77.00	72.00	56.00
New Mexico	64	65	65	67	68	45.00	57.00	67.00	65.00	50.00
Arizona	35	35	36	35	40	75.00	85.00	95.00	95.00	78.00
Utah	89	92	97	100	100	59.00	73.00	87.00	82.00	62.00
Nevada	20	20	20	20	20	75.00	85.00	98.00	90.00	70.00
Washington	275	275	289	301	316	70.00	80.00	99.00	92.00	68.00
Oregon	214	214	220	229	240	61.00	72.00	88.00	80.00	61.00
California	602	614	626	626	613	75.00	80.00	94.00	94.00	79.00
Far Western	1,958	1,976	2,029	2,058	2,083	65.18	74.53	88.53	84.89	66.82
United States	21,801	21,828	21,849	22,443	22,975	59.58	73.93	84.57	83.43	57.57

Bureau of Agricultural Economics. Estimates of crop reporting board.

[1] Total value divided by total number and rounded to nearest dollar for States. Division and United States averages not rounded. State figures are new weighted value series not comparable to State figures previously published for years prior to 1925.

[2] Preliminary.

TABLE 442.—*Heifers and heifer calves: Estimated number on farms, by States, January 1, 1927–1931*

State and division	Heifers 1 to 2 years old being kept for milk cows					Heifer calves under 1 year being kept for milk cows				
	1927	1928	1929	1930	1931[1]	1927	1928	1929	1930	1931[1]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Maine	33	32	31	37	39	34	33	38	41	38
New Hampshire	14	14	16	17	16	14	15	18	17	15
Vermont	47	49	55	58	58	49	55	63	63	57
Massachusetts	17	17	16	20	19	17	18	21	21	19
Rhode Island	2	3	3	3	3	3	3	3	3	3
Connecticut	13	13	15	18	19	13	13	19	20	18
New York	178	197	224	253	245	207	232	250	256	225
New Jersey	15	16	15	16	16	15	15	16	15	11
Pennsylvania	124	136	149	171	157	138	152	175	187	161
North Atlantic	443	477	524	593	572	490	536	603	623	547
Ohio	160	158	174	190	192	170	172	193	201	184
Indiana	112	125	135	140	153	137	150	159	164	140
Illinois	184	175	186	205	213	200	207	220	228	210
Michigan	153	162	178	196	200	180	185	209	213	179
Wisconsin	345	360	378	386	404	405	399	395	413	396
Minnesota	312	324	337	357	357	340	352	372	380	346
Iowa	245	250	250	265	257	240	240	255	262	254
Missouri	177	172	178	189	182	180	180	180	191	185
North Dakota	98	100	108	116	114	100	111	114	120	112
South Dakota	112	112	123	125	121	140	130	134	140	133
Nebraska	124	124	126	126	120	120	120	126	126	116
Kansas	120	125	130	134	118	125	135	141	153	135
North Central	2,142	2,187	2,303	2,429	2,431	2,337	2,381	2,498	2,591	2,390
Delaware	5	5	5	5	5	4	4	4	4	4
Maryland	25	26	27	29	30	25	27	29	30	28
Virginia	48	52	56	59	61	52	53	55	59	54
West Virginia	27	30	33	35	34	28	36	40	36	33
North Carolina	47	50	57	58	64	52	55	60	66	54
South Carolina	29	28	27	27	28	31	31	29	27	27
Georgia	77	77	77	81	89	90	90	90	94	81
Florida	18	19	17	18	18	18	19	18	17	16
South Atlantic	276	287	299	312	329	300	315	325	333	297
Kentucky	61	65	69	72	65	75	80	85	87	67
Tennessee	103	110	117	119	119	108	122	129	129	120
Alabama	87	88	90	92	92	87	90	92	87	74
Mississippi	82	90	95	100	108	91	99	99	110	94
Arkansas	90	92	92	99	99	105	103	102	118	110
Louisiana	41	41	42	43	44	32	34	35	36	35
Oklahoma	112	116	125	135	142	180	200	200	219	220
Texas	194	184	200	202	210	220	210	220	220	210
South Central	770	786	830	862	879	898	938	962	1,006	930
Montana	36	35	37	37	35	38	38	41	41	39
Idaho	40	43	44	45	46	44	48	49	49	49
Wyoming	14	15	15	15	15	19	20	20	19	19
Colorado	48	50	51	51	51	64	61	63	63	60
New Mexico	14	14	14	14	15	18	14	14	15	15
Arizona	10	9	9	7	8	13	12	12	10	10
Utah	21	23	25	24	24	24	26	28	27	27
Nevada	6	6	6	6	6	6	6	6	6	6
Washington	53	58	61	64	67	65	67	72	73	70
Oregon	44	45	46	49	50	45	47	48	50	50
California	142	149	152	167	160	130	137	134	136	130
Far Western	428	447	460	479	477	466	476	487	489	475
United States	4,059	4,184	4,416	4,675	4,688	4,491	4,646	4,875	5,042	4,639

Bureau of Agricultural Economics.

[1] Preliminary.

TABLE 443.—*Heifers and heifer calves: Estimated number on farms, United States, January 1, 1920–1931*

Year	Heifers 1 to 2 years old being kept for milk cows	Heifer calves under 1 year being kept for milk cows	Year	Heifers 1 to 2 years old being kept for milk cows	Heifer calves under 1 year being kept for milk cows
	Thousands	*Thousands*		*Thousands*	*Thousands*
1920	4,418		1926	3,923	4,655
1921	4,155		1927	4,059	4,491
1922	3,968		1928	4,184	4,646
1923	4,147		1929	4,416	4,875
1924	4,137	4,426	1930	4,675	5,042
1925	4,195	4,722	1931 [1]	4,688	4,639

Bureau of Agricultural Economics.

[1] Preliminary.

TABLE 444.—*Purebred dairy cattle: Number registered, each year, by breeds, United States, 1921–1930*

Year	Ayrshire			Guernsey			Holstein-Friesian			Jersey		
	Bulls	Cows	Total	Bulls	Cows	Total	Bulls	Cows	Total	Bulls	Cows	Total
1921			5,874	8,036	13,971	22,007	39,585	88,265	127,850	11,213	31,123	42,336
1922	1,565	4,816	6,381	8,065	14,007	22,072	30,631	83,141	113,772	11,651	33,801	45,452
1923	1,578	5,975	7,553	9,758	16,976	26,734	29,089	86,043	115,132	12,291	38,159	50,450
1924	1,431	5,508	6,939	10,301	18,166	28,467	28,209	83,320	111,529	12,331	39,832	52,163
1925	1,561	5,972	7,533	11,299	20,742	32,041	26,935	82,659	109,594	12,131	41,725	53,856
1926	1,720	6,142	7,862	12,392	22,298	34,690	28,117	82,971	111,088	12,837	42,915	55,752
1927	1,847	6,554	8,401	12,777	22,694	35,471	28,817	81,146	109,963	15,666	48,411	64,077
1928	2,274	7,837	10,111	14,363	24,664	39,027	33,512	88,214	121,726	19,393	54,516	73,909
1929	2,586	8,833	11,419	14,661	26,288	40,949	34,438	89,927	125,365	19,230	52,431	71,861
1930	2,050	8,159	10,209	15,810	28,662	44,472	29,242	75,901	105,143	14,350	43,767	58,117

Bureau of Agricultural Economics. Obtained from registry associations. See 1930 Yearbook, Table 441, p. 901, for data for earlier years.

TABLE 445.—*Cattle: Tuberculin testing under accredited-herd and area plans, 1916–17 to 1929–30*

Year beginning July—	Cattle tested					Modified accredited counties	Herds accredited	Herds passed one test	Herds under supervision
	Accredited-herd plan	Area plan	Total	Reactors found	Per cent of reactors				
	Number	*Number*	*Number*	*Number*		*Number*	*Number*	*Number*	*Number*
1916–17	20,101		20,101	645	3.2				
1917–18	134,143		134,143	6,544	4.9		204	883	
1918–19	329,878		329,878	13,528	4.1		578	5,652	
1919–20	700,670		700,670	28,709	4.1		2,588	10,064	
1920–21	1,366,358		1,366,358	53,768	3.9		4,831	33,215	71,806
1921–22	1,722,209	[1] 662,027	2,384,236	82,569	3.5		8,015	111,719	140,376
1922–23	1,695,662	1,765,187	3,460,849	113,844	3.3		12,310	150,748	187,915
1923–24	1,865,863	3,446,501	5,312,364	171,559	3.2	38	19,747	216,737	305,809
1924–25	2,008,526	4,991,502	7,000,028	214,491	3.1	51	24,110	392,740	414,620
1925–26	1,989,048	6,661,732	8,650,780	323,084	3.7	109	24,009	382,674	435,840
1926–27	2,522,791	7,177,385	9,700,176	285,361	2.9	149	34,084	229,086	261,148
1927–28	2,589,844	8,691,646	11,281,490	262,113	2.3	180	38,880	427,595	473,218
1928–29	2,853,633	8,830,087	11,683,720	206,764	1.8	213	1,639	249,420	281,323
1929–30	2,953,350	9,892,521	12,845,871	216,932	1.7	236	11,863	227,921	347,448

Bureau of Animal Industry.

[1] Testing during six months.

TABLE 446.—*Cattle: Status of tuberculosis-eradication work, by States, June 30, 1930*

States, etc.	Accredited-herd work			Eradication from areas [1]			Total tuberculin tests, 1917 to June 30, 1930		
	Herds accredited	Herds passed 1 test	Herds under supervision	Modified accredited counties	Counties completing 1 or more tests of all cattle [2]	Total counties engaged in testing [2]	Total cattle	Reactors	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*P. Ct.*
Alabama	317	10,970	13,557	0	0	3	482,974	2,291	0.5
Arizona	46	8,557	8,653	0	0	2	311,484	6,961	2.2
Arkansas	16	12,522	12,541	1	1	3	111,840	487	.4
California	147	7,934	8,479	5	6	9	669,908	6,943	1.0
Colorado	185	1,362	2,062	0	0	2	108,486	2,465	2.3
Connecticut	3,293	3,354	7,127	0	0	4	623,268	45,604	7.3
Delaware	1,305	4,538	6,519	1	1	1	204,609	15,006	7.3
District of Columbia	1	44	46	0	1	1	14,161	124	.9
Florida	103	8,177	9,010	0	2	2	364,413	4,021	1.1
Georgia	31	49,058	49,093	27	29	32	423,606	3,210	.8
Idaho	66	37,549	40,820	35	35	42	769,730	4,316	.6
Illinois	5,575	28,691	178,846	49	49	90	5,718,269	215,287	3.8
Indiana	20,198	153,981	176,095	80	84	87	2,519,474	28,605	1.1
Iowa	3,051	143,023	216,919	54	59	94	7,043,381	163,864	2.3
Kansas	657	102,600	103,380	50	50	52	1,546,823	12,934	.8
Kentucky	41	79,382	81,229	43	61	64	743,515	6,224	.8
Louisiana	14	3,246	3,426	0	0	0	389,463	7,923	2.0
Maine	961	42,803	43,817	16	16	16	741,529	7,648	1.0
Maryland	9,219	16,627	33,552	1	8	17	1,018,297	56,195	5.5
Massachusetts	2,172	3,450	6,147	1	1	3	434,334	48,256	11.1
Michigan	75	183,866	185,070	82	83	83	4,169,106	64,045	1.5
Minnesota	9,143	102,248	112,616	47	49	49	6,038,794	119,510	2.0
Mississippi	28	10,890	10,918	6	7	8	327,246	1,456	.4
Missouri	219	82,428	86,261	12	13	18	1,087,469	7,698	.7
Montana	62	32,937	36,426	[3] 13	[3] 13	14	915,389	7,087	.8
Nebraska	125	79,217	80,049	42	44	46	2,578,855	29,504	1.1
Nevada	16	2,277	2,586	3	3	13	180,815	2,193	1.2
New Hampshire	4,625	3,123	8,108	2	2	6	539,967	26,802	5.0
New Jersey	3,832	4,667	12,256	0	0	0	441,000	27,459	6.2
New Mexico	24	2,908	3,010	0	0	19	85,057	563	.7
New York	80,188	27,800	117,626	12	26	55	5,725,750	450,189	7.9
North Carolina	307	256,617	256,924	100	100	100	839,564	3,967	.5
North Dakota	5,363	57,114	68,872	36	38	43	2,126,721	23,502	1.1
Ohio	828	211,446	217,908	51	60	74	3,008,538	84,216	2.8
Oklahoma	262	2,877	3,155		1	2	273,636	4,114	1.5
Oregon	494	27,659	28,169	8	14	28	1,255,223	12,684	1.0
Pennsylvania	6,027	118,324	134,391	31	31	59	3,647,482	158,650	4.3
Rhode Island	134	249	713	0	0	0	53,947	6,772	12.6
South Carolina	113	70,461	70,635	16	16	19	332,177	1,589	.5
South Dakota	1,292	9,784	11,218	5	6	6	867,194	14,911	1.7
Tennessee	133	73,386	73,626	13	13	18	611,911	2,752	.4
Texas	426	35	600	1	1	2	403,418	4,262	1.1
Utah	99	11,992	12,457	1	2	28	618,954	5,573	.9
Vermont	7,523	2,847	12,571	(4)	(4)	8	1,340,967	51,845	3.9
Virginia	976	55,275	56,530	36	37	52	878,298	13,468	1.5
Washington	89	45,898	50,071	[5] 15	[5] 18	35	1,357,465	32,100	2.4
West Virginia	640	63,335	65,139	27	27	34	545,823	5,337	1.0
Wisconsin	12,414	169,626	186,878	53	71	71	8,425,515	166,717	2.0
Wyoming	3	11,211	12,576	0	0	0	156,675	1,169	.7
Alaska	0	89	102	0	0	0	2,446	57	2.3
Hawaii	-----	-----	724	0	0	0	91,145	1,794	2.0
Interstate testing	-----	-----	-----	0	0	0	1,699,654	9,378	.6
Indian schools [6]	-----	-----	-----	0	0	0	413	27	6.5
Purebreds in United States [6]	-----	-----	-----	0	0	0	4,486	157	3.5
Total	182,858	2,438,454	2,919,503	[7] 976	[7] 1,078	1,414	74,870,664	1,979,911	2.6

Bureau of Animal Industry.

[1] Accredited-herd work began in 1917; area work, 1921.
[2] Including District of Columbia.
[3] Not including part of 1 county.
[4] Not including 43 towns.
[5] Not including parts of 2 counties.
[6] Testing in United States before work organized by States.
[7] Not including parts of 3 counties and 43 towns.

TABLE 447.—*Milk: Annual production of milk per milk cow in herds kept by crop correspondents, by States, 1925-1930* [1]

State and division	1925	1926	1927	1928	1929	1930
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Maine	5,274	5,268	5,262	5,069	5,232	5,381
New Hampshire	5,232	5,861	5,718	5,704	5,761	5,673
Vermont	5,223	5,180	5,350	5,200	5,171	5,259
Massachusetts	6,190	6,713	6,701	6,536	6,251	6,603
Rhode Island	6,248	6,622	6,734	7,006	6,807	7,166
Connecticut	5,934	6,391	6,549	6,240	6,178	6,369
New York	5,943	6,159	6,296	6,323	6,220	6,193
New Jersey	6,655	6,460	6,768	7,085	7,163	6,962
Pennsylvania	5,834	6,135	6,260	6,268	6,287	6,251
North Atlantic	5,840	6,061	6,185	6,176	6,133	6,138
Ohio	5,469	5,718	5,883	5,856	5,907	5,767
Indiana	5,083	5,207	5,423	5,356	5,542	5,311
Illinois	4,937	5,143	5,070	5,252	5,320	5,344
Michigan	6,035	6,342	6,363	6,442	6,464	6,299
Wisconsin	5,928	6,108	6,172	6,262	6,381	6,196
Minnesota	5,524	5,539	5,673	5,835	5,977	5,898
Iowa	4,438	4,681	4,778	5,124	5,280	5,283
Missouri	3,398	3,589	3,729	3,852	3,875	3,817
North Dakota	4,310	4,517	4,544	4,859	4,885	4,897
South Dakota	3,918	4,070	4,468	4,606	4,754	4,788
Nebraska	4,225	4,693	4,855	4,907	4,870	5,119
Kansas	4,292	4,721	4,870	4,938	5,034	5,007
North Central	5,010	5,223	5,331	5,464	5,555	5,484
Delaware	4,788	5,019	5,289	5,078	5,213	4,940
Maryland	5,244	5,505	5,797	5,792	5,591	5,302
Virginia	4,109	4,337	4,721	4,612	4,541	4,015
West Virginia	3,863	4,298	4,651	4,673	4,462	4,252
North Carolina	4,048	4,420	4,529	4,444	4,389	4,188
South Carolina	3,245	3,504	3,705	3,773	3,595	3,635
Georgia	3,169	3,340	3,659	3,508	3,419	3,331
Florida	2,628	2,509	2,458	2,541	2,698	2,497
South Atlantic	3,881	4,142	4,411	4,345	4,253	4,007
Kentucky	4,413	4,654	4,782	4,541	4,480	4,204
Tennessee	3,446	4,015	4,103	4,124	4,048	3,851
Alabama	2,817	3,005	3,075	2,986	3,069	3,045
Mississippi	2,558	2,835	2,987	3,026	3,011	2,996
Arkansas	3,154	3,410	3,626	3,483	3,474	3,239
Louisiana	2,324	2,403	2,582	2,489	2,652	2,509
Oklahoma	3,705	4,170	4,267	4,130	4,167	3,939
Texas	2,798	3,303	3,626	3,553	3,604	3,440
South Central	3,221	3,598	3,777	3,689	3,703	3,529
Montana	4,009	4,386	4,657	4,737	5,150	5,183
Idaho	5,661	5,776	5,953	6,149	6,360	6,713
Wyoming	3,872	4,380	4,508	4,657	4,991	4,696
Colorado	4,371	4,648	5,101	5,039	5,286	5,223
New Mexico	3,075	3,556	4,158	3,822	3,674	3,677
Arizona	5,143	5,898	6,059	5,697	5,819	5,928
Utah	5,107	5,451	5,466	5,792	6,050	5,867
Nevada	4,781	4,879	4,924	4,923	5,551	5,521
Washington	6,083	6,275	6,670	6,728	6,506	6,585
Oregon	5,356	5,928	5,937	6,100	5,950	6,019
California	6,108	5,636	6,019	6,088	6,369	6,479
Western	5,317	5,404	5,706	5,779	5,936	6,002
United States	4,785	5,018	5,164	5,216	5,266	5,188

Bureau of Agricultural Economics.

[1] Calculated by multiplying average daily production per cow by the number of days in the year. Daily production derived from milk production and milk cows reported on the 1st of each month for about 20,000 herds.

TABLE 448.—*Milk: Production per milk cow, on first day of each month, by herds kept by crop correspondents, by States, 1930*

State and division	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
Maine	14.2	14.3	14.6	15.3	15.8	16.5	16.1	16.3	14.1	13.3	13.3	13.3
New Hampshire	15.7	17.3	15.5	15.7	15.2	16.9	17.8	16.4	13.9	13.6	13.5	15.0
Vermont	13.6	14.4	13.7	15.7	16.3	18.4	16.0	14.6	11.2	13.5	12.4	13.1
Massachusetts	18.4	18.6	17.8	18.0	19.6	19.2	18.9	17.5	17.4	18.1	17.6	16.3
Rhode Island	18.3	18.5	19.3	16.9	19.7	21.9	19.7	20.9	18.2	23.2	19.9	19.0
Connecticut	16.7	17.4	16.7	18.8	19.7	20.0	16.3	18.3	17.2	15.9	16.6	16.1
New York	15.1	14.9	15.6	17.6	18.7	23.2	21.0	17.5	14.7	15.1	15.2	14.7
New Jersey	18.7	18.8	19.3	19.0	21.0	21.4	22.2	19.1	18.0	15.2	17.5	18.0
Pennsylvania	16.4	17.0	17.4	17.5	18.4	21.2	19.8	16.7	14.9	15.4	15.4	15.3
North Central	15.7	16.0	16.3	17.4	18.4	21.2	19.6	17.1	14.8	15.2	15.2	15.0
Ohio	13.8	14.8	15.1	15.4	17.0	20.4	18.8	15.6	15.0	14.6	14.7	14.1
Indiana	13.1	13.4	13.9	14.2	16.1	18.6	17.0	14.3	14.2	14.1	13.6	12.5
Illinois	12.7	14.6	13.4	15.2	16.6	18.5	17.0	13.9	13.8	13.4	13.1	13.0
Michigan	15.2	16.4	16.9	17.6	19.1	23.2	22.2	17.5	14.8	14.7	14.5	14.6
Wisconsin	15.0	15.6	17.2	18.1	19.5	23.2	22.1	17.8	14.9	13.2	13.4	13.7
Minnesota	15.5	16.4	17.8	18.7	19.0	21.2	19.9	15.5	12.7	11.7	12.0	13.1
Iowa	12.2	13.4	14.2	15.0	16.5	19.2	18.6	14.6	13.4	11.9	12.2	12.3
Missouri	8.3	7.8	8.3	9.3	11.1	13.6	13.5	11.6	10.4	11.0	10.4	9.9
North Dakota	10.6	12.3	13.5	13.5	14.6	17.7	19.5	15.1	13.0	11.7	9.8	9.3
South Dakota	10.5	11.5	13.3	13.5	14.8	19.0	18.0	13.4	12.1	10.6	9.8	10.4
Nebraska	11.4	12.5	14.5	15.4	16.9	18.0	17.8	13.4	13.3	12.1	11.0	11.3
Kansas	11.9	13.0	14.3	15.2	15.6	17.7	15.9	13.1	12.6	11.9	10.8	12.3
North Central	12.9	13.9	14.8	15.6	16.8	19.6	18.9	15.0	13.5	12.6	12.4	12.4
Delaware	12.2	13.6	15.5	15.7	14.2	15.8	12.7	9.2	12.0	14.1	11.8	14.0
Maryland	14.9	15.3	14.4	15.0	15.5	17.3	15.0	13.6	13.6	12.3	13.6	13.8
Virginia	10.5	10.3	9.7	9.6	12.0	14.0	13.6	10.2	11.3	11.0	10.5	10.0
West Virginia	10.3	9.5	9.5	10.7	12.3	15.6	15.0	12.0	12.8	12.1	11.5	9.8
North Carolina	10.0	9.8	10.5	10.6	12.1	13.2	13.3	12.4	12.4	11.4	11.4	10.6
South Carolina	8.9	8.5	9.2	9.3	10.3	11.1	11.3	10.6	11.1	9.8	10.0	9.3
Georgia	8.5	8.8	8.5	9.0	9.6	10.1	10.3	9.8	9.4	8.7	8.8	8.3
Florida	6.4	6.4	7.8	6.5	8.6	8.0	9.0	6.3	6.5	5.6	4.8	6.6
South Central	10.3	10.0	10 0	10.3	11.4	12.9	12.4	10.8	11.2	10.4	10.3	10.0
Kentucky	9.9	9.7	10.4	10.6	12.9	15.0	14.6	12.0	11.4	11.4	10.8	9.8
Tennessee	9.2	8.9	9.2	9.1	11.6	13.4	12.7	10.9	11.4	10.6	10.3	9.7
Alabama	7.1	7.8	8.6	7.5	9.2	9.3	9.9	8.5	8.0	7.7	8.2	8.0
Mississippi	7.3	7.2	7.5	7.7	9.9	10.3	9.4	8.7	8.3	8.2	7.1	7.0
Arkansas	7.9	7.6	8.3	8.7	10.9	11.4	11.3	8.5	7.9	8.6	8.5	7.4
Louisiana	6.1	5.3	5.8	6.9	8.0	7.6	7.3	7.4	6.9	6.9	6.8	7.6
Oklahoma	10.2	8.9	10.7	11.2	13.2	13.7	13.1	10.9	9.6	9.6	9.9	9.1
Texas	8.4	8.7	9.9	9.4	11.0	10.9	10.6	9.8	8.6	9.0	8.6	8.2
South Central	8.7	8.5	9.4	9.4	11.4	12.0	11.6	10.1	9.4	9.4	9.1	8.6
Montana	11.1	10.8	11.5	13.4	16.3	19.0	18.3	15.8	15.0	13.6	13.0	12.4
Idaho	15.7	14.9	16.9	18.8	20.3	23.1	23.9	18.9	14.3	19.2	19.5	15.3
Wyoming	10.9	11.5	12.4	11.5	13.1	16.4	17.3	14.8	11.4	12.2	11.9	11.5
Colorado	12.4	12.5	13.0	16.2	15.2	18.0	17.5	16.3	14.0	12.5	12.0	12.1
New Mexico	8.0	9.6	9.8	8.5	12.0	12.3	12.4	11.1	11.0	10.5	9.0	6.4
Arizona	15.3	14.2	18.9	15.9	15.4	16.7	16.6	19.5	17.3	15.5	14.9	14.3
Utah	15.6	13.8	14.2	16.8	16.7	20.1	19.6	17.7	15.3	13.6	15.5	15.0
Nevada	12.1	14.6	13.6	12.5	18.1	19.9	16.4	16.9	13.1	15.6	14.8	11.2
Washington	15.7	16.6	15.8	16.4	22.0	22.4	22.3	20.2	17.7	15.9	17.0	14.8
Oregon	14.5	14.3	15.0	16.9	20.1	22.3	19.7	17.3	15.6	14.4	13.9	14.0
California	15.1	18.7	18.5	20.4	20.9	20.5	18.5	15.9	17.4	16.6	16.0	13.6
Western	13.5	14.3	14.8	16.2	18.3	19.8	18.9	16.9	15.2	14.7	14.6	13.3
United States	12.81	13.31	13.81	14.49	15.83	18.02	17.23	14.23	12.79	12.47	12.34	12.07

Bureau of Agricultural Economics.

TABLE 449.—*Dairy-Herd-Improvement Associations: Number, by States, 1906–1931*

State	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918
Michigan	1	4	2	5	4	3	4	4	3	3	10	15	7
Maine	------	------	3	4	3	6	5	4	5	8	11	5	1
New York	------	------	1	1	3	9	18	21	29	35	47	43	19
Vermont	------	------	------	2	8	10	11	17	28	33	38	47	18
Iowa	------	------	------	2	5	4	8	7	8	13	23	30	15
California	------	------	------	1	3	2	4	4	5	7	9	15	16
Wisconsin	------	------	------	9	10	10	8	11	24	37	51	81	112
Nebraska	------	------	------	1	0	0	0	3	2	3	4	4	2
Colorado	------	------	------	------	1	1	2	1	1	0	0	3	5
Pennsylvania	------	------	------	------	1	1	2	2	7	14	19	24	21
Ohio	------	------	------	------	1	0	0	1	4	5	20	30	24
Washington	------	------	------	------	1	3	1	0	0	1	12	18	11
Maryland	------	------	------	------	------	1	3	3	2	4	7	8	4
Illinois	------	------	------	------	------	4	3	2	7	3	3	17	15
Minnesota	------	------	------	------	------	3	7	10	9	11	22	26	23
New Hampshire	------	------	------	------	------	1	1	1	4	8	11	12	8
Oregon	------	------	------	------	------	1	1	1	7	11	15	17	11
Utah	------	------	------	------	------	1	0	0	1	1	0	1	1
Massachusetts	------	------	------	------	------	2	2	2	3	0	4	4	0
Virginia	------	------	------	------	------	2	2	2	0	0	2	4	4
Kansas	------	------	------	------	------	------	------	1	1	1	1	4	3
Indiana	------	------	------	------	------	------	------	2	2	3	7	9	7
Kentucky	------	------	------	------	------	------	------	1	1	0	1	1	0
Missouri	------	------	------	------	------	------	------	------	2	1	2	5	4
New Jersey	------	------	------	------	------	------	------	------	2	3	4	8	9
West Virginia	------	------	------	------	------	------	------	------	1	1	3	1	1
Connecticut	------	------	------	------	------	------	------	------	1	3	6	3	0
North Carolina	------	------	------	------	------	------	------	------	2	0	0	0	0
Louisiana	------	------	------	------	------	------	------	------	1	0	0	0	0
South Dakota	------	------	------	------	------	------	------	------	1	1	3	3	0
Nevada	------	------	------	------	------	------	------	------	------	1	0	1	0
Arizona	------	------	------	------	------	------	------	------	------	------	2	2	1
Rhode Island	------	------	------	------	------	------	------	------	------	------	2	2	0
Delaware	------	------	------	------	------	------	------	------	------	------	2	3	2
Idaho	------	------	------	------	------	------	------	------	------	------	2	1	1
Mississippi	------	------	------	------	------	------	------	------	------	------	1	0	0
Montana	------	------	------	------	------	------	------	------	------	------	1	2	0
Tennessee	------	------	------	------	------	------	------	------	------	------	1	8	4
New Mexico	------	------	------	------	------	------	------	------	------	------	------	1	0
Wyoming	------	------	------	------	------	------	------	------	------	------	------	1	0
Alabma	------	------	------	------	------	------	------	------	------	------	------	------	2
Georgia	------	------	------	------	------	------	------	------	------	------	------	------	1
North Dakota	------	------	------	------	------	------	------	------	------	------	------	------	1
Total	1	4	6	25	40	64	82	100	163	211	346	459	353

TABLE 449.—*Dairy-Herd-Improvement Associations: Number, by States, 1906–1931*—Continued

State	1919	1920	1921	1922	1923	1925	1926	1927	1928	1929	1930	1931
Michigan	13	14	11	17	53	105	108	102	105	94	90	88
Maine	0	0	0	3	4	2	1	0	0	0	5	5
New York	25	28	24	31	27	24	28	36	42	54	51	69
Vermont	12	18	17	21	20	17	23	23	25	23	23	28
Iowa	11	14	17	22	47	56	61	77	86	101	101	100
California	14	18	21	21	27	20	30	35	32	32	33	31
Wisconsin	105	115	103	127	151	176	169	159	166	154	142	131
Nebraska	2	0	0	1	4	2	6	10	17	23	28	29
Colorado	5	5	4	6	6	7	6	5	9	14	15	15
Pennsylvania	35	64	46	45	36	42	43	49	65	76	88	88
Ohio	24	41	35	36	36	21	25	28	29	39	38	37
Washington	9	6	10	10	11	10	8	11	10	12	15	12
Maryland	2	6	7	6	4	9	10	8	7	8	9	13
Illinois	27	23	25	24	23	24	26	30	34	51	59	62
Minnesota	21	19	23	37	55	88	84	85	105	117	120	96
New Hampshire	9	10	10	11	10	5	4	2	4	7	7	8
Oregon	6	9	5	5	4	7	8	9	11	14	14	16
Utah	0	1	1	1	4	5	4	5	5	5	8	6
Massachusetts	0	1	5	6	6	3	6	7	9	11	11	13
Virginia	5	8	10	12	13	15	18	18	20	20	20	20
Kansas	15	13	13	13	9	8	11	13	14	20	22	25
Indiana	10	5	10	5	10	17	25	31	34	41	51	37
Kentucky	0	5	5	2	3	2	0	2	(1)	8	12	12
Missouri	5	6	7	11	12	13	19	21	25	34	36	34
New Jersey	9	12	8	6	6	6	9	11	17	18	16	15
West Virginia	1	3	5	5	6	3	3	3	4	6	7	9
Connecticut	0	1	0	2	1	1	2	4	5	3	4	4
North Carolina	0	2	2	0	0	2	5	5	5	8	7	7
Louisiana	0	1	0	0	0	0	0	1	2	2	2	3
South Dakota	0	0	0	0	4	11	9	10	8	14	12	12
Nevada	0	0	1	1	4	3	1	3	0	1	0	0
Arizona	0	0	2	1	1	2	1	1	2	3	4	3
Rhode Island	0	4	4	4	3	0	0	0	0	1	1	1
Delaware	2	1	0	0	0	0	0	0	0	1	1	1
Idaho	4	5	6	4	8	8	8	9	12	13	13	12
Mississippi	0	0	3	2	1	1	2	0	1	1	2	3
Montana	0	0	0	0	2	4	3	7	7	8	9	9
Tennessee	6	3	3	4	2	2	2	2	3	7	10	10
New Mexico	0	0	1	1	1	0	1	1	2	2	1	1
Wyoming	1	0	0	0	0	1	0	0	0	1	1	1
Alabama	1	3	1	1	0	0	0	1	3	4	7	6
Georgia	0	0	0	0	0	0	0	1	1	2	1	0
North Dakota	1	1	2	6	8	5	3	6	4	7	9	9
Oklahoma	1	1	2	1	3	5	5	5	12	22	25	21
South Carolina	1	1	1	0	0	0	0	0	0	1	3	2
Texas	3	0	0	0	0	0	0	1	3	6	7	5
Arkansas	------	1	2	2	2	0	0	0	2	(1)	1	3
Florida	------	------	------	------	------	------	------	------	------	1	2	0
Total	385	468	452	513	627	732	777	837	947	1,090	1,143	1,112

Bureau of Dairy Industry. Up to and including 1923 data were collected on July 1. Beginning with 1924 reports are made by calendar years. Last 7 columns give data for Jan. 1.

[1] No report.

TABLE 450.—*Cooperative Dairy Bull Associations: Number active, by States, July 1, 1908, to January 1, 1931* [1]

State	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Michigan	3	7	8	9	7	8	9	8	8	8	7	7
Minnesota	------	1	1	1	1	2	2	2	3	3	3	4
Maryland	------	------	------	1	1	1	1	1	1	1	1	2
North Dakota	------	------	------	------	2	1	1	1	1	1	1	1
Vermont	------	------	------	------	------	------	1	1	1	1	1	2
Oregon	------	------	------	------	------	------	------	1	2	2	2	2
Wisconsin	------	------	------	------	------	------	------	1	1	1	1	2
Illinois	------	------	------	------	------	------	------	------	1	1	1	1
Iowa	------	------	------	------	------	------	------	------	1	1	1	1
Massachusetts	------	------	------	------	------	------	------	------	1	1	1	1
North Carolina	------	------	------	------	------	------	------	------	1	4	5	8
South Carolina	------	------	------	------	------	------	------	------	3	9	9	11
Pennsylvania	------	------	------	------	------	------	------	------	------	2	4	10
Missouri	------	------	------	------	------	------	------	------	------	1	1	1
Indiana	------	------	------	------	------	------	------	------	------	------	1	3
Utah	------	------	------	------	------	------	------	------	------	------	3	2
Montana	------	------	------	------	------	------	------	------	------	------	1	2
Kansas	------	------	------	------	------	------	------	------	------	------	1	1
Alabama	------	------	------	------	------	------	------	------	------	------	------	1
Georgia	------	------	------	------	------	------	------	------	------	------	------	2
Louisiana	------	------	------	------	------	------	------	------	------	------	------	1
Mississippi	------	------	------	------	------	------	------	------	------	------	------	6
New Jersey	------	------	------	------	------	------	------	------	------	------	------	1
Rhode Island	------	------	------	------	------	------	------	------	------	------	------	1
Tennessee	------	------	------	------	------	------	------	------	------	------	------	2
Washington	------	------	------	------	------	------	------	------	------	------	------	1
Wyoming	------	------	------	------	------	------	------	------	------	------	------	2
Total	3	8	9	11	11	12	14	15	24	36	44	78

State	1920	1921	1922	1923	1925	1926	1927	1928	1929	1930	1931
Michigan	7	7	5	7	6	4	4	6	6	2	1
Minnesota	6	15	19	17	18	19	20	[2]	[2]	0	2
Maryland	2	2	2	2	3	3	2	1	0	0	0
North Dakota	1	1	1	2	3	2	1	0	1	0	0
Vermont	3	5	4	2	2	1	1	1	0	0	1
Oregon	2	2	2	1	1	1	1	1	1	[2]	1
Wisconsin	1	3	4	4	0	0	0	0	0	0	1
Illinois	1	1	6	7	8	11	11	10	12	11	9
Iowa	1	1	2	2	2	2	2	2	2	1	1
Massachusetts	0	0	0	0	0	0	0	0	0	0	0
North Carolina	9	9	9	9	3	2	0	0	0	0	0
South Carolina	17	20	23	16	10	9	6	5	0	0	0
Pennsylvania	21	21	27	24	28	38	43	58	64	71	70
Missouri	3	7	10	10	10	12	15	27	31	23	34
Indiana	5	7	7	7	4	3	1	0	0	0	0
Utah	2	2	3	8	14	14	15	11	18	20	15
Montana	2	2	0	1	1	1	0	0	0	0	0
Kansas	1	1	1	2	1	1	2	4	3	2	2
Alabama	7	7	7	7	7	0	0	1	2	6	10
Georgia	1	1	0	0	2	2	0	0	0	0	0
Louisiana	1	1	1	1	1	3	9	21	53	75	52
Mississippi	11	12	10	9	8	7	4	7	21	10	5
New Jersey	4	6	8	8	2	0	0	0	0	0	2
Rhode Island	1	1	1	0	0	0	0	0	[2]	0	0
Tennessee	2	2	2	4	4	4	4	4	4	3	3
Washington	2	2	3	3	4	4	5	6	4	3	3
Wyoming	2	2	2	2	1	1	1	0	0	0	0
Arkansas	3	2	4	6	6	7	9	2	[2]	3	9
Idaho	3	6	9	29	32	32	31	22	18	20	21
Nevada	1	1	1	1	1	2	2	1	1	0	0
Oklahoma	1	1	1	4	7	7	9	14	20	28	37
Kentucky	------	3	7	9	17	18	17	[2]	[2]	0	2
Connecticut	------	1	1	2	2	2	2	0	0	0	0
New Hampshire	------	1	0	0	0	0	0	0	0	0	0
Virginia	------	1	1	2	2	2	2	2	2	0	0
West Virginia	------	1	1	1	0	0	0	0	0	0	0
Florida	------	1	1	1	0	0	1	0	2	2	3
Nebraska	------	------	1	2	4	5	4	1	1	1	1
Ohio	------	------	2	2	3	3	3	3	7	7	8
Texas	------	------	2	2	0	0	17	19	57	[3]	57
Maine	------	------	------	2	1	0	0	[2]	2	2	1
New Mexico	------	------	------	------	1	1	1	2	3	4	7
South Dakota	------	------	------	------	1	2	2	4	3	2	1
Delaware	------	------	------	------	------	------	1	[2]	1	0	0
Total	123	158	190	218	220	225	248	235	339	296	359

[1] No directory was issued July 1, 1924. [2] No report. [3] Data incomplete.

TABLE 451.—*Dairy-Herd-Improvement Associations: Number of associations, Herds, and Cows, by States, January 1, 1931*

State	Associations	Herds	Cows	Average per association: Herds	Average per association: Cows	Average cows per herd	Percentage of cows in the associations [1]
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Per cent*
Alabama	6	84	3, 376	14	563	40	0. 9
Arizona	3	103	3, 185	34	1, 062	31	8. 0
Arkansas	3	45	470	15	157	10	. 1
California	31	1, 730	79, 302	56	2, 558	46	12. 9
Colorado	15	242	4, 699	16	313	19	1. 9
Connecticut	4	69	1, 952	17	488	28	2. 0
Delaware	1	24	527	24	527	22	1. 5
Florida	0	0	0	0	0	0	. 0
Georgia	0	0	0	0	0	0	. 0
Idaho	12	347	4, 653	29	388	13	2. 5
Illinois	62	1, 468	23, 717	24	383	16	2. 4
Indiana	37	880	15, 484	24	418	18	2. 1
Iowa	100	2, 406	37, 630	24	376	16	2. 8
Kansas	25	599	9, 346	24	374	16	1. 3
Kentucky	12	299	5, 719	25	477	19	1. 2
Louisiana	3	35	691	12	230	20	. 3
Maine	5	125	1, 621	25	324	13	1. 2
Maryland	13	276	4, 483	21	345	16	2. 3
Massachusetts	13	274	6, 115	21	470	22	4. 7
Michigan	88	1, 730	21, 811	20	248	13	2. 4
Minnesota	96	2, 259	33, 756	24	352	15	2. 2
Mississippi	3	67	1, 752	22	584	26	. 4
Missouri	34	717	13, 379	21	394	19	1. 5
Montana	9	117	2, 544	13	283	22	1. 4
Nebraska	29	656	9, 613	23	331	15	1. 6
Nevada	0	0	0	0	0	0	. 0
New Hampshire	8	220	4, 556	28	570	21	6. 0
New Jersey	15	344	8, 165	23	544	24	7. 0
New Mexico	1	10	869	10	869	87	1. 3
New York	69	1, 485	32, 336	22	469	22	2. 3
North Carolina	7	88	3, 154	13	451	36	1. 1
North Dakota	9	159	2, 670	18	297	17	. 5
Ohio	37	725	11, 017	20	298	15	1. 2
Oklahoma	21	418	9, 159	20	436	22	1. 4
Oregon	16	657	13, 089	41	818	20	5. 5
Pennsylvania	88	2, 073	31, 947	24	363	15	3. 5
Rhode Island	1	23	643	23	643	28	3. 2
South Carolina	2	15	443	8	222	30	. 3
South Dakota	12	299	4, 777	25	398	16	. 6
Tennessee	10	141	2, 804	14	280	20	. 9
Texas	5	91	2, 005	18	401	22	. 6
Utah	6	255	2, 643	42	440	10	2. 2
Vermont	28	629	13, 719	22	490	22	4. 8
Virginia	20	426	12, 698	21	635	30	3. 1
Washington	12	360	6, 873	30	573	19	2. 2
West Virginia	9	116	1, 713	13	190	15	. 7
Wisconsin	131	3, 208	59, 410	24	454	19	2. 8
Wyoming	1	14	199	14	199	14	. 3
Total or average	1, 112	26, 308	510, 714	23. 7	459	19. 41	2. 2

[1] Based on estimated total number of cows and heifers kept for milk, 2 years old and over.

Bureau of Dairy Industry.

TABLE 452.—*Milk cows: Estimated average price* [1] *per head received by producers, United States, 1921–1930*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	66. 82	63. 44	65. 37	64. 35	62. 63	59. 89	56. 55	55. 85	54. 33	53. 39	53. 28	53. 30	59. 10
1922	52. 83	53. 54	54. 87	54. 46	54. 76	54. 87	54. 20	52. 67	52. 79	52. 86	51. 62	53. 21	53. 56
1923	54. 01	54. 15	55. 29	56. 14	55. 91	56. 34	56. 22	55. 45	56. 13	55. 51	55. 39	54. 66	55. 43
1924	55. 57	55. 49	55. 88	55. 92	56. 37	56. 45	55. 46	55. 74	55. 54	54. 30	55. 05	54. 00	55. 48
1925	54. 81	54. 79	56. 19	56. 85	57. 88	57. 79	57. 95	58. 26	58. 68	60. 17	60. 69	60. 38	57. 87
1926	62. 06	63. 41	63. 17	65. 65	66. 63	66. 74	66. 68	65. 37	66. 12	66. 26	66. 91	66. 74	65. 51
1927	66. 77	68. 22	70. 18	71. 98	72. 43	74. 19	74. 15	74. 24	76. 10	78. 62	81. 09	82. 36	74. 19
1928	83. 11	86. 34	87. 95	88. 55	89. 00	89. 90	90. 37	90. 43	92. 56	92. 86	93. 05	92. 87	89. 75
1929	91. 54	91. 77	92. 80	93. 55	94. 94	95. 29	96. 34	95. 26	95. 55	95. 12	94. 48	92. 61	94. 10
1930	89. 17	85. 02	81. 00	80. 70	79. 53	77. 62	71. 75	65. 91	66. 23	66. 37	64. 68	62. 00	74. 16

Bureau of Agricultural Economics. Monthly prices weighted by number of milk cows Jan. 1, by States; yearly price is a straight average of 12 months. For previous data see 1930 or earlier Yearbooks.

[1] As reported by county dealers.

TABLE 453.—*Average production, cost, and value per cow of butterfat and milk, classified on butterfat basis, 12 months records completed in 1929, by herd-improvement associations*

Cows	Milk	Butter-fat	Price of product per pound	Value of product	Cost of roughage	Cost of grain	Total feed cost	Value of product over feed cost	Return for $1 spent for feed	Feed cost per pound of butterfat	Feed cost per 100 pounds of milk
Number	*Pounds*	*Pounds*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
58	386	16	0.75	12	35	14	49	[1]−37	0.24	3.06	12.69
445	1,331	54	.71	38	31	15	46	[1]−8	.83	.85	3.46
2,129	2,694	106	.66	70	32	20	52	18	1.35	.49	1.93
8,569	3,981	155	.65	101	34	24	58	43	1.74	.37	1.46
24,607	5,234	203	.65	132	36	29	65	67	2.03	.32	1.24
42,983	6,425	251	.65	163	37	35	72	91	2.26	.29	1.12
47,420	7,561	299	.65	195	39	40	79	116	2.47	.26	1.04
35,289	8,660	347	.65	226	40	45	85	141	2.66	.24	.98
19,719	9,775	397	.65	257	41	51	92	165	2.79	.23	.94
8,482	10,864	445	.65	288	42	57	99	189	2.91	.22	.91
3,222	12,119	496	.65	322	45	64	109	213	2.95	.22	.90
1,242	13,392	545	.65	357	47	74	121	236	2.95	.22	.90
405	14,698	597	.66	396	50	80	130	266	3.05	.22	.88
180	16,321	646	.66	429	49	92	141	288	3.04	.22	.86
61	17,394	699	.67	466	60	100	160	306	2.91	.23	.92
24	19,659	750	.72	540	63	107	170	370	3.18	.23	.86
13	20,442	793	.66	522	59	104	163	359	3.20	.21	.80
5	23,104	840	.87	732	74	155	229	503	3.20	.27	.99
5	24,258	896	.71	635	62	132	194	441	3.27	.22	.80
1	26,176	1,024	.53	544	61	106	167	377	3.26	.16	.64
Average	7,498	298	.65	194	39	40	79	115	2.46	.27	1.05

[1] Minus (−) sign indicates loss.

TABLE 454.—*Dairy products: Quantity produced, 1922–1929*

Product	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Creamery butter	1,153,515	1,252,214	1,356,080	1,361,526	1,451,766	1,496,495	1,487,049	1,597,027
Whey butter (made from whey cream)	2,291	1,904	1,665	1,774	2,872	1,217	1,097	1,221
Renovated or process butter	4,448	2,802	2,813	2,519	2,505	4,286	2,716	2,531
American cheese:								
Whole milk	282,806	308,108	324,695	347,240	335,915	307,777	335,253	370,314
Part skim	2,164	2,145	2,470	2,793	2,927	3,390	2,900	4,951
Full skim	2,500	2,033	1,605	3,298	1,384	1,888	3,048	1,074
Swiss cheese (including block)	19,983	24,555	21,844	23,457	20,883	18,141	16,718	19,406
Brick and Munster cheese	37,194	33,250	32,052	34,101	31,048	31,546	28,960	31,763
Limburger cheese	7,383	7,100	9,734	9,163	9,639	8,842	7,437	8,568
Cream and Neufchatel cheese	9,936	10,334	14,945	17,575	18,192	25,962	30,589	34,405
All Italian varieties of cheese	2,627	2,132	1,973	1,562	2,425	3,377	3,587	5,948
All other varieties of cheese	5,387	5,040	4,622	4,325	5,003	5,763	9,027	7,504
Cottage, pot, and bakers' cheese	32,389	35,527	54,347	59,485	67,977	75,679	87,525	94,941
Condensed milk (sweetened):								
Case goods—								
Skimmed	3,915	2,748	2,044	3,135	1,298	1,623	1,366	1,632
Unskimmed	230,456	196,058	187,281	186,807	154,944	161,355	139,077	145,922
Bulk goods—								
Skimmed	76,049	102,236	96,581	114,198	147,473	143,722	154,723	202,475
Unskimmed	30,292	44,860	47,429	44,758	55,737	39,668	38,660	51,689
Total condensed milk	340,712	345,902	333,335	348,898	359,452	346,368	333,826	401,718
Evaporated milk (unsweetened):								
Case goods—								
Skimmed	3,574	7,035	11,555	5,994	11,985	8,100	10,618	----------
Unskimmed	949,909	1,252,520	1,189,755	1,202,456	1,158,476	1,273,815	1,337,022	1,499,644
Bulk goods—								
Skimmed	67,066	77,416	83,131	86,954	116,758	126,085	147,625	153,624
Unskimmed	70,088	92,008	82,772	113,556	86,833	101,354	89,336	151,662
Total evaporated milk	1,090,637	1,428,979	1,367,213	1,408,960	1,374,052	1,509,354	1,584,601	1,804,930
Condensed or evaporated buttermilk	44,343	54,833	66,837	77,079	86,687	99,180	102,452	107,288
Dried or powdered buttermilk	9,007	13,032	18,058	20,246	31,378	38,435	45,502	54,215
Powdered whole milk	5,599	6,560	7,887	8,931	10,768	11,464	9,605	13,202
Powdered skimmed milk	40,617	62,251	69,219	73,317	91,718	118,123	147,996	207,579
Powdered cream	118	328	1,018	339	331	338	673	294
Dried casein (skim milk or buttermilk product)	6,927	14,548	20,759	16,660	16,953	18,033	22,151	30,537
Malted milk	13,659	15,331	15,889	18,050	20,673	22,116	21,128	22,850
Milk sugar (crude)	2,191	2,872	3,331	5,655	4,476	4,077	5,323	8,965
Ice cream of all kinds (gallons)	161,609	173,412	181,564	214,382	215,248	226,756	232,185	254,618

Bureau of Agricultural Economics. Compiled from reports of factories made direct to the bureau.

TABLE 455.—*Dairy products: Quantity produced 1929, by months*

Manufactured product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	100 lbs.	*100 lbs.*	*100 lbs.*	*100 lbs.*	*100 lbs.*	*100 lbs.*	*100 lbs.*	*100 lbs.*	*100 lbs.*	*100 lbs.*	*100 lbs.*	*100 lbs.*	*100 lbs.*
Creamery butter	103, 519	99, 963	114, 404	133, 684	174, 341	192, 869	185, 317	152, 192	123, 582	118, 116	97, 186	101, 854	1, 597, 027
Whey butter (made from whey cream)	58	57	65	96	126	143	155	133	108	109	88	83	1, 221
Renovated or process butter	307	224	296	280	245	175	221	189	161	137	196	100	2, 531
American cheese:													
Whole milk	19, 925	19, 522	24, 059	30, 181	42, 483	51, 702	48, 007	37, 811	30, 824	25, 961	19, 655	20, 184	370, 314
Part skim	363	364	453	472	556	612	451	356	322	327	310	365	4, 951
Full skim	132	90	79	97	165	210	28	41	33	77	66	56	1, 074
Swiss cheese (including block)	181	180	241	850	3, 037	3, 894	3, 448	2, 795	2, 342	1, 456	689	293	19, 406
Brick and Munster cheese	2, 425	2, 291	2, 681	2, 853	3, 039	3, 166	2, 613	2, 362	2, 274	2, 789	2, 755	2, 515	31, 763
Limburger cheese	396	352	479	727	1, 028	1, 155	1, 044	889	780	747	543	428	8, 568
Cream and Neufchatel cheese	3, 326	3, 348	3, 682	2, 639	2, 942	2, 845	2, 311	2, 312	2, 396	2, 768	2, 980	2, 856	34, 405
All Italian varieties	319	331	455	429	538	546	616	596	563	544	454	557	5, 948
All other varieties	476	503	507	447	630	1, 082	578	547	580	775	723	656	7, 504
Cottage, pot, and bakers' cheese	7, 296	7, 444	8, 932	8, 059	8, 960	9, 083	8, 357	7, 884	7, 268	7, 762	7, 001	6, 895	94, 941
Condensed milk (sweetened):													
Case goods—													
Skimmed	183	193	221	71	28	185	232	142	79	132	69	97	1, 632
Unskimmed	13, 095	10, 914	13, 693	14, 672	14, 596	15, 254	13, 086	10, 071	9, 433	12, 438	9, 502	9, 168	145, 922
Bulk goods—													
Skimmed	12, 440	11, 483	13, 724	20, 366	29, 597	30, 896	20, 899	15, 944	12, 713	12, 677	10, 185	11, 551	202, 475
Unskimmed	2, 510	2, 927	3, 798	4, 902	6, 451	7, 746	6, 270	4, 560	3, 724	3, 529	2, 130	3, 142	51, 689
Evaporated milk (unsweetened):													
Case goods—													
Skimmed	------	------	------	------	------	------	------	------	------	------	------	------	------
Unskimmed	92, 214	94, 299	115, 199	146, 066	188, 787	212, 260	175, 808	128, 256	97, 179	87, 951	75, 897	85, 728	1, 499, 644
Bulk goods—													
Skimmed	7, 291	7, 112	9, 754	14, 756	21, 021	26, 674	16, 113	14, 759	11, 571	9, 290	7, 904	7, 379	153, 624
Unskimmed	7, 243	7, 251	10, 179	13, 027	18, 273	19, 336	20, 807	18, 073	13, 240	9, 192	7, 473	7, 568	151, 662
Concentrated skim milk (for animal feed)	902	873	933	1, 473	1, 918	1, 610	1, 415	1, 283	1, 055	917	1, 332	1, 168	14, 897
Condensed or evaporated buttermilk (including concentrated product)	6, 919	6, 354	7, 078	8, 884	13, 945	14, 367	11, 967	9, 899	7, 555	8, 507	5, 282	6, 531	107, 288
Dried or powdered buttermilk	3, 496	3, 639	4, 200	4, 733	5, 938	6, 357	6, 049	4, 839	3, 891	3, 827	3, 432	3, 814	54, 215
Powdered whole milk	262	298	530	1, 134	2, 161	2, 578	2, 315	1, 549	566	576	390	843	13, 202
Powdered skim milk	11, 807	12, 059	15, 544	19, 276	24, 703	25, 796	23, 602	18, 175	14, 753	13, 627	13, 089	15, 148	207, 579
Powdered cream	------	5	4	22	84	114	17	------	------	20	28	------	294
Dried casein (skim milk or buttermilk product)	1, 635	1, 845	2, 152	2, 834	4, 085	5, 152	3, 146	2, 180	1, 719	1, 844	1, 645	2, 250	30, 537

Malted milk	1,526	1,736	2,034	1,986	1,934	1,981	1,647	1,991	2,045	2,319	1,936	1,715	22,850
Milk sugar (crude)	399	422	498	918	1,021	1,055	896	796	710	746	693	811	8,965
Ice cream (all kinds), gallons	9,369	9,897	15,485	19,771	26,808	35,132	40,840	35,487	24,558	15,504	12,023	9,744	254,618

Bureau of Agricultural Economics. Compiled from reports made direct to the bureau.

NOTE.—These statistics were compiled from reports furnished voluntarily by more than 12,000 firms which manufacture dairy products. The 1929 statistics are the most complete of any year since these reports were inaugurated in 1918. Some allowance therefore should be made for this when comparing 1929 production with that of previous years. It is estimated that of the above quantities the following amounts of the major products are the result of more complete returns in 1929: Creamery butter, 50,000,000 pounds; American cheese (whole milk), 30,000,000 pounds; ice cream, 10,000,000 gallons.

TABLE 456.—*Fluid milk and fluid cream: Receipts at New York, by State of origin, 1927–1929, and by months, 1930*

[40-quart units] [1]

State of origin	1927	1928	1929	1930 Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Fluid milk:																
Connecticut	162, 613	82, 720	125, 890	206, 080	14, 644	13, 539	19, 100	16, 388	21, 671	20, 807	16, 632	13, 958	14, 887	17, 812	17, 692	18, 950
Massachusetts	131, 577	126, 443	109, 452	100, 046	7, 919	6, 927	7, 587	7, 980	11, 360	10, 859	11, 058	10, 860	6, 792	5, 857	5, 668	7, 179
Maryland	43, 632	66, 164	139, 230	129, 572	13, 851	12, 278	14, 012	10, 668	10, 549	9, 917	9, 023	6, 984	10, 015	11, 141	10, 143	10, 991
New Jersey	2, 051, 503	1, 700, 809	1, 380, 211	1, 098, 490	98, 086	89, 030	101, 260	101, 220	110, 444	98, 529	87, 370	82, 562	78, 720	86, 954	81, 492	82, 823
New York	27, 521, 242	27, 098, 784	26, 748, 404	26, 656, 903	2, 233, 027	2, 056, 016	2, 262, 602	2, 158, 983	2, 354, 404	2, 292, 464	2, 288, 442	2, 142, 886	2, 306, 780	2, 266, 964	2, 152, 883	2, 142, 052
Ohio			6, 090	1, 356											525	831
Pennsylvania	3, 652, 306	4, 408, 705	4, 850, 724	4, 880, 032	435, 500	376, 388	397, 407	394, 409	440, 586	411, 186	412, 632	413, 310	412, 348	405, 632	393, 928	386, 706
Vermont	889, 847	1, 068, 937	1, 321, 577	1, 233, 618	111, 002	95, 408	87, 651	91, 205	110, 375	119, 901	132, 468	91, 857	100, 028	103, 815	92, 748	97, 160
Canada			32, 553	15, 874	2, 327	1, 533	1, 948	168	72		808	493	2, 569	2, 058	1, 923	1, 975
Miscellaneous	1, 396	2, 229		6, 306	571	909	1, 449	1, 941	630			216		190	400	
Total	34, 454, 116	34, 554, 791	34, 714, 131	34, 328, 277	2, 916, 927	2, 652, 028	2, 892, 416	2, 782, 962	3, 060, 091	2, 963, 663	2, 958, 433	2, 763, 126	2, 932, 139	2, 900, 423	2, 757, 402	2, 748, 667
Fluid cream:																
Arkansas			4, 753	616					200	208	208					
Connecticut	114	282	2, 929	7, 182	769	714	668	725	579	573	481	510	489	518	512	644
Delaware		99														
Illinois	953	2, 688	400	1, 016	200			200	300		216			100		
Indiana	2, 935	7, 794	12, 517	7, 855		600		225	1, 725	2, 400	1, 350	1, 055	200	300		
Iowa	10, 962	23, 117	4, 343													
Kansas			600													
Kentucky		200	8, 500	1, 400				400	200	400		200	200			
Massachusetts	2, 510	2, 434	3, 594	6, 441	594	574	908	675	532	493	346	179	425	667	575	473
Maryland		613	1, 077	3, 300	590	140	570	250	275	750	560	105	60			
Michigan	4, 813	2, 920	200	1, 830			406		400		624	400				
Minnesota	7, 568	11, 599	13, 072	6, 316	583	196	790	400	500	550	600	1, 027	263	605	220	582
Missouri		2, 269	6, 889	4, 415	1, 000				1, 100	600		310	1, 405			
New Jersey	39, 990	41, 900	15, 949	16, 212	1, 551	1, 491	1, 898	1, 712	2, 047	1, 919	866	709	685	968	947	1, 419
New York	1, 192, 527	1, 285, 635	1, 323, 875	1, 350, 342	93, 082	81, 911	108, 279	108, 955	155, 624	143, 544	127, 757	112, 638	107, 051	109, 792	99, 024	102, 685
Ohio	1, 800	11, 170	23, 092	21, 994	356	1, 635	2, 875	1, 775	4, 174	3, 190	2, 649	950	1, 700	1, 150	775	765
Pennsylvania	197, 678	183, 852	246, 430	251, 630	20, 601	19, 739	21, 923	21, 356	31, 428	34, 762	23, 544	14, 886	14, 659	16, 190	15, 515	17, 027
Tennessee	210	7, 767	16, 446	13, 135	217	217	1, 407	651	1, 719	2, 553	1, 085	2, 184	1, 558	1, 127	200	217
Virginia		33														
Vermont	73, 738	96, 830	71, 267	95, 844	7, 403	4, 749	6, 330	9, 043	15, 448	12, 040	10, 417	6, 969	5, 674	6, 804	5, 788	5, 179
Wisconsin	24, 720	16, 549	34, 524	18, 049	1, 700	1, 200	1, 202	675	2, 005	1, 216	1, 488	2, 803	1, 400	600	2, 360	1, 400
Canada	10, 857	4, 908	36, 035	34, 152	990	887	1, 897	2, 082	5, 851	4, 478	3, 633	3, 800	3, 667	3, 325	2, 394	1, 148
Texas			424													
Miscellaneous				676	65				200	192			217	2		
Total	1, 571, 375	1, 702, 659	1, 826, 916	1, 842, 405	129, 701	114, 053	149, 153	149, 124	224, 307	209, 868	175, 824	148, 725	139, 653	142, 148	128, 310	131, 539

Bureau of Agricultural Economics.

[1] 40-quart units equal 10 gallons, or about 86 pounds for milk and about 82.5 pounds for cream.

TABLE 457.—*Fluid milk and fluid cream: Receipts at Philadelphia by State of origin—1929, and by months, 1930*

[40 quart units] [1]

State of origin	1929	1930												
		Total	January	February	March	April	May	June	July	August	September	October	November	December
Fluid milk:														
Delaware	652,876	558,870	50,146	41,453	47,516	46,620	55,433	48,632	43,246	47,167	45,754	45,352	43,443	44,108
Indiana	17,028													
Maryland	956,450	883,395	65,447	62,605	75,514	76,893	82,813	73,688	77,416	75,037	87,915	76,727	68,360	60,980
New Jersey	579,825	497,308	46,572	44,905	45,782	42,409	43,904	41,819	36,610	34,721	37,815	40,477	40,963	41,331
New York		9,587					128			4,205	4,531	723		
Ohio	3,104	6,290								250	4,900	1,140		
Pennsylvania	5,142,301	5,298,624	444,597	398,847	448,744	432,518	461,762	444,849	443,062	416,362	422,050	465,108	453,033	467,692
Virginia	1,607	41,104					1,200	2,000	7,975	9,455	7,873	4,978	4,490	3,133
West Virginia		99,829	7,718	9,216	10,896	9,270	6,510	6,048	8,404	9,673	9,191	9,875	7,930	5,098
Wisconsin	720	310									310			
Miscellaneous	79,223													
Total	7,433,134	7,395,317	614,480	557,026	628,452	607,710	651,750	617,036	616,713	596,870	620,339	644,380	618,219	622,342
Fluid cream:														
Arkansas	1,813	2,421					406	203	391	406	812	203		
Delaware	2,777	4,371	483	368	739	587	423	479	88	44	29	97	290	744
Illinois	4,341	2,754			200		225		800	618	406	324	181	
Indiana	59,026	73,237	4,556	3,601	3,905	4,150	5,622	6,051	6,362	8,911	10,416	6,593	6,551	6,519
Iowa	3,753													
Kansas	2,000	1,268					400	222	406			240		
Kentucky	4,220	4,822	200		600	800	1,022	800	600	600		200		
Maryland	38,947	39,214	4,681	4,798	3,862	2,800	4,331	4,897	1,836	630	294	2,452	3,066	5,567
Michigan	2,406	17,292	200	200	1,440	1,400	2,638	3,240	4,325	1,625	801	800	611	12
Minnesota	53,810	19,334	100	1,160	4,425	3,335	4,178	1,040	1,480	2,249	687	380	300	
Missouri	27,041	15,367	1,403	603	1,236	1,206	3,815	2,212	1,209	1,206	1,015	853	609	
New Jersey	2,090	589		25	80	114	70	75	80			35		110
New York		3,083				28		200		171	1,142	1,039	253	250
Ohio	33,847	29,260	2,450	2,353	2,840	1,150	1,505	1,219	1,670	1,490	5,865	6,530	1,946	242
Oklahoma	1,673	1,450	200		200		200	400	400	50				
Pennsylvania	48,167	46,292	3,816	3,227	3,227	3,333	4,643	7,378	3,623	4,493	2,279	4,118	2,697	3,458
Tennessee	3,221	4,756	400	200	400	621	800		1,000	200	400	735		
Texas	1,318	1,748					825		200		250	273	200	
Virginia	16,691	31,172	1,473	1,148	1,023	4,807	8,784	4,445	3,018	1,637	919	807	1,551	1,560
West Virginia		1,989	142	20	43	106	111	67	234			257	324	685
Wisconsin	86,589	92,010	4,218	2,965	6,921	6,064	11,505	8,521	12,407	13,544	10,577	7,769	4,309	3,210
Miscellaneous	1,126	600									600			
Total	394,856	393,029	24,322	20,668	31,141	30,501	51,503	41,449	40,129	37,874	36,492	33,705	22,888	22,357

Bureau of Agricultural Economics.

[1] 40-quart units equal 10 gallons, or about 86 pounds for milk and 82.5 pounds for cream.

TABLE 458.—*Condensed and evaporated milk: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year									
	Average, 1909–1913		1926		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Netherlands	[1] 23	55	389	293,046	278	324,800	359	354,572	139	378,059
United States	0	[2] 16,200	1,663	114,549	2,623	103,028	2,608	115,551	2,634	110,184
Denmark	[1,2] 5	[2] 4,724	2	56,734	14	55,304	13	52,597	2	54,934
Switzerland	201	80,539	71	73,940	11	81,234	14	82,252	13	78,475
Canada	259	4,575	152	24,775	125	33,680	137	27,118	179	26,746
Australia	4,463	727	[1] 130	[1] 31,217	[1] 96	[1] 15,725	[1] 27	[1] 19,975	[1] 52	[1] 17,395
Norway	3	32,106	1,055	24,483	747	16,698	646	18,747	323	15,548
Italy	806	5,913	715	11,073	1,335	8,905	1,728	7,092	2,124	4,822
Irish Free State	(3)	(3)	1,659	9,169	1,494	6,302	1,282	10,746	1,116	10,503
New Zealand	261	132	7	1,225	3	1,557	3	1,367	7	2,175
Lithuania	(3)	(3)	[1] 62	5,782	[1] 83	8,888	[1] 98	12,655	[1] 103	19,910
Czechoslovakia	(3)	(3)	421	640	141	315	228	2,753	271	2,831
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	121,175	48,221	269,682	14,287	283,789	27,771	301,978	25,046	296,501	27,732
Cuba	28,457	0	48,567	0	50,586	0	44,340	0	[1] 47,415	0
Germany [4]	66	12,080	12,036	1,681	13,434	980	13,290	1,477	8,264	4,235
France	2,458	4,140	13,551	7,607	11,299	9,454	12,271	12,483	14,401	11,520
Dutch East Indies	[5] 13,049	89	24,301	0	26,149	0	30,875	0	34,990	0
Philippine Islands	12,311	0	24,142	0	25,974	0	26,524	0	29,875	0
Japan	10,061	0	9,641	213	9,510	399	10,183	385	10,892	317
British India	11,236	0	18,980	0	24,933	0	26,354	0	27,436	0
Union of South Africa	21,227	0	11,122	24	11,330	29	12,020	45	12,132	16
China	4,484	0	11,994	0	11,095	0	14,643	0	13,285	0
Peru	[1,2] 2,038	0	8,886	0	7,629	0	8,444	0	8,667	0
Austria	[1,6] 323	[1,6] 79	1,358	64	1,105	254	1,205	305	[1] 1,247	[1] 371
Greece	[1] 176	0	5,111	0	7,052	0	8,097	0	7,879	0
Indo-China	[1] 2,437	[1] 72	5,995	252	5,955	174	[1] 7,603	[1] 123	[1] 9,709	[1] 72
Siam [7]	0	0	4,788	0	6,617	0	8,827	0	8,447	0
Jamaica [1]	2,860	0	3,803	0	4,103	0	4,616	0	5,084	0
Belgium [4]	0	0	3,370	1,312	2,915	2,615	3,689	3,516	4,099	4,155
Trindad and Tobago	[1] 37	0	2,836	0	3,132	0	3,706	0	3,850	0
Algeria	[1] 143	[1] 38	2,725	229	[1] 3,682	[1] 129	[1] 5,291	[1] 205	[1] 4,094	[1] 144
Tunis	[1,2] 1,334	0	1,828	0	2,644	0	[1] 2,734	0	[1] 2,722	0
Poland	(3)	(3)	79	2	263	22	464	18	385	1
Egypt	[8] 1,628	0	1,339	289	1,395	351	1,347	368	1,525	504
Argentina	742	0	1,524	13	1,446	28	1,353	12	[1] 1,578	[1] 15
Brazil	8,694	0	1,838	0	1,947	0	1,356	0	-------	-------
Total, 36 countries	250,957	209,690	495,822	672,609	524,934	698,642	558,353	749,408	561,440	770,664

Bureau of Agricultural Economics. Official sources, except where otherwise stated.

* Preliminary.
[1] International Yearbook of Agricultural Statistics.
[2] 4-year average.
[3] Figures for pre-war years are included in the countries of the pre-war boundaries.
[4] Includes some powdered milk.
[5] 3-year average.
[6] Average for Austria-Hungary.
[7] Figures for Siam are for 12 months ended Mar. 31 of the year following year shown.
[8] 1 year only.

TABLE 459.—*Milk, wholesale: Estimated average price per 100 pounds received by producers, United States, 1923–1930*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1923	------	------	------	------	------	------	------	------	2.81	2.98	3.02	2.92
1924	2.86	2.84	2.75	2.50	2.40	2.40	2.29	2.18	2.35	2.43	2.45	2.55
1925	2.48	2.55	2.62	2.48	2.47	2.47	2.45	2.55	2.56	2.73	2.69	2.65
1926	2.74	2.68	2.56	2.46	2.39	2.35	2.40	2.37	2.47	2.46	2.60	2.61
1927	2.68	2.64	2.55	2.58	2.51	2.44	2.40	2.36	2.48	2.55	2.56	2.64
1928	2.67	2.69	2.61	2.51	2.49	2.45	2.45	2.46	2.56	2.60	2.63	2.65
1929	2.64	2.64	2.63	2.59	2.53	2.47	2.46	2.50	2.52	2.55	2.60	2.60
1930	2.53	2.44	2.39	2.35	2.28	2.22	2.15	2.18	2.25	2.30	2.31	2.20

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of milk cows Jan. 1. Prices quoted are to dealers, factories, etc.

TABLE 460.—*Milk, standard or grade B: Retail price per quart, delivered to family trade, New York, Chicago, New Orleans, and San Francisco, 1921–1930*

Market and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
New York:	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	17	16	15	------	------	14	14	15	15	15	15	15	------
1922	15	15	15	------	13	13	14	15	15	15	15	16	------
1923	16	15	15	15	14	14	14	14	15	15	16	15	15
1924	15	14	14	14	13	13	13	13	14	14	15	15	14
1925	15	15	15	15	15	14	14	15	15	15	15	15	15
1926	15	15	15	15	15	15	15	15	15	15	15	15	15
1927	15	15	15	15	15	15	15	15	16	16	16	16	15
1928	16	16	15	15	15	15	15	16	16	16	16	16	16
1929	16	16	16	16	16	16	16	16	16	16	16	16	16
1930	16	16	16	16	15	15	15	15	16	16	16	16	16
Chicago:													
1921	14	14	14	14	14	14	14	14	12	12	12	12	13
1922	12	12	12	12	12	12	12	12	12	12	12	12	12
1923	12½	13	13	13	13	13	14	14	14	14	14	14	13
1924	14	14	14	14	14	14	14	14	14	14	14	14	14
1925	14	14	14	14	14	14	14	14	14	14	14	14	14
1926	14	14	14	14	14	14	14	14	14	14	14	14	14
1927	14	14	14	14	14	14	14	14	14	14	14	14	14
1928	14	14	14	14	14	14	14	14	14	14	14	14	14
1929	14	14	14	14	14	14	14	14	14	14	14	14	14
1930	14	14	14	14	14	14	14	14	14	14	14	14	14
New Orleans:													
1921	17	17	16	16	16	16	16	16	16	16	14	14	16
1922	14	14	14	14	14	14	14	14	------	14	14	14	------
1923	14	------	14	14	14	14	14	14	14	15	15	------	------
1924	------	15	15	15	14	14	14	14	14	14	14	14	------
1925	14	14	14	14	12	12	12	12	12	14	14	14	13
1926	14	14	14	14	14	14	14	14	14	14	14	14	14
1927	14	14	14	14	14	14	14	14	14	14	14	14	14
1928	14	14	14	14	14	14	14	14	14	14	14	14	14
1929	14	14	14	14	14	14	14	14	14	14	14	14	14
1930	14	14	14	14	14	14	14	14	14	14	14	14	14
San Francisco:													
1921	15½	15½	15	15	15	14½	13½	14	14	13½	13½	13½	14
1922	13½	12½	12½	12½	------	12½	12½	12½	12½	12½	12½	13	------
1923	12½	12½	12½	12½	12½	12½	------	12½	------	------	14	14	------
1924	14	14	14	14	14	14	14	14	14	14	14	14	14
1925	14	14	14	14	14	14	14	14	14	14	14	14	14
1926	14	14	14	14	14	14	14	14	14	14	14	14	14
1927	14	14	14	14	14	14	14	14	14	14	14	14	14
1928	14	14	14	14	14	14	14	14	14	14	14	14	14
1929	14	14	14	14	14	14	14	14	14	14	14	14	14
1930	14	14	14	14	14	14	14	14	14	14	14	14	14

Bureau of Agricultural Economics. Compiled from reports of the bureau secured through the cooperation of milk distributors, producers' associations, and municipal officers.

TABLE 461.—*Milk, standard or grade B: Retail price per quart, delivered to family trade in cities, 1930*

Market	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Boston	15½	15½	15½	15½	15½	14½	14½	15½	15½	15½	15½	15½	15¼
New York	16	16	16	16	15	15	15	15	16	16	16	[1] 16	15¾
Philadelphia	13	13	13	13	13	13	13	13	13	13	13	13	13
Pittsburgh	14	13	13	13	13	13	13	13½	14	14	13	13	13¼
Cleveland	12	12	12	12	12	12	12	12	13	12	12	12	12
Indianapolis	12	12	12	12	12	12	12	12	12	12	12	11	12
Chicago	14	14	14	14	14	14	14	14	14	14	14	14	14
Detroit	14	13	------	------	13	------	13	13	------	13	13	13	------
Milwaukee	12	12	12	12	12	11	11	11	11	11	11	11	11½
Minneapolis	12	11	11	11	11	11	11	11	11	11	11	10	11
St. Louis	13	13	13	13	13	13	13	13	13	13	13	12	13
Kansas City, Mo	14	13	14	13	13	13	13	13	13	13	13	13	13¼
Washington, D. C	14½	14½	14½	14½	14½	14½	14½	14½	14½	14½	14½	14½	14½
Jacksonville	18½	18½	18½	17½	18	18½	18½	18½	19	19	19	19	18½
Louisville	13	13	12	12	12	12	12	13	13	13	12	12	12½
Birmingham	16	16	16	16	16	16	16	16	16	16	16	16	16
New Orleans	14	14	14	14	14	14	14	14	14	14	14	14	14
Dallas	13	13	13	13	13	13	13	13	13	13	13	13	13
Butte	13	13	13	13	13	13	13	13	------	13	------	------	------
Denver	------	------	11	11	11	11	11	------	------	------	11	11	------
Salt Lake City	10	10	------	10	10	10	------	------	------	10	------	------	------
Seattle	11½	11	11	12	10	11	12	10	11	11	10½	11	11
Portland, Oreg	------	------	12	13½	13½	12	13½	13½	13	13	11	11	------
Los Angeles	------	------	15	15	------	------	15	14	------	14	------	------	------
San Francisco	14	14	14	14	14	14	14	14	14	14	14	14	14

Bureau of Agricultural Economics. Compiled from reports of the bureau secured through the cooperation of milk distributors, producers' associations, and municipal officers.

[1] Prices were reduced 1 cent per quart on Dec. 8.

TABLE 462.—*Creamery butter production in factories in the United States, by States, 1920–1929*

State	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Me	727	719	596	402	568	479	547	517	348	256
N. H	300	305	309	424	271	137	90	72	44	23
Vt	13, 253	14, 919	12, 289	11, 935	12, 294	9, 372	8, 305	6, 732	5, 469	3, 776
Mass	3, 198	3, 895	2, 999	1, 844	1, 790	2, 026	2, 150	2, 514	2, 340	1, 496
R. I	58	77	76	76	105	68	75	100	66	48
Conn	877	1, 165	986	753	820	675	617	550	401	371
New England	18, 413	21, 080	17, 255	15, 434	15, 848	12, 757	11, 784	10, 485	8, 668	5, 975
N. Y	16, 949	24, 298	25, 474	18, 893	25, 974	16, 960	14, 222	12, 864	11, 557	9, 104
N. J	143	214	261	437	642	170	49	101	15	14
Pa	11, 422	14, 629	12, 803	13, 142	12, 444	11, 476	11, 808	11, 709	11, 349	11, 113
Middle Atlantic	28, 514	39, 141	38, 538	32, 472	39, 060	28, 606	26, 079	24, 674	22, 921	20, 231
Ohio	65, 594	78, 724	84, 193	79, 195	80, 932	77, 566	79, 386	79, 603	75, 681	80, 583
Ind	39, 223	47, 854	48, 158	51, 484	54, 355	54, 362	57, 592	62, 436	60, 409	62, 701
Ill	41, 051	48, 866	47, 249	51, 359	58, 225	56, 872	62, 544	59, 875	62, 864	69, 272
Mich	45, 404	55, 011	59, 954	64, 818	70, 676	70, 729	72, 040	69, 368	65, 803	63, 426
Wis	97, 355	124, 504	142, 235	139, 895	153, 335	161, 369	159, 733	153, 545	137, 483	155, 815
E. North Central	288, 627	354, 959	381, 789	386, 751	417, 523	420, 898	431, 295	424, 827	402, 240	431, 797
Minn	120, 297	154, 268	170, 463	199, 926	229, 474	245, 669	268, 437	274, 860	271, 345	282, 884
Iowa	84, 290	106, 516	129, 778	141, 407	159, 378	156, 361	168, 827	177, 224	196, 068	214, 562
Mo	35, 228	42, 422	46, 565	51, 818	56, 801	55, 953	66, 861	62, 549	69, 201	82, 505
N. Dak	13, 419	16, 177	21, 675	23, 355	28, 515	31, 500	34, 898	32, 462	30, 889	41, 889
S. Dak	14, 071	18, 886	21, 146	27, 447	24, 643	29, 193	29, 814	32, 843	34, 853	40, 361
Nebr	56, 661	66, 653	74, 809	76, 748	81, 423	83, 930	90, 882	95, 004	96, 472	97, 110
Kans	32, 899	37, 000	40, 204	42, 674	46, 844	47, 768	50, 998	50, 667	55, 756	58, 967
W. North Central	356, 865	441, 922	504, 640	563, 375	627, 078	650, 374	710, 717	725, 609	754, 584	818, 278
Del	350	395	203	154	150	80	67	50	47	42
Md	440	620	542	382	500	339	266	229	223	172
D. C	503	577	475	10		461	52			
Va	2, 210	2, 833	3, 118	4, 231	4, 614	3, 842	4, 378	5, 881	6, 051	5, 882
W. Va	867	530	420	276	466	533	487	287	325	381
N. C	832	1, 263	1, 549	1, 718	1, 683	1, 556	1, 680	2, 032	1, 849	2, 189
S. C	16	19	165	537	527	429	364	432	392	496
Ga	7	85	979	1, 868	1, 826	1, 836	1, 982	3, 044	2, 224	2, 124
Fla		11	81	99	20	22	105	129	153	93
S. Atlantic	5, 225	6, 333	7, 532	9, 275	9, 786	9, 098	9, 381	12, 084	11, 264	11, 379
Ky	7, 875	10, 746	12, 010	12, 244	12, 942	14, 087	16, 975	19, 364	19, 822	20, 050
Tenn	5, 903	8, 707	9, 164	11, 463	12, 762	11, 286	11, 826	17, 190	15, 333	17, 929
Ala	398	742	917	831	839	1, 086	991	1, 237	991	2, 041
Miss	2, 626	4, 286	5, 778	5, 715	5, 648	4, 895	6, 896	7, 920	7, 241	7, 429
E. South Central	16, 802	24, 481	27, 869	30, 253	32, 191	31, 354	36, 688	45, 711	43, 387	47, 449
Ark	345	586	731	996	1, 259	1, 174	1, 325	1, 710	1, 115	2, 778
La	55	160	87	185	125	90	92	324	461	882
Okla	9, 596	10, 427	11, 142	14, 065	14, 421	15, 841	19, 664	23, 617	24, 277	25, 770
Tex	9, 125	11, 257	10, 179	10, 956	11, 997	10, 866	14, 594	24, 276	20, 599	26, 511
W. South Central	19, 121	22, 430	22, 139	26. 202	27, 802	27, 971	35, 675	49, 927	46, 452	55, 941
Wyo	875	1, 277	1, 403	1, 894	1, 941	1, 999	2, 289	2, 009	1, 831	2, 320
Colo	12, 979	15, 290	16, 410	18, 625	18, 130	18, 794	18, 255	20, 871	21, 614	21, 924
N. Mex	6	29	129	185	251	326	455	447	421	535
Idaho	4, 660	4, 935	7, 582	9, 883	13, 431	15, 101	18, 456	20, 918	20, 832	24, 017
Ariz	828	1, 358	623	600	2, 107	1, 034	1, 489	2, 150	2, 246	1, 922
Utah	3, 567	4, 549	5, 913	7, 500	8, 585	7, 034	8, 037	9, 909	9, 549	11, 068
Nev	2, 018	2, 388	2, 642	2, 361	2, 640	2, 593	2, 432	2, 187	2, 211	2, 231
Mont	5, 168	7, 439	7, 713	10, 667	13, 874	13, 968	15, 549	16, 759	16, 364	16, 684
Mountain	30, 101	37, 265	42, 415	51, 715	60, 959	60, 849	66, 962	75, 250	75, 068	80, 701
Wash	23, 751	23, 228	24, 239	26, 666	29, 331	25, 673	28, 914	29, 870	29, 452	30, 223
Oreg	14, 288	15, 289	17, 158	18, 128	20, 993	21, 575	22, 570	22, 831	20, 963	22, 413
Calif	61, 870	68, 810	69, 941	81, 943	75, 509	72, 371	71, 701	75, 227	72, 050	72, 635
Pacific	99, 909	107, 327	111, 338	126, 737	125, 833	119, 619	123, 185	127, 928	122, 465	125, 276
Total	863, 577	1, 054, 938	1, 153, 515	1, 242, 214	1, 356, 080	1, 361, 526	1, 451, 766	1, 496, 495	1, 487, 049	1, 597, 027

Bureau of Agricultural Economics. The compilations are made from reports of factories to the bureau.

TABLE 463.—*Creamery butter: Receipts, gross weight, at five markets, by months, specified years*

Market and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
New York:													
1928	18, 945	18, 474	20, 506	19, 264	22, 539	27, 412	26, 559	23, 722	21, 103	19, 702	17, 067	15, 300	250, 593
1929	19, 498	18, 873	20, 486	21, 895	26, 751	27, 936	29, 700	23, 854	20, 657	20, 983	17, 032	18, 095	265, 760
1930	20, 877	19, 579	21, 523	22, 868	26, 723	29, 898	27, 567	19, 519	19, 690	19, 431	17, 910	22, 485	268, 070
Chicago:													
1928	17, 052	15, 928	19, 232	17, 881	22, 649	29, 784	25, 654	21, 357	16, 418	15, 295	14, 036	15, 228	230, 514
1929	18, 158	16, 356	18, 758	19, 056	25, 935	30, 081	27, 119	22, 793	17, 130	16, 832	15, 766	16, 648	244, 632
1930	16, 837	16, 422	19, 877	20, 317	27, 434	29, 585	24, 689	18, 189	15, 979	15, 191	14, 349	14, 769	233, 633
Philadelphia:													
1928	6, 716	6, 343	6, 725	6, 429	7, 578	10, 077	8, 640	7, 735	6, 690	6, 404	5, 532	5, 626	84, 495
1929	6, 781	6, 158	7, 006	6, 745	8, 839	9, 491	8, 918	7, 570	6, 673	6, 309	6, 342	6, 554	87, 386
1930	6, 956	6, 144	6, 674	7, 119	8, 263	9, 183	8, 127	6, 127	5, 942	5, 649	5, 976	7, 602	83, 762
Boston:													
1928	5, 874	5, 619	5, 985	6, 768	8, 658	11, 454	12, 562	9, 389	6, 331	5, 501	4, 292	4, 891	87, 324
1929	6, 091	5, 259	5, 915	6, 656	9, 216	10, 787	11, 063	7, 812	5, 922	4, 652	4, 030	3, 780	81, 183
1930	4, 615	4, 266	5, 225	6, 257	8, 646	10, 899	9, 640	6, 524	4, 691	3, 790	3, 368	4, 534	72, 455
San Francisco:													
1928	1, 508	1, 433	1, 852	1, 816	2, 158	2, 591	2, 486	2, 328	1, 939	2, 005	1, 869	2, 047	24, 032
1929	1, 962	1, 911	1, 814	2, 529	3, 138	2, 885	2, 642	2, 074	1, 590	1, 470	1, 569	1, 571	25, 155
1930	1, 590	1, 555	1, 881	2, 566	3, 438	2, 769	2, 639	1, 975	1, 442	1, 467	1, 515	1, 901	24, 738
Total:													
1921	30, 779	28, 935	35, 154	39, 088	59, 563	78, 449	61, 464	62, 734	50, 216	45, 350	36, 421	37, 257	565, 410
1922	41, 775	39, 041	45, 101	40, 716	67, 063	92, 632	76, 918	60, 172	45, 577	40, 595	37, 372	38, 401	625, 363
1923	47, 843	39, 877	48, 955	47, 947	64, 328	89, 976	75, 336	56, 243	49, 307	45, 393	39, 759	41, 460	646, 424
1924	44, 476	47, 756	52, 328	51, 690	67, 572	91, 742	92, 036	67, 959	56, 247	49, 760	35, 868	39, 471	696, 905
1925	44, 825	41, 785	48, 351	50, 035	67, 454	88, 024	82, 918	68, 341	53, 303	51, 599	42, 099	42, 993	681, 727
1926	46, 809	46, 809	54, 646	53, 990	64, 653	89, 993	81, 053	59, 849	52, 985	45, 280	40, 588	42, 825	679, 480
1927	44, 756	45, 502	53, 633	57, 298	75, 535	89, 773	79, 670	68, 055	50, 055	45, 425	39, 895	39, 978	689, 575
1928	50, 095	47, 797	54, 300	52, 158	63, 582	81, 318	75, 901	64, 531	52, 481	48, 907	42, 796	43, 092	676, 958
1929	52, 490	48, 557	53, 979	56, 881	73, 879	81, 180	79, 442	64, 103	51, 972	50, 246	44, 739	46, 648	704, 116
1930	50, 875	47, 966	55, 180	59, 127	74, 504	82, 334	72, 662	52, 334	47, 744	45, 528	43, 118	51, 291	682, 663

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

TABLE 464.—*Creamery butter: Production reported by factories, United States, 1920–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lsb.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1920	49, 044	46, 355	56, 303	60, 622	86, 845	114, 695	110, 844	90, 669	77, 106	65, 129	53, 570	52, 395	863, 577
1921	58, 906	56, 556	67, 677	82, 763	119, 077	130, 633	111, 898	111, 638	89, 932	84, 374	70, 024	71, 460	1, 054, 933
1922	73, 505	67, 405	79, 532	86, 623	132, 351	150, 034	135, 231	114, 160	92, 359	83, 070	68, 628	70, 617	1, 153, 515
1923	83, 688	74, 134	88, 311	100, 547	134, 350	158, 371	138, 278	120, 802	102, 273	89, 297	74, 909	77, 254	1, 242, 214
1924	87, 468	86, 731	95, 760	106, 012	139, 954	161, 992	164, 443	137, 836	115, 102	100, 536	77, 282	82, 964	1, 356, 080
1925	87, 121	80, 218	92, 302	107, 023	145, 478	164, 253	158, 920	136, 738	108, 325	104, 520	85, 492	91, 136	1, 361, 526
1926	97, 893	94, 222	112, 432	121, 049	155, 912	178, 276	159, 554	133, 294	116, 732	103, 068	88, 481	90, 853	1, 451, 766
1927	97, 965	95, 522	111, 451	126, 415	168, 808	188, 792	170, 484	146, 808	113, 546	102, 399	86, 058	88, 247	1, 496, 495
1928	101, 045	99, 394	111, 777	118, 849	156, 294	181, 037	167, 601	145, 430	119, 499	105, 894	87, 745	92, 484	1, 487, 049
1929	103, 519	99, 963	114, 404	133, 684	174, 341	192, 869	185, 317	152, 192	123, 582	118, 116	97, 186	101, 854	1, 597, 027

Bureau of Agricultural Economics.

TABLE 465.—*Creamery butter:* [1] *Cold-storage holdings, United States, 1921–1930*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1921	58, 682	41, 486	27, 103	14, 732	7, 712	21, 682	61, 991	82, 838	92, 292	90, 116	77, 983	65, 129
1922	48, 412	35, 047	22, 582	9, 113	3, 830	13, 202	67, 410	103, 151	112, 039	96, 680	73, 857	47, 773
1923	26, 819	16, 122	8, 910	4, 824	3, 248	10, 112	62, 768	101, 774	102, 731	96, 117	76, 472	51, 508
1924	30, 299	15, 246	9, 847	7, 842	8, 913	22, 348	74, 184	134, 118	156, 440	153, 494	135, 018	100, 832
1925	65, 694	45, 748	28, 789	10, 875	3, 739	13, 036	63, 687	109, 075	128, 403	114, 172	94, 916	74, 754
1926	52, 785	39, 381	26, 313	17, 392	17, 527	30, 561	86, 897	131, 152	138, 151	125, 342	100, 871	64, 381
1927	34, 347	17, 952	7, 952	3, 044	3, 436	25, 404	89, 996	145, 147	163, 701	147, 396	118, 679	83, 224
1928	46, 289	28, 273	14, 404	5, 716	5, 109	15, 952	69, 750	120, 437	136, 175	128, 071	105, 811	70, 985
1929	43, 783	24, 747	11, 910	5, 532	5, 883	28, 369	91, 962	151, 621	168, 952	158, 541	138, 405	111, 650
1930	81, 935	60, 230	46, 530	30, 556	22, 957	50, 378	106, 522	145, 061	143, 089	131, 489	109, 646	88, 012

Bureau of Agricultural Economics. Compiled from reports made by cold-storage establishments.

[1] Quantities given are net weights.

TABLE 466.—*Butter: Receipts at five markets, gross weight, by State of origin, 1923–1930*

NEW YORK

State of origin	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Vermont	46		58	22	52	70	1	1
Massachusetts	259	647	345	204	223	66	15	87
New York	6, 130	8, 185	6, 974	6, 177	5, 385	5. 978	5, 097	7, 119
New Jersey	129		22	466	256	93	123	1
Pennsylvania	1, 279	988	525	1, 176	1, 025	1, 074	1, 923	1, 982
Ohio	9, 834	7, 350	7, 121	6, 674	7, 565	7, 498	6, 217	6, 925
Indiana	5, 222	3, 788	5, 958	5, 209	5, 417	5, 150	4. 890	4, 799
Illinois	33, 830	35, 039	39, 440	40, 037	37, 954	35, 816	35. 738	34, 307
Michigan	7, 075	11, 265	15, 498	13, 669	13, 566	15, 227	7, 555	8, 802
Wisconsin	11, 771	13, 730	16, 903	17, 792	17, 615	15, 459	15, 839	13, 917
Minnesota	84, 944	74, 166	57, 206	57, 038	57, 081	44, 654	56, 333	65, 883
Iowa	48, 440	57. 781	56, 833	62, 093	66, 935	68, 676	78. 347	74, 630
Missouri	4, 649	3, 930	5, 396	6, 045	6, 540	6, 182	6, 573	4, 345
North Dakota	134	397	193	109	573	2, 397	2, 052	2, 514
South Dakota	260	270	279	1, 218	1, 129	1, 290	1, 503	1, 151
Nebraska	20, 359	24, 811	25, 088	27, 157	28, 457	28, 138	26, 803	26, 825
Kansas	1, 294	1, 064	847	2, 065	3, 808	4, 797	6, 520	7, 512
Maryland	151	132	276	104	131	283	196	240
Virginia	417	684	432	417	473	535	467	244
North Carolina	358	198	193	155	340	415	429	215
Georgia	98	97	178	52	38	86	39	137
Kentucky	517	954	463	710	978	884	617	573
Tennessee	1, 132	859	1, 034	1, 881	2, 369	2, 305	2, 906	2, 465
Alabama	234	70	138	171	220	370	154	159
Mississippi	142		203	663	1, 251	812	1, 070	623
Oklahoma	261		327	535	363	502	1, 302	771
Montana		465	37	19	288	296	278	337
Washington	194		27	224	310	26	27	29
California	288	87	102	1	161	218	1	82
Other States	686	852	181	513	730	1, 222	2, 743	1, 348
Canada	3, 631	950	1, 850	146	89	74	2	47
Total	243, 764	248, 759	244, 127	252, 742	261, 322	250, 593	265, 760	268, 070

CHICAGO

State of origin	1923	1924	1925	1926	1927	1928	1929	1930
New York	25	153	69	35	31	275	35	107
Pennsylvania	36	103	55	43	2	15	56	8
Ohio	425	360	619	417	194	128	78	251
Indiana	1, 109	1, 102	805	867	749	943	1, 098	1, 217
Illinois	7, 392	8, 870	5, 819	6, 632	8, 057	6, 371	8, 406	15, 594
Michigan	1, 966	1, 761	1, 474	1, 297	1, 024	923	854	576
Wisconsin	70, 588	79, 928	75, 941	72, 200	64, 611	58, 108	65, 356	68, 047
Minnesota	39, 611	46, 767	54, 859	43, 569	48, 057	50, 230	54, 043	46, 380
Iowa	42, 108	46, 896	46, 150	41, 092	39, 347	39, 948	44, 152	39, 606
Missouri	11, 188	11, 975	9, 678	10, 411	13, 484	11, 508	13, 020	12, 487
North Dakota	3, 418	6, 301	8, 511	6, 114	4, 181	2, 919	3, 287	2, 384
South Dakota	14, 249	15, 971	18, 151	16, 402	16, 513	18, 270	16, 187	13, 496
Nebraska	17, 433	20, 054	19, 361	22, 505	17, 090	19, 498	17, 450	16, 225
Kansas	10, 300	11, 098	7, 864	8, 036	9, 989	12, 981	11, 185	9, 928
Kentucky	871	560	539	957	1, 888	1, 894	2, 067	1, 353
Tennessee	112	35	137	126	438	113	166	75
Mississippi	144	198	66	44	31	49	239	143
Oklahoma	1, 894	2, 144	2, 735	4, 392	4, 510	2, 329	3, 175	3, 104
Texas	216	102	78	212	3, 680	2, 322	2, 325	1, 483
Montana	643	1, 077	343	107	194	165	235	159
Idaho	233	202		64		7	8	27
Colorado	1, 239	1, 829	430	828	678	1, 315	977	780
Other States	477	597	154	196	452	203	233	208
Total [1]	225, 892	258, 083	254, 308	236, 546	235, 200	230, 514	244, 632	233, 638

PHILADELPHIA

State of origin	1923	1924	1925	1926	1927	1928	1929	1930
New York	5, 673	1, 926	2, 221	1, 262	596	690	529	694
Pennsylvania	2, 571	2, 297	1, 735	1, 268	1, 097	731	612	626
Ohio	2, 699	3, 437	3, 224	3, 505	3, 162	2, 665	1, 934	1, 854
Indiana	3, 757	2, 393	1, 688	1, 848	1, 736	1, 502	1, 523	1, 647
Illinois	11, 753	10, 874	11, 156	7, 766	4, 807	3, 811	4, 023	4, 652
Michigan	1, 812	3, 446	6, 415	3, 418	1, 835	1, 356	568	1, 342
Wisconsin	4, 119	4, 616	2, 963	4, 305	6, 313	3, 307	4, 585	5, 395
Minnesota	27, 194	34, 753	32, 168	40, 986	45, 478	54, 427	54, 499	52, 743

TABLE 466.—*Butter: Receipts at five markets, gross weight, by State of origin, 1923–1930*—Continued

PHILADELPHIA—Continued

State of origin	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Iowa	1,314	2,783	2,313	4,288	5,237	4,808	6,446	6,220
Missouri	942	1,677	687	1,490	1,444	1,921	2,385	1,767
South Dakota	11	110	76	158	263	418	582	215
Nebraska	1,757	2,409	3,510	4,957	4,341	4,271	5,038	2,824
Kansas	223	320	628	127	370	384	135	70
Delaware	71	21	189	1	6	1	9	14
Maryland	1,057	137	138	242	205	98	85	72
Virginia	1,247	1,638	1,196	1,027	935	881	1,289	665
West Virginia	160	145	146	197	277	225	53	65
North Carolina	14	7	26	87	33	5	96	148
Kentucky	119	187	57	221	313	212	130	111
Tennessee	915	1,979	722	1,101	1,969	1,742	2,360	1,967
Mississippi	401	311	115	276	493	695	214	268
Other States	537	875	568	815	817	345	291	413
Total [1]	68,598	76,731	72,064	79,345	81,727	84,495	87,386	83,762

BOSTON

State of origin	1923	1924	1925	1926	1927	1928	1929	1930
Maine	87	196	192	116	167	86	17	21
New Hampshire	263	143	19	22	94	14	3	2
Vermont	5,854	5,923	4,071	3,075	2,318	1,974	781	185
Massachusetts	702	723	989	735	346	168	15	3
New York	5,578	5,468	5,769	3,327	2,607	1,626	1,380	1,208
Pennsylvania	188	26	143	119	240	95	192	81
Ohio	3,064	3,282	2,661	2,046	2,751	2,879	3,214	2,942
Indiana	2,722	2,436	1,434	1,122	1,576	1,808	3,495	2,842
Illinois	33,517	25,384	13,555	11,766	13,557	12,251	11,893	12,065
Michigan	1,555	2,394	1,867	1,928	1,675	1,787	703	993
Wisconsin	1,813	1,983	2,463	3,101	2,238	2,057	1,679	3,292
Minnesota	15,880	22,744	26,975	30,948	30,830	33,652	28,908	29,119
Iowa	3,023	3,361	4,360	4,616	3,969	4,261	4,257	4,397
Missouri	646	1,404	3,170	2,940	3,151	3,989	3,221	2,408
North Dakota	1,545	1,230	2,167	2,479	1,871	1,227	2,247	880
South Dakota	1,891	2,450	3,070	3,609	3,526	2,985	2,851	1,911
Nebraska	3,274	6,378	8,086	8,860	10,335	12,159	12,315	7,438
Kansas	402	507	1,048	1,705	1,532	1,801	1,268	796
Kentucky	72	91	46	30	228	298	580	222
Oklahoma	166	288	151	463	664	575	825	540
Montana	49	220	39	24	183	14	29	237
Other States	231	261	201	211	754	1,616	1,310	873
Total [1]	82,659	86,921	82,476	83,243	84,617	87,324	81,183	72,455

SAN FRANCISCO

State of origin	1923	1924	1925	1926	1927	1928	1929	1930
Nebraska	25	47	349	55	77	33	81	87
Montana	361	700	1,895	2,331	2,173	2,150	1,222	2,018
Idaho	502	490	1,043	1,191	1,722	1,255	1,361	1,223
Colorado	30	21	545	192	406	260	159	93
Utah	179	158	98	95	223	384	134	35
Nevada	293	258	252	63	113	74	41	184
Washington	682	606	469	327	300	182	231	495
Oregon	1,177	948	1,195	2,306	2,253	1,796	2,748	2,489
California	21,805	22,984	21,587	20,701	18,976	17,732	19,070	18,110
Other States	141	199	993	343	466	166	108	4
Total [1]	25,511	26,411	28,752	27,604	26,709	24,032	25,155	24,738

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

[1] Totals include receipts from Canada as follows: Chicago, 215,000 pounds in 1923, 470,000 pounds in 1925; Philadelphia, 252,000 pounds in 1923, 391,000 pounds in 1924, and 173,000 pounds in 1925; Boston, 137,000 pounds in 1923, 29,000 pounds in 1924, 1,000 pounds in 1926, 5,000 pounds in 1927, 2,000 pounds in 1928; San Francisco, 316,000 pounds in 1923 and 326,000 pounds in 1925.

TABLE 467.—*Butter: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year									
	Average, 1909–1913		1926		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Denmark	6,241	195,530	2,816	292,115	1,826	315,721	1,621	325,710	1,434	350,616
New Zealand	47	38,761	16	130,820	0	163,020	0	162,352	1	185,226
Australia	46	77,859	[1] 3,726	83,016	[1] 10,935	75,089	[1] 2,561	112,813	[1] 4	102,608
Netherlands	4,987	75,133	3,347	100,428	4,042	105,714	5,123	103,485	4,469	104,323
Argentina	113	6,934	15	64,234	3	46,808	7	44,182	[1] 2	37,547
Irish Free State	(2)	(2)	6,501	56,099	4,836	65,576	5,879	62,623	4,478	62,774
Russia	2,202	150,294	[1] 263	59,410	[1] 428	71,747	---------	71,888	---------	55,933
Finland	2,370	26,337	196	29,127	2	33,238	3	29,488	[1] 3	36,610
Canada	3,388	3,973	9,152	9,814	11,209	2,696	16,802	1,995	35,928	1,400
Sweden	330	45,870	79	33,353	63	40,707	93	38,679	24	54,960
Latvia	(2)	(2)	[1] 32	22,344	[1] 28	23,724	[1] 28	28,673	[1] 47	32,621
Estonia	(2)	(2)	0	19,161	0	21,839	31	24,741	1	27,247
Italy	972	7,870	153	5,679	2,085	2,805	3,565	1,779	1,937	1,941
Yugoslavia	(2)	(2)	7	322	1	769	0	482	0	635
Spain	939	259	309	408	337	303	466	170	[1] 409	[1] 177
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	455,489	1,179	626,325	1,688	625,144	1,703	666,231	1,395	702,749	1,096
Germany	111,441	498	215,584	264	238,683	190	279,000	281	296,226	337
France	13,713	40,769	1,499	11,040	10,854	21,039	5,217	22,227	9,653	16,713
Belgium	14,024	3,125	5,013	1,899	2,559	2,957	2,917	3,712	9,559	2,877
Switzerland	11,106	44	17,818	131	18,727	159	18,061	150	16,650	158
United States	1,647	4,125	8,029	5,483	8,460	4,343	4,659	3,898	2,773	3,724
Dutch East Indies	4,152	0	10,115	0	9,170	0	11,086	0	11,098	0
Greece	206	8	1,009	0	1,625	0	1,172	0	1,537	0
Czechoslovakia	(2)	(2)	1,160	334	1,683	369	990	1,296	836	---------
Norway	976	3,137	2,369	338	2,511	25	1,532	82	1,352	1,191
Austria	[3] 6,281	[3] 4,267	4,648	583	4,230	440	1,785	1,094	[1] 1,088	[1] 2,211
Cuba	1,459	0	2,169	0	1,878	0	1,204	3	[1] 1,200	---------
Egypt	2,350	[4] 166	2,839	44	2,552	85	1,774	51	2,162	28
China	[5] 1,677	0	1,762	0	1,530	0	1,945	0	1,372	0
Peru	462	20	1,844	6	1,441	9	2,116	2	1,484	2
Algeria	1,946	9	1,507	53	[1] 2,124	[1] 48	[1] 2,496	[1] 41	[1] 2,317	[1] 64
Philippine Islands	1,665	0	1,188	0	1,072	0	1,412	0	1,338	0
Trinidad and Tobago	847	0	1,086	0	1,344	0	823	0	[1] 1,530	0
Union of South Africa	3,913	26	1,847	303	2,920	334	3,921	393	1,604	2,337
Total, 34 countries	654,989	686,193	934,423	928,496	974,302	1,001,457	1,044,520	1,043,685	1,115,265	1,086,071

Bureau of Agricultural Economics. Official sources, except where otherwise noted. Butter includes all butter made from milk, melted and renovated butter, but does not include margarine, cocoa butter, or ghee.

* Preliminary.
[1] International Yearbook of Agricultural Statistics.
[2] Figures for pre-war years are included in the countries of the pre-war boundaries.
[3] Average for Austria-Hungary.
[4] 2-year average.
[5] 4-year average.

TABLE 468.—*Butterfat: Estimated average price per pound received by producers, United States, 1921–1930*

Year beginning May—	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	Weighted average
	Cts.	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
1921–22	29.7	27.6	31.6	36.8	36.2	40.0	40.6	39.9	33.4	34.0	34.5	33.4	34.0
1922–23	33.4	33.9	34.8	32.8	35.5	39.2	44.2	50.3	47.0	44.9	44.9	46.0	39.3
1923–24	40.3	36.9	36.7	38.7	42.2	44.1	47.8	49.2	50.6	48.5	46.4	40.8	42.4
1924–25	37.6	37.1	37.8	35.8	36.6	36.6	37.0	41.1	40.6	37.9	41.5	40.5	38.1
1925–26	40.3	39.9	40.5	41.3	42.6	47.1	47.8	47.6	45.2	43.1	42.9	40.4	42.6
1926–27	39.1	39.3	38.6	38.6	40.5	42.4	44.8	47.9	46.9	46.8	48.0	47.1	42.5
1927–28	43.6	40.8	40.3	39.4	41.6	44.4	45.8	47.8	48.5	46.0	46.5	45.4	43.6
1928–29	44.4	43.5	43.3	44.3	46.5	47.0	47.6	49.2	47.6	47.8	48.3	46.5	45.8
1929–30	45.4	43.6	43.4	43.3	44.6	45.6	43.5	41.9	36.7	35.4	34.9	37.3	41.8
1930–31	36.5	31.6	31.6	35.2	37.7	37.0	35.3	30.6	------	------	------	------	--------

Bureau of Agricultural Economics. Quotations cover butterfat for all uses. Based on reports of special price reporters. Monthly prices weighted by number of milk cows Jan. 1, by States; yearly price obtained by weighting monthly prices by production of creamery butter.

TABLE 469.—*Butter, 92-score creamery: Average wholesale price, at five leading markets, by months, specified years*

Market and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
New York:	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	33	30	33	31	28	28	28	29	30	30	31	30	30
1911	26	26	24	21	22	23	25	26	27	30	34	37	27
1912	39	32	31	33	30	27	27	27	30	31	34	37	32
1913	35	36	37	35	29	28	27	28	32	31	34	36	32
1914	33	29	28	25	26	27	28	30	31	32	35	34	30
1915	34	32	30	31	29	28	27	26	27	29	31	35	30
1916	33	34	37	36	31	30	29	31	34	35	39	40	34
1917	40	44	42	44	40	39	39	41	44	45	46	50	43
1918	52	50	44	42	42	44	45	46	56	58	63	69	51
1919	62	52	62	64	58	52	53	55	59	68	71	72	61
1920	65	66	67	71	61	57	57	55	59	60	63	55	61
1921	52	47	48	46	32	33	40	43	43	47	45	44	43
1922	37	37	38	38	38	37	36	35	41	46	51	54	41
1923	52	50	49	46	42	39	39	44	46	48	53	55	47
1924	53	50	47	38	39	41	40	38	38	39	43	45	43
1925	40	41	48	45	43	42	43	43	48	51	51	49	45
1926	45	45	43	39	41	41	40	42	45	47	51	55	44
1927	49	52	50	50	43	43	42	42	46	48	50	52	47
1928	49	47	49	45	45	44	45	47	49	48	51	50	47
1929	48	50	48	45	44	44	42	43	46	46	43	41	45
1930	37	36	37	39	35	33	35	39	40	40	36	32	37
Chicago:													
1927	48	50	49	48	41	40	40	41	45	46	48	51	46
1928	47	46	48	44	43	43	44	46	47	46	49	49	46
1929	47	49	48	44	42	42	41	42	45	44	41	39	44
1930	35	35	37	37	34	32	35	38	38	38	34	31	35
San Francisco:													
1927	47	48	45	42	41	42	42	44	47	48	49	48	45
1928	46	45	43	40	42	43	46	48	50	51	49	50	46
1929	46	47	45	43	45	45	45	46	49	48	48	42	46
1930	36	38	38	39	37	34	34	37	39	37	34	33	36
Philadelphia:													
1927	50	52	51	51	44	43	43	43	47	49	51	53	48
1928	50	48	50	46	46	45	46	48	50	49	52	51	48
1929	49	51	49	46	45	45	43	44	47	47	44	42	46
1930	38	36	38	40	36	34	36	40	41	41	37	33	38
Boston:													
1927	50	52	51	51	44	43	42	42	46	48	48	50	47
1928	49	47	50	46	45	44	45	47	49	48	50	50	48
1929	48	50	49	46	44	44	43	44	46	46	43	41	45
1930	37	36	38	39	35	33	36	39	40	40	36	33	37

Bureau of Agricultural Economics. Compiled from Urner-Barry reports, 1910–1917 (New York), average of daily range; subsequently from reports of bureau representatives in the markets. Earlier data available in 1925 Yearbook, p. 1094, Table 501, and 1927 Yearbook, p. 1082.

TABLE 470.—*Butter, creamery: Average wholesale prices per pound, all scores, by months, New York and Chicago, 1930*

NEW YORK

Month	93	92	91	90	89	88	87	86	Centralized car lots		
									90	89	88
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
January	37.42	36.63	36.03	35.19	34.10	32.60	31.62				
February	36.44	35.70	35.22	34.67	33.93	32.83	32.00				
March	37.98	37.27	36.71	36.24	35.43	34.36	33.46				
April	39.25	38.53	38.08	37.70	36.82	35.46	34.46				
May	35.60	34.85	34.37	33.82	32.87	31.47	30.50				
June	33.74	32.93	32.42	31.84	30.96	29.94	29.12				
July	36.08	35.24	34.59	33.89	33.06	32.27	31.52				
August	39.86	38.92	38.40	37.74	36.83	35.96	35.13				
September	40.67	39.77	39.25	38.35	37.28	36.22	35.40				
October	40.98	39.98	38.85	36.46	35.29	33.73	32.98				
November	37.09	36.09	34.74	33.15	31.89	30.20	29.24				
December	33.18	32.18	31.62	30.43	29.13	28.15	27.19				
Average	37.36	36.51	35.86	34.96	33.97	32.77	31.89				

CHICAGO

Month	93	92	91	90	89	88	87	86	Centralized car lots 90	Centralized car lots 89	Centralized car lots 88
January	35.84	35.10	34.44	33.83	33.08	31.87	30.62	30.02	35.00	33.60	31.58
February	36.05	35.30	34.66	34.14	33.45	32.57	31.68	31.18	35.30	34.33	32.59
March	37.98	37.25	36.68	36.20	35.15	33.04	31.58	30.73	37.20	36.12	32.91
April	37.98	37.23	36.75	36.24	35.39	34.17	32.85	31.50	37.26	36.36	34.01
May	34.45	33.72	32.77	32.12	31.25	29.88	28.96	28.15	33.72	32.23	29.98
June	32.84	32.09	30.81	29.96	29.14	28.28	27.36	26.72	31.77	30.58	28.36
July	35.34	34.59	33.26	32.45	31.53	30.55	29.54	29.00	34.45	33.04	31.26
August	38.73	37.98	37.02	36.52	35.60	34.52	33.65	32.73	37.95	36.83	34.79
September	38.91	38.16	37.26	36.74	35.85	34.43	33.70	32.90	37.80	36.13	34.16
October	38.50	37.75	36.75	35.69	33.42	31.77	30.48	29.56	35.54	33.31	31.77
November	34.45	33.70	32.82	31.64	30.27	29.02	27.93	27.41	31.59	29.88	28.61
December	31.26	30.51	29.63	28.94	27.87	26.92	25.96	25.44	29.48	27.61	26.58
Average	36.03	35.28	34.40	33.71	32.67	31.42	30.36	29.61	34.75	33.34	31.38

Bureau of Agricultural Economics.

TABLE 471.—*Butter: Average export price per pound in Copenhagen, Denmark, 1914–1930*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1914	26.1	25.6	25.6	24.1	23.4	23.9	25.9	24.4	25.0	27.8	27.3	29.9	25.8
1915	29.6	26.9	28.0	27.6	29.6	29.1	31.0	32.6	34.7	41.6	40.5	36.6	32.3
1916	33.8	35.4	37.8	36.8	36.3	35.7	36.7	40.1	42.1	42.6	44.3	44.9	38.9
1917	45.3	39.6	38.4	37.2	38.6	40.5	45.0	49.7	54.6	65.4	68.4	65.5	49.0
1918	64.2	63.7	64.0	65.0	65.3	64.7	65.1	65.0	62.0	58.3	75.6	76.0	65.7
1919	75.8	73.8	72.4	71.1	58.2	50.8	48.4	46.5	54.7	53.8	59.5	52.1	59.8
1920	48.9	42.1	49.2	49.8	44.2	44.8	42.4	42.9	43.6	45.7	44.7	44.0	45.2
1921	42.4	39.3	40.4	43.9	33.5	32.4	38.3	41.1	36.4	38.3	39.9	31.8	38.1
1922	31.1	31.0	32.9	33.8	33.5	37.0	39.4	39.1	41.1	40.7	39.9	39.7	36.6
1923	40.5	41.3	41.0	34.5	29.5	29.3	30.7	34.7	40.3	38.9	39.4	41.4	36.8
1924	40.0	39.5	36.9	31.3	36.4	33.4	37.8	41.1	42.3	46.1	44.2	46.8	39.6
1925	42.0	45.4	46.1	40.6	36.9	39.4	40.5	44.2	45.7	46.5	44.6	37.8	42.5
1926	36.5	40.2	38.8	36.2	34.8	35.7	35.4	36.1	36.6	36.3	34.9	37.1	36.6
1927	36.4	39.3	36.8	35.2	32.9	33.2	32.2	35.0	39.6	39.4	41.2	38.0	36.6
1928	35.4	37.5	40.0	36.8	35.4	34.9	36.4	38.0	40.2	39.5	40.6	42.4	38.1
1929	39.1	39.0	35.5	32.8	33.4	35.1	35.3	35.6	39.7	40.5	38.7	35.8	36.7
1930	32.0	35.3	31.7	27.4	26.3	27.7	30.3	29.2	29.9	30.1	27.2	27.3	29.5

Bureau of Agricultural Economics. Danish Butter Journal (Smor Tidende) official quotations. For earlier years, 1882–1913, see the United States Department of Agriculture Yearbook, 1923, p. 923.

Conversions from Danish quotations in ore per pound (1.1023 pounds) at par of exchange (100 ore=26.8 cents) to July, 1914; beginning July, 1914, to December, 1926, inclusive, from weekly quotations in kroner per 100 kg., at average monthly exchange rate as quoted by Federal Reserve Board. Beginning January, 1927, to date at par of exchange.

TABLE 472.—*Cheese, whole milk American Cheddar: Production in the United States, 1920–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1920	10, 457	11, 509	14, 954	18, 856	29, 832	41, 376	34, 313	26, 787	22, 935	20, 054	13, 308	10, 303	254, 684
1921	11, 889	12, 857	17, 678	23, 521	34, 556	36, 444	26, 977	27, 652	23, 612	21, 496	13, 426	11, 618	261, 726
1922	12, 837	13, 927	18, 774	21, 740	31, 349	36, 254	33, 265	29, 496	25, 581	25, 785	18, 382	15, 416	282, 806
1923	15, 092	15, 326	20, 184	24, 014	32, 942	41, 382	38, 288	31, 822	28, 648	25, 566	18, 236	16, 608	308, 108
1924	17, 718	18, 886	22, 955	24, 597	33, 657	43, 517	40, 716	33, 602	30, 539	26, 210	17, 252	15, 046	324, 695
1925	16, 834	17, 991	21, 598	26, 889	38, 012	45, 782	43, 706	37, 659	31, 548	28, 253	20, 349	18, 619	347, 240
1926	19, 519	19, 984	25, 216	29, 221	38, 598	46, 320	40, 164	33, 239	28, 809	23, 164	16, 386	15, 295	335, 915
1927	16, 660	17, 085	21, 318	24, 533	34, 704	41, 489	38, 195	31, 944	25, 783	23, 012	16, 717	16, 337	307, 777
1928	18, 010	19, 005	23, 451	28, 221	37, 324	45, 012	40, 072	34, 229	30, 342	25, 134	18, 013	16, 440	335, 253
1929	19, 925	19, 522	24, 059	30, 181	42, 483	51, 702	48, 007	37, 811	30, 824	25, 961	19, 655	20, 184	370, 314

Bureau of Agricultural Economics.

TABLE 473.—*Cheese, whole-milk American Cheddar: Production, United States, by States, 1920–1929*

State	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Vermont	1, 382	1, 380	954	1, 200	1, 755	1, 120	1, 114	629	603	713
Other New England States	3	79	-------	-------	34	6	128	96	147	75
New England	1, 385	1, 459	954	1, 200	1, 789	1, 126	1, 242	725	750	788
New York	30, 829	37, 970	47, 726	37, 448	36, 608	38, 401	31, 663	24, 931	31, 075	26, 072
New Jersey	130	-------	634	196	155	-------	-------	-------	-------	-------
Pennsylvania	2, 673	3, 208	2, 209	2, 497	1, 750	1, 349	1, 681	1, 750	2, 196	1, 240
Middle Atlantic	33, 632	41, 178	50, 569	40, 141	38, 513	39, 750	33, 344	26, 681	33, 271	27, 312
Ohio	659	654	195	128	366	253	269	303	936	1, 114
Indiana	42	117	62	78	306	198	234	701	4, 969	8, 903
Illinois	999	1, 751	2, 401	2, 875	2, 498	2, 444	2, 902	2, 836	4, 115	6, 016
Michigan	4, 032	5, 064	3, 657	4, 342	5, 867	5, 844	6, 827	5, 906	7, 724	8, 619
Wisconsin	188, 548	182, 777	193, 376	226, 916	235, 186	258, 684	248, 059	227, 447	221, 775	242, 269
East North Central	194, 280	190, 363	199, 691	234, 339	244, 223	267, 423	258, 291	237, 193	239, 519	266, 921
Minnesota	5, 502	5, 693	5, 291	7, 229	9, 790	8, 419	8, 984	7, 556	9, 163	10, 979
Iowa	545	313	344	361	530	501	383	410	661	991
Missouri	380	382	96	224	105	252	312	484	2, 377	4, 442
Others	31	141	190	186	354	477	912	1, 301	4, 973	6, 571
West North Central	6, 458	6, 529	5, 921	8, 000	10, 779	9, 649	10, 591	9, 751	17, 174	22, 983
South Atlantic	220	184	226	277	276	155	110	164	751	1, 365
Tennessee	26	50	71	284	398	321	172	154	650	2, 458
Others	-------	29	-------	51	-------	37	-------	15	3, 605	6, 841
East South Central	26	79	71	335	398	358	172	169	4, 255	9, 299
West South Central	-------	15	51	-------	37	-------	5	-------	1, 433	3, 329
Wyoming	1, 180	1, 543	3, 416	1, 791	1, 883	1, 923	2, 118	2, 067	2, 185	2, 231
Idaho	1, 722	2, 117	3, 368	5, 311	7, 343	7, 320	7, 986	7, 434	7, 718	7, 327
Utah	849	1, 027	3, 219	2, 139	2, 162	1, 753	1, 809	2, 205	2, 592	2, 794
Montana	233	113	259	641	792	1, 296	1, 484	1, 435	2, 347	1, 873
Others	231	529	187	318	701	482	650	1, 390	3, 101	3, 111
Mountain	4, 215	5, 329	10, 449	10, 200	12, 881	12, 774	14, 047	14, 531	17, 943	17, 336
Washington	1, 143	1, 910	2, 928	2, 762	2, 998	3, 076	3, 130	2, 924	4, 051	4, 456
Oregon	8, 282	8, 777	8, 720	7, 678	9, 951	9, 903	11, 517	11, 435	11, 051	12, 580
California	5, 043	5, 904	3, 226	3, 082	2, 850	3, 026	3, 466	4, 204	5, 052	3, 945
Pacific	14, 468	16, 591	14, 874	13, 522	15, 799	16, 005	18, 113	18, 563	20, 154	20, 981
Total	254, 684	261, 727	282, 806	308, 014	324, 695	347, 240	335, 915	307, 777	335, 253	370, 314

Bureau of Agricultural Economics. The compilations are made from reports of factories to the bureau.

TABLE 474.—*Cheese: Receipts, gross weight, at five markets, by months, specified years*

Market and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
New York:													
1928	3, 695	3, 403	3, 944	4, 017	4, 158	4, 865	4, 495	4, 326	4, 085	4, 476	3, 408	3, 400	48, 272
1929	3, 725	3, 854	4, 066	3, 095	4, 576	5, 218	5, 588	5, 074	4, 534	3, 858	3, 502	3, 821	50, 911
1930	4, 094	4, 212	3, 660	3, 977	4, 934	6, 247	4, 956	4, 368	4, 661	3, 881	3, 676	3, 499	52, 165
Chicago:													
1928	7, 713	7, 184	7, 401	7, 615	7, 626	9, 152	10, 792	9, 450	9, 108	8, 639	6, 930	5, 654	97, 264
1929	7, 262	7, 134	5, 511	5, 619	7, 972	8, 257	9, 048	8, 542	6, 641	6, 053	4, 585	4, 199	80, 823
1930	5, 378	4, 949	5, 066	5, 001	5, 586	5, 702	5, 980	5, 577	4, 906	4, 024	3, 491	3, 206	58, 866
Philadelphia:													
1928	1, 295	1, 261	1, 343	1, 312	1, 796	2, 092	2, 821	1, 752	2, 096	2, 405	1, 693	1, 173	21, 039
1929	1, 220	1, 198	1, 190	1, 602	1, 957	1, 616	2, 265	1, 786	2, 023	2, 105	1, 840	1, 171	19, 973
1930	1, 214	1, 295	1, 927	1, 461	1, 929	2, 268	2, 279	1, 709	2, 214	1, 790	1, 542	1, 539	21, 167
Boston:													
1928	898	1, 031	991	1, 113	1, 587	1, 884	1, 950	2, 048	1, 607	2, 154	1, 281	818	17, 362
1929	639	978	709	997	1, 232	1, 978	2, 363	1, 837	1, 108	1, 222	917	919	14, 899
1930	922	1, 189	1, 111	1, 220	1, 330	2, 097	1, 894	1, 764	1, 642	1, 542	1, 178	993	16, 882
San Francisco:													
1928	808	836	975	1, 082	1, 086	1, 223	1, 683	1, 152	1, 326	991	867	647	12, 676
1929	935	713	785	1, 018	1, 013	1, 337	1, 284	1, 366	983	1, 105	985	769	12, 293
1930	918	821	1, 140	1, 367	1, 694	1, 581	2, 326	1, 535	1, 087	988	896	766	15, 119
Total:													
1921	11, 488	11, 283	12, 758	13, 952	19, 361	21, 680	19, 324	15, 999	14, 923	16, 653	13, 228	10, 973	181, 622
1922	10, 734	11, 258	14, 789	15, 565	19, 146	22, 770	20, 211	19, 806	17, 463	18, 323	15, 699	14, 071	199, 835
1923	13, 063	12, 617	15, 354	16, 433	18, 963	25, 406	25, 764	21, 680	18, 619	21, 325	16, 557	13, 256	219, 037
1924	13, 899	16, 092	16, 540	16, 175	19, 030	22, 041	25, 143	19, 996	18, 855	17, 479	14, 884	14, 922	215, 056
1925	15, 202	12, 845	14, 898	15, 436	18, 529	24, 025	25, 825	24, 176	20, 520	21, 029	17, 059	14, 012	223, 556
1926	14, 853	13, 568	15, 055	15, 531	14, 972	21, 777	21, 973	20, 736	18, 784	18, 699	15, 954	15, 986	207, 888
1927	12, 707	14, 916	14, 956	16, 922	21, 301	22, 134	24, 134	22, 556	21, 522	18, 996	14, 278	13, 826	218, 248
1928	14, 409	13, 715	14, 654	15, 139	16, 253	19, 216	21, 741	18, 728	18, 222	18, 665	14, 179	11, 692	196, 613
1929	13, 781	13, 877	12, 261	12, 331	16, 750	18, 406	20, 548	18, 605	15, 289	14, 343	11, 829	10, 879	178, 899
1930	12, 526	12, 466	12, 904	13, 026	15, 473	17, 895	17, 435	14, 953	14, 510	12, 225	10, 783	10, 003	164, 199

Bureau of Agricultural Economics. Compiled from reports of bureaus representatives in the various markets. See 1927 Yearbook, p. 1084, for data for earlier years.

TABLE 475.—*Cheese, American, and all varieties:*[1] *Cold-storage holdings, United States, 1921–1930*[2]

AMERICAN

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1921	34, 115	25, 000	17, 477	14, 294	13, 466	17, 814	34, 948	41, 284	46, 635	45, 163	42, 969	34, 055
1922	27, 691	21, 430	15, 006	10, 745	10, 868	15, 481	33, 130	46, 580	53, 625	49, 473	40, 852	37, 291
1923	33, 617	26, 593	20, 693	14, 465	14, 077	17, 507	36, 834	55, 839	63, 960	62, 384	57, 927	55, 105
1924	49, 566	40, 506	35, 160	28, 294	26, 202	27, 172	45, 239	65, 864	76, 406	73, 153	67, 905	58, 705
1925	49, 187	41, 552	34, 647	27, 716	26, 147	29, 550	46, 468	66, 634	76, 512	78, 582	71, 913	66, 495
1926	58, 457	50, 339	42, 587	38, 041	35, 597	39, 346	54, 069	73, 681	81, 297	77, 646	72, 491	63, 881
1927	54, 596	46, 026	39, 382	35, 193	32, 487	35, 826	49, 999	67, 091	69, 749	65, 453	59, 035	53, 447
1928	47, 765	41, 793	36, 710	31, 887	30, 207	36, 716	53, 646	73, 088	83, 906	81, 833	82, 318	74, 325
1929	68, 075	57, 764	49, 546	45, 105	42, 032	47, 641	62, 737	79, 907	86, 558	84, 815	78, 058	71, 065
1930	63, 478	53, 672	47, 818	41, 922	39, 324	49, 172	70, 186	88, 749	87, 221	85, 076	78, 919	71, 132

ALL VARIETIES

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
1921	51, 169	40, 207	30, 456	24, 908	23, 940	28, 453	47, 617	56, 317	62, 903	62, 366	59, 505	49, 002
1922	41, 594	33, 001	25, 477	19, 339	18, 980	24, 070	43, 542	57, 763	66, 875	62, 923	53, 815	48, 620
1923	45, 234	37, 228	29, 516	21, 815	21, 192	26, 235	48, 728	70, 860	80, 663	78, 791	74, 302	72, 623
1924	67, 221	57, 232	50, 388	42, 413	40, 235	42, 644	61, 755	84, 073	95, 211	91, 282	88, 043	77, 594
1925	67, 558	58, 461	50, 117	40, 480	39, 037	42, 888	61, 992	83, 568	95, 472	97, 777	90, 866	84, 561
1926	76, 649	67, 531	58, 175	51, 285	47, 450	52, 167	68, 771	90, 053	98, 473	95, 385	89, 785	81, 084
1927	72, 055	62, 136	54, 072	47, 840	45, 616	50, 864	67, 216	87, 937	90, 204	85, 131	77, 603	70, 735
1928	64, 035	55, 862	48, 784	43, 303	41, 791	48, 990	68, 613	89, 708	101, 498	98, 339	97, 421	89, 970
1929	85, 730	74, 016	63, 968	58, 153	54, 618	61, 097	79, 724	98, 070	106, 009	102, 849	94, 879	86, 949
1930	80, 623	69, 223	61, 891	55, 343	53, 025	68, 127	90, 421	108, 899	107, 219	103, 691	96, 393	87, 171

Bureau of Agricultural Economics. Compiled from reports made by cold-storage establishments.

[1] Quantities given are net weight.

[2] The term "American cheese" is intended to cover only those varieties known as twins, flats, daisies, Cheddars, longhorns, and square prints. It does not, therefore, include all kinds of cheese made in America.

Table 476.—*Cheese: Gross receipts at five markets, by State of origin, 1921–1930*

NEW YORK

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Vermont	14	97	305	79	273	47	3	16	33	43
Massachusetts	420	189	228	235	248	244	189	64	365	93
New York	22,413	21,770	16,909	14,478	14,107	11,180	11,867	13,390	11,252	10,866
New Jersey	97	46	40	48	16	18	204	186	69	69
Pennsylvania	1,623	1,181	955	618	1,105	745	434	745	588	466
Ohio	773	632	321	136	374	363	587	646	678	617
Indiana	187	182	277	581	2,075	5,653	3,833	1,923	1,585	1,084
Illinois	7,061	6,997	8,535	8,382	7,211	7,406	7,231	5,132	4,497	6,145
Michigan	787	506	619	644	472	301	440	837	937	844
Wisconsin	17,044	16,100	19,758	16,339	18,978	17,587	19,258	23,002	27,068	28,835
Minnesota	112	494	249	352	118	551	279	179	188	329
Iowa	57	94	206	295	777	346	421	178	82	84
Missouri	131	315	170	48	98	158	287	123	7	13
Nebraska	144	23	4	240	48	76	150	42	52	45
Virginia	24	5	4	49	23	12	3	24	220	1
Other States	640	289	417	180	100	91	280	248	372	204
Canada	454	1,189	428	255	140	585	1,471	1,537	2,918	2,427
Total	51,981	50,109	49,425	42,959	46,163	45,363	46,937	48,272	50,911	52,165

BOSTON

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
Maine	35	17	38	5	4	114	143	147	1	(1)
New Hampshire	55	75	50	41	6	5	2	2	1	5
Vermont	1,444	471	623	736	432	413	124	47	34	113
Massachusetts	39	32	27	13	8	5	41	65	37	38
New York	5,868	6,527	7,402	5,209	4,546	4,328	2,831	3,787	2,847	2,349
Pennsylvania	132	136	183	181	206	152	197	56	10	60
Ohio	71	35	23	137	201	162	196	110	6	12
Indiana	36	66	28	1	47	60	170	388	161	382
Illinois	1,782	2,091	3,881	2,931	1,782	3,622	3,261	1,845	1,754	1,387
Michigan	31	296	191	74	198	184	200	422	322	132
Wisconsin	3,294	3,091	3,392	4,317	7,787	6,229	7,170	9,953	9,260	9,492
Other States	142	475	71	23	97	162	221	353	407	2,910
Canada	279	209	5	56	--------	1	32	187	59	2
Total	13,208	13,521	15,914	13,724	15,314	15,437	14,588	17,362	14,899	16,882

PHILADELPHIA

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
New York	7,068	4,660	4,538	3,655	3,627	2,630	2,462	2,201	2,145	2,231
Pennsylvania	2,041	517	245	240	84	63	41	4	57	91
Ohio	205	223	136	26	11	133	86	82	52	1
Indiana	100	95	142	95	201	122	115	110	137	34
Illinois	2,557	2,955	4,126	4,333	4,073	4,636	3,704	2,701	3,075	2,091
Michigan	45	115	131	199	111	188	634	499	539	655
Wisconsin	8,487	10,638	8,884	8,003	10,850	11,428	12,723	14,735	13,825	15,966
Minnesota	41	1	54	--------	68	184	416	343	23	34
Iowa	3	25	44	164	37	1	3	2	4	4
Other States	405	87	63	151	33	69	86	196	41	60
Canada	--------	8	(1)	(1)	--------	--------	126	166	75	--------
Total	20,952	19,324	18,363	16,866	19,095	19,454	20,396	21,039	19,973	21,167

CHICAGO

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
New York	221	2,391	2,429	1,667	1,282	2,218	3,489	4,246	4,652	2,857
New Jersey	--------	45	24	95	32	--------	41	445	780	319
Pennsylvania	163	308	289	158	115	112	532	479	230	60
Ohio	99	301	147	91	745	315	532	176	111	136
Indiana	16	22	66	50	49	93	43	255	296	396
Illinois	3,102	4,011	4,497	3,965	4,592	3,293	2,996	2,900	1,994	1,853
Michigan	1,687	1,415	729	1,241	118	238	550	137	192	246
Wisconsin	76,706	95,656	110,648	117,439	119,244	100,676	109,504	82,954	67,495	49,447
Minnesota	2,687	1,960	3,177	2,733	3,108	3,265	2,503	2,979	2,999	1,751
Iowa	287	810	705	620	606	457	263	296	278	98
Missouri	56	222	83	188	65	43	122	583	181	24
South Dakota	78	17	16	64	2	106	138	9	29	16

[1] Not over 500 pounds.

TABLE 476.—*Cheese: Gross receipts at five markets, by State of origin, 1921–1930*—Continued

CHICAGO—Continued

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Kansas	166	3	51	30	45	72	26	36	35	30
Texas	32	9	15	2	38	35	12	15	6	5
Montana	313	26	203	311	81	--------	66	--------	1	10
Colorado	27	104	16	34	192	42	31	58	197	22
California	113	57	--------	--------	9	94	3	45	56	37
Other States	96	117	304	963	426	786	1,040	1,084	685	683
Canada	--------	250	246	373	380	3,259	1,742	567	606	867
Total	85,849	107,724	123,645	130,024	131,129	115,104	123,633	97,264	80,823	58,866

SAN FRANCISCO

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
New York	388	314	249	310	307	529	596	572	734	784
Illinois	505	855	1,441	821	463	222	192	91	3	221
Wisconsin	1,064	1,353	1,979	2,216	1,987	2,694	2,198	1,820	1,136	759
Minnesota	--------	--------	63	152	154	94	24	--------	(1)	(1)
Montana	--------	56	338	5	64	79	1	160	3	1
Idaho	139	222	1,039	2,262	2,835	2,858	3,331	3,334	3,303	3,413
Colorado	176	322	222	256	323	294	241	225	179	165
Utah	24	10	17	76	164	387	199	30	59	28
Washington	145	108	112	58	120	50	91	17	17	13
Oregon	2,245	2,448	2,557	2,710	3,029	3,148	3,273	2,877	3,374	5,427
California	4,800	3,416	3,650	2,603	2,316	2,123	2,515	3,508	3,449	4,213
Other States	146	53	23	13	93	52	33	42	36	95
Total	9,632	9,157	11,690	11,482	11,855	12,530	12,694	12,676	12,293	15,119

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

[1] Not over 500 pounds.

TABLE 477.—*Cheese, No. 1 American, fresh single daisies: Average wholesale price per pound, New York, by months, 1924–1930*

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1924	24	24	23	20	19	20	20	21	21	21	21	22	21
1925	24	24	24	24	24	24	24	24	24	25	[1] 25	25	24
1926	26	25	23	21	21	21	22	22	23	24	25	26	23
1927	26	26	25	24	24	24	24	25	27	28	27	29	26
1928	------	[1] 25	25	24	24	26	26	26	27	26	25	25	[2] 25
1929	25	24	24	24	23	23	23	23	24	24	24	23	24
1930	21	21	21	21	20	18	18	19	20	19	19	18	20

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the market.

[1] Less than 10 quotations during month.
[2] Based on 11 months' quotations.

TABLE 478.—*Cheese: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year									
	Average 1909–1913		1926		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Notherlands	522	127, 379	1, 081	185, 706	1, 284	214, 565	1, 484	202, 999	1, 445	211, 234
New Zealand	3	55, 561	1	163, 693	7	167, 193	1	175, 534	6	199, 258
Canada	1, 054	167, 260	1, 219	134, 657	1, 721	110, 533	1, 779	114, 152	2, 104	92, 946
Italy	13, 308	60, 560	7, 920	72, 947	13, 123	70, 078	10, 206	80, 466	13, 975	72, 413
Switzerland	7, 150	70, 075	3, 456	61, 972	3, 638	75, 058	3, 396	62, 695	3, 437	69, 726
Denmark	1, 414	527	1, 427	15, 345	1, 102	11, 644	864	13, 417	649	14, 513
Australia	360	799	[1] 1, 859	[1] 4, 803	[1] 2, 097	[1] 4, 813	[1] 1, 007	[1] 9, 262	[1] 548	[1] 5, 131
Yugoslavia	([2])	([2])	342	4, 180	389	5, 826	325	4, 132	370	4, 937
Finland	478	2, 086	62	6, 364	34	6, 502	39	3. 634	[1] 43	4, 836
Czechoslovakia	([2])	([2])	1, 964	7, 732	2, 534	8, 463	2, 625	7, 922	3, 347	7, 053
Hungary	([2])	([2])	1, 617	1, 834	1, 733	2, 609	1, 782	1, 398	1, 543	1, 695
Bulgaria	[3] 52	[4] 5, 972	42	187	19	5, 790	15	1, 932	[1] 11	2, 636
Russia	3, 911	7, 011	[1] 130	[1] 72	[1] 133	[1] 1, 847	------	------	------	------
PRINCIPAL IMPORTING COUNTIRES										
United Kingdom	257, 407	950	333, 187	2, 994	325, 891	5, 363	333, 182	5, 852	331, 744	6, 388
Germany	48, 687	1, 967	141, 345	2, 320	158, 740	3, 160	135, 530	3, 664	146, 569	4, 919
United States	46, 346	5, 142	78, 417	3, 903	79, 796	3, 410	81, 403	2, 600	76, 382	2, 645
France	49, 056	26, 880	34, 673	31, 481	36, 856	25, 595	36, 694	35, 122	51, 079	40, 325
Belgium	31, 771	354	33, 187	1, 239	36, 538	1, 001	39. 148	914	46, 455	899
Austria	[5] 12,298	[5] 966	7, 665	1, 376	7, 553	1, 387	6, 401	2, 461	[1] 5, 345	[1] 2, 663
Algeria	6, 592	138	5, 464	234	6, 849	210	8, 821	185	8, 469	196
Egypt	8, 182	[6] 48	6, 842	79	6, 740	176	7, 085	155	6, 526	195
Spain	5, 032	53	7, 023	79	7, 576	73	8, 667	91	[1] 6, 970	[1] 67
Cuba	4, 520	7	4, 463	2	5, 210	3	4, 163	12	[1] 4, 484	0
Argentina	10, 447	[4] 6	3, 431	866	3, 228	1, 224	4, 344	764	[1] 4, 000	796
Irish Free State	([2])	([2])	2, 740	403	2, 414	212	2, 449	133	2, 409	124
Sweden	946	41	1, 375	656	1, 522	574	1, 501	145	1, 413	263
Dutch East Indies	757	0	1, 763	0	1, 997	0	1, 938	0	2, 347	0
Norway	663	377	1, 266	757	1, 452	894	1, 094	927	841	1, 347
British India	1, 314	0	1, 190	5	1, 332	4	1, 218	6	1, 257	7
Tunis	1, 382	19	1, 125	22	1, 314	14	1, 430	47	[1] 1, 683	[1] 13
Brazil	4, 178	[4] 1	1, 545	0	1, 395	0	1, 763	0	------	------
Union of South Africa	4, 991	3	420	290	537	431	734	298	669	404
Total, 32 countries	522, 821	534, 182	688, 241	706, 198	714, 754	728, 652	701, 088	730, 919	726, 120	748, 425

Bureau of Agricultural Economics. Official sources except where otherwise noted. All cheese made from milk, including cottage cheese.

* Preliminary.
[1] International Yearbook of Agricultural Statistics.
[2] Figures for pre-war years, are included in the countries of the pre-war boundaries.
[3] 3-year average.
[4] 4-year average.
[5] Average for Austria-Hungary.
[6] 1 year only.

TABLE 479.—*Oleomargarine: Production and apparent consumption in the United States, 1924–25 to 1929–30*

Year beginning July	Production			Stocks beginning of year	Exports	Stocks end of year	Apparent consumption	
	Colored	Uncolored	Total				Total	Per capita
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*Lbs.*
1924–25	11,280	204,123	215,403	2,607	887	2,720	214,403	1.87
1925–26	13,181	234,866	248,047	2,720	1,256	2,942	246,569	2.12
1926–27	14,502	242,655	257,157	2,942	942	3,299	255,858	2.17
1927–28	15,351	279,348	294,699	3,299	732	3,187	294,079	2.46
1928–29	16,306	316,816	333,122	3,187	633	4,191	331,485	2.74
1929–30	17,103	332,021	349,124	4,191	931	4,702	347,682	2.84

Bureau of Agricultural Economics. Production and stocks from reports of the Bureau of Internal Revenue. Exports from reports of the Bureau of Foreign and Domestic Commerce. See 1927 Yearbook, p. 1088, for data for earlier years.

TABLE 480.—*Oleomargarine: Materials used in manufacture, 1920–21 to 1929–30*

Material	Year beginning July—									
	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Oleo oil	49,676	40,980	46,645	52,265	44,102	47,418	48,741	45,477	47,185	45,322
Coconut oil	103,112	57,394	65,656	83,059	79,449	98,307	107,654	141,000	171,412	185,066
Cottonseed oil	18,533	15,420	18,757	20,640	20,966	25,608	23,372	24,801	28,173	30,214
Milk	79,716	53,939	59,835	69,090	61,924	72,662	73,700	83,115	94,752	97,753
Peanut oil	16,332	11,625	6,922	5,656	4,392	5,257	4,872	5,459	6,617	5,714
Salt	25,365	16,262	17,998	20,593	18,725	20,593	21,683	25,024	27,311	28,890
Oleo stearine	4,858	4,574	4,815	5,317	5,250	5,314	5,145	5,532	5,834	6,269
Neutral lard	29,268	27,057	29,568	32,210	25,674	25,172	24,872	25,036	24,189	19,632
Oleo stock	2,065	2,143	2,322	2,756	3,183	3,082	2,552	1,738	1,294	1,189
Butter	1,499	1,107	1,576	1,900	1,509	2,330	2,070	2,484	2,611	2,616
Corn oil	926			457	196	174	183	38		(1)
Soybean oil	461					1	33			619
Edible tallow	233			24	111	93	219	70	26	16
Mustard-seed oil	110			38	27	34	53	56	12	48
Coloring	26	11	11	26	38	41	18	19	47	21
Miscellaneous	9,776	3,417	2,918	432	688	1,374	918	1,220	1,474	1,279
Total	341,956	233,929	257,023	294,463	266,234	307,460	316,085	361,069	410,937	424,648

Bureau of Agricultural Economics. Compiled from annual reports of the Bureau of Internal Revenue.

[1] Not over 500 pounds.

TABLE 481.—*Oleomargarine, standard, uncolored: Average wholesale price per pound, Chicago, by months, 1921–1930*

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	24.9	23.6	22.2	20.5	19.8	18.5	18.9	20.5	20.5	20.5	20.1	19.5	20.8
1922	19.0	17.5	17.5	17.5	17.5	17.5	18.2	18.5	18.5	18.5	19.2	20.5	18.3
1923	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	21.0	21.5	22.2	22.5	20.9
1924	22.5	22.5	21.9	20.5	20.5	20.5	21.2	22.5	22.5	23.0	24.0	24.5	22.2
1925	24.5	24.5	24.5	24.5	23.9	23.5	23.7	24.5	24.5	24.5	24.5	24.5	24.3
1926	24.5	24.3	23.5	23.3	22.5	22.5	22.5	22.5	22.5	22.5	21.8	21.5	22.8
1927	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	23.9	24.5	23.5	23.5	22.3
1928	23.5	23.5	23.5	21.5	21.5	21.5	21.5	21.5	22.0	23.5	23.5	23.5	22.5
1929	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
1930	23.5	23.5	23.5	23.5	23.5	22.8	20.5	20.5	20.5	20.5	20.5	19.0	21.8

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics Wholesale Price Bulletins.

Table 482.—*Chickens: Estimated number and value on hand January 1, 1920–1930*

Geographic division and year	Chickens on hand Jan. 1		
	Number of fowls	Price per fowl	Total value
	Thousands	*Cents*	*1,000 dollars*
North Atlantic:			
1920 (census)	33,256	138.28	45,988
1921	33,588	133.72	44,914
1922	39,906	117.12	46,738
1923	42,899	112.56	48,287
1924	46,586	116.09	54,080
1925	44,077	118.16	52,046
1926	44,817	126.45	56,669
1927	46,164	125.12	57,760
1928	47,711	122.80	58,587
1929	46,240	129.27	59,776
1930	49,636	135.52	67,266
East North Central:			
1920 (census)	84,516	96.02	81,154
1921	80,260	88.05	70,669
1922	88,709	79.12	70,187
1923	95,467	73.36	70,035
1924	98,949	79.02	78,190
1925	91,289	85.33	77,901
1926	93,932	95.42	89,628
1927	98,775	96.30	95,125
1928	99,129	90.83	90,037
1929	96,634	98.36	95,054
1930	103,366	100.29	103,662
West North Central:			
1920 (census)	105,348	89.51	94,293
1921	108,559	81.45	88,421
1922	114,883	75.81	87,093
1923	121,206	64.89	78,651
1924	132,587	66.37	87,995
1925	124,475	68.39	85,123
1926	126,193	80.05	101,012
1927	129,947	83.94	109,076
1928	130,628	79.14	103,377
1929	129,693	84.88	110,087
1930	139,616	81.66	114,007
South Atlantic:			
1920 (census)	36,408	96.94	35,292
1921	37,492	86.96	32,603
1922	40,405	75.61	30,550
1923	41,132	77.55	31,898
1924	45,732	80.37	36,757
1925	42,271	81.95	34,641
South Atlantic—Con.			
1926	42,095	88.10	37,085
1927	45,023	89.02	40,081
1928	47,722	84.50	40,323
1929	42,583	86.96	37,030
1930	43,586	91.36	39,818
South Central:			
1920 (census)	74,011	84.82	62,777
1921	70,275	75.32	52,931
1922	80,631	66.24	53,410
1923	76,193	61.58	46,920
1924	88,492	61.77	54,662
1925	81,086	65.26	52,916
1926	81,155	71.29	57,858
1927	89,125	74.72	66,592
1928	93,801	70.45	66,085
1929	87,434	73.38	64,161
1930	90,418	77.56	70,124
Far Western:			
1920 (census)	25,999	115.41	30,005
1921	25,994	108.95	28,320
1922	31,973	100.29	32,066
1923	34,572	88.75	30,683
1924	36,842	81.65	30,081
1925	34,557	81.73	28,244
1926	36,035	93.38	33,648
1927	39,631	100.89	39,985
1928	44,373	91.11	40,429
1929	41,897	94.73	39,690
1930	42,835	98.78	42,312
United States:			
1920 (census)	359,537	97.21	349,509
1921	356,168	89.30	318,058
1922	396,507	80.77	320,259
1923	411,469	74.61	306,998
1924	449,188	76.09	341,765
1925	417,755	79.20	330,871
1926	424,227	88.61	375,900
1927	448,665	91.07	408,619
1928	463,364	86.07	398,838
1929	444,481	91.30	405,798
1930	469,457	93.13	437,190

Bureau of Agricultural Economics.

TABLE 483.—*Chickens: Estimated number and value per head on farms, January 1, 1924–1930*

State and division	Number chickens Jan. 1							Value per head						
	1924	1925	1926	1927	1928	1929	1930	1924	1925	1926	1927	1928	1929	1930
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Maine	2,127	1,957	1,957	1,898	2,020	1,908	2,051	125	125	132	132	136	140	155
New Hampshire	1,293	1,267	1,267	1,242	1,336	1,271	1,381	145	140	148	153	150	150	160
Vermont	1,054	970	970	999	1,040	978	1,095	122	122	130	132	130	130	140
Massachusetts	2,071	2,030	2,030	1,949	2,027	1,991	2,152	160	150	165	155	160	160	170
Rhode Island	361	361	361	383	412	391	416	165	160	170	160	160	157	175
Connecticut	1,752	1,699	1,784	1,820	1,961	2,059	2,221	145	145	155	150	155	155	165
New York	14,835	13,945	13,945	14,224	14,366	13,980	14,621	114	112	121	120	117	123	126
New Jersey	4,512	4,196	4,322	4,538	4,674	4,628	4,881	140	140	149	146	130	145	148
Pennsylvania	18,581	17,652	18,181	19,111	19,875	19,034	20,818	100	108	115	115	114	121	128
North Atlantic	46,586	44,077	44,817	46,164	47,711	46,240	49,636	116.09	118.16	126.45	125.12	122.80	129.27	135.52
Ohio	22,707	21,345	22,643	23,549	23,887	23,185	24,954	85	89	100	100	93	97	101
Indiana	19,462	17,710	17,356	18,310	17,821	17,331	18,735	75	82	94	95	89	95	97
Illinois	28,566	25,995	26,514	27,575	27,479	27,148	28,758	80	85	96	96	91	101	101
Michigan	14,083	12,956	13,605	14,422	15,143	14,503	15,597	81	90	96	98	92	103	105
Wisconsin	14,131	13,283	13,814	14,919	14,799	14,467	15,322	71	80	88	91	88	95	97
East North Central	98,949	91,289	93,932	98,775	99,129	96,634	103,366	79.02	85.33	95.42	96.30	90.83	98.36	100.29
Minnesota	17,433	16,736	17,087	17,276	16,789	17,411	18,627	60	70	77	80	73	79	80
Iowa	32,554	30,275	31,183	31,806	32,340	32,005	34,713	73	78	89	90	84	90	85
Missouri	31,984	28,786	29,937	31,733	31,733	30,603	33,121	72	70	81	85	85	88	86
North Dakota	5,508	5,233	5,442	5,263	5,158	5,322	5,669	54	58	70	71	70	77	70
South Dakota	8,405	7,985	8,065	8,226	8,449	8,472	9,087	65	62	73	82	74	83	74
Nebraska	14,203	13,635	13,090	13,613	13,787	13,471	14,803	62	58	74	80	75	84	78
Kansas	22,500	21,825	21,389	22,030	22,372	22,409	23,596	60	63	77	83	75	81	80
West North Central	132,587	124,475	126,193	129,947	130,628	129,693	139,616	66.37	68.39	80.05	83.94	79.14	84.88	81.66
North Central	231,536	215,764	220,125	228,722	229,757	226,327	242,982	71.78	75.56	86.61	89.28	84.18	91.59	89.58
Delaware	1,547	1,392	1,392	1,434	1,462	1,389	1,421	100	100	115	120	105	109	115
Maryland	4,804	4,324	4,454	4,721	4,762	4,511	4,611	93	95	113	112	100	104	112
Virginia	10,451	9,406	9,594	10,361	10,896	9,879	10,203	83	83	90	92	91	95	99
West Virginia	4,929	4,436	4,436	4,569	4,747	4,643	4,876	82	83	95	92	90	92	97
North Carolina	9,570	8,900	8,900	9,345	10,116	8,675	8,769	77	78	80	81	81	82	85
South Carolina	4,644	4,365	4,103	4,513	4,827	4,138	4,159	73	73	73	78	73	72	77

Georgia	7, 478	7, 254	7, 066	7, 632	8, 245	7, 054	7, 233	70	75	74	76	71	72	76
Florida	2, 309	2, 194	2, 150	2, 448	2, 667	2, 294	2, 314	88	95	105	100	85	87	88
South Atlantic	45, 732	42, 271	42, 095	45, 023	47, 722	42, 583	43, 586	80. 37	81. 95	88. 10	89. 02	84. 50	86. 96	91. 36
Kentucky	12, 508	11, 257	11, 483	12, 401	12, 539	11, 063	12, 069	65	69	74	80	77	82	88
Tennessee	13, 425	12, 217	12, 584	13, 339	14, 156	12, 712	12, 821	63	68	73	77	73	75	81
Alabama	7, 192	6, 473	6, 473	6, 862	7, 090	6, 237	6, 655	65	65	67	70	67	70	76
Mississippi	6, 817	6, 135	6, 503	7, 023	7, 171	6, 584	6, 909	69	70	70	71	70	72	80
Arkansas	8, 548	7, 522	7, 898	8, 530	8, 871	8, 401	8, 748	58	58	67	67	62	68	70
Louisiana	4, 514	4, 063	4, 063	4, 724	4, 289	4, 307	4, 529	76	67	77	76	77	81	85
Oklahoma	13, 836	13, 283	13, 626	15, 107	15, 561	15, 457	15, 853	56	63	74	80	73	78	75
Texas	21, 652	20, 136	18, 525	21, 139	24, 124	22, 673	22, 834	58	64	69	72	67	67	73
South Central	88, 492	81, 086	81, 155	89, 125	93, 801	87, 434	90, 418	61. 77	65. 26	71. 29	74. 72	70. 45	73. 38	77. 56
Montana	2, 797	2, 545	2, 596	2, 466	2, 676	2, 863	2, 713	62	70	71	80	83	84	80
Idaho	2, 200	2, 090	2, 194	2, 414	2, 562	2, 728	2, 662	56	61	70	75	73	79	84
Wyoming	899	809	793	828	953	930	971	62	70	73	80	80	82	88
Colorado	4, 078	3, 752	3, 902	4, 214	4, 288	4, 502	4, 872	66	67	73	78	74	75	79
New Mexico	1, 072	965	888	977	1, 119	1, 101	1, 110	67	68	75	81	74	76	77
Arizona	595	655	720	864	735	676	676	88	90	100	95	95	100	105
Utah	1, 436	1, 436	1, 405	1, 642	1, 806	1, 940	2, 165	68	66	76	75	75	81	87
Nevada	260	234	251	271	288	286	291	90	77	90	90	95	100	110
Washington	5, 691	5, 577	6, 134	7, 054	8, 313	7, 572	7, 915	82	80	95	105	90	95	99
Oregon	3, 501	3, 326	3, 326	3, 692	4, 291	4, 049	3, 903	90	93	94	95	91	94	99
California	14, 313	13, 168	13, 826	15, 209	17, 342	15, 250	15, 557	95	95	110	120	103	109	114
Far Western	36, 842	34, 557	36, 035	39, 631	44, 373	41, 897	42, 835	81. 65	81. 73	93. 38	100. 89	91. 11	94. 73	98. 78
United States	449, 188	417, 755	424, 227	448, 665	463, 364	444, 481	469 457	76. 09	79. 20	88. 61	91. 07	86. 07	91. 30	93. 13

Bureau of Agricultural Economics.

TABLE 484.—*Eggs: Annual layings per flock on farms of crop correspondents, by States, 1925–1930* [1]

State and division	1925	1926	1927	1928	1929	1930
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Maine	8,518	8,317	8,287	8,567	8,685	9,868
New Hampshire	9,479	7,944	8,594	9,248	9,290	9,077
Vermont	6,272	6,293	6,344	6,786	6,685	7,384
Massachusetts	9,384	10,160	9,436	11,004	10,707	11,634
Rhode Island	10,534	10,108	10,588	11,215	9,536	11,856
Connecticut	8,740	9,819	10,749	10,965	11,345	11,643
New York	10,117	10,065	10,512	10,404	11,078	11,050
New Jersey	11,889	12,193	12,291	12,017	12,294	12,339
Pennsylvania	11,403	12,114	12,619	12,209	12,589	12,920
North Atlantic	10,283	10,543	10,946	10,880	11,253	11,567
Ohio	11,987	12,656	13,221	12,770	12,890	13,701
Indiana	12,102	12,537	12,938	12,596	12,643	12,756
Illinois	11,734	12,230	12,470	12,044	12,099	12,333
Michigan	8,959	9,594	10,084	10,251	10,008	10,345
Wisconsin	9,004	9,631	10,163	10,477	10,777	11,455
Minnesota	10,251	10,245	10,251	10,352	10,579	11,391
Iowa	13,434	14,683	14,689	14,792	14,632	15,382
Missouri	13,005	14,285	14,489	13,932	13,510	14,075
North Dakota	7,652	7,889	7,448	7,570	7,320	7,348
South Dakota	10,379	10,704	10,798	11,328	11,476	12,382
Nebraska	10,759	11,473	11,412	11,736	11,737	12,750
Kansas	14,160	14,917	15,218	15,223	15,249	15,559
North Central	11,462	12,141	12,379	12,303	12,284	12,822
Delaware	16,696	17,568	19,660	19,615	16,541	14,604
Maryland	11,692	12,637	13,659	12,349	12,795	12,066
Virginia	7,977	8,287	9,032	8,506	8,442	8,254
West Virginia	8,576	8,682	8,801	8,882	8,190	8,579
North Carolina	5,782	5,819	6,372	6,314	5,560	5,208
South Carolina	4,976	5,338	5,840	5,612	5,083	5,241
Georgia	5,432	5,399	5,530	5,484	4,894	4,776
Florida	7,372	7,640	8,023	7,247	7,320	6,901
South Atlantic	6,678	6,894	7,334	7,113	6,618	6,489
Kentucky	6,843	7,408	8,311	6,945	6,424	6,785
Tennessee	6,645	7,199	8,035	7,192	6,618	6,706
Alabama	5,569	5,797	6,120	5,402	5,521	5,457
Mississippi	5,284	6,095	6,110	5,673	5,162	5,019
Arkansas	5,578	6,098	6,454	6,216	5,983	5,642
Louisiana	6,576	6,968	6,764	6,396	5,992	6,004
Oklahoma	9,576	10,962	11,841	11,001	10,959	10,698
Texas	7,336	7,940	9,345	9,611	9,485	9,196
South Central	6,742	7,388	8,056	7,529	7,234	7,203
Montana	6,822	7,190	6,506	7,549	7,247	7,311
Idaho	8,378	9,840	10,087	11,218	10,886	9,986
Wyoming	7,269	7,968	7,554	8,391	7,764	8,439
Colorado	8,235	8,913	8,552	9,510	9,752	9,546
New Mexico	6,235	6,731	7,314	7,762	7,694	7,177
Arizona	9,482	9,734	9,764	8,903	9,020	9,333
Utah	7,849	8,983	9,245	10,080	10,026	11,433
Nevada	7,737	10,482	9,339	11,926	13,051	10,318
Washington	9,865	9,968	10,996	10,266	10,607	10,883
Oregon	9,153	9,059	10,281	10,522	10,579	10,005
California	8,925	9,500	9,834	9,507	8,293	8,795
Western	8,484	9,050	9,362	9,593	9,335	9,223
United States	8,859	9,401	9,827	9,608	9,440	9,620

Bureau of Agricultural Economics.

[1] Calculated by multiplying average daily layings per flock by the number of days in the year. Daily production derived from number of eggs laid on the first day of each month, as reported for about 22,000 farm flocks.

TABLE 485.—*Eggs: Number laid per flock* [1] *on farms of crop correspondents on first day of each month, by States, 1930*

State and division	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Maine	24.3	25.2	26.9	42.3	36.5	35.4	29.2	29.2	25.5	16.7	15.3	17.6
New Hampshire	18.4	30.0	26.7	35.7	40.1	30.5	25.7	23.2	21.4	18.1	13.5	13.7
Vermont	13.3	20.7	24.7	27.9	31.8	25.5	23.7	21.8	17.8	15.7	10.3	9.3
Massachusetts	24.9	31.3	43.8	47.5	42.8	37.0	31.0	26.3	25.6	22.8	22.3	24.8
Rhode Island	18.3	26.0	31.2	49.4	42.8	35.0	32.0	30.0	29.0	31.4	28.5	33.0
Connecticut	29.0	29.4	35.2	44.8	45.9	37.8	35.6	30.0	29.3	23.1	18.7	23.0
New York	20.5	25.2	35.8	45.5	49.8	44.1	35.8	32.2	27.9	19.8	11.7	15.2
New Jersey	22.5	40.8	38.4	50.4	50.6	45.0	40.0	36.5	29.1	21.5	16.9	15.4
Pennsylvania	22.7	28.8	46.1	57.5	57.2	49.4	38.6	35.8	30.0	24.7	16.1	18.5
North Atlantic	21.9	27.8	38.7	49.0	49.9	43.5	35.4	32.6	27.9	21.6	14.8	17.2
Ohio	20.7	27.2	51.6	65.5	62.8	50.4	43.9	36.3	30.2	25.6	17.2	18.5
Indiana	17.0	22.9	51.8	62.9	60.0	47.9	40.0	31.5	28.8	24.4	16.6	14.9
Illinois	14.3	18.9	48.6	63.7	63.8	48.6	38.3	29.1	26.2	22.5	16.7	13.7
Michigan	15.3	21.9	33.1	46.1	48.0	42.1	33.5	28.8	26.1	18.9	11.8	14.1
Wisconsin	20.3	23.8	36.8	51.2	54.1	43.6	36.6	30.9	27.1	21.1	12.9	16.8
Minnesota	13.6	21.0	35.2	55.1	59.5	47.5	38.1	31.1	26.9	22.4	11.0	11.1
Iowa	14.4	20.8	54.7	78.2	80.7	66.5	53.0	38.3	34.6	29.1	17.7	15.8
Missouri	17.8	19.3	62.0	74.5	65.0	55.8	43.1	33.3	29.2	25.5	18.2	17.7
North Dakota	5.6	8.4	18.6	35.4	39.6	32.7	28.0	23.4	20.5	16.6	7.2	4.5
South Dakota	11.4	16.1	45.0	62.7	62.9	51.3	42.6	32.8	30.6	26.1	12.8	10.4
Nebraska	16.4	19.2	57.1	63.3	58.9	51.0	43.1	29.7	26.8	23.6	14.7	13.2
Kansas	22.6	23.3	72.6	77.1	70.4	61.7	50.1	37.2	30.4	28.2	18.1	18.8
North Central	16.6	20.9	49.2	63.3	62.0	51.1	41.6	32.5	28.6	24.1	15.3	15.1
Delaware	22.3	37.3	68.5	56.6	61.4	55.4	43.7	38.1	24.0	21.5	23.4	21.2
Maryland	19.5	25.2	50.2	57.4	55.0	44.0	36.6	32.5	24.3	18.8	14.9	17.3
Virginia	13.6	19.5	36.9	39.5	34.9	29.2	24.7	20.3	16.8	14.8	11.1	11.4
West Virginia	14.3	19.7	37.5	40.5	37.7	31.8	26.6	23.7	17.1	14.7	9.6	10.3
North Carolina	9.7	14.2	21.5	21.5	19.5	17.7	15.4	13.2	11.5	10.8	8.7	8.6
South Carolina	9.3	15.2	21.9	23.6	18.8	16.4	16.5	12.9	11.0	9.9	9.0	8.2
Georgia	7.8	12.3	19.8	21.1	17.5	16.5	14.5	11.4	11.3	9.5	7.4	7.4
Florida	12.9	19.6	28.7	28.0	23.3	22.4	20.0	16.8	14.3	13.9	14.3	12.2
South Atlantic	11.1	17.6	27.5	28.9	25.5	22.4	19.5	16.3	13.7	12.1	9.7	9.6
Kentucky	8.8	11.5	30.7	36.2	32.0	24.3	20.0	16.0	14.2	12.6	9.4	7.5
Tennessee	8.6	14.9	31.3	35.4	28.8	22.1	19.1	15.3	13.0	12.0	10.4	9.1
Alabama	8.9	15.3	23.5	23.3	19.6	17.7	17.0	14.4	9.3	11.8	10.6	7.6
Mississippi	9.6	13.3	20.6	21.9	18.2	17.0	15.0	11.5	9.9	10.2	9.8	8.3
Arkansas	9.3	8.7	26.0	26.9	23.6	20.6	16.7	13.5	10.9	12.0	10.6	7.3
Louisiana	8.6	14.0	28.3	24.6	25.1	20.5	15.5	13.5	11.9	12.1	10.4	11.4
Oklahoma	20.6	14.5	56.1	53.5	47.3	39.3	30.2	22.7	18.4	19.7	15.4	15.4
Texas	13.4	14.9	43.2	42.8	38.7	34.3	26.6	27.9	17.5	18.0	15.9	13.7
South Central	11.1	13.5	33.4	34.3	30.1	25.4	20.8	18.1	13.6	14.0	12.0	10.2
Montana	8.0	9.5	21.9	32.6	35.8	29.9	25.0	22.6	19.3	16.3	8.9	8.1
Idaho	25.0	16.6	30.7	41.2	43.7	38.9	33.5	25.7	26.6	19.7	17.6	11.9
Wyoming	9.3	11.9	31.1	38.2	35.8	33.1	28.8	25.9	22.6	16.9	11.8	10.1
Colorado	13.1	15.4	37.8	43.7	44.7	37.5	32.3	26.2	23.6	19.4	12.6	8.5
New Mexico	11.3	13.1	29.0	35.1	35.0	30.0	22.8	19.7	15.0	12.0	7.8	6.6
Arizona	15.5	19.1	35.5	35.0	43.9	34.7	29.1	25.0	20.2	19.0	17.0	13.7
Utah	28.8	22.2	50.4	50.1	48.4	40.7	36.8	32.8	24.6	16.4	15.6	12.7
Nevada	16.6	20.0	33.8	44.1	51.7	40.0	33.3	29.1	22.5	17.4	14.4	13.9
Washington	20.0	24.3	35.6	44.6	42.0	37.1	34.0	31.0	28.2	20.7	20.5	20.0
Oregon	19.4	17.7	37.1	45.7	40.2	34.0	32.9	30.2	21.8	17.9	16.6	15.8
California	16.1	20.1	34.3	36.3	32.6	31.6	28.0	23.2	21.7	18.8	13.5	11.3
Western	16.8	17.9	34.2	35.7	39.3	34.5	30.5	26.3	22.9	18.3	14.5	12.4
United States	14.4	18.5	38.6	45.2	43.2	36.3	30.0	24.8	20.9	18.2	13.2	12.6

Bureau of Agricultural Economics.

[1] Excluding flocks containing 400 or more hens and pullets of laying age on Jan. 1.

TABLE 486.—*Poultry, live: Freight receipts, by States, at New York, 1927, 1928, 1930, and monthly, 1930*

State	1927	1928	1929	1930												
				Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Car-loads	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*
Mass	1	1														
N. Y	1	1	1													
N. J				1					1							
Pa	58	36	44	12	2					1		2	4	1		2
Ohio	429	343	335	305	18	2	1	1	4	14	14	8	42	57	90	54
Ind	1,267	842	963	1,168	69	37	31	48	56	59	90	86	163	167	188	174
Ill	1,227	874	880	1,174	101	56	52	60	54	59	84	106	156	135	146	165
Mich	1	6	6													
Wis	253	219	175	188	2				2	18	32	24	36	39	25	10
Minn	166	164	131	123	14	7	4	1	2	10	18	13	10	21	10	13
Iowa	856	586	354	604	48	11	13	6	19	63	87	66	94	64	48	85
Mo	2,147	1,896	1,874	2,019	124	97	113	150	129	159	192	231	219	201	192	212
N. Dak		33	57	55								3	19	25	7	1
S. Dak	187	313	273	214	35	13	7	5	8	18	15	6	13	33	31	30
Nebr	996	1,078	1,156	1,082	105	84	67	55	64	79	87	95	131	130	75	110
Kans	661	474	422	509	51	39	47	44	45	33	29	36	60	47	27	51
Del				1					1							
Md				2			2									
Va	56	68	56	91	5	10	13	12	5	3	1	5	4	1	18	14
N. C	91	158	240	107	12	21	23	21	12	4	2	2	2		3	5
S. C	29	41	125	49	8	8	10	13	7		2					1
Ga	45	151	179	79	4	18	19	25	12							1
Fla			2	.4	2		2									
Ky	739	741	397	511	21	15	38	82	66	30	26	58	49	42	30	54
Tenn	975	1,060	884	642	46	47	76	138	119	51	29	26	25	10	37	38
Ala	82	176	181	129	9	17	28	33	17	4	3	5	2		6	5
Miss	154	188	90	76	5	11	20	18	7		2	2	2		5	4
Ark	420	410	369	349	20	31	34	51	33	26	25	44	18	12	16	39
La	1	1														
Okla	808	873	835	763	84	119	134	119	67	47	31	26	29	23	23	61
Tex	365	436	348	332	45	78	67	66	34	18	6	1	1		4	12
Wyo	2	5	13	4	1					1	1			1		
Colo	52	89	86	82	9	13	12	6	8	8	5	4	6	5	5	1
N. Mex	1	4	13	2	1	1										
Utah			4													
Other States	34															
U. S	12,104	11,267	10,493	10,677	841	735	813	954	772	705	781	849	1,085	1,014	986	1,142

Bureau of Agricultural Economics.

TABLE 487.—*Poultry, live: Freight receipts, percentage of different classes in cars unloaded, at New York, 1927–1930, by months, 1930*

Class	1927	1928	1929	1930												
				Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Fowls	66.2	68.9	65.5	69.4	69.3	84.0	90.0	93.3	90.8	79.1	67.1	57.2	49.2	51.7	51.1	65.5
Broilers	5.9	4.9	5.1	3.5	.3	.2	.1	1.1	4.6	16.2	17.0	7.4	.6	.1	.1	.1
Chickens	22.4	20.0	22.6	20.8	23.0	10.8	5.7	2.0	.4	1.0	12.5	32.5	47.0	44.7	30.0	21.8
Cocks	2.3	2.3	1.9	1.7	1.3	1.7	1.9	2.1	3.1	2.8	2.4	2.0	1.3	1.0	.8	1.0
Capons	.3	.3	.2	.2	.9	.9	.6	.1	0	0	0	0	0	0	0	.1
Ducks	1.7	1.3	1.6	1.6	2.3	1.0	.6	.5	.6	.6	.8	.8	1.7	1.7	3.9	3.2
Geese	1.0	1.0	1.1	1.4	2.2	.8	.4	.1	.1	.1	.1	.1	.1	.1	5.0	6.0
Turkeys	.9	1.1	1.6	1.2	.5	.5	.5	.3	.2	.2	.1	0	.1	.2	8.4	2.3
Miscellaneous	.2	.2	.4	.2	.2	.1	.2	.5	.2	0	0	0	0	.5	.7	0

Bureau of Agricultural Economics.

TABLE 488.—*Poultry, dressed: Receipts, gross weight, at four markets, by months, 1921–1930*

Market and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Boston:													
1921	3, 377	2, 229	1, 465	1, 707	1, 795	2, 086	1, 499	2, 437	2, 482	3, 581	7, 472	9, 791	39, 921
1922	4, 175	2, 765	2, 478	1, 705	2, 551	2, 883	2, 091	2, 198	2, 479	3, 306	7, 488	10, 444	44, 563
1923	7, 690	3, 785	2, 917	1, 946	2, 439	2, 778	2, 427	2, 661	2, 674	4, 418	10, 752	11, 526	56, 013
1924	6, 210	4, 607	3, 072	2, 235	2, 602	2, 952	3, 492	2, 856	3, 270	4, 402	11, 842	13, 724	61, 264
1925	4, 200	3, 252	2, 697	2, 181	2, 582	2, 893	2, 893	2, 786	2, 554	4, 336	7, 907	8, 439	46, 720
1926	3, 778	2, 981	2, 837	2, 052	2, 598	3, 196	3, 161	3, 677	3, 960	4, 089	8, 891	11, 942	53, 162
1927	4, 318	3, 610	2, 440	2, 398	3, 653	3, 455	2, 996	3, 612	3, 404	4, 663	8, 511	10, 245	53, 305
1928	4, 591	3, 756	4, 137	2, 877	3, 285	3, 290	3, 899	3, 468	3, 555	4, 680	7, 716	10, 329	55, 583
1929	4, 586	3, 231	2, 315	2, 855	2, 718	3, 369	3, 153	3, 628	4, 309	5, 048	8, 826	10, 395	54, 433
1930	4, 270	3, 992	2, 815	2, 544	3, 193	3, 514	3, 401	2, 952	3, 154	3, 875	8, 270	9, 309	51, 289
New York:													
1921	11, 441	7, 006	5, 190	5, 021	4, 883	6, 150	5, 314	8, 992	10, 277	11, 887	21, 182	27, 208	124, 551
1922	10, 783	6, 909	6, 371	6, 399	7, 896	8, 822	6, 785	7, 768	9, 115	12, 594	22, 232	32, 538	138, 212
1923	21, 730	12, 335	8, 390	6, 916	6, 804	8, 589	9, 414	9, 497	9, 653	16, 509	26, 822	27, 289	163, 948
1924	15, 603	11, 927	9, 893	7, 368	10, 172	10, 157	10, 502	10, 504	12, 981	15, 916	28, 875	35, 464	179, 362
1925	14, 400	10, 871	7, 949	8, 119	10, 245	10, 717	11, 668	11, 110	12, 409	16, 696	28, 857	27, 216	170, 257
1926	13, 078	10, 646	9, 921	8, 248	10, 594	14, 041	13, 555	14, 609	15, 068	18, 129	31, 924	33, 082	192, 895
1927	12, 954	8, 957	8, 722	7, 770	11, 633	13, 635	12, 168	14, 589	15, 470	17, 682	31, 740	32, 797	188, 117
1928	14, 999	11, 064	9, 322	9, 703	10, 628	11, 127	13, 252	13, 850	14, 332	21, 799	31, 846	32, 454	194, 376
1929	14, 221	10, 900	9, 964	9, 520	10, 233	11, 876	13, 078	15, 707	16, 558	20, 602	31, 495	32, 903	197, 057
1930	15, 054	11, 674	8, 476	10, 630	13, 877	14, 999	11, 807	12, 533	15, 383	19, 647	32, 584	34, 221	200, 885
Philadelphia:													
1921	1, 498	1, 071	1, 411	1, 005	1, 303	1, 565	1, 226	1, 419	1, 587	2, 020	2, 882	5, 905	22, 892
1922	1, 947	1, 790	1, 077	664	1, 182	1, 304	1, 237	1, 217	1, 237	1, 356	2, 653	5, 655	21, 319
1923	2, 206	1, 530	1, 388	1, 042	1, 055	1, 509	1, 343	1, 618	1, 348	1, 749	3, 281	6, 542	24, 611
1924	2, 614	1, 818	1, 704	1, 194	1, 234	1, 458	1, 536	1, 660	1, 421	1, 873	4, 053	7, 075	27, 640
1925	2, 818	2, 030	2, 183	1, 450	1, 343	1, 638	1, 739	1, 810	1, 552	1, 924	4, 702	6, 106	29, 295
1926	2, 906	1, 791	2, 203	1, 717	1, 374	1, 758	1, 853	2, 039	2, 352	2, 123	4, 916	7, 094	32, 126
1927	2, 885	2, 006	2, 005	1, 769	1, 695	1, 668	1, 398	1, 918	2, 530	2, 613	4, 432	6, 903	31, 822
1928	2, 373	1, 601	1, 885	1, 359	1, 558	2, 177	1, 931	1, 763	2, 097	2, 965	4, 925	7, 210	31, 844
1929	2, 548	1, 851	1, 680	1, 471	1, 557	1, 663	2, 134	2, 319	2, 302	2, 542	6, 002	8, 595	34, 664
1930	3, 041	2, 501	2, 207	1, 991	2, 388	2, 117	1, 794	1, 772	2, 166	3, 046	5, 607	7, 906	36, 536
Chicago:													
1921	6, 343	3, 328	2, 794	2, 104	2, 421	2, 524	2, 097	2, 615	3, 804	4, 157	15, 723	17, 082	64, 992
1922	5, 345	3, 042	3, 394	2, 744	2, 744	3, 597	3, 590	4, 250	4, 290	4, 178	13, 167	23, 320	73, 661
1923	11, 497	5, 208	4, 057	2, 532	2, 912	3, 329	3, 679	4, 018	4, 724	5, 411	15, 163	27, 743	90, 273
1924	12, 723	8, 043	5, 675	4, 385	3, 311	3, 295	4, 042	2, 523	2, 196	4, 791	15, 675	21, 805	88, 464
1925	6, 167	3, 230	2, 219	1, 573	1, 996	2, 239	1, 376	1, 760	2, 168	4, 303	20, 022	25, 033	72, 086
1926	6, 360	3, 159	2, 383	1, 792	1, 805	2, 105	2, 154	2, 607	2, 897	6, 397	22, 863	23, 110	77, 632
1927	6, 495	3, 546	2, 195	1, 835	2, 872	2, 257	1, 227	2, 257	2, 531	3, 752	15, 739	19, 029	63, 735
1928	6, 639	3, 591	2, 216	1, 876	2, 137	1, 977	2, 771	2, 829	3, 580	5, 719	15, 301	18, 544	67, 180
1929	7, 712	3, 469	2, 707	2, 725	2, 811	3, 270	3, 520	3, 984	4, 710	9, 070	25, 578	23, 812	93, 368
1930	9, 835	5, 597	2, 899	2, 339	2, 163	2, 645	2, 303	2, 777	3, 809	6, 274	19, 409	20, 103	80, 153
Total:													
1921	22, 659	13, 634	10, 860	9, 837	10, 402	12, 325	10, 136	15, 463	18, 150	21, 645	47, 259	59, 986	252, 356
1922	22, 250	14, 506	13, 320	11, 512	14, 373	16, 606	13, 703	15, 433	17, 121	21, 434	45, 540	71, 957	277, 755
1923	43, 123	22, 858	16, 752	12, 436	13, 210	16, 205	16, 863	17, 794	18, 399	28, 087	56, 018	73, 100	334, 845
1924	37, 150	26, 395	20, 344	15, 182	17, 319	17, 862	19, 572	17, 543	19, 868	26, 982	60, 445	78, 068	356, 730
1925	27, 585	19, 383	15, 048	13, 323	16, 166	17, 487	17, 676	17, 466	18, 683	27, 259	61, 488	66, 794	318, 358
1926	26, 122	18, 576	17, 344	13, 809	16, 371	21, 099	20, 724	22, 932	24, 278	30, 738	68, 594	75, 228	355, 815
1927	26, 652	18, 119	15, 362	13, 772	19, 853	21, 015	17, 789	22, 376	23, 935	28, 710	60, 422	68, 974	336, 979
1928	28, 602	20, 012	17, 560	15, 815	17, 608	18, 571	21, 853	21, 910	23, 564	35, 163	59, 788	68, 537	348, 983
1929	29, 067	19, 451	16, 666	16, 571	17, 319	20, 178	21, 885	25, 638	27, 879	37, 262	71, 901	75, 705	379, 522
1930	32, 200	23, 764	16, 397	17, 504	21, 621	23, 275	19, 305	20, 034	24, 512	32, 842	65, 870	71, 539	368, 863

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

Table 489.—*Poultry, dressed: Receipts, gross weight, at four markets, by State of origin, 1922–1930*

BOSTON

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Maine	647	791	706	709	438	690	509	500	479
New Hampshire	53	47	50	41	29	62	17	15	25
Vermont	200	149	105	74	34	26	28	31	31
Massachusetts	413	357	344	205	260	495	85	27	37
New York	1, 454	1, 850	1, 111	1, 045	1, 251	1, 467	1, 709	757	1, 008
Pennsylvania	49	72	114	180	47	260	104	1	21
Ohio	1, 708	1, 141	1, 216	255	300	533	390	140	84
Indiana	5, 939	6, 558	7, 382	6, 524	4, 884	5, 225	5, 368	3, 200	3, 677
Illinois	19, 618	23, 308	20, 155	12, 292	14, 768	14, 203	11, 719	10, 651	10, 497
Michigan	1, 015	527	911	622	524	681	888	663	515
Wisconsin	680	291	612	375	1, 236	553	932	266	94
Minnesota	1, 076	2, 222	3, 878	3, 929	5, 076	5, 886	6, 860	6, 786	9, 024
Iowa	4, 422	7, 131	6, 834	6, 957	8, 141	7, 003	6, 648	7, 609	7, 495
Missouri	774	1, 086	2, 540	1, 822	1, 944	1, 509	1, 881	2, 722	2, 328
Nebraska	471	682	1, 336	1, 707	2, 297	1, 930	3, 298	3, 163	3, 950
North Dakota	14	294	314	237	553	469	478	1, 473	1, 521
South Dakota	3	121	101	92	131	46	114	559	377
Kansas	1, 454	2, 114	2, 864	3, 566	4, 027	3, 592	4, 557	4, 917	2, 155
Kentucky	1, 005	1, 330	854	822	970	453	204	141	365
Tennessee	65	39	73	118	234	160	330	510	173
Oklahoma	1, 253	1, 043	1, 737	1, 699	1, 571	2, 066	2, 662	1, 364	1, 215
Texas	(1)	(1)	6, 185	2, 797	3, 703	5, 110	5, 034	6, 693	5, 476
Other States	2, 228	4, 740	1, 842	478	579	814	1, 761	2, 245	742
Canada	22	120	---------	174	165	72	7	---------	---------
Total	44, 563	56, 013	61, 264	46, 720	53, 162	53, 305	55, 583	54, 433	51, 289

NEW YORK

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
Massachusetts	848	632	1, 408	1, 146	461	425	336	347	390
New York	3, 572	3, 062	3, 119	11, 459	12, 966	16, 438	14, 167	12, 489	14, 415
New Jersey	1, 395	1, 552	1, 661	1, 303	1, 298	1, 022	649	211	178
Pennsylvania	1, 220	1, 085	1, 148	922	911	1, 332	660	524	537
Ohio	5, 113	4, 131	4, 337	4, 352	3, 298	3, 920	2, 306	3, 399	2, 519
Indiana	17, 021	15, 814	14, 886	15, 215	12, 918	11, 585	11, 624	11, 480	13, 637
Illinois	40, 911	48, 267	57, 246	45, 861	32, 890	28, 356	24, 864	25, 393	28, 182
Michigan	1, 901	1, 683	1, 399	702	952	659	2, 561	1, 962	1, 435
Wisconsin	1, 503	2, 364	2, 862	3, 058	2, 787	1, 843	1, 551	934	1, 304
Minnesota	4, 412	6, 382	9, 143	9, 372	11, 840	10, 820	13, 937	12, 914	21, 322
Iowa	15, 854	19, 520	18, 775	18, 776	29, 840	25, 226	26, 324	30, 819	30, 295
Missouri	10, 522	14, 630	18, 629	17, 148	19, 146	19, 231	19, 817	19, 305	16, 301
North Dakota	165	769	515	668	1, 056	1, 028	1, 236	1, 841	2, 099
South Dakota	976	1, 140	1, 299	1, 795	2, 970	3, 413	3, 595	4, 692	5, 007
Nebraska	2, 515	3, 036	4, 610	4, 288	6, 979	7, 041	9, 057	8, 120	8, 861
Kansas	10, 174	15, 151	8, 429	11, 379	20, 757	20, 725	21, 070	20, 448	18, 887
Delaware	109	64	84	91	65	56	54	31	29
Maryland	1, 226	860	959	1, 021	896	757	346	238	283
Virginia	1, 904	1, 956	2, 588	1, 899	2, 299	2, 229	2, 158	2, 013	1, 586
Kentucky	3, 873	5, 524	5, 082	4, 361	4, 497	4, 700	5, 234	3, 050	2, 329
Tennessee	3, 964	3, 445	4, 070	2, 773	3, 531	4, 507	4, 542	3, 384	2, 390
Arkansas	129	326	(1)	760	788	78	40	442	532
Oklahoma	2, 254	2, 704	2, 553	3, 105	6, 336	7, 314	5, 478	7, 042	6, 410
Texas	5, 296	7, 206	12, 108	6, 665	10, 059	13, 192	16, 181	18, 386	15, 301
Montana	(1)	(1)	203	123	120	202	471	315	399
Idaho	(1)	(1)	242	176	416	244	1, 656	1, 730	1, 122
Colorado	(1)	(1)	530	434	600	315	1, 180	598	1, 225
Washington	(1)	238	173	205	673	248	190	619	383
California	649	1, 061	528	459	605	318	1, 117	1, 753	1, 476
Other States	503	814	601	462	843	846	1, 928	2, 558	2, 051
Canada	203	532	175	279	98	47	47	20	--------
Total	138, 212	163, 948	179, 362	170, 257	192, 895	188, 117	194, 376	197, 057	200, 885

[1] Included in "Other States."

TABLE 489.—*Poultry, dressed: Receipts, gross weight, at four markets, by State of origin, 1922–1930*—Continued

CHICAGO

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
New York	247	335	339	385	837	715	661	837	455
Indiana	1, 347	818	849	731	411	536	559	778	801
Illinois	18, 720	17, 497	13, 184	4, 517	5, 920	3, 893	2, 581	3, 411	3, 521
Michigan	332	276	186	82	40	66	379	62	111
Wisconsin	7, 555	7, 372	7, 771	5, 384	5, 701	3, 982	3, 409	4, 811	3, 135
Minnesota	7, 310	10, 764	11, 425	10, 267	12, 586	10, 541	7, 829	13, 833	9, 891
Iowa	19, 001	18, 654	21, 023	21, 538	21, 420	14, 719	13, 117	18, 505	18, 152
Missouri	3, 952	6, 231	5, 980	4, 621	3, 828	4, 812	6, 379	6, 647	5, 985
North Dakota	3, 292	7, 594	5, 984	5, 714	6, 041	4, 769	5, 933	8, 502	7, 616
South Dakota	3, 348	4, 509	6, 396	5, 954	7, 388	6, 069	7, 371	10, 366	9, 010
Nebraska	1, 959	1, 813	1, 690	2, 149	2, 632	3, 247	4, 295	4, 169	3, 875
Kansas	2, 499	3, 602	3, 252	3, 411	4, 110	2, 915	4, 315	5, 108	4, 111
Kentucky	849	937	508	80	107	208	32	124	143
Tennessee	694	810	564	186	371	377	361	483	381
Mississippi	169	94	49	12	3	6	7	38	31
Arkansas	256	372	315	117	177	238	688	193	216
Oklahoma	801	2, 217	2, 164	2, 476	1, 998	2, 250	2, 712	2, 830	1, 880
Texas	709	4, 507	4, 077	1, 802	1, 378	2, 577	3, 302	6, 930	6, 268
Montana	271	1, 500	2, 095	1, 738	1, 773	1, 022	1, 530	2, 904	1, 898
Idaho	69	40	75	131	26	120	171	551	446
Wyoming	17	39	109	81	98	133	260	373	444
Colorado	63	80	169	390	222	228	293	378	546
Other States	173	182	260	179	194	312	941	1, 535	1, 237
Canada	28	30	--------	141	371	--------	55	--------	--------
Total	73, 661	90, 273	88, 464	72, 086	77, 632	63, 735	67, 180	93, 368	80, 153

PHILADELPHIA

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
New York	424	368	1, 047	676	852	759	683	749	442
New Jersey	63	71	227	15	107	113	305	130	812
Pennsylvania	1, 372	1, 260	919	901	805	824	245	190	69
Ohio	1, 153	820	1, 206	741	507	696	491	397	390
Indiana	1, 907	1, 762	1, 231	1, 750	3, 659	4, 135	3, 263	2, 917	1, 562
Illinois	7, 165	9, 497	9, 456	8, 728	5, 505	4, 232	1, 940	1, 531	2, 897
Michigan	142	36	39	256	36	102	47	45	117
Wisconsin	396	406	268	697	787	544	570	374	191
Minnesota	1, 274	2, 389	2, 252	2, 732	3, 796	4, 475	3, 062	4, 190	7, 595
Iowa	1, 017	1, 124	1, 883	2, 700	3, 536	4, 179	4, 962	5, 558	6, 577
Missouri	1, 088	522	1, 002	2, 315	2, 035	1, 168	1, 249	951	1, 222
North Dakota	4	650	595	436	427	445	620	1, 140	882
South Dakota	45	16	17	321	88	132	150	497	922
Nebraska	167	298	453	377	1, 354	673	1, 089	1, 438	1, 288
Kansas	660	655	932	910	885	1, 615	4, 901	3, 564	2, 248
Maryland	201	256	162	233	181	84	106	128	82
Virginia	2, 241	2, 588	2, 448	2, 331	1, 745	1, 458	1, 097	1, 166	853
West Virginia	985	957	982	1, 034	797	410	291	313	302
Kentucky	81	68	459	171	105	504	542	621	756
Oklahoma	321	446	880	1, 302	2, 474	2, 067	2, 710	2, 984	2, 418
Texas	213	130	798	303	1, 208	1, 829	1, 745	3, 450	3, 029
Other States	400	292	384	366	1, 237	1, 378	1, 776	2, 331	1, 882
Total	21, 319	24, 611	27, 640	29, 295	32, 126	31, 822	31, 844	34, 664	36, 536

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

TABLE 490.—*Poultry, dressed: Receipts, gross weight, by State of origin, New York, by months, 1930*

State of origin	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Massachusetts	7	46	9	35	74	69	3	36	3	29	19	60
New York	101	257	309	1,542	2,254	2,364	2,816	2,170	1,288	895	354	65
New Jersey	36	25	4	5	6	22	5	5	9	33	8	20
Pennsylvania	25	15	12	62	98	91	39	16	51	21	45	62
Ohio	56	59	69	259	127	166	79	275	199	345	358	527
Indiana	1,163	1,204	890	1,279	2,014	1,104	594	807	779	1,003	1,269	1,531
Illinois	2,369	1,598	1,509	2,851	3,051	2,229	1,352	1,460	1,550	2,039	3,393	4,781
Michigan	56	87	20	325	370	239	170	29	(1)	------	101	38
Wisconsin	109	110	79	1	122	138	142	45	159	107	69	223
Minnesota	1,466	857	1,193	268	525	1,783	695	546	1,502	2,694	4,222	5,571
Iowa	2,911	1,595	903	608	917	1,540	1,556	1,663	2,923	4,368	4,646	6,665
Missouri	1,069	977	672	588	735	1,153	1,049	1,334	1,643	1,686	2,891	2,504
North Dakota	68	70	42	2	------	30	20	------	71	165	707	924
South Dakota	530	238	106	39	89	112	93	254	274	1,201	743	1,328
Nebraska	990	722	278	364	463	691	444	367	723	1,187	1,191	1,441
Kansas	1,516	931	648	648	997	1,317	1,609	1,783	2,054	2,198	2,684	2,502
Delaware	2	1	2	3	2	4	4	2	3	1	5	------
Maryland	5	8	5	28	5	5	8	5	10	26	76	102
Virginia	8	15	1	32	28	87	163	186	298	268	323	177
Kentucky	44	113	66	255	363	163	127	256	213	132	382	215
Tennessee	72	110	75	41	222	104	157	333	403	294	415	164
Arkansas	------	20	------	------	44	81	42	62	115	84	64	20
Oklahoma	473	658	490	419	378	297	147	325	599	375	1,443	806
Texas	1,105	1,129	536	793	811	1,051	469	378	377	200	5,470	2,982
Montana	16	85	------	------	------	------	------	------	3	2	90	203
Idaho	347	------	44	------	------	------	------	------	------	97	319	315
Colorado	94	116	------	------	------	------	------	------	------	(1)	562	453
Washington	------	31	------	------	99	68	------	65	72	48	------	------
California	20	402	456	89	6	32	6	103	43	91	2	226
Other States	396	195	58	94	77	59	18	28	19	58	733	316
Total	15,054	11,674	8,476	10,630	13,877	14,999	11,807	12,533	15,383	19,647	32,584	34,221

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

[1] Not over 500 pounds.

TABLE 491.—*Frozen poultry:* [1] *Cold-storage holdings, by months, United States, 1921–1930*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1921	79,025	81,096	79,001	62,315	47,651	35,408	27,268	21,188	20,064	25,602	34,876	65,167
1922	103,697	103,350	88,709	68,471	50,840	38,602	34,837	30,659	27,671	25,984	30,238	51,781
1923	100,170	121,632	113,503	94,872	74,562	57,274	49,100	41,250	34,131	33,142	40,363	63,274
1924	93,434	99,486	93,497	76,067	52,068	39,299	34,886	33,604	33,837	40,070	55,139	87,939
1925	133,990	138,189	130,513	108,608	82,732	68,126	58,562	53,558	47,946	44,345	53,787	86,733
1926	111,501	108,512	95,397	73,124	52,783	42,808	36,730	35,793	38,634	44,771	64,842	106,854
1927	144,497	145,076	129,510	104,697	77,282	61,525	50,064	42,293	39,711	43,201	52,315	85,030
1928	117,490	118,154	103,494	83,169	56,832	43,872	38,230	40,395	40,749	43,578	58,093	79,173
1929	109,684	102,380	89,088	68,728	52,901	41,643	42,001	40,896	49,010	61,976	86,873	115,876
1930	140,723	141,552	133,172	105,708	77,420	61,167	54,253	46,967	42,589	46,938	59,269	82,925

Bureau of Agricultural Economics. Compiled from reports made by cold-storage establishments.

[1] Quantities given net weight.

TABLE 492.—*Turkeys: Estimated average price per pound received by producers, United States, 1912–1930*

Season	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Season	Oct. 15	Nov. 15	Dec. 15	Jan. 15
	Cents	*Cents*	*Cents*	*Cents*		*Cents*	*Cents*	*Cents*	*Cents*
1912	13.6	14.4	14.8	14.9	1922	25.1	29.5	32.3	29.7
1913	14.6	15.2	15.5	15.5	1923	26.6	27.9	24.5	23.1
1914	14.1	14.1	14.5	14.5	1924	23.3	24.2	25.8	26.2
1915	13.7	14.8	15.5	15.6	1925	24.0	28.3	31.1	31.7
1916	17.0	18.6	19.6	19.5	1926	26.6	29.8	32.8	31.6
1917	20.0	21.0	23.0	22.9	1927	26.4	30.8	32.3	29.8
1918	23.9	25.7	27.0	27.3	1928	27.2	31.2	30.5	28.2
1919	26.6	28.3	31.1	32.0	1929	27.2	27.1	23.5	23.7
1920	30.0	31.8	33.1	33.0	1930	21.0	20.1	19.9	21.6
1921	25.7	28.2	32.5	30.7					

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number 1919 Census by States.

TABLE 493.—*Chickens: Estimated average price per pound received by producers, United States, 1910–1930*

Year beginning July—	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910–11	12.2	12.0	11.8	11.4	11.0	10.6	10.6	10.6	10.7	10.9	11.0	11.1	11.0
1911–12	11.2	11.2	11.0	10.6	10.0	9.7	10.0	10.4	10.4	11.0	11.1	11.0	10.4
1912–13	11.2	11.3	11.4	11.4	11.0	10.8	10.8	11.0	11.4	11.7	11.9	12.0	11.2
1913–14	13.0	12.8	12.7	13.0	11.4	11.3	11.5	12.0	12.4	13.0	12.7	13.1	12.0
1914–15	13.4	13.1	12.8	12.0	11.1	10.7	10.9	11.3	11.7	11.9	12.0	12.2	11.5
1915–16	12.2	12.2	12.0	11.8	11.5	11.2	11.5	12.1	12.5	13.1	13.6	14.0	12.0
1916–17	14.1	14.1	14.2	14.4	13.9	13.6	14.1	15.1	15.7	17.3	17.5	17.7	14.6
1917–18	17.4	16.7	18.4	18.5	17.0	17.5	18.4	20.3	20.2	20.7	20.6	21.3	18.4
1918–19	23.2	23.4	23.6	22.2	21.7	22.4	22.1	21.8	23.4	25.7	26.7	26.4	23.0
1919–20	26.8	26.1	25.0	23.3	22.0	22.0	23.3	25.7	26.9	28.4	28.0	27.4	24.2
1920–21	28.4	26.6	26.9	24.6	22.9	20.6	21.7	22.3	22.8	22.2	21.8	21.5	22.8
1921–22	21.7	21.4	20.2	19.1	18.6	18.2	18.9	19.0	19.4	20.0	20.2	20.6	19.3
1922–23	20.7	18.9	18.6	18.1	17.2	17.2	17.3	18.6	18.8	19.4	20.1	20.3	18.2
1923–24	20.6	19.8	19.7	19.0	17.7	16.6	17.5	18.2	18.9	19.4	20.3	20.5	18.3
1924–25	20.2	20.0	19.8	19.4	18.5	17.9	18.5	19.1	20.0	21.1	22.0	21.6	19.2
1925–26	21.4	20.8	20.4	20.0	19.2	19.5	20.9	21.5	21.9	23.1	23.7	23.9	20.7
1926–27	23.6	22.1	21.4	20.8	20.0	19.8	20.1	21.1	21.3	21.8	21.7	20.2	20.7
1927–28	19.9	19.7	19.4	19.7	19.4	19.2	19.6	20.1	20.1	20.8	21.5	21.5	19.8
1928–29	21.9	21.6	22.3	22.0	21.5	21.2	21.6	22.1	22.7	23.8	24.4	24.6	22.1
1929–30	23.7	22.7	22.4	21.5	20.3	19.1	19.8	20.4	20.6	21.1	20.0	19.0	20.4
1930–31	17.4	17.3	17.8	17.4	16.1	15.3							

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number 1919 census by States; yearly price obtained by weighting monthly prices by receipts of dressed poultry. Average price of chickens (live weight) of all ages as reported.

TABLE 494.—*Eggs: Receipts at five markets, by months, specified years*

Market and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Boston:													
1927	120	153	245	307	270	234	155	128	109	92	65	82	1,960
1928	102	145	229	211	258	200	158	112	96	96	78	72	1,757
1929	133	99	190	290	234	177	176	125	110	77	54	53	1,718
1930	96	112	209	227	208	175	138	102	82	66	68	90	1,573
New York:													
1927	458	542	863	1,094	1,038	716	521	441	386	355	319	315	7,048
1928	412	613	931	1,052	1,089	767	591	494	407	392	268	272	7,288
1929	394	371	821	1,061	999	837	668	526	444	380	293	335	7,129
1930	461	511	938	1,155	1,076	785	645	451	496	373	322	382	7,595
Philadelphia:													
1927	96	100	183	244	211	158	119	114	117	80	68	59	1,549
1928	97	133	176	210	246	175	168	117	140	103	75	95	1,735
1929	118	76	169	234	220	181	156	143	131	94	74	101	1,697
1930	100	112	204	244	261	178	145	94	114	91	86	130	1,759
Chicago:													
1927	243	326	628	1,002	935	594	363	255	231	127	101	96	4,901
1928	200	366	592	813	849	562	356	284	241	150	75	113	4,601
1929	206	222	554	924	799	554	342	301	210	135	62	89	4,398
1930	202	308	641	927	747	516	381	231	211	131	69	111	4,475
San Francisco:													
1927	54	57	78	83	69	65	68	66	54	50	50	56	750
1928	52	63	106	75	61	59	61	69	54	52	49	55	756
1929	67	63	82	86	80	65	67	55	49	49	49	54	766
1930	59	67	71	79	73	74	69	65	50	55	47	56	765
Total:													
1919	494	1,014	1,556	2,761	2,424	1,890	1,276	1,018	826	691	394	341	14,686
1920	508	815	1,447	1,934	2,203	1,805	1,143	911	806	594	398	382	12,946
1921	653	1,161	2,209	2,467	2,055	1,561	1,142	1,107	909	727	488	531	15,010
1922	809	1,025	1,952	2,902	2,583	1,926	1,304	1,019	816	704	484	492	16,016
1923	852	1,032	2,118	2,268	2,852	2,066	1,349	1,180	988	844	555	587	16,691
1924	714	1,006	1,654	2,539	2,544	1,871	1,431	1,042	876	748	457	524	15,406
1925	618	1,176	1,846	2,563	2,193	2,025	1,315	1,106	930	709	433	626	15,540
1926	906	1,070	1,741	2,086	2,261	2,015	1,386	1,081	933	699	581	752	15,511
1927	971	1,178	1,997	2,730	2,523	1,767	1,226	1,004	897	704	603	608	16,208
1928	863	1,320	2,034	2,361	2,503	1,763	1,334	1,076	938	793	545	607	16,137
1929	918	831	1,816	2,595	2,332	1,814	1,409	1,150	944	735	532	632	15,708
1930	918	1,110	2,063	2,632	2,365	1,728	1,378	943	953	716	592	769	16,167

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets. Reported in cases of 30 dozen. See 1927 Yearbook, p. 1098, for data for earlier years.

TABLE 495.—*Eggs: Receipts at six markets by State of origin, 1922–1930*

BOSTON

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Maine	99	122	99	100	82	76	84	70	64
New Hampshire	38	44	28	32	22	25	31	24	28
Vermont	37	36	25	27	18	17	22	17	17
Massachusetts	24	21	16	12	7	16	7	6	10
New York	40	36	37	28	31	41	32	31	27
Ohio	108	87	75	39	52	115	53	52	44
Indiana	320	233	185	156	163	211	152	133	117
Illinois	710	845	691	390	327	319	251	195	161
Michigan	42	43	48	40	41	41	36	36	35
Minnesota	108	109	191	250	229	219	236	221	229
Iowa	142	146	186	259	270	307	194	245	272
Missouri	100	78	80	158	134	131	106	107	64
Nebrsska	19	19	31	61	91	87	94	128	139
Kansas	83	61	57	174	182	206	244	253	171
Other States	100	64	80	107	159	149	215	200	195
Total	1,970	1,944	1,829	1,833	1,808	1,960	1,757	1,718	1,573

CHICAGO

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
Illinois	310	256	194	170	148	152	120	184	150
Michigan	18	18	20	14	13	37	57	40	22
Wisconsin	474	584	592	473	485	503	427	477	490
Minnesota	462	610	644	573	618	583	545	688	772
Iowa	843	996	892	888	875	927	826	804	977
Missouri	1,045	880	661	604	655	832	674	566	542
North Dakota	23	33	46	42	53	27	38	45	40
South Dakota	405	551	595	564	514	445	467	445	508
Nebraska	352	359	465	511	464	420	438	429	399
Kansas	532	501	433	439	403	477	446	315	232
Arkansas	14	20	3	15	23	48	32	10	2
Oklahoma	103	101	72	87	70	82	96	68	35
Texas	22	49	25	14	13	36	97	67	13
Other States	81	51	37	104	241	332	338	260	293
Total	4,684	5,009	4,679	4,498	4,575	4,901	4,601	4,398	4,475

NEW YORK

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
New York	491	645	615	688	637	605	666	660	625
New Jersey	134	199	222	216	213	194	180	214	228
Pennsylvania	265	238	274	244	240	212	191	189	214
Ohio	514	436	327	324	394	356	276	204	209
Indiana	726	575	526	568	542	566	468	437	454
Illinois	1,379	1,342	1,223	1,258	939	950	869	771	829
Michigan	100	107	97	70	56	36	46	42	70
Wisconsin	54	54	68	90	78	54	54	29	49
Minnesota	217	264	261	246	201	178	204	195	279
Iowa	921	934	942	924	1,102	1,038	1,071	1,254	1,388
Missouri	438	453	415	364	351	342	349	403	276
Nebraska	38	55	57	56	55	64	132	145	166
Kansas	222	242	181	197	237	214	280	318	275
Delaware	52	63	82	80	80	87	72	39	39
Maryland	84	124	124	118	118	141	131	88	70
Virginia	65	99	104	92	80	111	102	89	79
Kentucky	143	103	61	74	69	97	63	23	31
Tennessee	251	249	141	189	120	195	186	113	87
Washington	143	271	254	375	543	655	661	669	760
California	354	430	331	456	439	502	589	581	698
Other States	230	273	238	265	324	451	698	666	769
Total	6,821	7,156	6,543	6,894	6,818	7,048	7,288	7,129	7,595

PHILADELPHIA

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
New York	17	35	26	29	19	6	24	41	22
Pennsylvania	147	174	155	133	109	97	273	274	287
Ohio	149	100	103	129	100	96	54	51	47
Indiana	149	125	103	98	113	129	60	56	44
Illinois	274	312	304	264	189	110	124	113	124
Michigan	145	163	148	123	113	95	61	57	47
Wisconsin	29	34	34	37	53	46	38	52	65
Minnesota	63	75	84	113	104	151	196	218	237
Iowa	71	80	106	109	105	127	128	126	125

TABLE 495.—*Eggs: Receipts at six markets by State of origin, 1922–1930*—Continued

PHILADELPHIA—Continued

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Missouri	152	147	134	131	260	221	183	167	157
Nebraska	15	36	15	17	46	30	29	34	39
Kansas	48	70	45	43	68	60	91	71	78
Delaware	46	53	46	35	23	16	49	51	44
Maryland	68	66	58	55	38	35	38	43	55
Virginia	144	149	153	120	99	129	125	108	86
West Virginia	27	26	21	17	9	13	6	5	4
Tennessee	61	25	12	27	15	59	22	15	25
Other States	98	57	48	92	103	129	234	215	273
Total	1,703	1,727	1,595	1,572	1,566	1,549	1,735	1,697	1,759

SAN FRANCISCO

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
Idaho	1	6	3	6	10	6	13	3	2
Washington	6	10	6	11	6	17	6	4	(1)
Oregon	7	13	10	37	16	19	23	18	8
California	824	825	737	686	710	705	710	737	749
Other States	--------	1	4	3	2	3	4	4	6
Total	838	855	760	743	744	750	756	766	765

LOS ANGELES

State of origin	1922	1923	1924	1925	1926	1927	1928	1929	1930
Idaho	--------	--------	--------	62	56	22	10	31	22
Utah	--------	--------	--------	16	26	19	4	20	52
Oregon	--------	--------	--------	24	19	6	7	18	5
California	--------	--------	--------	456	446	409	604	641	761
Other States	--------	--------	--------	17	13	4	8	25	4
Total	--------	--------	--------	575	560	460	633	735	844

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets. Reported in cases of 30 dozen.

[1] Not over 500 cases.

TABLE 496.—*Case and frozen eggs: Cold-storage holdings, United States, 1921–1930*

Kind and year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
Case eggs: [1]	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
1921	408	43	43	1,926	4,909	6,844	7,534	7,605	7,210	6,269	4,380	2,403
1922	889	179	13	950	4,648	8,056	9,811	10,161	9,608	7,924	5,726	3,257
1923	1,311	213	13	453	3,737	7,890	10,222	10,509	9,883	8,737	6,645	4,028
1924	1,927	500	44	579	3,563	6,875	8,685	9,267	8,778	7,409	5,267	3,102
1925	1,050	81	21	1,240	4,872	7,712	9,482	10,024	9,873	8,612	6,322	3,786
1926	1,683	578	77	872	3,735	7,236	9,133	9,845	9,573	8,048	5,888	3,215
1927	1,096	253	92	1,868	5,501	8,962	10,565	10,746	9,650	7,960	5,485	2,956
1928	882	26	66	1,087	4,515	8,168	10,002	10,496	9,944	8,542	6,247	3,542
1929	1,415	248	11	559	3,952	6,705	8,510	8,962	8,547	7,195	4,930	2,631
1930	704	139	84	2,231	5,766	9,178	10,743	11,198	10,375	9,174	6,785	4,154
Frozen eggs: [2]	*1,000 lbs.*	*1,000 lbs*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1921	27,325	24,927	22,363	20,873	21,730	26,822	27,737	27,952	27,408	26,656	26,114	22,899
1922	19,260	16,209	13,193	10,473	14,154	18,273	23,528	27,855	34,516	33,545	30,523	26,233
1923	22,787	18,517	14,603	10,311	12,921	20,730	29,686	36,192	37,280	43,836	40,424	36,004
1924	32,087	27,682	23,106	20,736	23,707	29,956	33,565	35,184	34,128	31,006	26,633	22,100
1925	21,303	16,292	11,364	11,353	19,579	29,544	38,379	42,855	47,099	44,299	45,314	39,336
1926	33,905	29,256	24,167	21,849	25,739	34,815	45,688	51,810	52,634	51,062	44,966	38,620
1927	33,593	31,207	26,053	33,272	52,053	71,605	81,263	81,418	77,508	71,208	62,066	54,703
1928	47,020	38,575	31,362	34,411	51,532	67,941	77,744	81,670	89,196	82,255	73,327	64,201
1929	56,181	48,055	38,250	34,918	51,825	71,560	84,766	91,488	86,693	81,541	70,331	61,772
1930	53,644	44,080	35,192	49,751	76,664	106,904	115,134	116,272	113,138	106,631	98,359	89,571

Bureau of Agricultural Economics. Compiled from reports made by cold-storage establishments.

[1] 30-dozen cases. [2] Quantities given are net weight.

TABLE 497.—*Eggs and egg products: International trade, average 1909–1913, annual 1926–1929*

EGGS IN THE SHELL

Country	Calendar year									
	Average 1909–1913		1926		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*
China	270	25,542	0	63,230	0	50,235	0	52,059	0	50,489
Denmark	2,243	34,340	192	69,351	284	70,405	153	65,750	21	65,474
Netherlands	19,542	29,360	9,620	86,414	10,502	103,614	11,376	111,145	4,879	119,909
Irish Free State	(1)	(1)	440	43,662	372	49,462	547	50,465	275	48,109
Poland	(1)	(1)	82	86,076	184	96,400	601	80,190	298	78,620
United States	[2] 1,701	12,108	298	26,634	250	28,707	286	20,192	308	12,075
Italy	4,104	33,482	10,226	31,535	22,379	20,700	26,299	17,675	24,071	15,542
Morocco	-------	[3] 5,653	0	15,614	0	11,983	0	13,207	0	18,469
Belgium	19,148	11,521	790	32,969	994	39,956	917	56,819	1,487	59,405
France	37,215	8,920	7,337	17,020	9,435	15,862	11,723	46,564	21,639	37,794
Egypt	[2] 101	9,690	1	8,939	0	9,197	14	10,625	1	12,461
Hungary	[4] 91,561	[4] 177,153	242	24,754	299	20,935	410	12,999	441	10,585
Bulgaria	55	16,512	0	17,391	0	18,335	0	15,650	0	18,696
Rumania	18	12,323	1	16,683	1	11,696	-------	-------	-------	-------
Lithuania	(1)	(1)	0	5,787	0	5,349	0	5,388	0	4,626
Algeria	86	187	2	7,010	[5] 4	4,702	[5] 30	5,762	[5] 49	6,839
Union of South Africa	1,382	[6] 90	62	2,684	126	3,600	146	3,929	48	4,546
Sweden	4,207	3,781	1,560	2,619	215	5,485	334	5,432	351	7,419
Estonia	(1)	(1)	0	884	0	1,340	10	1,960	0	1,859
Finland	2,899	3	23	83	17	26	74	9	[5] 14	[5] 58
Norway	387	4	126	452	84	98	102	178	119	995
Russia	18,081	274,891	-------	43,808	-------	102,186	-------	141,429	-------	65,219
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	190,015	0	220,741	500	243,012	965	263,740	1,131	247,430	1,556
Germany	228,279	675	196,852	182	225,118	286	245,746	685	229,412	253
Japan	6,867	0	25,462	0	21,700	0	16,269	0	10,074	0
Spain	7,404	618	25,318	20	35,102	12	48,585	12	[5] 44,341	[5] 13
Switzerland	19,747	48	17,198	10	16,159	12	16,964	17	18,004	16
Austria	(1)	(1)	22,315	1,732	24,780	2,002	25,692	1,727	[5] 20,884	[5] 1,773
Cuba	4,732	0	11,774	0	11,220	0	6,392	0	[5] 2,736	0
Philippine Islands	4,315	0	4,942	0	5,728	0	6,016	0	7,237	0
Mexico	[3] 824	0	4,616	0	5,009	-------	3,903	-------	-------	-------
Canada	6,341	148	3,560	1,777	3,227	448	997	988	713	1,148
Argentina	2,351	0	8,477	1,475	10,976	977	11,792	1,073	[5] 11,388	[5] 481
Czechoslovakia	(1)	(1)	4,032	1,437	4,287	3,287	7,205	1,999	7,115	1,921
Total, 34 countries	673,875	657,059	576,289	610,732	651,464	678,261	706,323	725,059	653,335	646,350

*Preliminary.
[1] Figures for pre-war years are included in the countries of the pre-war boundaries.
[2] 1 year only.
[3] 2-year average.
[4] Average for Austria-Hungary.
[5] International Yearbook of Agricultural Statistics.
[6] 4-year average.

TABLE 497.—*Eggs and egg products: International trade, average 1909–1913, annual 1926–1929*—Continued

EGGS NOT IN THE SHELL

Country	Calendar year: Average 1909–1913, Imports	Average 1909–1913, Exports	1926, Imports	1926, Exports	1927, Imports	1927, Exports	1928, Imports	1928, Exports	1929 *, Imports	1929 *, Exports
PRINCIPAL EXPORTING COUNTRY	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
China	0	17, 217	0	132, 471	0	100, 856	0	126, 803	0	150, 923
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	------	------	65, 235	613	70, 058	466	65, 221	614	74, 542	384
United States	[6] 394	(7)	25, 738	522	15, 341	661	23, 474	508	26, 030	326
Germany	11, 214	3, 225	14, 559	2, 157	17, 836	1, 544	19, 362	2, 385	25, 544	2, 413
France	3, 297	851	5, 893	124	4, 978	175	9, 026	99	11, 919	514
Netherlands	0	0	3, 882	665	3, 970	862	4, 133	1, 064	5, 485	791
Italy	381	4	1, 318	0	953	27	1, 376	28	1, 647	6
Canada	(7)	(7)	1, 379	0	2, 025	0	3, 030	0	560	0
Irish Free State	(1)	(1)	1, 022	22	1, 090	37	883	13	1, 067	4
Belgium	------	------	795	112	1, 110	85	1, 169	194	1, 628	589
Sweden	[3] 255	0	758	20	674	0	828	1	1, 232	2
Denmark	526	[8] 6	569	3	461	6	293	11	662	[5] 1
Czechoslovakia	(1)	(1)	568	23	812	22	901	9	1, 235	7
Union of South Africa	(7)	(7)	71	62	40	5	24	0	14	0
Norway	174	0	12	0	6	0	10	0	[5] 16	0
Total, 15 countries	16, 241	21, 303	121, 799	136, 794	119, 354	104, 746	129, 730	131, 729	151, 581	155, 960

Bureau of Agricultural Economics. Official sources, unless otherwise noted. In countries reporting other than dozens of eggs, the conversion factor used is 1½ pounds equals one dozen.

1 Figures for pre-war years are included in the countries of the pre-war boundaries.
3 2-year average.
5 International Yearbook of Agricultural Statistics.
6 4-year average.
7 Stated in value only.
8 3-year average.

TABLE 498.—*Eggs: Estimated average price per dozen received by producers, United States, 1910–1930*

Year beginning April	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910–11	18. 6	18. 4	18. 2	17. 9	18. 5	20. 9	23. 8	27. 2	29. 7	26. 2	19. 3	15. 7	19. 3
1911–12	14. 8	14. 6	14. 4	14. 8	16. 4	18. 7	21. 8	26. 1	29. 1	29. 3	26. 8	21. 2	18. 2
1912–13	17. 4	16. 9	16. 7	17. 0	18. 2	20. 6	24. 0	27. 8	28. 2	24. 8	21. 1	17. 9	18. 9
1913–14	15. 9	16. 5	16. 8	16. 4	17. 7	21. 3	26. 0	31. 3	32. 9	29. 8	25. 3	22. 2	19. 8
1914–15	16. 4	16. 9	17. 2	17. 5	19. 1	22. 5	23. 7	28. 2	31. 9	31. 7	23. 7	16. 5	19. 3
1915–16	16. 6	16. 5	16. 1	16. 3	17. 3	20. 6	24. 6	29. 4	31. 1	28. 8	24. 2	18. 2	19. 0
1916–17	17. 7	18. 5	18. 9	19. 9	21. 6	25. 3	30. 4	34. 9	38. 3	38. 1	35. 7	25. 3	23. 3
1917–18	28. 5	30. 2	29. 9	29. 0	30. 5	35. 8	38. 5	41. 2	45. 9	48. 9	45. 8	30. 9	33. 0
1918–19	30. 4	30. 6	29. 5	33. 0	35. 2	39. 1	44. 9	51. 7	59. 3	55. 3	34. 8	33. 9	34. 9
1919–20	36. 0	38. 9	36. 1	37. 9	40. 6	43. 1	51. 0	59. 1	69. 6	60. 9	48. 5	40. 5	41. 8
1920–21	36. 6	37. 5	35. 9	37. 8	42. 5	48. 6	54. 6	62. 9	67. 1	54. 5	31. 0	26. 8	39. 3
1921–22	20. 5	19. 4	20. 1	24. 3	28. 9	30. 9	39. 4	50. 0	51. 1	31. 7	31. 4	19. 5	25. 3
1922–23	20. 0	20. 9	20. 2	20. 3	20. 6	27. 3	34. 6	43. 6	47. 2	37. 8	29. 9	25. 4	24. 7
1923–24	21. 6	21. 8	20. 9	21. 3	23. 6	29. 8	34. 6	45. 6	45. 5	35. 4	33. 6	20. 4	25. 2
1924–25	19. 1	19. 8	21. 1	22. 8	26. 1	31. 8	38. 2	45. 8	49. 9	48. 6	35. 7	23. 9	26. 1
1925–26	24. 2	24. 8	26. 1	27. 9	30. 0	31. 1	37. 7	46. 8	48. 1	36. 3	28. 9	24. 1	28. 3
1926–27	24. 8	25. 2	25. 7	25. 7	26. 4	31. 5	36. 8	44. 9	47. 6	36. 9	29. 0	20. 8	27. 5
1927–28	20. 3	19. 8	17. 8	20. 7	23. 4	29. 4	35. 6	41. 6	43. 3	38. 2	29. 1	23. 4	24. 2
1928–29	22. 8	24. 2	23. 9	25. 6	27. 4	31. 4	34. 9	39. 6	42. 9	33. 0	31. 9	28. 0	27. 4
1929–30	23. 0	24. 4	26. 1	27. 2	29. 8	33. 9	38. 4	44. 2	45. 8	38. 4	31. 8	21. 3	27. 9
1930–31	21. 5	20. 0	18. 6	18. 8	20. 6	25. 3	26. 5	31. 7	26. 8	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production eggs, 1919 census, by States; yearly price obtained by weighting monthly prices by receipts monthly.

TABLE 499.—*Eggs: Average price per dozen at five markets, by months, specified years*

Market, grade, and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
New York:													
Fresh firsts—	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	38	27	23	22	21	20	18	21	24	26	31	34	25
1911	28	19	17	17	17	15	17	18	21	24	32	35	22
1912	34	36	22	20	19	19	20	21	24	26	31	29	25
1913	24	22	19	19	20	19	19	23	27	29	39	36	25
1914	33	29	26	20	20	21	21	24	26	27	35	38	27
1915	38	26	20	21	20	20	20	22	26	30	35	34	26
1916	31	26	22	22	22	23	25	29	33	34	41	46	30
1917	46	45	31	34	35	33	34	38	41	41	49	57	40
1918	65	58	38	35	35	36	41	43	47	53	65	67	49
1919	62	44	44	43	46	44	46	48	51	62	69	79	53
1920	71	59	48	44	44	43	47	51	57	64	77	78	57
1921	67	42	31	27	25	27	33	35	39	49	58	54	41
1922	41	38	25	26	27	25	24	26	39	43	53	53	35
1923	42	37	31	27	27	24	25	29	35	39	53	47	35
1924	42	39	25	24	25	27	29	33	39	44	52	57	36
1925	59	44	30	29	32	33	33	33	37	43	56	51	40
1926	38	31	29	32	31	30	29	31	38	40	50	48	36
1927	42	32	25	26	23	23	25	28	34	40	44	45	32
1928	45	32	29	28	30	29	30	31	33	32	37	37	33
1929	36	41	33	28	31	31	32	34	36	40	48	51	37
1930	42	35	26	27	23	24	22	25	25	26	31	29	28
Chicago:													
Fresh firsts—													
1927	38	27	24	23	22	22	23	26	33	37	42	43	30
1928	43	29	27	27	28	28	28	30	32	34	41	39	32
1929	36	38	29	26	30	29	31	33	37	42	47	48	35
1930	40	34	24	24	21	22	21	25	26	28	33	28	27
Boston:													
Western firsts—													
1927	41	31	26	25	24	23	25	28	34	39	44	44	32
1928	46	35	29	29	30	30	30	32	34	36	44	43	35
1929	38	43	32	28	31	31	32	35	37	40	49	52	37
1930	44	37	26	26	24	24	22	25	25	26	34	28	29
Philadelphia:													
Extra firsts—													
1927	43	33	27	26	26	25	28	33	40	48	55	50	36
1928	50	37	30	30	32	32	33	36	39	42	50	45	38
1929	41	45	35	29	33	34	36	39	44	49	56	58	41
1930	46	40	28	28	26	27	28	32	33	36	44	32	33
San Francisco:													
Fresh extras—													
1927	33	25	23	24	24	24	26	32	39	47	44	38	32
1928	33	24	25	25	26	29	30	33	39	44	45	38	33
1929	31	26	25	26	31	32	37	41	44	52	49	44	36
1930	36	28	28	28	27	26	26	31	37	40	41	27	31

Bureau of Agricultural Economics. Prices 1910–1922 are averages of daily prices in New York Journal of Commerce, Price Current and Chicago Dairy Produce, Philadelphia Commercial List; average of weekly prices quoted in Boston Chamber of Commerce and Pacific Dairy Review. Beginning 1923, monthly prices from the Bureau of Labor Statistics, except San Francisco, which is from the Pacific Dairy Review. Earlier data are available in 1925 Yearbook, p. 1224, Table 636, and 1927 Yearbook, p. 1105.

STATISTICS OF FOREIGN TRADE IN AGRICULTURAL PRODUCTS

TABLE 500.—*Summary of exports and imports, United States, 1908–09 to 1929–30*

Year beginning July—	Total exports	Agricultural exports[1]			Total imports	Agricultural imports[1]	Percentage of total	Excess of agricultural exports	Forest products			
		Domestic	Percentage of total	Reexports					Exports		Imports	Excess of imports
									Domestic	Reexports		
	1,000 dollars	*1,000 dollars*	*P. ct.*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*P. ct.*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
1908–09	1, 638, 356	903, 238	55. 1	12, 779	1, 311, 920	701, 780	53. 5	214, 237	72, 442	1, 789	60, 753	[2]13, 478
1909–10	1, 710, 084	871, 158	50. 9	22, 162	1, 556, 947	791, 372	50. 8	101, 948	85, 030	2, 110	75, 009	[2]12, 131
1910–11	2, 013, 549	1, 030, 794	51. 2	20, 573	1, 527, 226	770, 781	50. 5	280, 586	103, 039	1, 679	71, 736	[2]32, 982
1911–12	2, 170, 320	1, 050, 627	48. 4	17, 171	1, 653, 265	886, 399	53. 6	181, 399	108, 122	1, 350	69, 581	[2]39, 891
1912–13	2, 428, 506	1, 123, 652	46. 3	19, 652	1, 813, 008	912, 925	50. 4	230, 379	124, 836	2, 809	82, 878	[2]44, 767
1913–14	2, 329, 684	1, 113, 974	47. 8	20, 286	1, 893, 926	998, 346	52. 7	135, 914	106, 979	1, 961	81, 162	[2]27, 778
1914–15	2, 716, 178	1, 475, 938	54. 3	38, 222	1, 674, 170	997, 184	59. 6	510, 976	52, 554	1, 287	79, 451	25, 610
1915–16	4, 272, 178	1, 518, 071	35. 5	45, 017	2, 197, 884	1, 348, 291	61. 3	214, 797	68, 155	1, 435	94, 265	24, 675
1916–17	6, 227, 164	1, 968, 253	31. 6	45, 420	2, 659, 355	1, 598, 091	60. 1	415, 582	68, 919	3, 392	129, 580	57, 269
1917–18	5, 838, 652	2, 280, 466	39. 1	44, 210	2, 945, 655	1, 825, 417	62. 0	499, 259	87, 181	1, 409	128, 490	39, 900
1918–19	7, 081, 462	3, 579, 918	50. 6	105, 587	3, 095, 720	1, 929, 384	62. 3	1,756,121	113, 275	3, 758	132, 588	15, 555
1919–20	7, 949, 309	3, 861, 511	48. 6	128, 191	5, 238, 352	3, 408, 977	65. 1	580, 725	190, 049	5, 380	229, 092	33, 663
1920–21	6, 385, 884	2, 607, 641	40. 8	90, 740	3, 654, 459	2, 059, 816	56. 4	638, 565	141, 876	4, 043	225, 162	79, 243
1921–22	3, 699, 909	1, 915, 866	51. 8	43, 587	2, 608, 079	1, 371, 510	52. 6	587, 943	94, 115	2, 316	156, 844	60, 413
1922–23	3, 886, 682	1, 799, 168	46. 3	48, 393	3, 780, 959	2, 076, 371	54. 9	[3]228, 810	129, 981	1, 945	234, 599	102, 673
1923–24	4, 223, 973	1, 867, 098	44. 2	62, 719	3, 554, 037	1, 874, 622	52. 7	55, 195	162, 374	1, 563	216, 711	52, 774
1924–25	4, 778, 155	2, 280, 381	47. 7	64, 168	3, 824, 128	2, 056, 619	53. 8	287, 930	156, 187	1, 291	227, 423	69, 945
1925–26	4, 653, 148	1, 891, 739	40. 7	75, 162	4, 464, 872	2, 528, 213	56. 6	[3]561, 312	162, 731	1, 450	238, 545	74, 364
1926–27	4, 867, 346	1, 907, 864	39. 2	72, 169	4, 252, 024	2, 280, 340	53. 6	[3]300, 307	171, 970	1, 365	238, 247	64, 912
1927–28	4, 773, 332	1, 815, 451	38. 0	73, 391	4, 147, 499	2, 193, 091	52. 9	[3]304, 249	174, 599	1, 528	215, 874	39, 747
1928–29	5, 283, 938	1, 847, 216	35. 0	63, 942	4, 291, 888	2, 178, 568	50. 8	[3]267, 410	178, 092	2, 157	222, 249	42, 000
1929–30[4]	4, 618, 105	1, 495, 164	32. 4	50, 660	3, 848, 864	1, 891, 575	49. 1	[3]345, 751	162, 405	1, 382	209, 715	45, 928

Bureau of Agricultural Economics. This table supercedes Table No. 472 in the Yearbook of Agriculture, 1927; the value of total imports and exports has been given and the imports of "rubber and similar gums" have been deducted from "imports of forest products" and added to "imports, agricultural." Also reexports of "rubber and similar gums" have been deducted from "reexports of forest products" and added to "reexports, agricultural."

Does not include forest products.
Excess of exports.
[3] Excess of agricultural imports.
[4] Preliminary.

TABLE 501.—*Agricultural products: Value of trade between continental United States and noncontiguous Territories, 1921–22 to 1929–30*

Year beginning July	Porto Rico		Hawaii		Alaska	
	Shipments to	Shipments from	Shipments to	Shipments from	Shipments to	Shipments from
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
1921–22	21, 926	53, 892	12, 734	66, 292	7, 123	13
1922–23	24, 080	61, 801	15, 976	93, 313	8, 297	190
1923–24	28, 819	66, 581	17, 539	104, 267	9, 016	365
1924–25	29, 710	70, 190	17, 954	97, 430	9, 774	415
1925–26	32, 212	70, 385	17, 806	105, 470	9, 539	516
1926–27	32, 603	84, 061	18, 019	98, 600	8, 737	720
1927–28	28, 146	82, 326	19, 004	110, 338	9, 435	231
1928–29	31, 466	53, 333	19, 348	103, 653	9, 108	290
1929–30[1]	28, 105	75, 806	19, 771	98, 097	9, 257	511

Bureau of Agricultural Economics. Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1923–1930.

[1] Preliminary.

TABLE 502.—*Agricultural products: Value of principal groups exported from and imported into the United States, 1927–28 to 1929–30*

Article	Year beginning July					
	Domestic exports			Imports		
	1927–28	1928–29	1929–30 [1]	1927–28	1928–29	1929–30 [1]
ANIMALS AND ANIMAL PRODUCTS	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Animals, live	6, 700	6, 058	5, 307	26, 198	29, 634	21, 148
Dairy products	17, 043	17, 668	15, 808	37, 748	37, 764	31, 903
Eggs and egg products	6, 534	5, 145	4, 470	3, 710	8, 130	8, 851
Hides and skins, raw (except fur)	11, 243	9, 112	5, 896	146, 423	131, 780	129, 886
Meats and meat products	178, 782	187, 873	181, 584	23, 044	30, 654	23, 743
Silk, unmanufactured				382, 469	393, 648	360, 683
Wool and mohair, unmanufactured	172	107	103	79, 443	86, 521	59, 413
Animal products, miscellaneous	13, 608	13, 658	11, 185	37, 739	40, 862	40, 686
Total animals and animal products	234, 082	239, 621	224, 353	736, 774	758, 993	676, 318
VEGETABLE PRODUCTS						
Chocolate and cocoa	596	606	616	57, 398	45, 771	40, 754
Coffee	4, 540	2, 627	2, 747	297, 852	308, 268	256, 541
Cotton lint, unmanufactured	813, 401	861, 099	667, 251	44, 803	56, 437	42, 078
Linters	7, 136	7, 120	3, 959			
Total cotton, unmanufactured	820, 537	868, 219	671, 210	44, 803	56, 437	42, 078
Fruits	112, 129	149, 349	110, 429	56, 414	56, 392	61, 150
Grains and grain products	404, 041	335, 425	248, 278	34, 616	37, 026	24, 280
Nuts	1, 524	1, 528	1, 398	29, 472	31, 208	24, 739
Oilseeds and oilseed products	42, 116	40, 707	32, 879	143, 862	188, 383	167, 260
Rubber and similar gums				312, 300	235, 075	195, 680
Seeds, except oilseeds	3, 498	2, 854	3, 755	8, 516	9, 343	7, 820
Spices	248	296	344	19, 019	18, 811	18, 727
Sugar, molasses, and sirups	9, 527	9, 951	6, 489	245, 719	227, 825	176, 565
Tea				29, 006	26, 968	24, 321
Tobacco, unmanufactured	135, 970	148, 077	148, 451	58, 804	55, 803	47, 556
Vegetables	21, 255	23, 333	23, 644	39, 196	39, 880	49, 527
Vegetable products, miscellaneous	25, 525	24, 623	20, 571	79, 340	82, 385	78, 259
Total vegetable products	1, 581, 369	1, 607, 595	1, 270, 811	1, 456, 317	1, 419, 575	1, 215, 257
Total animal and vegetable products	1, 815, 451	1, 847, 216	1, 495, 164	2, 193, 091	2, 178, 568	1, 891, 575
FOREST PRODUCTS						
Dyeing and tanning materials	2, 716	2, 414	2, 258	9, 728	8, 019	8, 067
Gums, resins, and balsams	29, 685	28, 701	28, 511	31, 595	35, 969	29, 136
Wood	136, 685	138, 635	123, 310	87, 531	86, 210	77, 929
Forest products, miscellaneous	5, 514	8, 342	8, 326	87, 020	92, 051	94, 583
Total forest products	174, 599	178, 092	162, 405	215, 874	222, 249	209, 715
Total agricultural products	1, 990, 050	2, 025, 308	1, 657, 569	2, 408, 965	2, 400, 817	2, 101, 290

Bureau of Agricultural Economics. Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1928 and 1930. In the statistics of foreign commerce of the United States, the Philippine Islands are treated as a foreign country. The statistics of foreign commerce include the trade of the customs districts of Alaska, Hawaii, and Porto Rico with foreign countries, but do not include the trade of these Territories with the United States.

[1] Preliminary.

TABLE 503.—*Index numbers of United States agricultural exports, 1909–10 to 1929–30*

[Base 1910–1914=100]

Year beginning July	All commodities	All commodities except cotton	Cotton fiber	Grains and products	Cattle and meat products	Dairy products	Fruits
1909–10	78	86	73	82	91	58	76
1910–11	92	92	91	85	104	93	89
1911–12	114	100	125	78	115	126	101
1912–13	110	119	103	143	97	120	136
1913–14	106	103	108	112	92	103	98
1914–15	138	189	99	301	126	302	119
1915–16	118	184	70	237	164	479	109
1916–17	118	182	70	217	164	716	101
1917–18	101	165	53	179	197	975	63
1918–19	145	255	63	272	287	1, 287	111
1919–20	134	207	80	218	185	1, 275	122
1920–21	127	212	64	329	154	524	108
1921–22	137	218	76	317	153	571	105
1922–23	112	182	59	246	169	406	121
1923–24	104	153	67	143	179	451	214
1924–25	126	167	95	225	140	396	184
1925–26	106	123	93	117	114	327	211
1926–27	136	143	131	188	98	288	301
1927–28	112	138	92	188	98	263	258
1928–29	117	141	99	174	102	243	372
1929–30	97	117	82	130	104	221	216

Bureau of Agricultural Economics.

TABLE 504.—*Exports and imports of selected forest products, 1908–09 to 1929–30*

Year beginning July	Domestic exports: Lumber: Boards, deals, and planks	Domestic exports: Lumber: Staves	Domestic exports: Rosin	Domestic exports: Spirits of turpentine	Domestic exports: Timber, hewn and sawed	Imports: Camphor, crude	Imports: Lumber: Boards, deals, planks, and other sawed	Imports: Lumber: Shingles	Imports: Shellac	Imports: Wood pulp
	1,000 M feet	*Thousands*	*1,000 barrels*	*1,000 gallons*	*1,000 M feet*	*1,000 pounds*	*1,000 M feet*	*1,000 M*	*1,000 pounds*	*1,000 long tons*
1908–9	1, 358	52, 583	2, 170	17, 502	419	1, 990	846	1, 058	19, 185	274
1909–10	1, 684	49, 784	2, 144	15, 588	491	3, 007	1, 054	763	29, 402	378
1910–11	2, 032	65, 726	2, 190	14, 818	532	3, 726	872	643	15, 495	492
1911–12	2, 307	64, 163	2, 474	19, 599	438	2, 155	905	515	18, 746	478
1912–13	2, 550	89, 006	2, 806	21, 094	512	3, 709	1, 091	560	21, 912	502
1913–14	2, 405	77, 151	2, 418	18, 901	441	3, 477	929	895	16, 720	508
1914–15	1, 129	39, 297	1, 372	9, 464	174	3, 729	939	1, 487	24, 153	588
1915–16	1, 177	57, 538	1, 571	9, 310	201	4, 574	1, 218	1, 769	25, 818	507
1916–17	1, 042	61, 469	1, 639	8, 842	184	6, 885	1, 175	1, 924	32, 540	699
1917–18	1, 068	63, 207	1, 071	5, 095	106	3, 638	1, 283	1, 878	22, 913	504
1918–19	1, 073	62, 753	882	8, 065	92	2, 623	977	1, 757	14, 269	475
1919–20	1, 518	80, 791	1, 322	7, 461	234	4, 026	1, 492	2, 152	34, 151	727
1920–21	1, 269	65, 710	877	9, 742	123	2, 093	920	1, 831	23, 872	624
1921–22	1, 543	35, 162	786	10, 786	268	1, 592	1, 124	2, 190	30, 768	902
1922–23	1, 549	57, 466	1, 040	9, 012	383	3, 498	1, 958	2, 695	32, 773	1, 293
1923–24	1, 867	60, 868	1, 205	11, 194	815	1, 955	1, 786	2, 417	28, 512	1, 188
1924–25	1, 929	79, 922	1, 412	12, 308	586	1, 904	1, 732	2, 551	21, 436	1, 529
1925–26	1, 985	75, 534	1, 073	10, 254	652	2, 616	1, 869	2, 482	26, 188	1, 469
1926–27	2, 013	74, 826	1, 229	13, 820	707	2, 175	1, 841	2, 275	28, 707	1, 509
1927–28	2, 318	78, 466	1, 300	14, 332	825	2, 704	1, 529	2, 034	23, 012	1, 521
1928–29	2, 387	82, 409	1, 309	14, 175	711	5, 064	1, 441	2, 052	31, 548	1, 643
1929–30 [1]	2, 100	78, 624	1, 367	15, 745	657	1, 777	1, 457	1, 387	26, 444	1, 722

Bureau of Agricultural Economics. Compiled from Foreign Commerce and Navigation of the United States, 1909–1918, and Monthly Summary of Foreign Commerce of the United States, June issues, 1920–1930.

[1] Preliminary.

TABLE 505.—*Exports of selected domestic agricultural products, averages 1899–1900 to 1908–09, annual 1908–09 to 1929–30*

Year beginning July	Butter	Cheese	Milk, condensed and evaporated	Eggs in the shell	Pork and its products, total [1]	Pork, fresh	Pork, pickled	Bacon, including Cumberland sides	Hams and shoulders, including Wiltshire sides	Lard
Average:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 dozen*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1899–1900 to 1903–4	15,425	31,552	([2])	3,125	1,305,217	28,090	119,050	361,686	209,954	576,414
1904–5 to 1908–9	12,484	11,849	([2])	5,439	1,248,682	13,157	125,799	271,929	208,230	622,299
1908–9	5,981	6,823	([2])	5,207	1,053,142	9,555	52,355	244,579	212,170	528,723
1909–10	3,141	2,847	13,311	5,326	707,110	1,040	40,032	152,163	146,885	362,928
1910–11	4,878	10,367	12,180	8,559	879,455	1,355	45,729	156,675	57,709	476,108
1911–12	6,092	6,338	20,643	15,406	1,071,952	2,598	56,321	208,574	204,044	532,256
1912–13	3,586	2,599	16,526	20,409	984,697	2,458	53,749	200,994	159,545	519,025
1913–14	3,694	2,428	16,209	16,149	921,913	2,668	45,543	193,964	165,882	481,458
1914–15	9,851	55,363	37,236	20,784	1,106,180	3,908	45,656	346,718	203,701	475,532
1915–16	13,487	44,394	159,578	26,396	1,462,697	63,006	63,461	579,809	282,209	427,011
1916–17	26,835	66,050	259,141	24,926	1,501,948	50,436	46,993	667,152	266,657	444,770
1917–18	17,736	44,303	528,759	18,969	1,692,124	21,390	33,222	815,294	419,572	392,506
1918–19	33,740	18,792	728,741	28,385	2,704,694	19,644	31,504	1,238,247	667,240	724,771
1919–20	27,156	19,378	708,463	38,327	1,762,611	27,225	41,643	803,667	275,456	587,225
1920–21	7,829	10,826	262,668	26,960	1,522,162	57,075	33,286	489,298	172,012	746,157
1921–22	7,512	7,471	277,311	33,762	1,516,320	25,911	33,510	350,549	271,642	812,379
1922–23	9,410	8,446	157,038	34,284	1,794,880	43,772	40,934	408,334	319,269	952,642
1923–24	5,425	3,938	213,613	32,832	1,934,189	49,113	37,469	423,500	381,564	1,014,898
1924–25	8,384	9,432	173,547	25,107	1,400,149	27,603	26,726	236,263	292,214	792,735
1925–26	5,280	4,094	135,865	27,931	1,172,685	15,867	29,126	186,153	220,014	695,445
1926–27	5,048	3,773	108,942	27,962	1,012,668	10,881	27,962	127,576	143,649	675,812
1927–28	3,965	2,873	108,943	22,832	1,046,306	11,059	31,650	126,977	127,819	716,398
1928–29	3,778	2,572	112,492	15,982	1,112,394	10,641	39,906	129,248	125,396	780,914
1929–30*	3,582	2,339	101,572	14,234	1,138,572	18,771	39,833	131,670	131,572	787,160

Year beginning July	Beef and its products, total [3]	Oleo oil	Cotton lint [4]	Linters [4]	Cottonseed cake and meal	Linseed cake and meal	Prunes	Raisins	Apples, fresh	Oranges	Sugar, raw and refined [5]
Average:	*1,000 pounds*	*1,000 pounds*	*1,000 bales*	*1,000 bales*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 barrels*	*1,000 boxes*	*1,000 sh. tons*
1899–1900 to 1903–4	636,969	147,626	6,669	------	1,074,720	552,190	39,767	3,314	1,109	([2])	6
1904–5 to 1908–9	599,332	188,550	8,303	------	1,173,349	684,450	35,003	6,856	1,239	([2])	16
1908–9	418,844	179,985	8,896	------	1,233,750	682,765	22,602	7,880	896	867	40
1909–10	286,296	126,092	6,413	------	640,089	652,317	89,015	8,526	922	932	63
1910–11	265,924	138,697	8,068	------	804,597	559,675	51,031	18,660	1,721	1,179	28
1911–12	233,925	126,467	11,070	------	1,293,690	596,115	74,328	19,949	1,456	1,197	40
1912–13	170,208	92,850	9,125	------	1,128,092	838,120	117,951	28,121	2,150	1,063	22
1913–14	151,212	97,017	9,522	------	799,974	662,869	69,814	14,766	1,507	1,559	26
1914–15	394,981	80,482	8,581	226	1,479,065	524,794	43,479	24,845	2,352	1,759	275
1915–16	457,556	102,646	5,917	251	1,057,222	640,916	57,423	75,015	1,466	1,575	815
1916–17	423,674	67,110	5,702	474	1,150,160	536,984	59,645	51,993	1,740	1,850	625
1917–18	600,132	56,603	4,455	186	44,681	151,400	32,927	54,988	635	1,240	288
1918–19	591,302	59,292	5,442	84	311,624	202,788	59,072	84,150	1,576	1,402	558
1919–20	368,002	74,529	7,035	52	449,573	336,336	114,066	86,857	1,051	1,619	722
1920–21	203,815	106,415	5,570	53	454,701	391,264	57,461	24,492	2,665	2,001	292
1921–22	222,462	117,174	6,592	126	532,721	484,059	109,398	49,639	1,094	1,641	1,001
1922–23	194,912	104,956	5,205	48	454,350	574,612	79,229	93,962	1,756	1,799	375
1923–24	185,372	92,965	5,784	115	250,366	560,114	136,448	88,152	4,098	2,592	135
1924–25	190,211	105,145	8,239	200	885,375	691,126	171,771	90,783	3,201	2,197	251
1925–26	152,320	90,410	8,110	102	716,505	589,166	151,405	135,027	3,672	2,253	300
1926–27	151,531	92,720	11,281	278	990,516	625,121	175,544	152,337	7,098	3,340	114
1927–28	106,595	64,851	7,890	230	664,523	606,304	260,625	193,099	3,144	2,988	106
1928–29	101,303	63,187	8,520	219	571,200	645,120	273,051	221,756	7,014	4,223	128
1929–30*	102,081	61,093	7,097	143	338,240	624,960	142,989	128,585	3,426	3,674	79

Footnotes at end of table.

TABLE 505.—*Exports of selected domestic agricultural products, averages 1899–1900 to 1908–09 annual 1908–09 to 1929–30*—Continued

Year beginning July	Barley, including flour, and malt[6]	Corn, including corn meal	Oats, including oatmeal	Rice, including flour, meal, and broken rice	Rye, including flour	Wheat, including flour	Tobacco, unmanufactured[7]	Glucose and grape sugar	Hops	Starch, including cornstarch
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 pounds*	*1,000 bushels*	*1,000 bushels*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Average: 1899–1900 to 1903–4	11,931	111,484	22,188	3,511	2,734	196,690	328,321	167,108	11,420	68,173
1904–05 to 1908–9	9,907	77,857	13,614	17,009	1,186	116,181	321,197	151,690	15,613	52,143
1908–9	6,729	37,665	2,334	1,567	1,296	116,373	287,901	112,225	10,447	33,228
1909–10	4,454	38,128	2,549	7,050	242	89,173	357,196	149,820	10,589	51,536
1910–11	9,507	65,615	3,846	15,575	40	71,338	355,327	181,963	13,105	158,239
1911–12	1,655	41,797	2,678	26,798	31	81,891	379,845	171,156	12,191	83,645
1912–13	17,874	50,780	36,455	24,801	1,855	145,159	418,797	200,149	17,591	110,898
1913–14	6,945	10,726	2,749	18,223	2,273	147,955	449,750	199,531	24,263	76,714
1914–15	28,712	50,668	100,609	75,449	13,027	335,702	348,346	158,463	16,210	107,037
1915–16	30,821	39,897	98,960	120,695	15,250	246,221	443,293	186,406	22,410	210,185
1916–17	20,319	66,753	95,106	181,372	13,703	205,962	411,599	214,973	4,825	146,424
1917–18	28,717	49,073	125,091	196,363	17,186	132,579	289,171	97,858	3,495	73,883
1918–19	26,997	23,019	109,005	193,128	36,467	287,402	629,288	136,230	7,467	143,788
1919–20	34,555	16,729	43,436	483,385	41,531	222,030	648,038	245,264	30,780	237,609
1920–21	27,255	70,906	9,391	440,855	47,337	369,313	506,526	141,954	22,206	135,365
1921–22	27,543	179,490	21,237	541,509	29,944	282,566	463,389	273,982	19,522	386,873
1922–23	21,909	96,596	25,413	370,670	51,663	224,900	454,364	162,693	13,497	260,796
1923–24	13,913	23,135	8,796	227,757	19,902	159,880	597,630	148,051	20,461	262,842
1924–25	28,543	9,791	16,777	112,037	50,242	260,803	430,702	139,577	16,122	214,247
1925–26	30,449	24,783	39,687	48,175	12,647	108,035	537,240	170,142	14,998	224,569
1926–27	19,655	19,819	15,041	304,358	21,697	219,160	516,401	148,789	13,369	233,111
1927–28	39,274	19,409	9,823	309,788	26,346	206,259	489,996	145,951	11,812	281,388
1928–29	60,295	41,876	16,251	392,684	9,488	163,687	565,925	123,366	8,836	235,660
1929–30*	24,054	10,278	7,966	288,908	2,598	153,316	600,126	101,816	6,792	203,343

Year beginning July	Cornstarch[8]	Apples, dried	Apricots, dried	Apricots, canned[9]	Pears, canned[9]	Peaches, canned[9]	Pineapples, canned[9]	Grapes	Pears, fresh[9]	Grapefruit, fresh
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 boxes*
1912–13	----	41,575	35,017	----	----	----	----	----	----	----
1913–14	----	33,566	17,402	----	----	----	----	----	----	----
1914–15	----	42,589	23,764	----	----	----	----	----	----	----
1915–16	----	16,219	23,940	----	----	----	----	----	----	----
1916–17	----	10,358	9,841	----	----	----	----	----	----	----
1917–18	38,659	2,603	5,230	----	----	----	----	----	----	----
1918–19	106,727	18,909	20,975	----	----	----	----	----	----	----
1919–20	163,315	11,819	26,768	----	----	----	----	----	----	----
1920–21	110,514	18,053	8,332	----	----	----	----	----	----	----
1921–22	348,940	12,431	16,736	----	----	----	----	[10] 173	----	[10] 140
1922–23	254,060	12,817	11,193	[10] 13,809	49,358	54,624	21,848	14,022	36,785	252
1923–24	255,135	30,323	38,777	26,576	38,431	50,374	25,238	20,257	50,237	305
1924–25	209,865	19,225	13,292	31,360	53,851	57,390	26,252	20,302	41,452	427
1925–26	208,463	24,833	18,132	29,547	75,876	83,160	37,543	24,268	71,205	379
1926–27	212,375	32,670	17,901	35,896	66,104	81,896	37,426	30,791	73,877	613
1927–28	275,921	21,704	23,684	29,013	52,671	86,634	51,227	38,819	51,056	719
1928–29	231,667	50,024	24,652	26,249	82,652	101,438	47,533	55,638	82,847	940
1929–30*	200,558	23,769	19,101	33,235	54,709	74,470	46,309	46,158	62,024	854

Bureau of Agricultural Economics. Compiled from Foreign Commerce and Navigation of the United States, 1900–1918, and Monthly Summary of Foreign Commerce of the United States, June issues 1921–1930.
Conversion factors used: Corn meal, 1 barrel=4 bushels corn; oatmeal, 18 pounds=1 bushel oats; rye flour, 1 barrel=6 bushels rye; malt, 1.1 bushels=1 bushel barley; wheat flour, 1 barrel=1900–1908, 4.75 bushels grain; 1909–1917, 4.7 bushels; 1918 and 1919, 4.5 bushels; 1920, 4.6 bushels; 1921–1929, 4.7 bushels; apples, 3 boxes=1 barrel.

* Preliminary.
1 Includes canned, fresh, salted, or pickled pork, lard, neutral lard, lard oil, bacon, and hams.
2 Reported in value only.
3 Includes canned, cured, and fresh beef, oleo oil, oleo stock, oleomargarine, tallow, and stearin from animal fats.
4 Bales of 500 pounds gross; lint cotton and linters not separately reported prior to 1915.
5 Includes maple sugar, 1919–1929.
6 Includes barley flour 1919–1922. Barley flour not separately reported prior to 1919 nor since 1922.
7 Includes "Stems, trimmings, and scrap tobacco."
8 Included with "Starch" prior to 1918.
9 Given in value only prior to 1923.
10 Jan. 1 to June 30.

TABLE 506.—*Imports of selected agricultural products, averages 1899–1900 to 1908–9, annual 1908–9 to 1929–30*

Year beginning July	Butter	Cheese	Beef and veal, fresh	Cattle hides	Goatskins	Total hides and skins except furs	Silk [1]	Cotton, unmanufactured	Wool, unmanufactured, including mohair, etc.	Total, tobacco, unmanufactured
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Average: 1899–1900 to 1903–4	192	17,846	(2)	131,736	83,047	309,360	13,942	67,292	155,394	28,216
1904–5 to 1908–9	532	30,462	(2)	138,922	95,555	372,292	20,061	78,771	209,413	38,688
1908–9	646	35,548	(2)	192,252	104,048	444,554	25,188	86,518	266,409	43,123
1909–10	1,360	40,818	(2)	318,004	115,845	608,619	23,457	86,038	263,928	46,853
1910–11	1,008	45,569	(2)	150,128	86,914	374,891	26,666	113,768	137,648	48,203
1911–12	1,026	46,542	(2)	251,012	95,341	537,768	26,585	109,780	193,401	54,740
1912–13	1,162	49,388	(2)	268,042	96,250	572,197	32,101	121,852	195,293	67,977
1913–14	7,842	63,784	180,137	279,963	84,759	561,071	34,546	123,347	247,649	61,175
1914–15	3,828	50,139	184,491	344,341	66,547	538,218	31,053	185,205	308,083	45,809
1915–16	713	30,088	71,102	434,178	100,657	743,670	41,925	232,801	534,828	48,078
1916–17	524	14,482	15,217	386,600	105,640	700,207	40,351	147,062	372,372	49,105
1917–18	1,806	9,839	25,452	267,500	66,933	432,517	43,681	103,326	379,130	86,991
1918–19	4,131	2,442	36,670	253,877	89,005	448,142	50,069	103,592	422,415	83,951
1919–20	20,771	17,914	42,436	439,461	126,996	798,569	58,410	345,314	427,578	94,005
1920–21	34,344	16,585	41,956	198,573	41,728	352,193	34,778	125,939	318,236	58,923
1921–22	9,551	34,271	28,001	204,936	83,535	392,904	57,437	179,165	255,087	65,225
1922–23	15,772	54,555	32,481	405,383	89,401	682,893	63,188	236,092	525,473	75,786
1923–24	29,466	66,597	25,144	176,475	65,881	365,194	56,595	146,024	239,122	54,497
1924–25	7,189	61,489	12,419	199,310	65,956	387,447	70,270	155,092	284,706	76,870
1925–26	6,440	62,412	18,279	155,587	86,484	355,266	76,838	161,454	345,512	69,974
1926–27	10,710	89,782	22,098	156,938	83,571	368,876	85,162	190,963	271,128	92,983
1927–28	4,955	75,424	47,650	307,362	84,751	532,379	87,128	175,450	248,035	81,045
1928–29	3,299	84,606	62,481	216,348	94,486	447,384	90,662	227,454	270,937	79,284
1929–30*	2,851	78,201	30,190	294,832	101,120	548,547	87,408	197,657	220,474	63,182

Year beginning July	Rubber and similar gums, crude, total	Coffee	Tea	Cocoa or cacao beans	Bananas	Olives	Lemons	Onions	Tomatoes, fresh	Beans, dry
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 bunches*	*1,000 gallons*	*1,000 boxes*	*1,000 bushels*	*1,000 pounds*	*1,000 bushels*
Average: 1899–1900 to 1903–4	66,973	928,799	94,342	54,936	(3)	(3)	2,153	843	(3)	1,002
1904–5 to 1908–9	95,054	965,058	98,353	91,774	[4] 36,988	[5] 2,796	2,025	941	(3)	1,270
1908–9	114,599	1,049,869	114,917	129,855	36,974	2,969	1,827	575	(2)	3,355
1909–10	154,621	871,470	85,626	108,668	38,157	4,555	2,165	1,024	(2)	1,015
1910–11	145,744	875,367	102,564	138,058	44,699	3,045	1,824	1,515	(2)	1,037
1911–12	175,966	885,201	101,407	145,969	44,521	5,077	1,968	1,436	(2)	1,005
1912–13	170,747	863,131	94,813	140,039	42,357	3,946	2,046	789	(2)	1,048
1913–14	161,777	1,001,528	91,131	176,268	48,684	5,316	(3)	1,115	(2)	1,634
1914–15	196,122	1,118,691	96,988	192,307	41,092	3,622	(3)	829	(2)	906
1915–16	304,183	1,201,104	109,866	243,232	36,755	5,938	(3)	816	(2)	663
1916–17	364,914	1,319,871	103,364	338,654	34,661	5,642	(3)	1,758	(2)	3,748
1917–18	414,984	1,143,891	151,315	399,040	34,550	2,385	(3)	1,313	(2)	4,146
1918–19	422,215	1,046,029	108,172	313,037	35,382	3,501	(3)	152	(2)	4,016
1919–20	660,610	1,414,228	97,826	420,331	36,848	5,206	(3)	1,884	(2)	3,806
1920–21	371,300	1,348,926	72,196	327,123	40,808	4,054	(3)	689	(2)	824
1921–22	578,512	1,238,012	86,142	317,124	46,120	(3)	1,373	2,488	(2)	520
1922–23	810,028	1,305,188	96,669	381,508	44,504	(3)	1,660	1,783	(2)	2,623
1923–24	633,489	1,429,617	105,443	382,971	44,935	6,848	1,018	1,406	[6] 50,838	886
1924–25	824,434	1,279,570	92,779	382,570	50,513	5,901	1,264	2,075	69,216	1,421
1925–26	962,659	1,437,364	99,411	417,060	58,550	5,992	1,247	2,194	82,448	1,271
1926–27	993,272	1,444,847	97,402	425,184	57,102	5,212	659	2,298	124,489	1,051
1927–28	959,245	1,535,392	90,099	411,543	64,029	6,458	1,308	1,399	113,357	2,465
1928–29	1,252,130	1,435,070	92,635	419,243	63,530	6,955	391	2,050	128,627	1,505
1929–30*	1,157,817	1,562,058	86,368	421,938	66,010	8,452	1,229	918	139,886	2,534

Footnotes at end of table.

TABLE 506.—*Imports of selected agricultural products, averages 1899–1900 to 1908–9, annual 1908–9 to 1929–30*—Continued

Year beginning July—	Almonds in terms of shelled [7]	Peanuts in terms of shelled [7]	Walnuts in terms of shelled [7]	Coconut meat [8]	Flaxseed	Sugar, raw and refined	Molasses	Jute and jute butts, unmanufactured	Manila or abaca	Sisal and henequen
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 bushels*	*1,000 short tons*	*1,000 gallons*	*1,000 long tons*	*1,000 long tons*	*1,000 long tons*
Average:										
1899–1900 to 1903–04	7,862	(9)	[4]18,017	(9)	504	1,894	13,788	102	54	87
1904–05 to 1908–09	13,832	(9)	26,849	[5]15,010	218	1,961	20,221	114	58	98
1908–9	11,029	(9)	26,158	23,843	594	2,095	22,093	157	62	91
1909–10	18,556	29,276	33,641	21,306	5,002	2,047	31,292	68	93	100
1910–11	15,523	18,834	33,619	37,817	10,499	1,969	23,838	65	74	118
1911–12	17,231	11,248	37,214	69,912	6,842	2,052	28,828	101	69	114
1912–13	13,856	14,989	17,213	40,870	5,294	2,370	33,927	125	74	154
1913–14	15,027	38,726	20,800	55,735	8,653	2,533	51,410	106	50	216
1914–15	13,679	19,338	20,490	96,485	10,666	2,710	70,840	83	51	186
1915–16	14,546	25,407	23,733	118,613	14,679	2,817	85,717	108	79	229
1916–17	19,916	32,385	23,839	256,801	12,394	2,666	110,238	113	77	143
1917–18	20,845	75,463	16,252	507,576	13,367	2,452	130,731	78	86	150
1918–19	25,615	20,425	9,057	315,749	8,427	2,918	130,075	53	68	153
1919–20	28,533	128,390	28,961	258,229	23,392	3,798	154,670	77	77	176
1920–21	15,861	46,202	15,902	213,134	16,170	3,506	113,414	90	52	159
1921–22	28,036	9,678	35,174	294,104	13,632	4,232	87,908	62	44	72
1922–23	24,345	45,013	25,970	338,597	25,006	4,367	161,135	85	98	98
1923–24	24,207	50,683	26,428	344,920	19,577	3,765	174,037	84	98	97
1924–25	22,503	93,191	36,623	371,961	13,419	4,337	215,778	56	73	146
1925–26	19,686	36,026	31,698	444,278	19,354	4,420	256,246	71	62	126
1926–27	15,890	49,792	31,776	507,136	24,224	4,420	260,259	89	61	116
1927–28	18,496	63,783	20,347	518,173	18,112	4,045	248,427	81	48	124
1928–29	18,673	30,412	24,500	687,121	23,494	4,753	296,550	92	60	135
1929–30*	19,955	9,941	20,228	546,888	19,652	3,641	253,099	80	73	112

Year beginning July	Milk and cream, fresh	Cream, fresh	Eggs, whole, in the shell	Eggs and egg yolks, dried, frozen, or prepared	Whole eggs, dried	Whole eggs, frozen	Yolks, dried	Yolks, frozen	Egg albumen, dried	Egg albumen, frozen, prepared and preserved	Hair of the Angora (mohair)
	1,000 gallons	*1,000 gallons*	*1,000 dozen*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1912–13	(2)	1,247	1,367	228					(2)		
1913–14	(2)	1,773	6,015	3,420					(2)		
1914–15	(2)	2,077	3,047	8,572					(2)		
1915–16	(2)	1,194	733	6,022					(2)		
1916–17	(2)	744	1,110	10,318					(2)		
1917–18	(2)	712	1,619	14,598					(2)		
1918–19	2,592	(2)	848	9,085					(2)		
1919–20	3,989	(2)	1,348	24,091					(2)		
1920–21	4,391	(2)	3,316	28,768					(2)		
1921–22	4,536	(2)	1,224	16,540					7,388		
1922–23	5,148	(2)	535	14,821					3,213		[10]7,220
1923–24	6,623	[6]1,646	426	[11]14,830	[6]544	[6]1,106	[6]522	[6]1,210	6,642	[6]636	3,583
1924–25	6,418	4,765	682		1,884	8,751	4,281	4,151	3,257	1,106	2,404
1925–26	7,479	4,798	276		1,365	12,647	6,004	5,662	4,490	5,119	6,463
1926–27	6,106	5,273	296		1,132	8,114	4,468	4,601	3,859	3,967	6,547
1927–28	5,425	4,819	256		575	611	3,486	1,229	2,361	553	2,204
1928–29	5,016	3,173	291		2,133	12,616	5,130	4,581	2,898	610	3,134
1929–30*	3,314	2,474	337		1,839	9,824	7,819	3,475	4,506	812	1,074

Bureau of Agricultural Economics. Compiled from Commerce and Navigation of the United States, 1900–1918, and Monthly Summary of Foreign Commerce, June issue, 1919–1930.

*Preliminary.
[1] Includes "Silk, raw or as reeled from cocoon," "Silk waste," and "Silk cocoons."
[2] Not separately classified.
[3] Reported in value only.
[4] 2-year average.
[5] 3-year average.
[6] Beginning Jan. 1, 1924.
[7] Conversion factors used: Almonds, 30 per cent unshelled equals shelled. Peanuts, 3 pounds unshelled equals 2 pounds shelled. Walnuts, 42 per cent unshelled equals shelled.
[8] Includes broken, or shredded, desiccated or prepared and copra.
[9] Included with "All other nuts."
[10] Beginning Sept. 22, 1922.
[11] July 1–Dec. 31, 1923.

TABLE 507.—*Destination of principal agricultural products exported from the United States, 1926–27 to 1929–30*

Article and country to which exported	Year beginning July							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
ANIMALS AND ANIMAL PRODUCTS								
Butter:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	5,048	3,965	3,778	3,582	100.0	100.0	100.0	100.0
Mexico	859	724	672	617	17.0	18.3	18.0	17.2
Cuba	734	479	370	96	14.5	12.1	9.8	2.7
Other South America	605	390	485	492	12.0	9.8	12.8	13.7
Panama	582	311	227	342	11.5	7.8	6.0	9.5
Other West Indies [1]	550	391	394	380	10.9	9.9	10.4	10.6
Haitian Republic	498	479	479	458	9.9	12.1	12.7	12.8
Peru	356	358	451	371	7.1	9.0	11.9	10.4
Philippine Islands	187	190	152	210	3.7	4.8	4.0	5.9
Other countries	677	643	548	616	13.4	16.2	14.4	17.2
Cheese:								
Total	3,773	2,873	2,572	2,339	100.0	100.0	100.0	100.0
Cuba	832	359	405	170	22.1	12.5	15.7	7.3
Mexico	670	581	423	506	17.8	20.2	16.4	21.6
Other West Indies [1]	479	331	360	252	12.7	11.5	14.0	10.8
Panama	434	432	460	485	11.5	15.0	17.9	20.7
Canada	350	259	170	176	9.3	9.0	6.6	7.5
Other Central America	284	293	294	289	7.5	10.2	11.4	12.4
China	252	145	89	45	6.7	5.0	3.5	1.9
Other countries	472	473	371	416	12.4	16.6	14.5	17.8
Milk:								
Condensed—								
Total	35,799	36,975	39,565	37,771	100.0	100.0	100.0	100.0
Total Europe	424	151	70	21	1.2	.4	.2	.1
Cuba	12,843	11,462	13,103	13,196	35.9	31.0	33.1	34.9
Philippine Islands	6,471	7,575	7,339	7,347	18.1	20.5	18.5	19.5
Japan, including Chosen	4,029	5,385	5,473	4,701	11.3	14.6	13.8	12.4
China	3,621	2,513	2,840	2,173	10.1	6.8	7.2	5.8
Hong Kong	2,065	3,764	3,739	3,905	5.8	10.2	9.5	10.3
Mexico	1,308	985	883	1,055	3.7	2.7	2.2	2.8
Other countries	5,038	5,140	6,118	5,373	13.9	13.8	15.5	14.2
Evaporated—								
Total	73,143	71,968	72,894	63,801	100.0	100.0	100.0	100.0
Total Europe	30,527	24,401	22,267	12,334	41.7	33.9	30.5	19.3
United Kingdom	27,418	23,805	21,759	11,877	37.5	33.1	29.9	18.6
Germany	1,851	16	71	11	2.5	0	.1	0
Belgium	286	389	265	25	.4	.5	.4	0
Other Europe	972	191	172	421	1.3	.3	.1	.7
Philippine Islands	12,806	15,563	16,372	17,153	17.5	21.6	22.5	26.9
Peru	4,215	3,569	4,027	3,602	5.8	5.0	5.5	5.6
Panama	4,127	3,589	4,606	4,805	5.6	5.0	6.3	7.5
China	3,025	3,035	3,447	2,056	4.1	4.2	4.7	3.2
Cuba	2,958	2,647	2,272	2,935	4.0	3.7	3.1	4.6
Mexico	2,714	2,157	2,185	2,274	3.7	3.0	3.0	3.6
British Malaya	1,932	2,817	2,761	3,359	2.6	3.9	3.8	5.3
Japan	1,616	2,466	2,544	2,785	2.2	3.4	3.5	4.4
Other countries	9,223	11,724	12,413	12,498	12.8	16.3	17.0	19.6
Bacon, including Cumberland sides:								
Total	127,543	126,967	129,245	131,670	100.0	100.0	100.0	100.0
Total Europe	98,561	99,554	103,235	106,389	77.3	78.4	79.9	80.8
United Kingdom	68,220	50,127	53,364	57,443	53.5	39.5	41.3	43.6
Germany	6,818	9,838	5,982	8,468	5.3	7.7	4.6	6.4
Finland	4,493	6,075	4,633	3,734	3.5	4.8	3.6	2.8
Norway	2,422	3,244	2,742	2,642	1.9	2.6	2.1	2.0
Netherlands	2,502	632	1,198	2,959	2.0	.5	.9	2.2
Italy	1,439	8,113	15,106	8,289	1.1	6.4	11.7	6.3
Other Europe	12,667	21,525	20,210	22,854	10.0	16.9	15.7	17.5
Cuba	21,070	19,107	16,698	15,957	16.5	15.0	12.9	12.1
Canada	4,584	5,173	5,769	5,617	3.6	4.1	4.5	4.3
Other countries	3,328	3,133	3,546	3,707	2.6	2.5	2.7	2.8

See footnotes at end of table.

TABLE 507.—*Destination of principal agricultural products exported from the United States, 1926–27 to 1929–30*—Continued

Article and country to which exported	Year beginning July							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
ANIMALS AND ANIMAL PRODUCTS—con.								
Hams and shoulders, including Wiltshire sides:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	143, 649	127, 819	125, 396	131, 572	100. 0	100. 0	100. 0	100. 0
Total Europe	126, 266	106, 526	103, 986	106, 460	87. 9	83. 3	82. 9	80. 9
United Kingdom	124, 391	104, 020	100, 959	103, 169	86. 6	81. 4	80. 5	78. 4
Belgium	451	660	1, 003	2, 136	. 3	. 5	. 8	1. 6
Other Europe	1, 424	1, 846	2, 024	1, 155	1. 0	1. 4	1. 6	. 9
Cuba	6, 548	8, 167	7, 435	6, 307	4. 6	6. 4	5. 9	4. 8
Canada	4, 803	6, 134	6, 309	11, 370	3. 3	4. 8	5. 0	8. 6
Other countries	6, 032	6, 992	7, 666	7, 435	4. 2	5. 5	6. 2	5. 7
Pork:								
Canned—								
Total	6, 731	8, 614	7, 974	12, 783	100. 0	100. 0	100. 0	100. 0
Total Europe	5, 675	7, 729	6, 700	10, 975	84. 3	89. 7	84. 0	85. 9
United Kingdom	5, 595	7, 632	6, 555	10, 737	83. 1	88. 6	82. 2	84. 0
Other Europe	80	97	145	238	1. 2	1. 1	1. 8	1. 9
Other countries	1, 056	885	1, 274	1, 808	15. 7	10. 3	16. 0	14. 1
Fresh—								
Total	10, 881	11, 059	10, 641	18, 771	100. 0	100. 0	100. 0	100. 0
Total Europe	7, 388	7, 420	7, 062	14, 212	67. 9	67. 1	66. 4	75. 7
United Kingdom	7, 128	6, 418	4, 547	10, 527	65. 5	58. 0	42. 7	56. 1
Other Europe	260	1, 002	2, 515	3, 685	2. 4	9. 1	23. 7	19. 6
Cuba	1, 763	1, 557	1, 732	1, 618	16. 2	14. 1	16. 3	8. 6
Canada	590	798	582	1, 091	5. 4	7. 2	5. 5	5. 8
Other countries	1, 140	1, 284	1, 265	1, 850	10. 5	11. 6	11. 8	9. 9
Pickled—								
Total	27, 962	31, 650	39, 906	39, 833	100. 0	100. 0	100. 0	100. 0
Total Europe	4, 801	7, 016	10, 248	7, 415	17. 2	22. 2	25. 7	18. 6
United Kingdom	3, 857	5, 184	7, 608	5, 094	13. 8	16. 4	19. 1	12. 8
Norway	394	722	854	799	1. 4	2. 3	2. 1	2. 0
Germany	134	289	366	328	. 5	. 9	. 9	. 8
Other Europe	416	821	1, 420	1, 194	1. 5	2. 6	3. 6	3. 0
Cuba	7, 760	7, 626	10, 550	9, 798	27. 8	24. 1	26. 4	24. 6
Canada	5, 800	7, 056	8, 596	11, 211	20. 7	22. 3	21. 5	28. 1
Newfoundland and Labrador	3, 532	3, 734	4, 530	4, 792	12. 6	11. 8	11. 4	12. 0
British West Indies and Bermudas	2, 730	2, 851	2, 810	221	9. 8	9. 0	7. 0	. 6
Haitian Republic	917	1, 055	838	719	3. 3	3. 3	2. 1	1. 8
Other countries	2, 422	2, 312	2, 334	5, 677	8. 6	7. 3	5. 9	14. 3
Lard:								
Total	675, 812	716, 398	780, 914	787, 160	100. 0	100. 0	100. 0	100. 0
Total Europe	489, 376	519, 188	555, 697	563, 401	72. 4	72. 5	71. 2	71. 6
United Kingdom	222, 086	233, 564	229, 899	240, 147	32. 9	32. 6	29. 4	30. 5
Germany	174, 621	176, 771	195, 695	180, 074	25. 8	24. 7	25. 1	22. 9
Netherlands	46, 071	35, 784	36, 992	48, 584	6. 8	5. 0	4. 7	6. 2
Belgium	12, 718	14, 541	14, 841	18, 700	1. 9	2. 0	1. 9	2. 4
Italy	7, 642	20, 384	29, 200	19, 865	1. 1	2. 8	3. 7	2. 5
Other Europe	26, 238	38, 144	49, 070	56, 031	3. 9	5. 4	6. 4	7. 1
Cuba	79, 599	78, 469	84, 316	79, 860	11. 8	11. 0	10. 8	10. 1
Other countries	106, 837	118, 741	140, 901	143, 899	15. 8	16. 5	18. 0	18. 3

TABLE 507.—*Destination of principal agricultural products exported from the United States, 1926–27 to 1929–30*—Continued

Article and country to which exported	Year beginning July							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
ANIMALS AND ANIMAL PRODUCTS—continued								
Lard, neutral:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	20,057	23,799	18,315	16,783	100.0	100.0	100.0	100.0
Total Europe	18,283	21,809	16,553	15,708	91.2	91.6	90.4	93.6
Germany	5,895	5,623	4,023	3,010	29.4	23.6	22.0	17.9
Netherlands	5,260	6,784	4,710	6,260	26.2	28.5	25.7	37.3
United Kingdom	3,530	5,096	3,919	2,320	17.6	21.4	21.4	13.8
Norway	1,039	1,228	895	755	5.2	5.2	4.9	4.5
Denmark	726	1,176	894	1,379	3.6	4.9	4.9	8.2
Sweden	912	696	649	787	4.5	2.9	3.5	4.7
Other Europe	921	1,206	1,463	1,197	4.7	5.1	8.0	7.2
Other countries	1,774	1,990	1,762	1,075	8.8	8.4	9.6	6.4
Oleo oil:								
Total	92,720	64,851	63,187	61,093	100.0	100.0	100.0	100.0
Total Europe	88,128	61,611	59,481	58,040	95.0	95.0	94.1	95.0
Netherlands	27,270	17,608	16,744	22,158	29.4	27.2	26.5	36.3
Germany	25,443	18,267	16,835	14,630	27.4	28.2	26.6	23.9
United Kingdom	18,691	16,092	16,328	11,735	20.2	24.8	25.8	19.2
Norway	5,460	3,596	2,763	2,549	5.9	5.5	4.4	4.2
Greece	3,972	454	602	750	4.3	.7	1.0	1.2
Other Europe	7,292	5,594	6,209	6,218	7.8	8.6	9.8	10.2
Other countries	4,592	3,240	3,706	3,053	5.0	5.0	5.9	5.0
VEGETABLE PRODUCTS								
Cotton, excluding linters:	*1,000 bales* [2]	*1,000 bales* [2]	*1,000 bales* [2]	*1,000 bales* [2]				
Total	11,281	7,890	8,520	7,097	100.0	100.0	100.0	100.0
Total Europe	8,813	6,428	6,598	5,568	78.1	81.5	77.4	78.5
Germany	2,829	2,090	1,891	1,770	25.1	26.5	22.2	24.9
United Kingdom	2,623	1,443	1,918	1,307	23.3	18.3	22.5	18.4
France	1,063	904	841	860	9.4	11.5	9.9	12.1
Italy	841	708	765	705	7.5	9.0	9.0	9.9
Other Europe	1,457	1,283	1,183	926	12.8	16.2	13.8	13.2
Japan	1,644	1,007	1,373	1,071	14.6	12.8	16.1	15.1
Other countries	824	455	549	458	7.3	5.7	6.5	6.4
Linters:								
Total	278	231	219	143	100.0	100.0	100.0	100.0
Total Europe	258	212	198	125	92.8	91.8	90.4	87.4
Germany	154	132	120	70	55.4	57.1	54.8	49.0
United Kingdom	51	22	16	7	18.3	9.5	7.3	4.9
France	26	36	32	26	9.4	15.6	14.6	18.2
Belgium	12	7	12	8	4.3	3.0	5.5	5.6
Other Europe	15	15	18	14	5.4	6.6	8.2	9.7
Canada	20	18	19	17	7.2	7.8	8.7	11.9
Other countries	0	1	2	1	0	.4	.9	.7
Fruits:								
Dried—								
Apples—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	32,670	21,704	50,024	23,769	100.0	100.0	100.0	100.0
Total Europe	31,313	20,735	48,808	23,059	95.8	95.5	97.6	97.0
Germany	12,158	10,877	22,085	11,425	37.2	50.1	44.1	48.1
Netherlands	9,568	3,315	12,451	4,323	29.3	15.3	24.9	18.2
United Kingdom	2,282	1,018	2,618	1,522	7.0	4.7	5.2	6.4
Sweden	2,278	2,524	2,985	3,015	7.0	11.6	6.0	12.7
Denmark	1,371	1,384	1,674	894	4.2	6.4	3.3	3.8
Other Europe	3,656	1,617	6,995	1,880	11.1	7.4	14.1	7.8
Other countries	1,357	969	1,216	710	4.2	4.5	2.4	3.0

See footnotes at end of table.

TABLE 507.—*Destination of principal agricultural products exported from the United States, 1926–27 to 1929–30*—Continued

Article and country to which exported	Year beginning July							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—continued								
Fruits—Continued.								
Dried—Continued.	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Apricots—								
Total	17,901	23,684	24,652	19,101	100.0	100.0	100.0	100.0
Total Europe	15,776	21,158	22,279	16,864	88.1	89.3	90.4	88.3
Germany	4,593	6,512	7,742	6,091	25.7	27.5	31.4	31.9
Netherlands	3,316	4,651	3,750	2,493	18.5	19.6	15.2	13.1
United Kingdom	2,084	1,964	1,422	1,019	11.6	8.3	5.8	5.3
Belgium	1,038	1,374	1,691	891	5.8	5.8	6.9	4.7
Sweden	952	994	776	939	5.3	4.2	3.1	4.9
Norway	945	1,260	988	1,327	5.3	5.3	4.0	6.9
Other Europe	2,848	4,403	5,910	4,104	15.9	18.6	24.0	21.5
Canada	1,257	1,920	1,614	1,431	7.0	8.1	6.5	7.5
Other countries	868	606	759	806	4.9	2.6	3.1	4.2
Prunes—								
Total	175,544	260,625	273,051	142,989	100.0	100.0	100.0	100.0
Total Europe	145,710	223,574	240,794	116,857	83.0	85.8	88.2	81.7
United Kingdom	40,173	45,601	40,836	28,143	22.9	17.5	15.0	19.7
Germany	38,553	79,732	77,883	44,789	22.0	30.6	28.5	31.3
France	27,217	27,390	59,822	9,298	15.5	10.5	21.9	6.5
Netherlands	10,242	23,140	17,286	5,584	5.8	8.9	6.3	3.9
Sweden	6,854	7,047	5,434	6,744	3.9	2.7	2.0	4.7
Other Europe	22,671	40,664	39,533	22,299	12.9	15.6	14.5	15.6
Canada	20,454	23,272	18,965	16,187	11.7	8.9	6.9	11.3
Other countries	9,380	13,779	13,292	9,945	5.3	5.3	4.9	7.0
Raisins—								
Total	152,337	193,099	221,756	128,585	100.0	100.0	100.0	100.0
Total Europe	97,714	131,925	152,785	77,659	64.1	68.3	68.9	60.4
United Kingdom	49,991	70,034	71,375	36,443	32.8	36.3	32.2	28.3
Germany	16,039	18,733	23,022	14,059	10.5	9.7	10.4	10.9
Netherlands	13,857	18,598	24,278	7,436	9.1	9.6	10.9	5.8
Denmark	1,994	1,593	2,244	1,331	1.3	.8	1.0	1.0
Other Europe	15,833	22,967	31,866	18,390	10.4	11.9	14.4	14.4
Canada	37,400	40,148	39,635	28,668	24.6	20.8	17.9	22.3
China	3,549	4,144	7,574	4,791	2.3	2.1	3.4	3.7
Japan	2,801	3,086	2,961	2,992	1.8	1.6	1.3	2.3
Other countries	10,873	13,796	18,801	14,475	7.2	7.2	8.5	11.3
Fresh—	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*				
Apples—								
Total	4,483	1,349	3,005	1,427	100.0	100.0	100.0	100.0
Total Europe	4,154	1,184	2,786	1,209	92.7	87.8	92.7	84.7
United Kingdom	3,305	1,004	1,720	953	73.7	74.4	57.2	66.8
Other Europe	849	180	1,066	256	19.0	13.4	35.5	17.9
Other countries	329	165	219	218	7.3	12.2	7.3	15.3
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*				
Apples—								
Total	7,844	5,384	12,026	5,998	100.0	100.0	100.0	100.0
Total Europe	6,142	4,025	10,057	4,471	78.3	74.8	83.6	74.5
United Kingdom	3,723	2,709	4,836	2,655	47.5	50.3	40.2	44.3
Germany	1,237	737	2,695	946	15.8	13.7	22.4	15.8
Other Europe	1,182	579	2,526	870	15.0	10.8	21.0	14.4
Canada	730	542	636	500	9.3	10.1	5.3	8.3
Other countries	972	817	1,333	1,027	12.4	15.1	11.1	17.2

TABLE 507.—*Destination of principal agricultural products exported from the United States, 1926–27 to 1929–30*—Continued

Article and country to which exported	Year beginning July							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—continued								
Fruits—Continued.								
Fresh—Continued.	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Oranges—								
Total	3, 340	2, 988	4, 223	3, 674	100. 0	100. 0	100. 0	100. 0
Canada	2, 636	2, 346	3, 151	2, 568	78. 9	78. 5	74. 6	69. 9
United Kingdom	403	402	709	796	12. 1	13. 5	16. 8	21. 7
Other countries	301	240	363	310	9. 0	8. 0	8. 6	8. 4
Grapefruit—								
Total	613	719	940	854	100. 0	100. 0	100. 0	100. 0
United Kingdom	310	333	561	496	50. 6	46. 3	59. 7	58. 1
Canada	264	349	335	308	43. 1	48. 5	35. 6	36. 1
France	4	4	4	5	. 7	. 6	. 4	. 6
Germany	8	6	8	10	1. 3	. 8	. 9	1. 2
Other countries	27	27	32	35	4. 3	3. 8	3. 4	4. 0
Canned—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	270, 370	255, 876	329, 823	283, 716	100. 0	100. 0	100. 0	100. 0
Total Europe	232, 707	215, 795	284, 400	243, 322	86. 1	84. 3	86. 2	85. 8
United Kingdom	203, 016	177, 256	236, 754	203, 151	75. 1	69. 3	71. 8	71. 6
Other Europe	29, 691	38, 539	47, 646	40, 171	11. 0	15. 0	14. 4	14. 2
Canada	15, 491	17, 993	22, 769	20, 438	5. 7	7. 0	6. 9	7. 2
Other countries	22, 172	22, 088	22, 654	19, 956	8. 2	8. 7	6. 9	7. 0
Grains and grain products:	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*				
Barley—								
Total	17, 044	36, 580	56, 996	21, 544	100. 0	100. 0	100. 0	100. 0
Total Europe	14, 254	25, 607	32, 686	12, 777	83. 6	70. 0	57. 3	59. 3
United Kingdom	8, 981	10, 151	13, 161	9, 370	52. 7	27. 8	23. 1	43. 5
Germany	2, 066	11, 599	13, 085	1, 521	12. 1	31. 7	23. 0	7. 1
Belgium	1, 576	642	1, 782	651	9. 2	1. 8	3. 1	3. 0
Netherlands	815	2, 581	3, 909	479	4. 8	7. 1	6. 9	2. 2
Other Europe	816	634	749	756	4. 8	1. 6	1. 2	3. 5
Canada	2, 184	10, 453	23, 886	8, 144	12. 8	28. 6	41. 9	37. 8
Other countries	606	520	424	623	3. 6	1. 4	. 8	2. 9
Corn—								
Total	17, 563	18, 374	40, 744	9, 354	100. 0	100. 0	100. 0	100. 0
Canada	10, 536	6, 454	11, 082	7, 390	60. 0	35. 1	27. 2	79. 0
Mexico	2, 124	323	572	1, 297	12. 0	1. 8	1. 4	13. 9
Cuba	2, 016	1, 021	765	226	11. 5	5. 6	1. 9	2. 4
United Kingdom	1, 268	1, 885	8, 237	20	7. 2	10. 3	20. 2	. 2
Denmark	563	845	896	0	3. 1	4. 6	2. 2	0
Netherlands	560	4, 311	7, 977	126	3. 2	23. 5	19. 6	1. 3
Germany	2	2, 520	4, 241	0	0	13. 7	10. 4	0
Other countries	504	1, 015	6, 974	295	3. 0	5. 4	17. 1	3. 2
Oats—								
Total	9, 245	6, 034	10, 848	4, 635	100. 0	100. 0	100. 0	100. 0
Total Europe	2, 532	1, 243	3, 195	15	27. 4	20. 6	29. 5	. 3
United Kingdom	1, 259	645	1, 177	13	13. 6	10. 7	10. 8	. 3
Belgium	352	123	257	0	3. 8	2. 0	2. 4	0
Germany	297	115	0	0	3. 2	1. 9	0	0
France	239	44	141	0	2. 6	. 7	1. 3	0
Other Europe	385	316	1, 620	2	4. 2	5. 3	15. 0	0
Canada	5, 198	3, 426	6, 501	3, 913	56. 2	56. 8	59. 9	84. 4
Cuba	1, 170	1, 028	861	490	12. 7	17. 0	7. 9	10. 6
Mexico	132	98	51	44	1. 4	1. 6	. 5	. 9
Other countries	213	239	240	173	2. 3	4. 0	2. 2	3. 8

TABLE 507.—*Destination of principal agricultural products exported from the United States, 1926–27 to 1929–30*—Continued

Article and country to which exported	Year beginning July							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—continued								
Grains and grain products—Contd.	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Oatmeal—Total	104,334	68,192	97,245	59,953	100.0	100.0	100.0	100.0
Total Europe	74,806	39,749	67,948	28,041	71.7	58.3	69.9	46.8
Netherlands	25,930	7,485	14,525	7,804	24.9	11.0	14.9	13.0
United Kingdom	18,885	14,447	23,775	8,358	18.1	21.2	24.4	13.9
Finland	13,219	9,471	17,335	8,441	12.7	13.9	17.8	14.1
Belgium	4,736	2,890	3,064	801	4.5	4.2	3.2	1.3
Other Europe	12,036	5,456	9,249	2,637	11.5	8.0	9.6	4.5
Mexico	4,027	3,739	3,802	4,054	3.9	5.5	3.9	6.8
South America	1,164	9,757	11,389	10,431	1.1	14.3	11.7	17.4
Canada	1,913	3,582	1,556	5,402	1.8	5.3	1.6	9.0
British India	850	1,770	1,594	2,013	.8	2.6	1.6	3.4
Other countries	21,574	9,595	10,956	10,012	20.7	14.0	11.3	16.6
Rice—Total	234,548	230,432	313,405	234,535	100.0	100.0	100.0	100.0
Total Europe	121,914	133,819	173,117	131,126	52.0	58.1	55.2	55.9
Germany	36,917	35,851	43,799	37,915	15.7	15.6	14.0	16.2
United Kingdom	33,675	35,459	41,812	35,854	14.4	15.4	13.3	15.3
Belgium	18,764	12,778	23,167	8,959	8.0	5.5	7.4	3.8
France	5,169	12,388	16,065	13,419	2.2	5.4	5.1	5.7
Other Europe	27,389	37,343	48,274	34,979	11.7	16.2	15.4	14.9
Japan	68,518	2,020	14,609	935	29.2	.9	4.7	.4
South America	24,847	41,205	78,719	69,284	10.6	17.9	25.1	29.5
Canada	7,525	14,227	19,800	18,239	3.2	6.2	6.3	7.8
Central America	3,468	5,888	5,852	5,031	1.5	2.6	1.9	2.1
Other countries	8,276	33,273	21,308	9,920	3.5	14.3	6.8	4.3
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*				
Rye—Total	21,613	26,064	9,346	2,538	100.0	100.0	100.0	100.0
Total Europe	7,485	5,974	3,381	142	34.6	22.9	36.2	5.6
United Kingdom	2,345	1,710	1,174	21	10.8	6.6	12.6	.8
Netherlands	1,768	1,408	868	0	8.2	5.4	9.3	0
Norway	489	298	57	3	2.3	1.1	.6	.1
Other Europe	1,306	1,313	918	97	6.0	5.0	9.8	3.9
Canada	14,118	20,080	5,913	2,347	65.3	77.0	63.3	92.5
Other countries	10	10	52	49	.1	.1	.5	1.9
Wheat—Total	156,250	145,999	103,114	92,175	100.0	100.0	100.0	100.0
Total Europe	111,198	89,203	46,645	56,679	71.2	61.1	45.2	61.5
United Kingdom	39,341	36,574	16,276	23,931	25.2	25.1	15.8	26.0
Netherlands	17,131	11,559	5,149	6,197	11.0	7.9	5.0	6.7
France	16,079	5,127	2,215	2,214	10.3	3.5	2.1	2.4
Italy	10,407	10,450	5,047	905	6.7	7.2	4.9	6.7
Belgium	8,926	8,797	3,232	6,314	5.7	6.0	3.1	6.9
Germany	7,287	5,582	1,674	4,769	4.7	3.8	1.6	5.2
Other Europe	12,027	11,114	13,052	12,349	7.6	7.6	12.7	13.3
Canada	26,793	45,563	41,190	16,777	17.1	31.2	39.9	18.2
Japan, including Chosen	7,336	6,304	3,782	9,185	4.7	4.3	3.7	10.0
China	1,099	0	1,241	140	.7	0	1.2	.2
Other countries	9,824	4,929	10,256	9,394	6.3	3.4	10.0	10.1

TABLE 507.—*Destination of principal agricultural products exported from the United States, 1926–27 to 1929–30*—Continued

Article and country to which exported	Year beginning July							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—continued								
Grain and grain products—Contd.	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Wheat, flour— Total	13,385	12,821	12,888	13,009	100.0	100.0	100.0	100.0
Total Europe	6,063	5,093	3,708	4,740	45.3	39.7	28.8	36.4
United Kingdom	1,733	1,224	886	1,560	12.9	9.5	6.9	12.0
Netherlands	1,568	1,530	1,084	1,031	11.7	11.9	8.4	7.9
Germany	834	534	312	452	6.2	4.2	2.4	3.5
Greece	282	113	49	30	2.1	.9	.4	.2
Other Europe	1,646	1,692	1,377	1,667	12.4	13.2	10.7	12.8
Cuba	1,199	1,216	1,204	1,199	9.0	9.5	9.3	9.2
Brazil	904	873	831	780	6.8	6.8	6.4	6.0
Other West Indies [1]	747	676	809	663	5.6	5.3	6.3	5.1
Philippine Islands	666	727	802	730	5.0	5.7	6.2	5.6
Hong Kong	618	929	868	752	4.6	7.2	6.7	5.8
Central America	613	697	752	684	4.6	5.4	5.8	5.3
China	418	790	1,242	553	3.1	6.2	9.6	4.3
Kwantung	189	136	428	891	1.4	1.1	3.3	6.8
Other countries	1,967	1,684	2,244	2,017	14.6	13.1	17.6	15.5
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Hops— Total	13,369	11,812	8,836	6,792	100.0	100.0	100.0	100.0
Total Europe	9,378	7,718	5,337	4,001	70.1	65.3	60.4	58.9
United Kingdom	4,559	6,121	4,175	3,255	34.1	51.8	47.2	47.9
Belgium	1,892	255	129	93	14.2	2.2	1.5	1.4
Other Europe	2,927	1,342	1,033	653	21.8	11.3	11.7	9.6
Canada	2,772	3,168	2,838	2,521	20.7	26.8	32.1	37.1
Other countries	1,219	926	661	270	9.2	7.9	7.5	4.0
Oil cake and oil-cake meal— Cottonseed cake— Total	599,448	527,023	395,257	211,566	100.0	100.0	100.0	100.0
Total Europe	585,526	526,913	395,230	211,364	97.7	100.0	100.0	99.9
Denmark	345,747	450,524	319,596	168,488	57.7	85.5	80.9	79.6
Germany	215,887	58,773	49,844	39,505	36.0	11.2	12.6	18.7
Other Europe	23,892	17,611	25,790	3,371	4.0	3.3	6.5	1.6
Other countries	13,922	110	27	202	2.3	0	0	.1
Cottonseed meal— Total	391,068	137,498	177,415	128,607	100.0	100.0	100.0	100.0
Total Europe	360,620	126,758	162,739	98,148	92.2	92.2	91.7	76.3
United Kingdom	150,699	45,844	60,084	46,955	38.5	33.3	33.9	36.5
Germany	127,687	39,157	46,312	19,752	32.7	28.5	26.1	15.4
Norway	28,746	11,655	10,192	1,019	7.4	8.5	5.7	.8
Other Europe	53,488	30,102	46,151	30,422	13.6	21.9	26.0	23.6
Other countries	30,448	10,740	14,676	30,459	7.8	7.8	8.3	23.7
Linseed or flaxseed cake— Total	609,520	589,174	624,913	601,819	100.0	100.0	100.0	100.0
Total Europe	609,394	589,053	624,086	599,386	100.0	100.0	99.9	99.9
Netherlands	381,104	305,321	371,385	323,537	62.5	51.8	59.4	53.8
Belgium	171,487	235,883	204,205	184,988	28.1	40.0	32.7	30.7
United Kingdom	45,522	38,698	40,392	48,745	7.5	6.6	6.5	8.1
Other Europe	11,281	9,151	8,104	42,116	1.9	1.6	1.3	7.0
Other countries	126	121	827	2,433	0	0	.1	.4

TABLE 507.—*Destination of principal agricultural products exported from the United States, 1926–27 to 1929–30*—Continued

Article and country to which exported	Year beginning July							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—continued								
Oils, vegetable:	*1,000*	*1,000*	*1,000*	*1,000*	*Per*	*Per*	*Per*	*Per*
Cottonseed—	*pounds*	*pounds*	*sdnoup*	*pounds*	*cent*	*cent*	*cent*	*cent*
Total	57,580	61,470	29,531	32,108	100.0	100.0	100.0	100.0
Canada	37,683	49,407	20,550	24,666	65.4	80.4	59.6	76.8
Cuba	2,770	2,033	1,836	2,448	4.8	3.3	6.2	7.6
Mexico	3,868	5,318	2,374	907	6.7	8.7	8.0	2.8
Japan	925	831	911	1,179	1.6	1.4	3.1	3.7
Panama	742	719	788	1,063	1.3	1.2	2.7	3.3
Argentina	2,160	1,108	912	253	3.8	1.8	3.1	.8
Other countries	9,432	2,054	2,160	1,592	16.4	3.2	7.3	5.0
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*				
Sugar, refined:								
Total	114	106	128	79	100.0	100.0	100.0	100.0
Total Europe	67	61	46	40	58.8	57.5	35.9	50.6
United Kingdom	37	35	24	25	32.5	33.0	18.8	31.6
France	5	1	2	1	4.4	.9	1.6	1.3
Norway	15	13	14	6	13.2	12.3	10.9	7.6
Other Europe	10	12	6	8	8.7	11.3	4.6	10.1
Uruguay	19	13	26	6	16.7	12.3	20.3	7.6
Canada	2	4	7	3	1.8	3.8	5.5	3.8
Newfoundland and Labrador	1	1	2	0	.9	0	1.6	0
West Indies and Bermuda	4	5	6	5	3.5	4.7	4.7	6.3
British Africa	5	5	12	6	4.4	4.7	9.4	7.6
Mexico	4	2	5	4	3.5	1.9	3.9	5.1
Other countries	12	15	24	15	10.4	14.2	18.7	19.0
Tobacco, leaf:	*1,000*	*1,000*	*1,000*	*1,000*				
Bright flue cured—	*pounds*	*pounds*	*pounds*	*pounds*				
Total	288,671	328,924	413,949	429,942	100.0	100.0	100.0	100.0
Total Europe	163,744	192,081	210,553	234,665	56.7	58.4	50.9	54.6
United Kingdom	134,886	157,506	171,515	186,583	46.7	47.9	41.4	43.4
Germany	11,105	13,378	13,841	8,150	3.8	4.1	3.3	1.9
Other Europe	17,753	21,197	5,197	39,932	6.2	6.4	6.2	9.3
China [3]	71,760	68,842	131,254	128,144	24.9	20.9	31.7	29.8
Australia	19,307	21,488	18,146	19,492	6.7	6.5	4.4	4.5
Canada	11,984	14,049	14,601	13,660	4.2	4.3	3.5	3.2
Japan	8,553	11,555	14,564	10,395	3.0	3.5	3.5	2.4
British India	4,538	5,031	5,884	3,874	1.6	1.5	1.4	.9
Other countries	8,785	15,878	18,947	19,712	2.9	4.9	4.6	4.6

Bureau of Agricultural Economics. Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1927-1930, and official records of the Bureau of Foreign and Domestic commerce.

[1] Excludes Bermuda. [2] Bales of 500 pounds. [3] Includes Hong Kong and Kwantung.

TABLE 508.—*Principal agricultural products imported into the United States, by countries, 1926–27 to 1929–30*

Article and country from which imported	Year beginning July— 1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
ANIMALS AND ANIMAL PRODUCTS								
Cattle:	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	267	548	566	419	100.0	100.0	100.0	100.0
Canada	168	343	256	192	62.9	62.6	45.2	45.8
Mexico	99	204	309	226	37.1	37.2	54.6	53.9
Other countries	0	1	1	1	0	.2	.2	.3
Butter:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	10,710	4,955	3,299	2,851	100.0	100.0	100.0	100.0
Total Europe	5,653	2,084	1,239	1,318	52.8	42.1	37.6	46.2
United Kingdom	3,932	870	58	171	36.7	17.6	1.8	6.0
Denmark	1,529	761	902	1,109	14.3	15.4	27.3	38.9
Other Europe	192	453	279	38	1.8	9.1	8.5	1.3
New Zealand	3,682	2,396	1,674	1,141	34.4	48.4	50.7	40.0
Canada	610	275	237	142	5.7	5.5	7.2	5.0
Other countries	765	200	149	250	7.1	4.0	4.5	8.8
Cheese:								
Total	89,782	75,424	84,606	78,261	100.0	100.0	100.0	100.0
Total Europe	72,454	63,374	73,888	71,859	80.7	84.0	87.3	91.8
Italy	36,572	31,332	38,337	36,989	40.7	41.5	45.3	47.3
Switzerland	20,638	16,449	19,731	19,386	23.0	21.8	23.3	24.8
France	4,923	5,874	6,243	6,058	5.5	7.8	7.4	7.7
Netherlands	3,687	3,736	3,525	2,917	4.1	5.0	4.2	3.7
Other Europe	6,634	5,983	6,052	6,509	7.4	7.9	7.1	8.3
Canada	16,609	11,439	9,381	5,895	18.5	15.2	11.1	7.5
Other countries	719	611	1,337	506	.8	.8	1.6	.7
Eggs, in the shell:	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*				
Total	296	256	291	337	100.0	100.0	100.0	100.0
Hong Kong	219	199	236	250	74.0	77.7	81.1	74.2
China	6	40	28	15	2.0	15.6	9.6	4.5
Canada	54	13	13	60	18.2	5.1	4.5	17.8
Other countries	17	4	14	12	5.8	1.6	4.8	3.5
Eggs and egg yolks (dried, frozen, and preserved):	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	18,315	5,901	24,460	22,957	100.0	100.0	100.0	100.0
China	14,825	5,409	20,582	18,206	80.9	91.7	84.1	79.3
United Kingdom	3,357	248	3,285	4,498	18.3	4.2	13.4	19.6
Other countries	133	244	593	253	.8	4.1	2.5	1.1
Egg albumen:								
Total	7,826	2,914	3,508	5,318	100.0	100.0	100.0	100.0
China	6,907	2,836	3,431	4,868	88.3	97.3	97.8	91.5
Other countries	919	78	77	450	11.7	2.7	2.2	8.5
Fibers, animal:								
Silk, raw, in skeins reeled from cocoon—								
Total	73,402	75,758	77,196	77,693	100.0	100.0	100.0	100.0
Japan	59,934	64,673	63,415	61,243	81.6	85.4	82.1	78.8
China	11,872	9,816	12,326	12,717	16.2	13.0	16.0	16.4
Other countries	1,596	1,269	1,455	3,733	2.2	1.6	1.9	4.8
Wool unmanufactured—								
Carpet wool—								
Total	144,698	145,489	164,713	141,111	100.0	100.0	100.0	100.0
United Kingdom	51,602	32,423	33,861	23,326	35.7	22.3	20.6	16.5
China	36,362	55,998	53,589	36,931	25.1	38.5	32.5	26.2
Argentina	9,513	8,924	19,820	24,405	6.6	6.1	12.0	17.3
Palestine and Syria	8,064	8,420	3,953	10,460	5.6	5.8	2.4	7.4
British India	6,906	10,811	14,390	11,106	4.8	7.4	8.7	7.9
France	5,371	5,414	4,470	4,260	3.7	3.7	2.7	3.0
Other countries	26,880	23,499	34,630	30,623	18.5	16.2	21.1	21.7

TABLE 508.—*Principal agricultural products imported into the United States, by countries, 1926–27 to 1929–30*—Continued

Article and country from which imported	Year beginning July—							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
ANIMALS AND ANIMAL PRODUCTS—continued								
Fibers, animal:								
Wool unmanufactured—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Clothing wool—Total	16,770	19,374	18,408	18,854	100.0	100.0	100.0	100.0
United Kingdom	4,775	4,169	2,499	1,807	28.5	21.5	13.6	9.6
Australia	3,797	5,515	5,936	5,690	22.6	28.5	32.2	30.2
Argentina	2,843	2,545	1,872	2,300	17.0	13.1	10.2	12.2
Canada	2,353	2,838	1,601	1,129	14.0	14.6	8.7	6.0
Chile	1,186	1,677	1,625	1,094	7.1	8.7	8.8	5.8
New Zealand	662	1,670	2,081	3,514	3.9	8.6	11.3	18.6
Uruguay	497	213	1,062	1,275	3.0	1.1	5.8	6.8
Other countries	657	747	1,732	2,045	3.9	3.9	9.4	10.8
Combing wool—Total	102,908	80,282	83,478	58,473	100.0	100.0	100.0	100.0
Australia	38,714	21,992	17,906	14,911	37.6	27.4	21.4	25.5
Uruguay	17,751	6,962	20,341	11,815	17.2	8.7	24.4	20.2
United Kingdom	15,484	17,344	12,319	8,784	15.0	21.6	14.8	15.0
Argentina	15,265	11,424	12,875	10,674	14.8	14.2	15.4	18.3
New Zealand	5,192	8,260	8,577	3,093	5.0	10.3	10.3	5.3
Other countries	10,502	14,300	11,460	9,196	10.4	17.8	13.7	15.7
Hair of the Angora goat (mohair), alpaca, etc.—Total	6,752	2,890	4,338	2,036	100.0	100.0	100.0	100.0
Turkey (Europe and Asia)	3,237	983	2,034	553	47.9	34.0	46.9	27.2
British South Africa	2,505	660	884	370	37.1	22.8	20.4	18.2
United Kingdom	792	541	384	391	11.7	18.7	8.9	19.2
Peru	82	425	716	622	1.2	14.7	16.5	30.6
China	74	184	145	48	1.1	6.4	3.3	2.4
Other countries	62	97	175	52	1.0	3.4	4.0	2.4
Sausage casings: Total	18,844	19,545	22,040	21,552	100.0	100.0	100.0	100.0
Argentina	4,804	4,975	5,719	5,459	25.5	25.5	26.0	25.3
Canada	3,351	3,928	2,989	2,218	17.8	20.1	13.6	10.3
Australia	2,198	2,213	2,597	3,024	11.7	11.3	11.8	14.0
China	2,074	1,640	1,445	1,256	11.0	8.4	6.6	5.8
Germany	1,904	1,353	2,599	1,813	10.1	6.9	11.8	8.4
New Zealand	901	1,223	1,086	1,470	4.8	6.3	4.9	6.8
Uruguay	876	917	1,317	1,527	4.6	4.7	6.0	7.1
Other countries	2,736	3,296	4,288	4,785	14.5	16.8	19.3	22.3
VEGETABLE PRODUCTS								
Cocoa or cacao beans: Total	425,184	411,543	419,243	421,938	100.0	100.0	100.0	100.0
British West Africa	164,338	133,963	146,739	145,400	38.7	32.6	35.0	34.5
Brazil	81,148	100,262	87,338	95,516	19.1	24.4	20.8	22.6
Dominican Republic	51,084	39,591	50,353	41,120	12.0	9.6	12.0	9.7
British West Indies and Bermudas	31,247	38,217	41,933	39,276	7.3	9.3	10.0	9.3
Germany	15,797	29,074	17,424	8,565	3.7	7.1	4.2	2.0
Ecuador	13,710	19,210	16,939	14,754	3.2	4.7	4.0	3.5
Venezuela	13,207	14,482	18,008	19,302	3.1	3.5	4.3	4.6
Other countries	54,653	36,744	40,509	58,005	12.9	8.8	9.7	13.8
Coffee: Total	1,444,847	1,535,392	1,435,070	1,562,058	100.0	100.0	100.0	100.0
Brazil	1,000,721	1,059,742	933,056	1,011,430	69.3	69.0	65.0	64.7
Colombia	313,590	261,678	263,236	351,333	21.7	17.0	18.3	22.5
Central America	40,070	64,443	54,774	56,763	2.8	4.2	3.8	3.6
Other countries	90,466	149,529	184,004	142,532	6.2	9.8	12.9	9.2

TABLE 508.—*Principal agricultural products imported into the United States, by countries, 1926–27 to 1929–30*—Continued

Article and country from which imported	Year beginning July—							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—contd.								
Fibers, vegetable:								
Cotton, raw—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	190,963	175,450	227,454	197,657	100.0	100.0	100.0	100.0
Egypt	102,280	94,581	135,007	86,872	53.6	53.9	59.4	44.0
Mexico	46,550	11,508	26,004	19,456	24.4	6.6	11.4	9.9
China	14,536	32,123	18,554	22,086	7.6	18.3	8.2	11.2
British India	9,240	12,467	25,736	28,297	4.8	7.1	11.3	14.3
Peru	8,650	9,146	8,636	9,151	4.5	5.2	3.8	4.6
Other countries	9,707	15,625	13,517	31,795	5.1	8.9	5.9	16.0
Flax, unmanufactured—	*Long tons*	*Long tons*	*Long tons*	*Long tons*				
Total	4,705	5,437	5,650	7,013	100.0	100.0	100.0	100.0
Total Europe	4,294	5,187	5,476	6,862	91.3	95.4	96.9	97.8
United Kingdom	1,231	1,800	1,758	1,768	26.2	33.1	31.1	25.2
Latvia	898	1,520	2,176	2,231	19.1	28.0	38.5	31.8
Russia in Europe	642	149	294	1,127	13.6	2.7	5.2	16.1
Estonia	566	113	0	31	12.0	2.1	0	.4
Belgium	446	739	757	810	9.5	13.6	13.4	11.5
Netherlands	287	253	208	231	6.1	4.7	3.7	3.3
Other Europe	224	613	283	664	4.8	11.2	5.0	9.5
Canada	45	126	72	97	1.0	2.3	1.3	1.4
Other countries	366	124	102	54	7.7	2.3	1.8	.8
Manila fiber—	*1,000 long tons*	*1,000 long tons*	*1,000 long tons*	*1,000 long tons*				
Total	61	48	60	73	100.0	100.0	100.0	100.0
Philippine Islands	60	47	60	71	98.4	97.9	100.0	97.3
Other countries	1	1	0	2	1.6	2.1	0	2.7
Sisal and henequen—								
Total	116	124	135	112	100.0	100.0	100.0	100.0
Mexico	82	93	95	57	70.7	75.0	70.4	50.9
Dutch East Indies	19	16	20	30	16.4	12.9	14.8	26.8
Other countries	15	15	20	25	12.9	12.1	14.8	22.3
Fruits:								
Dried—								
Currants—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	13,011	11,034	9,382	10,055	100.0	100.0	100.0	100.0
Total Europe	12,913	10,856	9,286	9,963	99.2	98.4	99.0	99.1
Greece	12,714	10,800	9,178	9,950	97.7	97.9	97.8	99.0
Other Europe	199	56	108	13	1.5	.5	1.2	.1
Other countries	98	178	96	92	.8	1.6	1.0	.9
Dates—								
Total	49,434	44,128	54,087	53,249	100.0	100.0	100.0	100.0
Hejaz, Arabia, etc	32,828	694	476	703	66.4	1.6	.9	1.3
Iraq	10,161	34,700	45,373	48,804	20.6	78.6	83.9	91.7
United Kingdom	3,413	6,987	3,085	1,350	6.9	15.8	5.7	2.5
Other countries	3,032	1,747	5,153	2,392	6.1	4.0	9.5	4.5
Figs—								
Total	39,504	31,459	35,563	21,917	100.0	100.0	100.0	100.0
Turkey (Europe and Asia)	22,270	16,566	22,418	12,784	56.4	52.7	63.0	58.3
Greece	6,842	2,465	4,910	6,084	17.3	7.8	13.8	27.8
Italy	3,305	1,943	1,358	641	8.4	6.2	3.8	2.9
Portugal	2,786	5,933	4,404	934	7.1	18.9	12.4	4.3
Other countries	4,301	4,552	2,473	1,474	10.8	14.4	7.0	6.7
Fresh—								
Bananas—	*1,000 bunches*	*1,000 bunches*	*1,000 bunches*	*1,000 bunches*				
Total	57,102	64,029	63,530	65,909	100.0	100.0	100.0	100.0
Central America	32,208	39,676	42,386	42,764	56.4	62.0	66.7	64.9
Jamaica	13,861	13,398	11,722	11,513	24.3	20.9	18.4	17.5
Cuba	2,905	2,730	3,467	4,149	5.1	4.3	5.5	6.3
Colombia	2,073	1,695	1,439	1,171	3.6	2.6	2.3	1.8
Other countries	6,055	6,530	4,516	6,312	10.6	10.2	7.1	9.5

TABLE 508.—*Principal agricultural products imported into the United States, by countries, 1926–27 to 1929–30*—Continued

Article and country from which imported	Year beginning July— 1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—contd.								
Fruits—Continued.								
Fresh—Continued.	*1,000 boxes* [1]	*1,000 boxes* [1]	*1,000 boxes* [1]	*1,000 boxes* [1]	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Lemons—Total	659	1,308	391	1,229	100.0	100.0	100.0	100.0
Total Europe	659	1,304	390	1,227	100.0	99.7	99.7	99.9
Italy	654	1,300	382	1,217	99.2	99.4	97.7	99.0
Other Europe	5	4	8	10	.8	.3	2.0	.9
Other countries	0	4	1	2	0	.3	.3	.1
	1,000 gallons	*1,000 gallons*	*1,000 gallons*	*1,000 gallons*				
Olives—Total	5,212	6,458	6,955	8,452	100.0	100.0	100.0	100.0
Total Europe	5,185	6,415	6,909	8,411	99.5	99.3	99.3	99.5
Spain	4,664	5,739	6,209	7,746	89.5	88.9	89.3	91.6
Greece	96	144	204	308	1.8	2.2	2.9	3.6
Other Europe	425	532	496	357	8.2	8.2	7.1	4.3
Other countries	27	43	46	41	.5	.7	.7	.5
Grains, flours, etc.:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Rice, cleaned, except patna—Total	54,088	33,674	25,166	20,946	100.0	100.0	100.0	100.0
Hong Kong	19,741	20,786	17,934	15,094	36.5	61.7	71.3	72.1
Mexico	8,002	1,264	1,022	1,259	14.8	3.8	4.1	6.0
Netherlands	5,837	2,139	271	1,622	10.8	6.4	1.1	7.7
Germany	3,768	1,077	396	489	7.0	3.2	1.6	2.3
Italy	3,695	3,971	1,032	1,310	6.8	11.8	4.1	6.3
Siam	2,912	448	1	0	5.4	1.3	0	0
British India	465	1,061	2,380	243	.8	3.2	9.5	1.2
Other countries	9,668	2,928	2,130	929	17.9	8.6	8.3	4.4
Rice, patna—Total	[2] 1,221	1,826	2,329	2,176	100.0	100.0	100.0	100.0
Netherlands	[2] 1,215	1,826	2,329	2,010	[2] 99.5	100.0	100.0	92.4
Other countries	[2] 6	0	0	166	[2] .5	0	0	7.6
Rice, uncleaned—Total	11,728	5,996	8,060	7,005	100.0	100.0	100.0	100.0
Mexico	7,802	3,036	5,904	4,181	66.5	50.6	73.3	59.7
Japan	3,213	2,316	1,441	1,492	27.4	38.6	17.9	21.3
British India	224	428	325	694	1.9	7.1	4.0	9.9
Other countries	489	216	390	628	4.2	3.7	4.8	9.1
Rice, flour and meal—Total	2,972	2,606	1,239	1,085	100.0	100.0	100.0	100.0
Mexico	2,307	1,981	508	340	77.6	76.0	41.0	31.3
Japan	469	442	504	472	15.8	17.0	40.7	43.5
China	36	38	68	51	1.2	1.5	5.5	4.7
Netherlands	0	21	0	100	0	.8	0	9.2
Other countries	160	124	159	122	5.4	4.7	12.8	11.3
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*				
Wheat—Total	13,235	15,706	21,430	12,948	100.0	100.0	100.0	100.0
Canada	13,234	15,706	21,429	12,948	100.0	100.0	100.0	100.0
Other countries	1	0	1	0	0	0	0	0
	1,000 barrels	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*				
Wheat flour—Total	6	6	3	2	100.0	100.0	100.0	100.0
Canada	5	3	2	1	83.3	50.0	66.7	50.0
Ecuador	0	2	0	0	0	33.3	0	0
United Kingdom	0	0	0	1	0	0	0	50.0
Other countries	1	1	1	0	16.7	16.7	33.3	0

See footnotes at end of table.

TABLE 508.—*Principal agricultural products imported into the United States, by countries, 1926–27 to 1929–30*—Continued

Article and country from which imported	Year beginning July— 1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—contd.								
Nuts:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Almonds, shelled—Total	15,699	18,257	18,106	18,304	100.0	100.0	100.0	100.0
Total Europe	15,171	17,843	17,536	18,068	96.6	97.7	96.9	98.7
Spain	8,389	9,637	10,399	8,902	53.4	52.8	57.4	48.6
Italy	6,076	7,703	6,578	8,912	38.7	42.2	36.3	48.7
France	541	306	286	136	3.4	1.7	1.6	.7
Other Europe	165	197	273	118	1.1	1.0	1.6	.7
Other countries	528	414	570	236	3.4	2.3	3.1	1.3
Almonds, not shelled—Total	638	464	1,891	5,503	100.0	100.0	100.0	100.0
Total Europe	499	463	1,882	5,484	78.2	99.8	99.5	99.7
Italy	180	98	73	375	28.2	21.1	3.9	6.8
Spain	158	229	1,068	4,530	24.8	49.4	56.5	82.3
France	154	131	474	518	24.1	28.2	25.1	9.4
Other Europe	7	5	267	61	1.1	1.1	14.0	1.2
Brazil	130	0	0	0	20.4	0	0	0
Other countries	9	1	9	19	1.4	.2	.5	.3
Filberts, shelled—Total	4,950	6,600	5,606	4,503	100.0	100.0	100.0	100.0
Total Europe	4,635	4,541	3,775	3,892	93.6	68.8	67.3	86.4
Turkey in Europe	1,910	2,559	0	0	38.6	38.8	0	0
France	1,414	1,206	1,027	178	28.6	18.3	18.3	4.0
Spain	421	329	1,764	2,888	8.5	5.0	31.5	64.1
Other Europe	890	447	984	826	17.9	6.7	17.5	18.3
Turkey in Asia	223	2,059	1,800	609	4.5	31.2	32.1	13.5
Other countries	92	0	31	2	1.9	0	.6	.1
Filberts, not shelled—Total	9,822	11,244	12,134	5,756	100.0	100.0	100.0	100.0
Total Europe	9,690	11,103	12,114	5,756	98.7	98.7	99.8	100.0
Italy	9,296	6,687	11,053	4,548	94.6	59.5	91.1	79.2
Turkey in Europe	54	1,200	0	0	.5	10.7	0	0
Spain	49	1,936	818	954	.5	17.2	6.7	16.6
Other Europe	291	1,280	243	254	3.1	11.3	2.0	4.2
Other countries	132	141	20	0	1.3	1.3	.2	0
Peanuts, shelled—Total	46,852	54,784	26,606	8,001	100.0	100.0	100.0	100.0
China	44,729	49,986	23,987	7,140	95.5	91.2	90.2	89.2
Other countries	2,123	4,798	2,619	861	4.5	8.8	9.8	10.8
Peanuts, not shelled—Total	4,410	13,498	5,709	2,910	100.0	100.0	100.0	100.0
China	3,812	12,339	4,680	2,445	86.4	91.4	82.0	84.0
Japan, including Chosen	245	509	360	212	5.6	3.8	6.3	7.3
Other countries	353	650	669	253	8.0	4.8	11.7	8.7
Walnuts, shelled—Total	20,979	16,015	17,956	17,278	100.0	100.0	100.0	100.0
Total Europe	12,002	13,540	11,341	12,079	57.2	84.5	63.2	69.9
France	8,995	12,551	9,308	11,357	42.9	78.4	51.8	65.7
Other Europe	3,007	989	2,033	722	14.3	6.1	11.4	4.2
China	8,144	1,952	5,052	4,364	38.8	12.2	28.1	25.3
Other countries	833	523	1,563	835	4.0	3.3	8.7	4.8

TABLE 508.—*Principal agricultural products imported into the United States, by countries, 1926–27 to 1929–30*—Continued

Article and country from which imported	Year beginning July—							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—contd.								
Nuts—Continued.								
Walnuts, not shelled—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	25, 706	10, 314	15, 581	7, 024	100. 0	100. 0	100. 0	100. 0
Total Europe	18, 652	6, 946	10, 557	5, 568	72. 6	67. 3	67. 8	79. 3
Italy	12, 082	4, 558	4, 501	4, 620	47. 0	44. 2	28. 9	65. 8
France	3, 566	2, 244	2, 720	831	13. 9	21. 8	17. 5	11. 8
Other Europe	3, 004	144	3, 336	117	11. 7	1. 3	21. 4	1. 7
China	5, 870	2, 531	4, 575	1, 419	22. 8	24. 5	29. 4	20. 2
Other countries	1, 184	837	449	37	4. 6	8. 2	2. 8	. 5
Oils, vegetable:								
Coconut oil, product of Philippine Islands	286, 776	273, 309	377, 288	370, 600	100. 0	100. 0	100. 0	100. 0
Olive oil, edible— Total	87, 922	70, 130	88, 118	98, 446	100. 0	100. 0	100. 0	100. 0
Total Europe	86, 393	69, 231	86, 821	95, 843	98. 3	98. 7	98. 5	97. 4
Italy	58, 706	45, 145	62, 202	71, 265	66. 8	64. 4	70. 6	72. 4
Spain	21, 682	17, 797	16, 910	20, 909	24. 7	25. 4	19. 2	21. 2
France	4, 705	5, 335	6, 182	2, 959	5. 4	7. 6	7. 0	3. 0
Other Europe	1, 300	954	1, 527	710	1. 4	1. 3	1. 7	. 8
Other countries	1, 529	899	1, 297	2, 603	1. 7	1. 3	1. 5	2. 6
Soybean oil— Total	23, 553	14, 562	17, 172	13, 333	100. 0	100. 0	100. 0	100. 0
Kwantung	15, 759	13, 546	11, 089	12, 867	66. 9	93. 0	64. 6	96. 5
Japan	4, 033	41	1, 729	121	17. 1	. 3	10. 1	. 9
China	1, 803	891	1, 520	0	7. 7	6. 1	8. 9	0
Other countries	1, 958	84	2, 834	345	8. 3	. 6	16. 4	2. 6
Oilseeds:								
Copra, not prepared— Total	454, 546	456, 158	629, 937	493, 456	100. 0	100. 0	100. 0	100. 0
Philippine Islands	330, 946	336, 920	386, 567	299, 193	72. 8	73. 9	61. 4	60. 6
British Malaya	59, 746	40, 381	84, 700	42, 114	13. 1	8. 9	13. 4	8. 5
French Oceania	29, 188	25, 273	21, 306	22, 662	6. 4	5. 5	3. 4	4. 6
British Oceania	19, 131	19, 941	37, 685	43, 778	4. 2	4. 4	6. 0	8. 9
Other countries	15, 535	33, 643	99, 679	85, 709	3. 5	7. 3	15. 8	17. 4
Flaxseed—	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*				
Total	24, 224	18, 112	23, 494	19, 652	100. 0	100. 0	100. 0	100. 0
Argentina	20, 581	16, 057	20, 927	19, 236	85. 0	88. 7	89. 1	97. 9
Canada	3, 429	1, 933	2, 528	355	14. 2	10. 7	10. 8	1. 8
Other countries	214	122	39	61	. 8	. 6	. 1	. 3
Seeds, except oilseeds:								
Clover seed—								
Clover, red—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	11, 012	5, 434	7, 552	2, 357	100. 0	100. 0	100. 0	100. 0
Total Europe	10, 702	5, 388	7, 401	2, 357	97. 2	99. 2	98. 0	100. 0
France	10, 173	493	3, 664	845	92. 4	9. 1	48. 5	35. 9
Germany	251	697	679	283	2. 3	12. 8	9. 0	12. 0
Poland-Danzig	0	2, 015	1, 278	1, 141	0	37. 1	16. 9	48. 4
Russia in Europe	0	1, 328	202	88	0	24. 4	2. 7	3. 7
Other Europe	278	855	1, 578	0	2. 5	15. 8	20. 9	0
Other countries	310	46	151	0	2. 8	. 8	2. 0	0

TABLE 508.—*Principal agricultural products imported into the United States, by countries, 1926–27 to 1929–30*—Continued

Article and country from which imported	Year beginning July—							
	1926–27	1927–28	1928–29	1929–30	1926–27	1927–28	1928–29	1929–30
VEGETABLE PRODUCTS—contd.								
Seed, except oilseed—Continued.								
All other, including alsike, crimson, and all other clover—Total	*1,000 pounds* 14,333	*1,000 pounds* 16,397	*1,000 pounds* 14,944	*1,000 pounds* 13,048	*Per cent* 100.0	*Per cent* 100.0	*Per cent* 100.0	*Per cent* 100.0
Total Europe	3,581	3,260	4,975	5,533	25.0	19.9	33.3	42.4
France	1,561	791	2,750	589	10.9	4.8	18.4	4.5
Germany	455	799	1,651	2,149	3.2	4.9	11.0	16.5
Other Europe	1,565	1,670	574	2,795	10.9	10.2	3.9	21.4
Canada	10,745	13,121	8,899	7,515	75.0	80.0	59.5	57.6
Other countries	7	16	1,070	0	0	.1	7.2	0
Spices:								
Pepper, unground—Total	25,217	23,978	25,663	30,988	100.0	100.0	100.0	100.0
British India	11,048	7,907	6,218	7,505	43.8	32.9	24.2	24.2
Dutch East Indies	6,636	6,446	9,205	17,250	26.3	26.9	35.9	55.7
United Kingdom	3,577	5,292	3,435	3,238	14.2	22.1	13.4	10.4
British Malaya	2,287	2,831	1,469	870	9.1	11.8	5.7	2.8
Other countries	1,669	1,502	5,336	2,125	6.6	6.3	20.8	6.9
Sugar, raw, cane: Total	*1,000 short tons* 4,420	*1,000 short tons* 4,045	*1,000 short tons* 4,752	*1,000 short tons* 3,641	100.0	100.0	100.0	100.0
Cuba	3,953	3,399	4,109	2,769	89.4	84.0	86.5	76.1
Philippine Islands	428	613	605	809	9.7	15.2	12.7	22.2
Other countries	39	33	38	63	.9	.8	.8	1.7
Tea: Total	*1,000 pounds* 97,402	*1,000 pounds* 90,099	*1,000 pounds* 92,635	*1,000 pounds* 86,368	100.0	100.0	100.0	100.0
Japan	28,430	25,399	27,329	22,048	29.2	28.2	29.5	25.5
United Kingdom	22,136	20,380	23,608	21,578	22.7	22.6	25.5	25.0
Ceylon	16,578	16,326	16,893	19,047	17.0	18.1	18.2	22.1
China	11,655	10,131	8,878	7,405	12.0	11.1	9.6	8.6
British India	8,059	9,198	7,688	9,217	8.3	10.2	8.3	10.7
Dutch East Indies	7,660	5,398	5,358	4,891	7.9	6.0	5.8	5.7
Other countries	2,884	3,267	2,881	2,182	2.9	3.8	3.1	2.4
Tobacco, leaf, unmanufactured:								
Leaf, product of Philippine Islands	1,117	2,541	4,678	4,007	100.0	100.0	100.0	100.0
Leaf, for cigar wrappers—Total	6,473	6,344	6,212	8,541	100.0	100.0	100.0	100.0
Netherlands	6,358	6,218	6,095	8,415	98.2	98.0	98.1	98.5
Other countries	115	126	117	126	1.8	2.0	1.9	1.5
All other leaf—Total	83,499	70,227	66,001	48,376	100.0	100.0	100.0	100.0
Greece	28,383	15,694	16,741	13,400	34.0	22.3	25.4	27.7
Cuba	24,233	21,530	22,116	21,773	29.0	30.7	33.5	45.0
Turkey (Europe and Asia)	15,355	17,289	14,269	6,162	18.4	24.6	21.6	12.7
Italy	13,708	13,743	11,286	6,563	16.4	19.6	17.1	13.6
Germany	973	1,242	305	391	1.2	1.8	.5	.8
Other countries	847	729	1,284	87	1.0	1.0	1.9	.2
India rubber, crude: Total	962,467	926,040	1,226,929	1,137,406	100.0	100.0	100.0	100.0
British Malaya	602,756	524,834	811,843	788,594	62.6	56.7	66.2	69.3
Dutch East Indies	156,772	170,161	215,863	195,297	16.3	18.4	17.6	17.2
Ceylon	89,874	73,542	112,257	118,425	9.3	7.9	9.1	10.4
United Kingdom	55,155	110,575	50,938	7,249	5.7	11.9	4.2	.6
Other countries	57,910	46,928	36,028	27,841	6.1	5.1	2.9	2.5

Bureau of Agricultural Economics. Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1928–1930, and official records of the Bureau of Foreign and Domestic Commerce.

[1] Boxes of 74 pounds net [2] January–June

TABLE 509.—*Vegetable oils: Exports from the United States, 1909–10 to 1929–30*

Year beginning July	Corn	Cotton-seed	Linseed	Cocoa butter or butterine	Coconut	Peanut	Soybean
	1,000 pounds	*1,000 pounds*	*1,000 gallons*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1909–10	11,299	223,955	228	-------	-------	-------	-------
1910–11	25,317	225,521	175	-------	-------	-------	-------
1911–12	23,866	399,471	247	-------	-------	-------	-------
1912–13	19,839	315,233	1,734	-------	-------	-------	-------
1913–14	18,282	192,963	239	-------	-------	-------	-------
1914–15	17,790	318,367	1,212	-------	-------	-------	-------
1915–16	8,968	266,512	714	-------	-------	-------	-------
1916–17	8,780	158,912	1,202	-------	-------	-------	-------
1917–18	1,831	100,780	1,188	-------	-------	-------	-------
1918–19	1,095	178,709	1,096	-------	-------	-------	-------
1919–20	12,483	159,400	1,136	11,048	141,088	4,922	67,782
1920–21	6,919	283,268	561	3,171	6,639	1,595	5,118
1921–22	5,280	91,615	366	1,856	10,185	1,802	537
1922–23	5,224	64,292	414	957	12,993	188	2,495
1923–24	4,196	39,418	350	888	19,423	168	2,892
1924–25	3,586	53,261	320	1,577	17,890	(1)	579
1925–26	2,927	59,015	311	1,766	15,444	(1)	623
1926–27	405	57,580	365	290	19,826	(1)	3,104
1927–28	329	61,470	296	1,897	22,358	(1)	7,514
1928–29	323	29,531	269	1,010	24,556	(1)	8,241
1929–30 [2]	363	32,108	284	347	30,306	(1)	5,509

Bureau of Agricultural Economics. Compiled from Foreign Commerce and Navigation of the United States, 1910–1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1930.

[1] Included with "Other vegetable oils and fats."
[2] Preliminary.

TABLE 510.—*Vegetable oils: Imports into the United States, 1909–10 to 1929–30*

Year beginning July	Castor [1]	Chinese nut	Cocoa butter or butterine	Coconut	Cottonseed [1]	Linseed	Olive	Palm	Palm kernel	Peanut	Rapeseed	Soybean
	1,000 gals.	*1,000 gals.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 gals.*	*1,000 gals.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 gals.*	*1,000 gals.*	*1,000 lbs.*
1909–10	7	[2] 5,760	3,370	48,346	(3)	(3)	4,545	92,772	(3)	(4)	[5] 1,083	(3)
1910–11	7	[2] 7,042	4,279	51,118	(3)	(3)	4,984	57,100	(3)	(4)	[5] 1,363	(4)
1911–12	8	4,768	6,075	46,371	1,513	737	5,473	47,159	25,393	896	1,183	28,021
1912–13	5	5,997	3,603	50,504	3,384	174	5,840	50,229	23,569	1,196	1,550	12,340
1913–14	189	4,932	2,839	74,386	17,293	192	6,981	58,040	34,328	1,337	1,464	16,360
1914–15	63	4,940	150	63,135	15,162	535	7,364	31,486	4,906	853	1,499	19,207
1915–16	253	4,968	400	66,008	17,181	50	8,109	40,497	6,761	1,475	2,561	98,120
1916–17	324	6,864	166	79,223	13,703	111	8,184	36,074	1,857	3,026	1,085	162,690
1917–18	1,175	4,816	(6)	259,195	14,291	51	2,652	27,405	19	8,289	3,056	336,825
1918–19	472	6,217	3	344,728	20,410	990	4,398	19,281	1,945	11,393	2,091	236,805
1919–20	271	10,614	42	271,540	24,165	4,550	7,029	50,165	54	22,064	1,230	195,774
1920–21	99	4,440	915	173,889	1,315	1,997	4,705	31,076	2,769	2,422	1,172	49,331
1921–22	46	7,410	7,123	230,236	(6)	22,494	11,112	39,159	-------	384	1,352	8,283
1922–23	185	11,919	3,010	212,573	45	7,568	15,635	118,816	-------	1,007	1,770	38,635
1923–24	36	10,786	1,169	181,230	(6)	2,379	15,121	86,784	1,126	2,008	2,068	17,631
1924–25	41	12,626	733	250,121	0	3,145	15,743	114,387	37,364	468	1,959	20,434
1925–26	66	11,315	14	200,878	283	2,231	18,363	152,254	85,074	450	2,038	17,401
1926–27	22	13,657	256	286,776	6,396	177	17,964	110,184	14,760	1,061	2,731	23,553
1927–28	125	11,150	18	273,309	1	46	15,746	183,977	56,021	648	2,604	14,562
1928–29	17	15,365	17	377,288	(6)	890	19,706	228,230	80,514	454	2,543	17,172
1929–30 [7]	16	17,459	270	370,600	2	722	21,149	237,860	41,380	262	2,152	13,333

Bureau of Agricultural Economics. Compiled from Foreign Commerce and Navigation of the United States 1910–1918: Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1930.

[1] Imports for consumption. (See introduction to Agricultural Statistics.)
[2] Includes peanut oil.
[3] Included in all other fixed or expressed.
[4] Included in Chinese nut oil.
[5] Includes hempseed.
[6] Less than 500 pounds.
[7] Preliminary.

TABLE 511.—*Oil cake and oil-cake meal: International trade, average 1909–1913, annual 1927–1929*

Country	Calendar year							
	Average, 1909–1913		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	0	1,704,124	188,884	1,569,969	250,786	1,186,934	334,172	1,278,525
Russia	0	1,453,413	0	663,880	0	314,627		
Germany	1,686,416	525,108	1,231,000	697,136	1,205,083	972,716	1,163,887	620,202
British India	1,262	268,648	220	581,860	320	699,241	228	705,990
France	288,968	476,863	90,852	325,823	75,411	438,107	102,219	360,341
Egypt	0	161,624	2	401,157	0	347,802	0	391,092
China	[1] 174	147,468	0	230,257	0	287,111	0	291,910
Italy	10,550	55,115	532	265,450	230	324,048	436	303,662
Argentina	0	42,587	0	173,438	0	144,049	0	146,339
Dutch East Indies	2,509	13,242	0	140,736	0	171,581	0	[2] 178,282
Roumania	12	21,654						
Peru	0	10,930	0	88,428	0	79,042	0	66,540
Brazil	0	[3] 6,574	0	37,904	0	44,407		
Czechoslovakia	(4)	(4)	72,817	54,878	103,306	46,186	97,258	59,652
Canada	7,752	51,370	15,486	46,147	13,930	44,419	21,911	51,032
Spain	0	2,164	1,114	41,893	5,116	13,898		
Australia [5]	[6] 148	[6] 1,347	4,772	926	6,261	5,711	938	10,210
Hungary	[7] 53,673	[7] 124,873	15,911	15,966	29,801	12,043	27,082	25,240
PRINCIPAL IMPORTING								
Denmark	1,002,329	15,777	1,587,719	22,891	1,432,965	30,050	1,625,956	
United Kingdom	790,865	161,798	1,087,247	144,243	809,899	108,134	1,077,993	160,247
Netherlands	707,116	219,819	592,427	130,177	669,165	120,920	835,947	133,907
Japan	189,868	0	314,853	29,436	353,768	58,424	316,707	78,254
Belgium	543,648	155,373	346,224	81,009	334,711	95,929	337,624	99,879
Sweden	346,755	1,535	293,246	15,963	311,856	9,416	290,655	18,261
Irish Free State	(4)	(4)	111,835	0	106,412	0	108,652	0
Finland	25,333	2,125	163,078	0	227,575	0	200,527	0
Switzerland	69,352	1,413	65,064	18,536	75,052	17,735	69,505	12,844
Norway	55,112	2,889	77,298	8	63,481	1	33,812	
Ceylon	[8] 40,494	[8] 28,509	43,045	19,393	42,636	32,650	40,195	37,343
Austria	(4)	(4)	33,204	745	45,513	899		
Total, 30 countries	5,822,336	5,656,342	6,327,930	5,797,809	6,166,277	5,706,080	6,685,704	5,029,752

Bureau of Agricultural Economics. Official sources except as otherwise noted. The class called here "Oil cake and oil-cake meal" includes the edible cake and meal remaining after making oil from such products as cottonseed, flaxseed, peanuts, corn, etc. Soybean cake is not included in this table.

*Preliminary.
[1] 3-year average.
[2] Java and Madura only.
[3] 4-year average.
[4] Figures for pre-war years are included in the countries of the pre-war boundaries.
[5] Year ended June 30.
[6] Calendar year.
[7] Average for Austria-Hungary.
[8] 1 year only.

TABLE 512.—*Rubber: International trade, average 1909–1913, annual 1927–1929*

Country	Calendar year							
	Average, 1909–1913		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
British Malaya	[1] 43, 472	[1] 85, 435	411, 473	837, 163	336, 932	920, 329	362, 011	1, 300, 117
Dutch East Indies	[2] 1	7, 679	0	629, 004	0	602, 476	0	[3] 148, 391
Ceylon	[4] 1, 299	10, 953	11, 119	125, 063	11, 435	128, 328	13, 377	180, 632
Brazil	0	84, 938	0	54, 894	0	39, 214	0	43, 786
British India	0	[4] 1, 504	72	25, 520	33	24, 180	271	26, 529
Indo-China	1	398	[1] 31	21, 225	[1] 18	21, 589	[1] 60	[1] 22, 727
British North Borneo [1]	0	331	0	14, 788	0	15, 003	0	16, 534
Bolivia	0	8, 395	0	8, 517	0	---------	0	---------
Mexico [1]	0	13, 462	313	10, 946	---------	---------	---------	---------
French Guiana [1]	241	3, 937	4	2, 060	14	1, 595	4	830
French Equatorial Africa [1]	10	3, 775	454	3, 891	0	3, 178	212	2, 365
Kamerun	0	6, 409	[1] 7	[1] 1, 970	0	[1] 4, 979	0	[1] 4, 426
Ecuador	0	1, 040	0	2, 290	0	[1] 712	0	---------
Belgian Congo	0	7, 755	0	2, 750	0	2, 342	0	1, 872
Nigeria	0	3, 054	0	[1] 4, 474	0	[1] 1, 902	0	[1] 2, 086
Switzerland	391	725	1, 093	1, 694	1, 268	2, 280	1, 466	2, 624
Gold Coast	0	2, 393	0	[1] 711	0	[1] 568	0	[1] 651
Peru	0	5, 030	0	697	0	908	0	543
Angola	0	5, 620	0	[1] 255	0	[1] 92	0	[1] 29
PRINCIPAL IMPORTING								
United States	100, 180	0	954, 750	0	987, 107	0	1, 262, 939	0
France	32, 704	21, 615	95, 128	18, 714	100, 658	18, 937	159, 546	8, 498
Germany	42, 004	9, 844	93, 836	6, 721	93, 455	8, 660	117, 054	7, 119
Japan	1, 917	0	46, 997	0	57, 898	0	76, 922	0
Canada	3, 945	225	59, 253	0	69, 220	0	79, 512	0
Italy	5, 381	225	25, 206	204	27, 903	58	36, 700	81
United Kingdom	43, 141	0	134, 047	0	9, 829	0	274, 790	0
Netherlands	10, 822	7, 172	10, 813	9, 389	9, 433	4, 527	13, 726	6, 525
Russia	19, 131	0	22, 868	0	33, 975	0	---------	0
Belgium	25, 891	20, 749	17, 095	2, 069	21, 622	3, 039	24, 973	3, 851
Spain	1, 067	0	12, 383	42	19, 042	2	[1] 4, 838	[1] 38
Austria	[5] 6, 696	[5] 1, 619	7, 750	1, 231	8, 001	1, 163	[1] 9, 928	[1] 2, 066
Sweden	1, 695	1	4, 951	168	5, 218	170	8, 527	107
Czechoslovakia [1]	([6])	([6])	6, 568	489	7, 328	804	10, 948	531
Hungary	([6])	([6])	2, 409	76	3, 349	269	3, 290	227
Denmark	250	0	1, 289	7	1, 261	6	1, 794	---------
Total, 35 countries	350, 239	314, 058	1, 910, 909	1, 786, 995	1, 795, 999	1, 806, 810	2, 462, 888	1, 782, 909

Bureau of Agricultural Economics. Official sources except where otherwise noted. Figures for rubber include "India rubber," so called, caoutchouc, caucho, jebe (Peru), hule (Mexico), borracha, massaranduba, mangabeira, manicoba, sorva, and seringa (Brazil), gamelastiek (Dutch East Indies), caura, and sernamhi (Venezuela).

*Preliminary.

[1] International Yearbook of Agricultural Statistics.

[2] 1 year only.

[3] Java and Madura.

[4] 3-year average.

[5] Average for Austria-Hungary

[6] Figures for pre-war years are included in the countries of the pre-war boundaries.

TABLE 513.—*Coffee: International trade, average 1909–1913, annual 1927–1929*

Country	Calendar year							
	Average, 1909–1913		1927		1928		1929*	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Brazil	0	1,672,282	0	1,999.374	1	0,836,187	0	1,889,034
Colubia	0	104,398	[1] 6	[1] 311,711	--------	369,726	--------	[1] 376,386
Dutch East Indies	4,227	54,149	3,726	186,957	3,286	252,494	[2] 64	[2] 63,330
Venezuela	0	111,328	0	112,579	0	84,401	0	--------
Guatemala	0	85,951	0	116,539	0	98,245	0	--------
Salvador	[3] 1,593	62,380	0	79,813	0	117,083	0	103,138
Haiti	0	61.943	0	68,280	0	84,579	0	62,956
Mexico	[4] 167	48,991	[1] 220	57,522	--------	69,617	--------	38,091
Costa Rica	0	27,515	0	[1] 35,613	0	41,539	0	[1] 43,378
Nicaragua	[5] 138	19,033	[1] 209	22,608	[1] 80	[11] 46,167	--------	--------
British India	[4] 605	27,780	4,664	31,329	4,943	28,556	6,417	11,567
Jamaica	0	8,263	0	[1] 9,153	0	[1] 8,832	--------	[1] 6,572
PRINCIPAL IMPORTING COUNTRIES								
United States	907,899	[6] 44,251	1,433,340	18,459	1,456,517	8,520	1,482,258	6,726
France	245,752	41	350,526	161	364.104	132	374,842	141
Germany	399,965	1,758	274,337	241	299,209	417	327,014	539
Netherlands	283,663	189,287	111,358	36,861	110,679	32.783	98,599	24,493
Italy	58,278	458	100,851	3	105,195	3	103,324	1
Sweden	74,486	24	95,034	23	94,777	49	90,349	18
Belgium	111,738	33,627	91,474	838	87,432	1,116	86,510	1,551
Spain	29,317	9	52,899	2	47.507	0	[1] 52,666	[1] 11
Argentina	28,125	0	54.069	0	54.000	0	[1] 54,663	0
Denmark	33,102	152	54,445	631	56,494	765	55,739	704
United Kingdom	28,581	241	45,490	212	37,203	262	--------	265
Finland	28,624	0	33,678	0	40,653	0	29,377	0
Norway	29,309	0	37,818	0	36,739	0	33,962	0
Cuba	24,606	4	22,780	1	11,731	1	[1] 18,528	[1] 2
Union o fSouth Africa	26,458	36	29,532	10	26,631	16	28,538	19
Switzerland	25,029	62	29,250	201	27,668	270	29,516	297
Czechoslovakia	(7)	(7)	29,591	5	28,495	2	29,877	2
Canada	13,378	55	26,513	58	28,143	47	28,468	.84
Egypt	15,654	0	21,925	4	18,935	5	21,012	10
Yugoslavia	(7)	(7)	20,679	1	21,192	1	21,466	1
British Malaya	[1] 7,524	[1] 7,137	18,870	10,364	14,648	7,070	14,219	5,555
Austria	[8] 128,304	[8] 8	18,190	5	19,156	7	[1] 20,605	[1] 6
Poland	(7)	(7)	15,398	2	16,210	13	17,854	15
Hungary	(7)	(7)	8,039	0	8,424	0	8,053	0
Russia	26,073	0	[1] 1,911	0	--------	0	--------	--------
Total, 37 countries	2,532,865	2,561,611	2,986,822	3,099,560	3,019,951	3,088,905	3,043,920	2,634,892

Bureau of Agriculture Economics. Compiled from official sources except where otherwise noted. The item coffee comprises unhulled and hulled, ground or otherwise prepared, but imitation or "surrogate" coffee and chicory are excluded.

* Preliminary.
[1] International Yearbook of Agricultural Statistics.
[2] Java and Madura only.
[3] 1 year only.
[4] 4-year average.
[5] 3-year average.
[6] Chiefly from Porto Rico.
[7] Figures for pre-war years are included in the countries of the pre-war boundaries.
[8] Average for Austria-Hungary.

TABLE 514.—*Tea: International trade, average 1909–1913, annual 1926–1929*

Country	Calendar year									
	Average 1909–1913		1926		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
British India	8,002	267,887	7,297	350,970	7,839	375,949	10,164	364,686	8,461	388,490
Ceylon	[1] 1	189,016	0	217,184	2	227,038	1	236,719	[2] 1	251,490
Dutch East Indies	6,742	46,675	7,778	120,174	7,995	127,292	9,339	135,058	[3] 8,362	[3] 119,864
China	18,890	197,997	11,011	109,129	8,809	114,651	13,030	123,150	5,010	125,695
Japan	590	35,823	1,115	23,965	882	23,487	1,027	24,004	1,323	23,660
Formosa	68	23,640	57	22,412	83	22,156	71	18,893	[2] 92	[2] 18,485
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	293,045	0	410,986	0	451,415	0	418,831	0	465,659	0
United States	98,897	0	95,930	0	89,169	0	89,824	0	89,373	0
Australia	35,442	0	[2] 46,949	0	[2] 49,672	0	[2] 49,076	0	[2] 50,576	0
Canada	37,927	0	37,630	0	38,117	0	39,527	0	38,677	0
Netherlands	11,383	45	26,177	25	27,694	28	28,186	26	28,716	40
Irish Free State	(4)	(4)	23,596	0	23,667	0	22,649	0	23,580	0
Russia	157,704	866	31,770	[2] 1,300	33,741	[2] 395	40,580	------	[2] 63,030	------
Persia [5]	9,446	125	15,146	438	13,090	470	15,662	161	------	------
New Zealand	7,542	0	10,928	0	10,825	0	11,149	0	12,061	0
Morocco	6,696	0	11,184	0	11,333	0	12,524	0	[2] 16,107	0
Union of South Africa	5,192	61	10,303	127	11,812	164	11,585	133	12,095	261
British Malaya	[2] 11,983	[2] 5,318	11,198	1,533	10,778	1,238	9,973	1,326	11,378	1,217
Egypt	1,950	0	8,408	300	8,605	233	14,318	291	13,093	218
Germany	8,964	23	10,116	0	11,409	0	11,786	0	12,723	0
Chile	3,505	0	4,430	0	4,653	0	5,767	5	5,415	0
Poland	(4)	(4)	3,938	1	4,621	0	5,025	0	4,839	73
Argentina	3,890	0	2,739	0	4,101	0	4,211	0	[2] 4,213	0
Indo-China	3,295	1,145	5,502	2,530	5,071	1,711	5,098	2,065	[2] 4,313	[2] 2,232
France	2,806	61	3,570	108	3,022	48	3,352	57	3,492	69
Czechoslovakia	(4)	(4)	1,449	9	1,455	2	1,597	1	1,607	0
Austria	[6] 3,424	[6] 3	1,231	0	1,278	0	1,360	0	[2] 1,430	[2] 2
Yugoslavia	(4)	(4)	815	0	759	0	902	0	913	0
Hungary	(4)	(4)	646	23	884	0	902	0	841	0
Total, 29 countries	737,384	768,685	801,989	850,228	842,781	894,862	837,516	906,575	887,380	931,826

Bureau of Agricultural Economics. Official sources except where otherwise noted.

* Preliminary.
[1] 2-year average.
[2] International Yearbook of Agricultural Statistics.
[3] Java and Madura only.
[4] Figures for pre-war years are included in the countries of the pre-war boundaries.
[5] The figures shown are for the year ended Mar. 20 of the year following the date shown.
[6] Average for Austria-Hungary.

TABLE 515.—*Copra and coconut oil: International trade, years 1926–1929*

COPRA

Country	Calendar year							
	1926		1927		1928		1929 *	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Dutch East Indies	0	830,873	0	673,013	0	971,900	0	[1] 116,532
Philippine Islands	549	383,647	290	439,419	2,273	516,795	----	382,658
British Malaya	181,462	415,305	126,645	320,414	195,395	409,602	192,506	444,949
Ceylon	641	270,973	224	222,001	346	221,385	----	228,759
Fiji	0	62,424	0	59,494	0	62,601	0	----
Solomon Islands [2]	0	50,012	0	48,796	0	----	0	----
Zanzibar	10,223	38,873	9,248	31,765	13,740	34,704	11,367	37,416
Tonga	0	31,342	0	25,204	0	----	0	----
Mozambique	0	39,827	0	38,412	0	41,684	0	----
West Samoa [2]	0	27,438	0	26,129	0	35,815	0	----
Tanganyika	0	16,460	0	16,278	0	20,872	0	----
Gilbert and Ellice Islands [3]	0	5,699	0	10,524	0	9,233	0	----
PRINCIPAL IMPORTING COUNTRIES								
Germany	438,087	1,434	413,295	310	442,593	16	539,130	1,545
United States	457,599	0	450,995	0	501,990	0	570,931	0
France [4]	304,725	17	345,355	19	405,174	40	421,130	628
Netherlands	340,257	936	297,870	554	302,201	689	309,244	1,618
Austria	30,321	0	29,766	0	29,638	0	----	0
Belgium	21,684	30	12,386	121	13,628	101	24,009	50
United Kingdom	130,859	0	79,596	0	89,484	0	148,051	0
Denmark	107,000	0	111,336	0	133,386	0	154,339	0
Australia [2]	78,659	0	79,772	0	66,238	0	64,558	0
Italy	51,709	7	61,779	12	58,516	4	78,012	8
Sweden	35,957	0	22,015	0	21,462	0	12,026	0
Norway	44,617	0	35,990	0	45,994	0	52,430	0
Latvia	3,051	0	2,824	0	3,655	0	4,941	0
British India	663	3,662	2,867	2,032	3,736	226	340	271
Tota, 26 countries	2,238,063	2,178,959	2,082,253	1,914,497	2,329,449	2,325,667	2,583,014	1,214,434

COCONUT OIL

Country	1926 Imports	1926 Exports	1927 Imports	1927 Exports	1928 Imports	1928 Exports	1929 * Imports	1929 * Exports
PRINCIPAL EXPORTING COUNTRIES								
Philippine Islands	0	258,579	0	319,232	0	313,589	0	420,019
Netherlands	10,717	117,981	13,147	115,792	3,199	124,479	9,674	134,128
Ceylon	9	63,892	11	75,393	10	87,261	----	98,395
France [4]	10,199	29,512	9,606	32,012	7,276	30,185	10,633	33,018
British Malaya	184	19,233	56	23,072	13	22,154	9	19,441
Dutch East Indies	10,376	32,812	13,525	19,152	9,342	72,634	[1] 224	[1] 68,221
Germany	4,139	15,076	2,355	27,305	13,791	41,956	23,176	64,056
Denmark	32,533	17,859	19,126	22,132	23,531	33,420	21,834	42,819
Australia [2]	232	450	255	398	214	295	98	285
PRINCIPAL IMPORTING COUNTRIES								
United States	245,129	15,952	293,370	20,418	290,637	24,653	411,936	29,532
United Kingdom	82,510	6,068	91,349	5,535	141,142	9,072	144,330	10,779
Belgium [5]	32,118	5,548	39,365	3,627	34,017	6,631	39,750	7,619
Sweden	27,184	5,209	28,162	4,203	37,497	2,791	45,607	1,118
Egypt	10,200	1	10,906	2	11,502	2	12,675	----
Italy [5]	5,450	42	7,633	55	12,338	138	11,392	31
British India	1,892	1,766	9,903	948	21,014	709	16,858	812
Rumania [2]	1,026	0	1,678	6	----	----	----	----
New Zealand	778	0	981	0	814	0	1,186	0
Portuguese India [2]	34	0	10	9	8	0	----	----
Total, 19 countries	474,710	589,980	541,438	669,291	606,345	769,969	749,382	930,273

Bureau of Agricultural Economics. Compiled from official sources except where otherwise noted.

* Preliminary.
[1] Java and Madura only.
[2] International Yearbook of Agricultural Statistics.
[3] Year beginning July 1.
[4] Includes some coconut.
[5] Includes some other oils.

TABLE 516.—*Crop summary: Acreage, production, and yield per acre, 1928–1930*

Crop	Acreage			Production				Yield per acre		
	1928	1929	1930	Unit	1928	1929	1930	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*		*Thousands*	*Thousands*	*Thousands*			
Corn	100, 673	97, 856	100, 829	Bushel	2, 818, 901	2, 614, 132	2, 081, 048	28. 0	26. 7	20. 6
All wheat	58, 272	61, 464	59, 153	do	914, 876	809, 176	850, 965	15. 7	13. 2	14. 4
Oats	41, 734	40, 043	41, 598	do	1, 439, 407	1, 228, 369	1, 402, 026	34. 5	30. 7	33. 7
Barley	12, 598	13, 068	12, 437	do	357, 487	302, 892	325, 893	28. 4	23. 2	26. 2
Rye	3, 480	3, 331	3, 722	do	43, 366	41, 911	50, 234	12. 5	12. 6	13. 5
Buckwheat	749	729	658	do	13, 148	11, 474	8, 975	17. 6	15. 7	13. 6
Flaxseed	2, 675	3, 050	3, 946	do	19, 928	17, 049	23, 782	7. 4	5. 6	6. 0
Rice (5 States)	956	868	960	do	43, 440	40, 462	41, 367	45. 4	46. 6	43. 1
Grain sorghums	6, 497	5, 921	6, 180	do	142, 513	100, 845	86, 622	21. 9	17. 0	14. 0
Cotton	45, 341	45, 793	45, 218	Bale	14, 478	14, 828	14, 243	[1] 152. 9	[1] 155. 0	[1] 150. 8
Cottonseed				Ton	6, 435	6, 590	6, 328			
Hay, tame	58, 140	60, 265	58, 473	do	93, 351	100, 893	826, 656	1. 61	1. 67	1. 41
Hay, wild	13, 138	13, 938	14, 136	do	12, 915	12, 765	12, 111	. 98	. 92	. 86
All hay	71, 278	74, 203	72, 609	do	106, 266	113, 658	94, 767	1. 49	1. 53	1. 31
Clover seed (red and alsike)	617	1, 643	1, 018	Bushel	961	2, 523	1, 460	1. 56	1. 54	1. 43
Sweetclover seed	227	207	165	do	909	868	656	4. 01	4. 19	3. 98
Lespedeza seed	40	42	27	do	184	185	96	4. 60	4. 40	3. 57
Alfalfa seed	199	305	316	do	532	793	920	2. 68	2. 60	2. 91
Timothy seed	332	391	356	do	1, 229	1, 448	1, 479	3. 70	3. 70	4. 16
Beans, dry edible	1, 641	1, 960	2, 181	do	17, 647	20, 707	22, 137	10. 8	10. 6	10. 1
Soybeans [2]	1, 144	1, 428	1, 635	do	16, 361	18, 748	20, 835	14. 3	13. 1	12. 7
Cowpeas [2]	1, 391	1, 089	1, 192	do	13, 352	10, 367	10, 857	9. 6	9. 5	9. 1
Velvetbeans	1, 558	1, 794	1, 742	Ton	713	804	692	[1] 915	[1] 896	[1] 794
Peanuts	1, 930	2, 021	1, 827	Pound	1, 276, 078	1, 358, 552	1, 183, 025	661	672	648
Potatoes	3, 837	3, 338	3, 394	Bushel	465, 350	359, 048	361, 090	121. 3	107. 6	106. 4
Sweet potatoes	810	821	838	do	77, 661	84, 521	71, 154	95. 9	102. 9	84. 9
Tobacco	1, 894	2, 040	2, 110	Pound	1, 374, 547	1, 524, 677	1, 510, 308	726	747	716
Sugar beets	644	688	799	Ton	7, 101	7, 318	9, 175	11. 0	10. 6	11. 5
Sugarcane except for sirup (La.).	131	169	184	do	2, 099	3, 159	3, 108	16. 0	18. 7	16. 94
Cane sirup	110	117	116	Gallon	20, 401	22, 114	19, 087	185. 5	189. 0	164. 5
Maple sugar	[3] 14,388	[3] 14,130	[3] 14,421	Pound	2, 317	1, 706	2, 588	[4] . 16	[4] . 12	[4] . 18
Maple sirup	[3] 14, 388	[3] 14,130	[3] 14,421	Gallon	3, 007	2, 595	3, 977	[4] . 21	[4] . 18	[4] . 28
Sorgo sirup	349	346	384	do	27, 152	26, 181	24, 132	77. 8	75. 7	62. 8
Broomcorn	298	303	395	Ton	54	47	50	[1] 363	[1] 312	[1] 251
Hops	26	25	20	Pound	32, 944	33, 220	23, 447	1, 257	1, 334	1, 202
Fruit crops:										
Apples, total				Bushel	186, 893	142, 788	163, 543			
Apples, commercial.				Barrel	35, 461	29, 004	33, 723			
Peaches, total				Bushel	[5] 68, 369	45, 789	[5] 53, 286			
Pears, total				do	24, 212	22, 063	25, 703			
Grapes, total [6]				Ton	[5] 2, 671	2, 099	[5] 2, 369			
Cherries (10 States).				do	91	85	107			
Plums and prunes, fresh (4 States).				do	132	116	143			
Prunes, dried (4 States).				do	226	160	[5] 254			
Oranges (7 States).				Box	54, 160	33, 839	47, 691			
Grapefruit (4 States).				do	12, 455	10, 718	14, 153			
Lemons (Calif.)				do	7, 900	5, 900	7, 020			
Cranberries	29	29	29	Barrel	551	546	570	19. 3	19. 1	19. 8
Pecans				Pound	59, 625	38, 005	37, 250			
Commercial truck crops:										
Artichokes	9	10	8	Box	1, 043	1, 082	1, 060	122	111	124
Asparagus [7]	96	98	101	Crate	9, 578	9, 766	10, 403	99	100	103
Beans, Lima	5	5	10	Bushel	286	382	589	55	79	61
Beans, snap [7]	134	150	173	Ton	146	189	188	1. 09	1. 26	1. 09
Beets	9	9	11	Bushel	1, 611	1, 600	2, 124	172	168	200
Cabbage [7]	139	157	155	Ton	999	1, 102	1, 015	7. 18	7. 01	6. 55
Cantaloupes	100	107	127	Crate	15, 370	16, 982	15, 391	154	159	121
Carrots	28	32	30	Bushel	7, 524	10, 957	10, 994	273	345	360
Cauliflower	21	25	27	Crate	5, 031	6, 500	5, 595	235	254	203

[1] Pounds
[2] Total except hay.
[3] Trees tapped.
[4] Per tree.
[5] Includes some quantities not harvested.
[6] Production is the total for fresh fruit, juice, and raisins.
[7] Includes production used for canning or manufacture.

TABLE 516.—*Crop summary: Acreage, production and yield per acre, 1928–1930*—Continued

Crop	Acreage			Production				Yield per acre		
	1928	1929	1930	Unit	1928	1929	1930	1928	1929	1930
Commercial truck-crops—Con.	*1,000 acres*	*1,000 acres*	*1,000 acres*		*Thousands*	*Thousands*	*Thousands*			
Celery	27	30	32	Crate	7,645	8,782	10,043	283	396	315
Corn, sweet [8]	324	379	400	Ton	636	743	701	1.96	1.96	1.75
Cucumbers [7]	117	121	166	Bushel	9,180	8,639	11,740	78	72	71
Eggplant	4	4	4	do	896	713	857	230	196	203
Kale	2	2	2	do	868	1,080	1,200	400	450	500
Lettuce	125	141	168	Crate	18,345	20,180	19,849	147	143	118
Onions	80	87	83	Bushel	20,454	25,470	26,124	256	293	315
Peas, green [7]	267	301	350	Ton	277	300	347	1.04	.99	.99
Peppermint (oil).		44	48	Pound		505	798		11	17
Peppers	18	18	19	Bushel	4,466	4,160	4,381	250	232	234
Pimientos	9	9	10	Ton	16	19	16	1.80	2.11	1.69
Potatoes, early	387	273	332	Bushel	53,368	34,695	42,659	138	127	129
Spinach [7]	61	70	58	Ton	171	226	138	2.82	3.22	2.40
Strawberries [7]	208	200	176	Quart	334,675	327,975	229,336	1,610	1,636	1,305
Tomatoes [7]	401	445	528	Ton	1,396	1,897	2,132	3.48	4.26	4.04
Watermelons	206	213	232	Number	63,045	69,579	74,751	306	327	322
Total truck crops except potatoes):	2,390	2,660	2,918							
For market (except potatoes).	1,422	1,539	1,639							
For manufacture.	968	1,121	1,279							
Total, all crops, with duplications eliminated.	361,891	364,520	366,507							

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[7] Includes production used for canning or manufacture.

[8] Mainly for canning but includes also market for New Jersey.

TABLE 517.—*Indexes of the volume of net agricultural production,*[1] *1919–1930*

[1919–1927=100]

Year	Grains	Fruits and vegetables	Truck crops	Meats animals	Dairy products	Poultry products	Cotton and cottonseed	Total
1919	101	82	71	96	81	85	91	91
1920	116	102	86	92	80	84	105	97
1921	100	76	74	91	91	95	64	87
1922	100	109	101	97	95	98	77	96
1923	97	108	99	107	103	107	80	101
1924	100	106	111	108	109	100	108	106
1925	95	98	115	102	110	104	128	106
1926	93	116	114	103	114	111	143	111
1927	97	104	129	103	116	116	103	106
1928	106	122	124	105	119	112	114	111
1929	87	102	141	105	122	116	118	109
1930	85	112	137	99	122	119	113	107

Bureau of Agricultural Economics.

[1] These indexes are based on estimates of production for sale and for consumption in the farm home. Production fed to livestock or used for seed is not included. For example, instead of total production, only the amounts of cornand oats shipped out of county where grown and only a small percentage of the hay crops are included. The index of dairy products represents total milk production for all purposes. Production of meat animals is represented by total slaughter, including slaughter for farm use. Calendar-year production of livestock and livestock products are here compared with crop production of the same year. Each group index as well as the total is obtained by multiplying the yearly quantities by a 1919–1927 average farm price received by producers for each of the commodities, and the sum of these yearly values at average prices, divided by the corresponding average sum for the period 1919–1927, taken as 100. The following commodities included in the index contribute about 90 per cent of the gross income from agricultural production: Grains—wheat, corn, oats, barley, rye, buckwheat, kafir, rice; fruits and vegetables—grapes, apples, apricots, peaches, pears, cranberries, figs, grapefruit, lemons, olives, oranges, potatoes, sweetpotatoes, dry edible beans; truck crops—asparagus, snap beans, cabbage, cantaloupes, cauliflower, celery, cucumbers, lettuce, onions, peas, spinach, strawberries, tomatoes, watermelons; meat animals—cattle, calves, sheep, lambs, hogs; dairy products—milk, total production; poultry products—chickens and eggs; cotton and cottonseed; total includes also tobacco, wool, and hay.

Table 518.—*Acreage of 51 crops and value of 75 crops, by States, average 1924–1928, annual 1928–1930*

State and division	Acreage of 51 crops [1]				Value of 75 crops			
	Average, 1924–1928	1928	1929	1930	Average, 1924–1928	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	1,605	1,602	1,420	1,411	63,791	41,074	85,602	50,881
New Hampshire	521	512	439	430	15,427	13,184	13,154	12,118
Vermont	1,139	1,123	1,095	1,084	33,567	29,353	29,855	28,127
Massachusetts	574	566	514	489	32,730	31,710	33,201	28,209
Rhode Island	61	59	53	52	2,938	2,671	2,717	2,392
Connecticut	479	476	424	419	30,652	29,828	30,907	29,061
New York	7,830	7,551	7,469	7,331	249,703	210,607	227,047	212,803
New Jersey	828	818	750	746	61,760	53,305	56,027	54,303
Pennsylvania	7,185	7,034	6,992	7,046	230,899	196,731	214,224	194,424
North Atlantic	20,222	19,740	19,155	19,000	721,468	608,466	692,734	612,318
Ohio	10,765	10,492	10,481	10,248	270,598	246,660	258,588	183,504
Indiana	10,776	10,247	10,460	10,379	225,072	213,677	219,313	163,086
Illinois	20,184	20,239	20,246	20,697	432,884	447,152	431,990	309,343
Michigan	8,457	8,334	8,184	8,259	220,903	208,666	202,391	173,081
Wisconsin	9,668	9,621	9,568	9,690	259,582	248,568	254,109	225,469
Minnesota	17,911	17,583	17,822	17,770	316,926	284,828	320,551	233,263
Iowa	21,836	21,979	21,839	21,908	464,466	497,039	501,807	367,171
Missouri	14,219	14,080	13,624	13,799	279,201	269,321	253,176	164,104
North Dakota	20,270	20,859	20,878	20,509	253,353	236,963	186,937	120,007
South Dakota	15,545	15,772	17,077	17,562	182,089	160,171	186,418	115,908
Nebraska	19,988	20,396	20,923	21,469	321,795	323,549	343,827	257,020
Kansas	21,992	22,918	22,996	23,625	344,105	373,129	305,187	203,840
North Central	191,611	192,519	194,097	195,916	3,570,973	3,509,723	3,464,294	2,515,796
Delaware	391	395	390	392	15,574	14,918	16,309	11,917
Maryland	1,776	1,793	1,767	1,734	68,535	59,997	65,968	42,907
Virginia	4,174	4,222	4,072	4,037	159,630	153,362	163,968	93,608
West Virginia	1,740	1,737	1,734	1,659	59,996	58,921	61,336	35,404
North Carolina	7,035	7,135	7,211	7,350	317,802	308,864	293,015	240,206
South Carolina	5,389	5,262	5,037	5,272	155,041	142,288	153,600	132,824
Georgia	10,327	10,363	10,555	10,622	239,349	231,089	250,599	200,721
Florida	1,212	1,279	1,316	1,343	103,908	109,915	112,554	109,795
South Atlantic	32,044	32,186	32,082	32,410	1,119,836	1,079,354	1,117,349	867,382
Kentucky	5,368	5,363	5,432	5,246	181,374	193,213	195,383	109,926
Tennessee	6,577	6,509	6,667	6,580	182,106	184,009	204,868	130,559
Alabama	7,796	7,818	8,028	8,337	206,365	195,933	203,031	146,453
Mississippi	6,361	6,665	6,811	6,787	228,323	221,507	262,469	134,460
Arkansas	6,937	7,073	7,145	7,137	206,016	208,413	209,613	90,987
Louisiana	4,266	4,538	4,639	4,623	146,288	153,857	164,724	107,808
Oklahoma	15,328	15,763	15,309	14,739	300,149	289,273	243,678	132,248
Texas	29,071	30,385	30,685	31,049	701,364	757,430	608,974	434,512
South Central	81,704	84,114	84,716	84,497	2,151,986	2,203,635	2,092,740	1,286,953
Montana	7,043	7,665	7,986	7,805	117,470	120,730	94,067	61,256
Idaho	2,702	2,878	2,881	2,870	93,130	91,306	103,563	76,750
Wyoming	1,722	1,850	1,932	1,958	29,708	31,677	36,301	28,571
Colorado	5,988	6,111	6,271	6,579	118,490	111,672	135,950	121,453
New Mexico	1,134	1,217	1,407	1,329	28,763	30,231	38,741	19,539
Arizona	542	612	648	674	36,800	47,332	50,544	36,938
Utah	1,067	1,109	1,128	1,168	38,131	39,559	38,581	29,757
Nevada	400	407	405	405	9,102	10,226	11,670	7,484
Washington	3,495	3,627	3,806	3,837	138,824	135,135	155,646	110,640
Oregon	2,675	2,751	2,825	2,807	82,690	88,699	100,636	68,554
California	4,825	5,105	5,180	5,252	463,782	483,137	542,454	431,036
Western	31,593	33.332	34,469	34,684	1,156,893	1,189,704	1,308,153	991,978
United States	357,173	361,891	364,520	366,507	8,721,155	8,590,882	8,675,270	6,274,427

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] State figures have been rounded to thousands and do not necessarily add exactly to the division and United States totals shown. Values based upon Dec. 1 prices or seasonal prices to December and differ from prices used in Tables 512 and 516.

TABLE 519.—*Farm value, gross income, and cash income from farm production, average, 1924–1928 and 1929*

State	Farm value [1]				Gross income [2]			
	Crops		Livestock and livestock products		Crops		Livestock and livestock products	
	Average, 1924–1928	1929	Average, 1924–1928	1929	Average, 1924–1928	1929	Average, 1924–1928	1929
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	76, 366	98, 957	31, 741	32, 611	49, 518	72, 248	31, 135	31, 453
New Hampshire	22, 033	20, 845	19, 765	21, 999	11, 356	11, 747	19, 311	21, 214
Vermont	41, 125	38, 469	39, 887	43, 420	16, 065	16, 521	38, 930	42, 111
Massachusetts	50, 422	52, 829	41, 989	45, 657	34, 939	38, 627	40, 490	44, 157
Rhode Island	5, 352	5, 103	6, 540	7, 644	3, 457	3, 428	6, 279	7, 244
Connecticut	38, 925	41, 132	33, 796	39, 147	26, 134	29, 795	32, 786	37, 403
New York	295, 342	272, 996	254, 075	293, 516	165, 141	158, 764	243, 421	277, 772
New Jersey	77, 198	71, 333	46, 516	50, 874	60, 936	57, 707	44, 737	48, 008
Pennsylvania	272, 103	251, 942	209, 660	245, 386	130, 877	129, 555	203, 480	234, 939
Ohio	319, 435	291, 743	274, 271	288, 358	146, 000	133, 578	268, 537	280, 239
Indiana	263, 787	237, 937	233, 675	261, 018	110, 895	96, 760	229, 671	256, 100
Illinois	495, 909	460, 465	353, 515	374, 737	245, 044	235, 846	352, 707	361, 814
Michigan	245, 381	227, 272	184, 445	203, 920	123, 295	122, 984	178, 053	196, 566
Wisconsin	295, 478	285, 439	329, 260	362, 249	84, 880	86, 408	321, 781	351, 867
Minnesota	346, 961	338, 267	317, 324	357, 096	134, 166	118, 126	308, 010	342, 028
Iowa	524, 332	510, 688	561, 976	609, 186	138, 273	138, 852	565, 485	596, 817
Missouri	329, 091	280, 935	291, 937	313, 631	127, 094	111, 840	292, 481	310, 302
North Dakota	269, 931	192, 511	84, 025	95, 354	177, 782	119, 731	82, 760	88, 779
South Dakota	198, 725	190, 690	154, 068	170, 980	75, 780	68, 181	157, 720	168, 181
Nebraska	345, 849	337, 967	288, 324	328, 168	134, 304	133, 377	292, 704	318, 464
Kansas	371, 052	310, 568	238, 690	278, 270	210, 708	168, 417	237, 615	273, 997
Delaware	18, 261	19, 035	9, 114	10, 615	12, 162	13, 140	8, 711	10, 087
Maryland	81, 494	76, 621	44, 369	50, 730	52, 114	50, 007	42, 140	48, 236
Virginia	198, 318	199, 149	83, 990	93, 214	131, 373	131, 573	82, 435	89, 378
West Virginia	81, 761	77, 691	50, 186	54, 254	41, 251	41, 566	49, 393	51, 709
North Carolina	373, 622	334, 415	77, 916	76, 592	294, 587	255, 786	77, 996	76, 343
South Carolina	183, 605	175, 581	36, 004	34, 391	142, 732	132, 120	37, 005	34, 118
Georgia	291, 234	300, 040	74, 889	74, 470	207, 842	216, 203	75, 834	74, 407
Florida	109, 062	116, 908	20, 952	20, 690	93, 769	103, 095	22, 073	20, 957
Kentucky	220, 474	219, 254	114, 494	111, 916	118, 675	118, 363	113, 479	111, 980
Tennessee	229, 224	237, 093	95, 213	97, 954	137, 045	136, 789	95, 426	97, 160
Alabama	251, 528	240, 404	57, 582	53, 708	186, 706	181, 511	57, 934	53, 839
Mississippi	265, 172	285, 413	53, 255	53, 511	214, 584	232, 161	53, 436	51, 776
Arkansas	238, 184	233, 174	60, 127	59, 177	183, 614	186, 523	59, 396	57, 362
Louisiana	166, 427	176, 988	32, 499	31, 225	134, 609	144, 679	32, 467	30, 359
Oklahoma	326, 779	256, 031	114, 637	133, 788	240, 298	178, 537	109, 139	126, 700
Texas	780, 789	666, 189	228, 578	258, 989	623, 128	502, 133	225, 343	238, 915
Montana	123, 024	96, 475	70, 740	84, 615	75, 087	50, 547	68, 221	81, 742
Idaho	101, 058	110, 000	54, 554	60, 025	64, 306	71, 593	58, 482	57, 900
Wyoming	31, 519	36, 460	41, 420	43, 345	13, 286	15, 752	39, 508	44, 941
Colorado	126, 936	139, 321	79, 540	93, 214	77, 581	83, 983	79, 827	90, 394
New Mexico	30, 352	38, 951	34, 455	41, 749	20, 054	27, 633	36, 704	39, 273
Arizona	38, 079	52, 405	22, 365	25, 447	30, 354	43, 054	26, 879	21, 241
Utah	42, 747	41, 865	38, 102	39, 375	25, 781	24, 253	37, 467	41, 870
Nevada	9, 137	10, 153	16, 433	13, 002	2, 976	3, 306	17, 243	14, 171
Washington	155, 371	168, 918	73, 787	86, 808	117, 171	127, 399	71, 426	83, 938
Oregon	95, 503	108, 023	67, 708	73, 496	64, 811	70, 418	66, 759	72, 902
California	484, 973	558, 550	185, 471	226, 493	412, 589	481, 248	182, 739	231, 935
United States	[3] 9, 942, 938	[4] 9, 498, 041	5, 833, 858	6, 426, 014	[3] 5, 928, 638	[4] 5, 680, 713	5, 770, 554	6, 243, 088

See footnotes at end of table.

TABLE 519.—*Farm value, gross income, and cash income from farm production, average, 1924–1928 and 1929*—Continued

State	Gross income [2]		Cash income [5]					
	Crops and livestock combined		Crops		Livestock and livestock products		Crops and livestock combined	
	Average, 1924–1928	1929	Average, 1924–1928	1929	Average, 1924–1928	1929	Average, 1924–1928	1929
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	80,653	103,701	41,638	63,999	24,362	24,630	66,000	88,629
New Hampshire	30,667	32,961	8,003	8,188	16,800	18,553	24,803	26,741
Vermont	54,996	58,632	10,956	11,307	35,594	38,438	46,549	49,745
Massachusetts	75,429	82,784	29,345	32,877	35,327	38,707	64,672	71,584
Rhode Island	9,736	10,672	2,866	2,813	5,596	6,491	8,462	9,304
Connecticut	58,920	67,198	22,084	25,689	28,354	32,672	50,438	58,361
New York	408,561	436,536	140,725	132,635	214,037	247,139	354,762	379,774
New Jersey	105,673	105,715	56,491	53,463	39,417	42,807	95,907	96,270
Pennsylvania	334,356	364,494	98,214	95,051	164,398	195,221	262,612	290,272
Ohio	414,536	413,817	118,103	105,690	219,990	231,337	338,093	337,027
Indiana	340,567	352,860	93,388	78,598	190,616	216,377	284,004	294,975
Illinois	597,752	597,660	223,420	212,984	303,047	311,404	526,466	524,388
Michigan	301,348	319,550	98,640	96,944	149,254	166,748	247,894	263,692
Wisconsin	406,661	438,275	60,599	59,745	292,791	322,400	353,390	382,145
Minnesota	442,176	460,154	115,530	97,351	272,132	305,317	387,661	402,668
Iowa	703,758	735,669	118,700	117,810	518,824	549,564	637,524	667,374
Missouri	419,575	422,142	97,470	83,169	239,528	255,569	336,998	338,738
North Dakota	260,542	208,510	172,716	114,115	65,101	71,390	237,817	185,505
South Dakota	233,500	236,362	71,046	63,149	140,630	150,167	211,676	213,316
Nebraska	427,007	451,841	125,502	124,053	265,259	289,427	390,761	413,480
Kansas	448,323	442,414	200,452	158,234	204,373	239,486	404,825	397,720
Delaware	20,873	23,227	10,596	11,460	7,077	8,417	17,674	19,877
Maryland	94,254	98,243	44,592	42,492	32,197	37,949	76,789	80,441
Virginia	213,808	220,951	103,244	102,902	47,470	53,075	150,714	155,977
West Virginia	90,644	93,275	25,341	25,682	31,704	34,294	57,045	59,976
North Carolina	372,583	332,129	256,403	219,111	29,692	30,299	286,096	249,410
South Carolina	179,737	166,238	121,619	111,872	10,481	9,083	132,100	120,955
Georgia	283,675	290,610	175,692	185,005	27,298	29,427	202,990	214,432
Florida	115,842	124,052	88,026	97,586	15,494	14,844	103,520	112,430
Kentucky	232,154	230,343	91,625	93,094	67,936	68,333	159,561	161,427
Tennessee	232,472	233,949	107,322	108,682	51,011	53,866	158,333	162,548
Alabama	244,640	235,350	158,275	154,679	18,371	19,006	176,646	173,685
Mississippi	268,020	283,937	191,947	209,073	23,051	23,198	214,998	232,271
Arkansas	243,010	243,885	160,716	163,873	26,622	27,584	187,338	191,457
Louisiana	167,076	175,038	124,055	134,152	16,347	14,927	140,402	149,079
Oklahoma	349,436	305,237	227,179	165,899	71,802	89,244	298,981	255,143
Texas	848,472	741,048	596,299	477,344	148,898	165,543	745,197	642,887
Montana	143,308	132,289	71,983	46,910	59,484	72,611	131,467	119,521
Idaho	117,788	129,493	61,053	68,414	47,137	51,577	108,190	119,991
Wyoming	52,794	60,693	12,315	14,715	36,780	41,854	49,095	56,569
Colorado	157,409	174,377	74,577	80,825	69,509	79,722	144,086	160,547
New Mexico	56,758	66,906	18,582	26,281	32,277	34,570	50,859	60,851
Arizona	57,233	64,295	29,273	41,479	24,188	18,753	53,461	60,232
Utah	63,248	66,126	23,775	22,301	33,751	38,246	57,525	60,547
Nevada	20,219	17,477	2,815	3,115	16,180	13,164	18,995	16,279
Washington	188,597	211,337	109,844	119,287	61,446	73,612	171,291	192,899
Oregon	131,570	143,320	58,986	64,356	59,039	64,805	118,025	129,161
California	595,328	713,183	405,841	473,747	168,615	217,827	574,456	691,574
United States	[3] 11,699,192	[4] 11,923,801	[3] 5,261,368	[4] 5,007,046	4,659,288	5,139,674	[3] 9,920,656	[4] 10,146,720

Bureau of Agricultural Economics.

[1] Commodities included are those shown in Table 516. Estimated quantities produced by States, times weighted annual prices, by States.
[2] Estimated quantities sold and consumed in farm households, by States, times weighted annual prices by States.
[3] Includes $3,507,000 for sugar beets in "Other States."
[4] Includes $4,846,000 for sugar beets in "Other States."
[5] Estimated quantities sold, by States, times weighted annual prices, by States; gross income equals cash income plus value of quantities consumed in farm households, times weighted annual prices.

TABLE 520.—*Farm value, gross income, and cash income from farm production, United States, average 1924–1928 and 1929*

Product	Farm value		Gross income		Cash income	
	Average, 1924–1928	1929	Average, 1924–1928	1929	Average, 1924–1928	1929
Crops:	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls*
Corn	2,252,421	2,038,041	397,030	329,548	370,828	305,057
Wheat	1,006,210	855,034	847,239	703,771	833,837	692,779
Oats	594,215	531,864	147,216	110,700	147,216	110,700
Barley	152,449	167,358	61,301	52,629	61,301	52,629
Rye	44,142	35,191	33,502	25,136	33,124	24,762
Buckwheat	12,591	11,110	9,564	7,983	8,680	7,062
Flaxseed	49,416	48,137	46,184	42,481	46,184	42,481
Rice	44,011	39,346	41,685	37,299	41,617	37,260
Grain sorghums	90,438	68,050	17,971	16,370	17,971	16,370
Emmer and spelt	2,486	1,897	202	146	202	146
Popcorn	1,816	1,901	1,816	1,901	1,816	1,901
Cotton lint	1,373,964	1,231,373	1,373,964	1,231,373	1,373,964	1,231,373
Cottonseed	206,510	200,675	152,923	144,312	152,923	144,312
Tobacco	256,201	285,583	256,201	285,583	256,201	285,583
Hay	1,283,914	1,257,671	200,795	192,592	200,795	192,592
Sweet sorghum forage	32,898	36,167	3,037	3,288	3,037	3,288
Hemp	144	97	144	97	144	97
Cloverseed (red and alsike)	17,239	22,690	14,261	19,907	14,261	19,907
Sweetclover seed	5,496	3,595	3,971	2,557	3,971	2,557
Clover seed, Japan (Lespedeza)	737	661	483	439	483	439
Alfalfa seed	9,438	8,285	8,444	7,291	8,444	7,291
Timothy seed	6,059	2,821	5,702	2,585	5,702	2,585
Dry edible beans	53,109	75,880	48,048	68,711	47,646	68,200
Soybeans	25,381	34,575	6,997	13,826	6,997	13,826
Cowpeas	32,733	24,334	4,271	5,570	2,991	4,458
Peanuts	61,238	52,030	37,393	31,874	36,076	30,144
Velvetbeans	12,933	16,760	----------	----------	----------	----------
Broomcorn	5,086	4,982	5,086	4,982	5,086	4,982
Potatoes	413,905	470,533	337,900	397,492	267,441	314,002
Sweetpotatoes	94,937	97,302	92,734	94,091	69,531	75,048
Truck crops	313,873	343,400	313,873	343,400	292,205	321,518
Hops	6,066	3,788	6,066	3,788	6,066	3,788
Apples	202,086	195,211	194,283	189,489	156,181	148,869
Peaches	62,966	62,705	60,462	58,790	46,549	44,864
Pears	25,423	30,908	24,617	29,998	20,244	25,950
Plums, prunes, cherries, and apricots	10,927	11,326	10,666	10,889	6,943	6,556
Grapes	63,219	59,387	62,280	58,527	58,497	54,895
Other fruits and nuts	203,917	257,036	203,870	256,939	201,967	253,518
Strawberries	55,397	54,311	55,397	54,311	54,816	53,790
Small fruits	24,393	23,440	24,393	23,440	24,032	23,122
Cranberries	6,313	7,088	6,313	7,088	6,313	7,088
Pecans	8,955	5,889	8,955	5,889	7,714	4,852
Sugar beets, for sugar	54,374	55,081	54,374	55,081	54,374	55,081
Sugarcane and sirup	26,969	30,187	18,210	22,575	12,082	15,383
Sorghum sirup	25,382	24,126	18,256	15,760	7,812	6,615
Maple sugar and sirup	8,681	6,326	8,681	6,326	7,578	5,635
Forest products	314,472	322,268	314,472	322,268	182,257	186,420
Farm gardens	290,136	284,350	290,136	284,350	----------	----------
Nursery products	20,432	20,432	20,432	20,432	20,432	20,432
Greenhouse products	76,839	76,839	76,839	76,839	76,839	76,839
Total	9,942,938	9,498,041	5,928,638	5,680,713	5,261,368	5,007,046
Livestock and livestock products:						
Cattle and calves	928,688	1,166,562	1,003,674	1,086,774	974,331	1,054,461
Hogs	1,508,342	1,481,808	1,546,016	1,564,626	1,252,107	1,289,236
Sheep and lambs	175,224	188,978	153,162	175,320	150,026	171,893
Horses	41,931	37,630	14,802	9,944	14,802	9,944
Mules	20,062	17,637	11,422	10,518	11,422	10,518
Chickens	428,808	502,433	430,060	481,883	255,497	300,172
Eggs (chicken)	698,037	789,595	669,080	755,495	511,104	593,932
Milk	1,919,604	2,127,860	1,829,175	2,045,017	1,380,188	1,599,069
Wool	94,032	93,427	94,032	93,427	94,032	93,427
Mohair	7,457	7,463	7,457	7,463	7,457	7,463
Honey	11,367	12,256	11,367	12,256	8,013	9,194
Beeswax	307	365	307	365	307	365
Total	5,833,858	6,426,014	5,770,554	6,243,088	4,659,288	5,139,674
Grand total	----------	----------	11,699,192	11,923,801	9,920,656	10,146,720

Bureau of Agricultural Economics. Estimated quantities produced, sold, and consumed in farm households times weighted annual prices. Cash income plus value of commodities consumed in farm households equals gross incomes. For feed and seed crops, horses and mules, value include sales by farmers in some States eventually bought by farmers in other States. These interfarm sales tend to overestimate the total income from farm production for the country as a whole.

TABLE 521.—*Gross income from farm production by groups of commodities, 1924–1930*

Source of income	1924	1925	1926	1927	1928	1929	1930
	Million dollars	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*
Crops:							
Grains	1,755	1,496	1,432	1,592	1,513	1,285	910
Fruits and nuts	671	683	694	690	705	727	566
Vegetables	953	1,193	1,093	1,062	967	1,162	1,015
Sugar crops	104	95	103	104	92	100	105
Cotton and cottonseed	1,710	1,740	1,251	1,464	1,470	1,376	779
Tobacco	259	251	237	257	278	286	211
Other crops	719	689	659	649	650	667	640
Total crops	6,170	6,147	5,468	5,817	5,675	5,603	4,226
Livestock and livestock products:							
Cattle, hogs, and sheep	2,380	2,822	2,922	2,664	2,727	2,827	2,280
Poultry and eggs	989	1,114	1,167	1,108	1,202	1,256	1,024
Dairy products	1,678	1,759	1,805	1,911	1,994	2,045	1,810
Wool	87	97	88	86	111	93	67
Other	33	28	30	30	32	28	27
Total livestock	5,167	5,820	6,012	5,799	6,066	6,249	5,208
Total crops and livestock	11,337	11,968	11,480	11,616	11,741	11,851	9,434

Bureau of Agricultural Economics.

TABLE 522.—*Gross income, annual expenditures, and income available for operators' capital, labor, and management, 1924–1929*

Year	Gross income	Expenditures						Balance available for capital, labor, and management	
		Operating costs [1]	Wages to hired labor [2]	Taxes [3]	Interest [4]	Rent [5]	Total deductions	Total	Per farm [6]
	Million dollars	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Dollars*
1924	11,337	2,548	1,206	458	712	927	5,853	5,486	857
1925	11,968	2,892	1,219	459	705	958	6,233	5,735	898
1926	11,480	2,725	1,241	465	699	809	5,939	5,541	870
1927	11,616	2,731	1,234	475	690	911	6,041	5,575	877
1928	11,741	2,953	1,228	482	684	916	6,263	5,478	864
1929	11,851	2,951	1,231	490	681	920	6,273	5,578	882

Bureau of Agricultural Economics.

1 All of the operating costs except 7.5 per cent of total fertilizer costs, 9.5 per cent of feed, 10 per cent of binder twine, 15 per cent of ginning costs, and 20 per cent of repairs on buildings and insurance. These deductions are estimated as paid by nonfarmer landlords.

2 Estimates of cash wages and board, and 10 per cent allowance for perquisites and hired domestic labor contributing to production.

3 70 per cent of estimated total taxes on all farm real estate paid by operators, less 10 per cent to allow for taxes on farm dwellings.

4 Paid on all bank loans and on 90 per cent of total farm mortgage debt held by nonfarmers, 10 per cent of the total mortgage debt being assigned to farm dwellings.

5 Paid on 72 per cent of all rented farms to nonoperators.

6 Estimated number of farms January, 1925, 6,572,000, reduced by 15,000, the 1920–1925 rate of decline in number of farms.

TABLE 523.—*Current value of capital employed in agriculture and income available for capital and management as percentage of capital used in production, 1924–1929*

Year	Current value of—			Income available for capital and management			
	All agricultural capital [1]	All capital used in production [2]	Operators' capital used in production [2]	On all capital used in production [3]		On operators' capital used in production	
	Million dollars	*Million dollars*	*Million dollars*	*Million dollars*	*Per cent*	*Million dollars*	*Per cent*
1924	57,712	51,496	27,563	2,286	4.4	1,081	3.9
1925	56,931	50,771	27,255	2,502	4.9	1,206	4.4
1926	54,926	48,834	26,010	2,068	4.2	1,006	3.9
1927	54,659	48,624	26,124	2,210	4.5	1,072	4.1
1928	54,904	48,923	26,590	2,127	4.3	984	3.7
1929	54,074	48,141	26,119	2,200	4.6	1,055	4.0

Bureau of Agricultural Economics.

[1] As of Dec. 31. Includes lands, buildings, machinery, livestock, and 1 per cent cash working capital.

[2] All capital excluding value of dwellings. This total includes value of automobiles used for pleasure which probably offsets value of dwellings used for production.

[3] Income available for all capital, labor, and management, less wage allowance for labor of operators and families. Operators are here allowed an annual hired-hand wage without board, and family labor is taken as 22 per cent additional to the operators' labor. The value of the operators' labor is here understated in so far as hired hands receive perquisites in addition to cash and board, and it may be overstated in so far as the operators' time is not entirely spent on farm work.

TABLE 524.—*Farm returns: Proportion of farmers obtaining net results within specified ranges, 1922–1929*

	United States								North Atlantic		East North Central		West North Central		South Atlantic		South Central		Western	
	1922	1923	1924	1925	1926	1927	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929
Number of reports	6,094	16,183	15,103	15,330	13,475	13,859	11,851	11,805	1,244	1,255	2,343	2,331	2,735	2,594	1,525	1,499	2,757	2,719	1,247	1,407
Size of farm ..... acres	252	298	303	304	315	275	284	270	136	139	144	146	347	350	186	184	277	255	689	563
Value of farm property Jan. 1 per farm ..... dollars	16,430	17,490	17,260	17,122	16,308	15,436	15,417	15,242	12,202	12,025	15,246	14,690	22,296	22,488	9,730	9,553	11,304	10,561	19,901	20,778
Net result per farm ..... do	917	1,020	1,205	1,297	1,133	1,290	1,334	1,298	1,105	1,254	1,170	1,178	1,798	1,684	639	764	1,121	987	2,171	1,994
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Proportion obtaining:																				
$5,000 or more	1.77	1.88	2.69	3.00	2.29	3.19	3.12	2.94	1.53	2.31	1.58	1.54	5.30	4.51	0.92	1.27	1.96	1.62	8.10	7.25
$3,000 to $4,999	3.89	4.67	6.10	6.82	5.49	6.42	6.77	6.24	5.55	6.14	4.78	4.85	12.29	10.99	1.57	2.40	4.50	3.05	10.99	10.09
$2,500 to $2,999	2.51	2.88	3.61	4.03	3.59	3.86	4.06	4.25	4.18	4.54	3.59	4.12	6.25	6.48	1.77	2.07	3.01	2.57	5.13	5.68
$2,000 to $2,499	4.33	5.13	5.99	6.26	5.46	6.53	6.35	6.01	6.43	6.61	6.70	5.92	8.30	8.87	2.36	3.20	4.93	4.01	9.38	7.18
$1,500 to $1,999	7.78	8.91	9.30	9.92	9.05	9.58	10.35	10.35	10.69	12.91	11.40	13.04	13.42	12.53	5.57	5.94	7.76	6.47	12.83	11.80
$1,000 to $1,499	14.39	14.49	15.13	15.44	14.09	15.46	15.23	14.89	14.55	14.74	17.41	16.82	17.55	16.69	10.62	11.00	14.07	13.61	14.92	15.07
$500 to $999	22.82	23.07	21.86	21.79	22.10	22.07	22.07	22.63	22.35	20.40	25.18	24.07	17.92	18.89	24.13	23.42	24.81	27.33	16.52	19.19
$0 to $499	27.98	26.09	24.68	22.32	26.43	23.98	23.19	24.76	23.55	23.83	21.60	22.61	13.46	14.80	34.76	37.89	30.76	33.65	16.28	16.35
$0 to −$499	9.89	9.10	7.85	7.81	8.56	6.68	7.20	6.37	8.84	7.41	6.44	6.22	3.98	4.20	15.08	10.94	7.11	6.58	4.57	4.55
−$500 to −$999	2.36	2.07	1.57	1.54	1.69	1.28	1.04	1.01	1.61	.71	.94	.64	.95	1.54	1.97	.80	.55	.63	.88	1.85
−$1,000 or more	2.28	1.71	1.22	1.07	1.25	.95	.62	.55	.72	.40	.38	.17	.58	.50	1.25	1.07	.54	.48	.40	.99
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Bureau of Agricultural Economics. The reports are those tabulated in Table 524 (preceding). For distribution by geographical divisions, see Table 476, Yearbook, 1927; Table 509, Yearbook, 1928; and Table 511, Yearbook, 1930.

TABLE 525.—*Farm returns, 1922–1929*

[Average of reports of owner-operators for their own farms for calendar year]

	United States								North Atlantic		East North Central		West North Central		South Atlantic		South Central		Western	
	1922	1923	1924	1925	1926	1927	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929
Number of reports	6,094	16,183	15,103	15,330	13,475	13,859	11,851	11,805	1,244	1,255	2,343	2,331	2,735	2,594	1,525	1,499	2,757	2,719	1,247	1,407
Size of farm—acres	252	298	303	304	315	275	284	270	136	139	144	146	347	350	186	184	277	255	689	563
Value of farm real estate, Jan. 1	$13,586	$14,530	$14,323	$14,157	$13,379	$12,543	$12,299	$12,090	$8,709	$8,566	$12,353	$11,693	$17,976	$17,950	$8,075	$7,895	$9,298	$8,643	$15,131	$16,219
Value of farm personalty, Jan. 1	2,844	2,960	2,937	2,965	2,929	2,893	3,118	3,152	3,493	3,459	2,893	2,997	4,320	4,538	1,655	1,658	2,006	1,918	4,770	4,559
Receipts:																				
Crop sales	816	850	1,012	993	926	978	946	1,019	786	831	510	557	911	818	901	1,119	1,153	1,143	1,600	2,063
Sales of livestock	660	760	780	897	894	851	936	922	494	471	867	909	1,711	1,806	413	389	489	490	1,431	1,116
Sales of livestock products	454	550	570	585	589	638	689	681	1,631	1,623	934	920	603	598	344	356	274	255	818	766
Miscellaneous other	42	80	72	76	39	38	37	37	60	65	35	40	42	35	25	30	20	21	59	51
Total	1,972	2,240	2,434	2,551	2,448	2,505	2,608	2,669	2,971	2,990	2,346	2,426	3,267	3,257	1,683	1,894	1,936	1,909	3,908	3,996
Cash outlay:																				
Hired labor	331	350	384	386	386	397	394	399	473	444	281	250	388	350	361	416	353	359	668	758
Livestock bought	204	240	222	242	242	238	238	238	200	202	183	205	399	389	162	156	145	155	323	294
Feed bought	175	210	248	244	232	243	262	276	611	612	288	275	290	302	125	149	115	146	302	317
Fertilizer	57	60	66	69	73	64	67	79	130	124	60	63	10	13	198	230	52	74	14	36
Seed	43	40	44	47	48	49	46	43	64	63	54	46	55	50	31	33	31	28	49	46
Taxes on farm property	174	190	192	191	183	180	184	187	163	165	216	217	238	240	114	115	115	118	263	267
Machinery and tools	123	110	103	119	130	129	151	159	130	135	125	137	255	257	57	68	85	98	254	248
Miscellaneous other	150	150	151	179	179	157	176	191	191	182	170	181	229	233	89	108	97	103	337	397
Total	1,257	1,350	1,410	1,477	1,473	1,457	1,518	1,572	1,962	1,927	1,377	1,374	1,864	1,834	1,137	1,275	993	1,081	2,210	2,363
Receipts less cash outlay	715	890	1,024	1,074	975	1,048	1,090	1,097	1,009	1,063	969	1,052	1,403	1,423	546	619	943	828	1,698	1,633
Increase in inventory of personal property	202	130	181	223	158	242	244	201	96	191	201	126	395	261	93	145	178	159	573	361
Net result	917	1,020	1,205	1,297	1,133	1,290	1,334	1,298	1,105	1,254	1,170	1,178	1,798	1,684	639	764	1,121	987	2,171	1,994
Interest paid	(1)	230	230	225	215	201	202	199	97	105	177	173	347	339	88	95	137	125	322	323
Spent for farm improvements	(1)	140	133	131	128	141	126	125	149	130	112	127	149	152	101	84	99	96	169	164

[1] Not reported for 1922.

TABLE 525.—*Farm returns, 1922–1929*—Continued

NONCASH (ESTIMATED) ITEMS

	United States								North Atlantic		East North Central		West North Central		South Atlantic		South Central		Western	
	1922	1923	1924	1925	1926	1927	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929
Value of food produced and used on the farm [2]	$294	$265	$266	$274	$282	$273	$269	$262	$267	$267	$268	$269	$290	$282	$298	$286	$245	$242	$245	$227
Value of family labor, including owner [2]	716	870	789	793	779	768	768	772	902	914	837	845	932	918	462	492	514	505	1,008	1,024
Change in value of real estate during the year (minus sign (−) shows decrease)	−52	−66	+145	+173	+2	+61	+72	+27	+64	+40	+26	−20	+52	+5	+27	−11	+79	+50	+257	+127

Bureau of Agricultural Economics. Compiled from reports of individual farms operated by their owners. Division averages for 1922 in Agriculture Yearbook, 1924, pp. 1131–1132; for 1923–1924 in Agriculture Yearbook, 1925, pp. 1342–1343; for 1925 in Yearbook of Agriculture, 1927, pp. 1132–1133; for 1926 in Yearbook of Agriculture, 1928, pp. 1038–1039; for 1927 in Yearbook of Agriculture, 1930, pp. 972–973.

[2] Averages of farms for which the item was reported.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*

This table presents some results, in terms of averages per farm, from most of the farm-business studies that have been made in the United States east of the Mississippi River from 1924 to 1929. The table is a supplement to Table 652, pp. 1285 to 1311, Agriculture Yearbook, 1925. Data prior to 1924 for a few localities were omitted from Table 652 (1925) and are included here. The data for 1924 in certain localities were published in Table 652 (1925) and those for other localities in this table.

The data presented were compiled from figures obtained directly from farmers, by the Bureau of Agricultural Economics, U. S. Department of Agriculture, by the State colleges of agriculture or agricultural experiment stations, or by the Bureau of Agricultural Economics cooperating with the State colleges of agriculture or the agricultural experiment stations. They include those obtained through research projects, extension projects, or joint research and extension projects, and whether obtained by the survey method, or from records or farm account books kept by farmers. In this table a larger percentage of the data are from records or farm account books kept by farmers than in Table 652 (1925).

EXPLANATION OF TERMS

Interpretation of the terms used in this table is essentially in accord with their use in Farmers' Bulletin No. 1139, A Method of Analyzing the Farm Business. They are briefly described as follows:

Year covered by study.—In many instances the year is not the calendar year, but the farm year as determined by the project leader. When not a calendar year, the year given is that in which the crops were usually harvested. Thus, 1929 may mean the calendar year 1929 or from Mar. 1, or Apr. 1, 1929, to Feb. 28 or Mar. 31, 1930. There has been a tendency in late years to make the farm year correspond to the calendar year.

Size of farms: Total.—The acreage of land operated as one farm, or unit. All, or practically all, of the area is operated by one set of machinery, horses, workmen, etc. The farm may consist of all-owned, all-rented, or both owned and rented land. When two or more farms are owned by the same person, or persons, but operated rather independently of each other, they are considered separate farms.

Size of farms: Crops.—The acreage in fruits, tilled, intertilled, and hay crops. Does not include pasture except annual crops when used as pasture. If more than one crop is grown on any of the land during the year, the acreage is counted but once in computing the acres in crops.

Capital: Total.—The value of all real estate, machinery, livestock, and other property used to carry on the year's business. It usually includes the value of the farm dwelling, but not of the household furnishings.

Capital: Real estate.—The value of the farm, including buildings, fences, and water supply.

Receipts.—Proceeds from the sale of crops produced during the farm year, the increase from livestock, and the receipts from work off the farm, rent of buildings, etc. The increase from livestock is found by subtracting the sum of the amount paid for livestock purchases and the inventory value at the beginning of the year from the sum of the receipts from livestock products, sales of livestock, and the inventory value at the end of the year. Receipts do not include the family living from the farm. Differences in method of calculating receipts and expenses employed in the original computations of the data for some of the studies have been eliminated in many instances when the data were assembled for this table. For the occasional study in which it was impracticable to eliminate these differences, receipts and expenses as shown may be slightly higher or lower than they should be in order to be strictly comparable with those for the other studies. In a table of this sort, where only averages for a study are given, these differences are rarely of more than minor significance as they affect the receipts and expenses, and there is no difference in the farm income.

Expenses.—Annual expenditures made in carrying on the farm business. They include depreciation on buildings and equipment, and the unpaid labor performed by members of the farm family, but do not include the farmer's own labor, or any household and personal expenses.

Farm income.—The difference between receipts and expenses. It does not include the family living from the farm.

Family income.—The farm income plus other unpaid family labor.

Labor income.—Farm income less 5 per cent interest charge for the use of the capital. It does not include the family living from the farm. In some of the studies, as originally published, other rates of interest were used. In certain localities the unpaid family labor was not obtained. In those localities with no entries for farm income, expenses, and labor incomes are not comparable with those in the other localities with entries for farm income. Had other unpaid family labor been obtained, expenses would have been higher and labor incomes lower than reported by the amount of this item. In these cases the figure carried in the labor-income column is family labor income, and not operator's labor income.

Return to capital.—The rate returned to the capital after the estimated value of the farmer's labor is deducted from the farm income. (See "Farmer's labor," below.)

Family living from the farm.—The food products set aside from the year's production, and the fuel, and house rent furnished by the farm for the living of the farm family. This is in addition to receipts, farm income, and labor income.

Operator's earnings.—Labor income plus family living from the farm.

Farmer's labor.—An allowance for the farmer's own labor and management at the rate he would have to pay another man to take his place. It does not include the family living from the farm.

Other unpaid family labor.—The unpaid family labor other than the labor of the farmer himself determined on the basis of what it would cost to have the same work done by hired labor, or on the amount of additional labor that would need to be hired to carry on the same sized business if the family labor had not been available.

Principal sources of receipts.—These are named in order of importance and in most instances include enough enterprises to amount to 75 per cent or more of the total receipts. Under this heading cotton includes sales of cottonseed; poultry includes sales of eggs; sheep includes lambs and wool; horses include mules and colts; work includes man, man and team, and machine work which the farmer did off the farm for hire; wood includes sales of timber, lumber, posts, firewood, etc. Cattle does not include sales of dairy products. In some instances receipts were grouped as crops, livestock, miscellaneous, and are not available in such detail of enterprises as just indicated.

Specific exceptions to the above explanations of terms are indicated by references to footnotes at end of the table.

Key.—The numbers indicate the agency which obtained the data, and the letters following the method used in obtaining the data, as follows:
1.—Bureau of Agricultural Economics, U. S. Department of Agriculture.
2.—State college of agriculture or agricultural experiment station.
3.—Bureau of Agricultural Economics, U. S. Department of Agriculture in cooperation with State college of agriculture or agricultural experiment station.
S—Farm business survey.
R—Records, or farm account books.
Thus a study with key 3R means the data were obtained by the Bureau of Agricultural Economics, U. S. Department of Agriculture, in cooperation with the State college of agriculture or agricultural experiment station, and they were taken from records or farm account books kept by the farmers.

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms		Capital		Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
					Total	Crops	Total	Real estate										
				No.	Acres	Acres	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Per ct.	Dolls.	Dolls.	Dolls.	Dolls.
Maine:																		
Aroostook	2S	Potatoes	1928	196	167	99	24,947	23,776	4,196	6,439	−2,243	−1,933	−3,490					310
Hancock, Washington	2S	Blueberries, work, wood	1926	239	196	51	4,628	3,998	1,527	890	637	746	406					109
Oxford	2S	Apples, dairy, wood, poultry, cattle.	1924	93	174	39	7,567	5,637	2,747	2,096	651	884	273					233
Do	2S	Apples, dairy, wood, cattle, poultry, work.	1925	93	176	40	7,616	5,686	2,658	2,106	552	732	171					180
Do	2S	Dairy, apples, wood, work, poultry, potatoes.	1926	93	175	39	7,592	5,746	2,388	1,930	458	629	78					171
New Hampshire:																		
Hillsborough, Rockingham, Strafford—Southern New Hampshire—poultry study.	2R	Poultry	1929–30	21			14,387	7,999	10,838	[1] 8,740		2,098	[2] 1,379		[3] 267	[3] 1,646		
Vermont:																		
Addison, Chittenden—Champlain Valley.	2S	Milk	1926	195	189	91	13,075	9,566	3,712	2,301	1,411	1,611	757	4.4	623	1,380	836	200
Addison, Rutland, Washington, Windham, Windsor.	3S	Dairy, work, cattle, wood	1928	162	180	38	5,463	3,211	1,824	1,181	643	741	370		478	848		98
Washington—Cabot, Marshfield	2S	Dairy, cattle, hogs, crops	1926	138	177	46	7,776	5,089	2,576	1,681	895	1,057	506	3.7	487	993	606	162
Rhode Island:																		
Kent—Coventry, West Greenwich.	2S	Poultry, dairy and cattle	1929	7	86	14	8,544	5,502	3,629	2,389	1,240	1,343	813	6.7	[3] 322	[3] 1,135	667	103
Newport—Jamestown	2S	Dairy and cattle, poultry	1929	10	135	44	10,828	19,309	6,457	6,314	143	616	−398	−9.7	[3] 335	[3] −63	1,194	473
Little Compton.	2S	do	1928	29	97	34	11,788	10,457	5,866	4,876	990	1,282	401	−1.5	[3] 293	[3] 694	1,168	292
Middletown	2S	do	1928	38	48	27	11,285	11,331	6,162	5,221	941	1,193	377	−4.4	[3] 223	[3] 600	1,443	252
Portsmouth	2S	Dairy and cattle, crops	1929	49	53	28	11,492	13,211	5,855	4,901	954	1,187	379	−.3	[3] 302	[3] 681	989	233

[1] Does not include other unpaid family labor.
[2] Family-labor income.
[3] Does not include house rent.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms		Capital		Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
					Total	Crops	Total	Real estate										
				No.	*Acres*	*Acres*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Per ct.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Rhode Island—Continued.																		
Providence—Cranston,	2S	Dairy and cattle	1929	37	76	25	16,809	12,862	7,907	7,078	829	1,177	−12	−1.4	[3] 309	[3] 297	1,061	348
Johnston, Cumberland, Lincoln.	2S	do	1928	33	87	32	17,448	14,143	9,133	7,295	1,838	2,159	966	3.8	[3] 417	[3] 1,383	1,181	321
Foster	2S	Dairy and cattle, poultry	1928	42	121	16	6,906	4,959	3,295	2,959	336	617	−9	−7.7	[3] 277	[3] 268	866	281
Washington—Richmond, South Kingston.	2S	do	1929	21	145	27	11,696	8,760	6,312	4,806	1,506	1,529	921	4.5	[3] 322	[3] 1,243	978	23
Connecticut: New London—Lebanon.	2S	Dairy, poultry	1922	159	107	30	7,484	6,150	2,121	1,816	305	-----	−69	-----	-----	-----	-----	-----
New York:																		
Allegany—Almond	2S	Poultry, dairy, crops (mostly potatoes).	1929	16	178	62	14,043	9,758	5,811	3,702	2,109	2,227	1,407	-----	-----	-----	-----	118
Broome, Cayugo, Chenango, Cortland, others—up-State poultry study.	3S	Poultry	1926	121	72	32	16,862	12,365	7,527	5,030	2,497	2,711	1,654	7.4	659	2,313	1,253	214
Chautauqua—grape study.	3S	Grapes, poultry, dairy, work	1928	112	70	45	18,796	16,962	2,392	2,360	32	286	−908	−4.2	628	−280	819	254
Do	2S	Grapes, dairy, tomatoes	1929	47	77	53	17,121	14,799	3,610	2,518	1,092	1,224	236	1.4	526	762	852	132
Chemung—Hicks	2S	Poultry, dairy, cattle	1928	13	177	61	5,951	3,177	2,400	1,578	822	1,009	524	-----	-----	-----	-----	187
Do	2S	do	1929	15	217	54	6,453	3,643	2,340	1,617	723	846	400	-----	-----	-----	-----	123
Chemung—Hicks, Horseheads.	2S	Milk, poultry, cattle	1930	46	182	70	15,239	9,618	4,438	2,998	1,440	1,708	678	4.7	549	1,227	724	268
Cortland—Homer, Tully.	2S	Dairy, livestock (mostly cattle).	1926	141	157	58	17,059	12,039	5,983	4,104	1,879	2,053	1,026	-----	-----	-----	-----	174
Herkimer, Oswego, Tompkins, others—abandoned farm areas.	2S	Dairy, cattle, work, poultry, potatoes.	1925, 1926, 1927	265	144	47	4,516	2,829	1,358	1,029	329	570	103	-----	399	502	-----	241
Jefferson	2S	Dairy, hay, livestock (mostly cattle).	1925	58	183	119	14,014	10,554	2,698	1,454	1,244	1,534	543	2.3	-----	-----	920	290
Livingston—Avon, Caledonia, Genesee, Lima, York.	2S	Dairy, beans, wheat, cattle	1928	514	166	93	18,195	13,431	4 001	2,705	1,296	1,677	386	1.8	472	858	972	381
Livingston, Monroe—Caldeonia.	2S	do	1927	43	159	89	18,380	14,462	4,730	2,705	2,025	2,256	1,106	5.4	-----	-----	1,031	231
Do	2S	do	1928	52	179	100	21,144	16,541	5,464	3,033	2,431	2,714	1,374	6.8	-----	-----	983	283

Madison	3S	Milk, cattle, peas	1924	91	163	62	15,011	9,898	4,921	3,681	1,240	1,489	489	1.7	------	------	988	249
Do	3S	Milk, peas, livestock (mostly cattle).	1925	114	169	66	15,950	10,507	7,381	4,885	2,496	2,748	1,699	9.0	------	------	1,068	252
Monroe—Churchville	2S	Dairy, poultry, cabbage, beans, grain, cattle, potatoes, fruits.	1928	14	136	83	23,771	17,225	7,916	5,199	2,717	2,843	1,528	------	------	------	------	126
Hilton	2S	Apples, dairy, cabbage, livestock (mostly cattle), work, wheat, peaches.	1928	109	84	65	16,001	13,550	2,696	2,067	629	788	−171	−1.0	597	426	795	159
Monroe, Orleans—Morton.	2S	Apples, peaches, livestock (mostly cattle), cabbage, cherries, dairy.	1928	28	119	93	24,420	20,321	4,890	3,324	1,566	1,862	345	3.2	734	1,079	792	296
Montgomery	2S	Milk, hay	1925	25	127	74	13,002	9,005	3,356	1,963	1,393	1,636	743	5.3	------	------	700	243
Nassau, Suffolk, Long Island—poultry study.	3S	Poultry	1926	32	14	3	29,242	25,234	10,092	6,159	3,933	4,320	2,471	7.6	929	3,400	1,711	387
Niagara—Newfane	2S	Apples, peaches, cabbage, pears, dairy, livestock (mostly cattle), tomatoes.	1925	172	70	54	18,629	16,525	4,809	2,958	1,851	2,030	920	5.8	------	------	768	179
Do	2S	Apples, peaches, livestock (mostly cattle), pears, dairy, cherries, poultry, cabbage.	1926	187	67	54	17,987	15,989	3,436	2,719	717	905	−182	−.3	------	------	768	188
Do	2S	Apples, peaches, livestock (mostly cattle), dairy, poultry, tomatoes, cabbage.	1927	170	69	56	18,181	16,176	2,736	2,168	568	768	−341	−1.2	------	------	792	200
Do	2S	Apples, peaches, dairy, poultry, cabbage, livestock (mostly cattle), tomatoes.	1928	149	72	57	16,591	14,563	2,880	2,125	755	994	−75	−.6	635	560	850	239
Niagara—grape study	3S	Grapes, poultry, dairy, apples, prunes.	1928	20	102	77	18,974	15,442	4,620	3,298	1,322	1,666	373	1.4	716	1,089	1,052	344
Niagara—southern part	2S	Milk, apples, poultry, cattle, work.	1928	155	104	77	12,986	10,000	2,357	1,980	377	643	−272	------	------	------	------	266
Ontario, Steuben, Yates—grape study.	3S	Grapes, dairy, beans, work, sheep.	1928	35	74	44	9,406	8,089	1,739	1,466	273	449	−197	−5.1	443	246	754	176
Orange, Ulster—grape study.	3S	Grapes, apples, currants, strawberries, cherries.	1928	35	43	32	22,540	20,883	5,318	4,872	446	741	−681	−3.3	788	107	1,185	295
Orleans, Oswego—muck farms.	2S	Onions, lettuce	1925	36	19	16	10,043	7,542	9,546	7,415	2,131	2,398	1,629	13.1	10	1,639	820	267
Do	2S	Lettuce, onions	1926	37	20	16	11,151	8,660	4,656	4,046	610	859	52	−2.9	------	------	928	249
Do	2S	do	1927	68	23	16	11,119	8,946	6,825	4,580	2,245	2,466	1,689	12.0	------	------	910	221
Oswego—Fulton	2S	Milk, potatoes, cattle	1929	45	116	51	10,472	7,006	3,545	2,322	1,223	1,461	699	4.6	473	1.172	743	238
St. Lawrence—Chipman	2S	Milk	1929	41	172	64	14,704	9,196	3,766	2,673	1,093	1,428	358	1.4	577	935	881	335
Saratoga	2S	Milk, cattle, fruits	1928	19	168	79	14,600	8,982	4,793	2,906	1,887	2,082	1,157	------	------	------	------	195
Schuyler—grape study	3S	Grapes, peaches, work, cherries, poultry.	1928	20	86	57	16,125	14,146	3,467	2,727	740	1,302	−66	.5	801	735	653	562
Seneca—livestock study	2S	Dairy, livestock (mostly cattle), wheat, hay.	1925	35	148	107	14,231	11,259	3,008	1,997	1,011	1,307	299	1.7	------	------	770	296
Do	2S	Dairy, fruits, poultry, beans, wheat, cattle, hay, alfalfa.	1928	22	171	116	15,336	10,984	4,698	2,689	2,009	2,243	1,242	------	------	------	------	234
Do	2S	Dairy, poultry, fruits, beans, hay, alfalfa, buckwheat, cattle, wheat.	1929	21	168	108	15,685	11,119	4,699	2,639	2,060	2,163	1,276	------	------	------	------	103

[3] Does not include house rent.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms		Capital		Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
					Total	Crops	Total	Real estate										
				No.	Acres	Acres	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Per ct.	Dolls.	Dolls.	Dolls.	Dolls.
New York—Continued.																		
Seneca—grape study	3S	Grapes, poultry, work, dairy, hay.	1928	15	98	76	14,046	11,952	3,907	2,694	1,213	1,537	511	2.6	452	963	846	324
Steuben—central part	2S	Dairy, beans, cattle, poultry	1927	43	189	84	16,670	11,687	4,150	2,746	1,404	1,715	570	2.2			1,030	311
Do	2S	Dairy, beans, cattle	1928	44	191	86	16,824	12,097	4,235	2,827	1,408	1,778	567	2.6			970	370
Sullivan—Liberty	2S	Milk, poultry	1929	48	112	39	13,859	10,386	3,636	2,996	640	938	−53	−.5	618	565	715	298
Tompkins—livestock study.	2S	Dairy, livestock (mostly cattle), hay, poultry, wheat, beans, buckwheat, cabbage.	1925	30	159	84	10,391	7,262	2,980	1,643	1,337	1,552	817	4.6			861	215
Wayne—Lyons	2S	Dairy, apples, beans, wheat, poulry, cattle, potatoes, cabbage.	1927	50	114	72	16,082	12,473	3,095	1,952	1,143	1,392	339	.2			1,112	249
Do	2S	Beans, dairy, apples, poultry, cabbage, wheat, cattle.	1928	46	114	69	15,976	12,518	3,410	2,116	1,294	1,621	495	1.2			1,096	327
Wyoming—Castile	2S	Dairy, beans, sheep, wheat	1927	50	136	86	18,705	14,557	4,688	3,079	1,609	1,751	674	2.1			1,218	142
Do	2S	Beans, dairy, sheep, wheat	1928	49	146	92	19,775	15,712	5,483	3,238	2,245	2,453	1,256	5.5			1,165	208
Yates—grapes study	3S	Grapes, work, apples, dairy	1928	40	66	43	13,634	12,335	1,862	1,582	280	423	−402	−4.9	605	203	947	143
New Jersey:																		
Bergen, Essex, Passaic—metropolitan New York.	2S	Spinach, celery, carrots, lettuce, beets, cabbage, tomatoes, sweet corn, horse-radish, rhubarb, cauliflower, string-beans, parsley, radishes.	1926	100	29	20	30,504	26,023	8,124	8,122	2		−1,523					
Do	2S	Spinach, celery, carrots, beets cabbage, tomatoes, lettuce, sweet corn, horse-radish, rhubarb.	1926	47	33	23	32,601	27,643	9,900	8,959	941		−689					
Do	2S	Spinach, lettuce, celery, carrots, cabbage, beets, horse-radish, tomatoes, sweet corn, rhubarb, string beans, romaine, radishes, cauliflower, parsley.	1927	47	33	24	30,857	26,254	10,653	8,935	1,718		175					
Burlington	2S	Dairy, cattle	1924	48	154	97	27,337	19,868	7,567	5,628	1,939		572	3.8			900	
Do	2S	Apples, peaches, sweet corn, tomatoes, string beans, potatoes, cherries.	1926	100	114	89	31,004	26,552	10,809	9,870	939		−611					
Do	2S	Apples; peaches, strawberries, tomatoes, sweet corn.	1927	57	139	115	38,699	33,530	17,227	13,524	3,703		1,768					
Do	2S	Apples, peaches	1928	56	127	107	35,548	31,052	12,936	11,659	1,277		−500					

Cumberland—commercial poultry.	2S	Poultry	1925	120	24	8	14, 697	11, 031	6, 150	4, 101	2, 049	------	1, 314	7.8	------	------	900	------
Cumberland, Salem	2S	Dairy, potatoes, tomatoes	1925	40	115	76	22, 075	15, 275	8, 041	5, 612	2, 429	2, 499	1, 325	6.9	------	------	900	70
Gloucester	2S	Sweet potatoes, asparagus, tomatoes.	1925	31	83	55	15, 523	12, 142	5, 935	4, 625	1, 310	------	534	2.6	------	------	900	------
Mercer	2S	Dairy, poultry	1925	25	116	73	20, 925	16, 212	4, 020	2, 937	1, 083	1, 175	37	.9	------	------	900	92
Monmouth	2S	Vegetables	1928	12	78	64	26, 334	21, 708	10, 844	8, 992	1, 852	1, 935	535	------	------	------	------	83
Monmouth and others	2S	Potatoes	1924	48	------	84	------	------	6, 551	5, 029	1, 522	------	------	------	------	------	------	------
Ocean	2S	Poultry	1927	43	23	------	20, 139	15, 635	8, 905	6, 133	2, 772	------	1, 765	------	------	------	------	------
Somerset	2S	Dairy, cattle	1926	35	136	85	22, 804	15, 714	6, 053	3, 581	2, 472	2, 595	1, 332	------	------	------	------	123
South Jersey	2S	Potatoes (Irish Cobbler), vegetables.	1926	23	107	73	20, 634	16, 101	8, 121	6, 061	2, 060	------	1, 028	------	------	------	------	------
Do	2S	Potatoes (red skins), vegetables.	1926	21	101	73	18, 531	14, 405	6, 937	5, 416	1, 521	------	594	------	------	------	------	------
Sussex	2S	Dairy	1925	11	185	64	18, 394	12, 500	5, 915	4, 384	1, 531	------	611	3.4	------	------	900	------
Pennsylvania:																		
Adams	3R	Apples, poultry, garden, cattle, hogs, peaches, hay.	1929	6	146	110	35, 776	30, 213	11, 359	8, 070	3, 289	------	1, 500	------	------	------	------	------
Cumberland	3R	Dairy and cattle, hogs, poultry, potatoes, wheat, corn.	1928	6	89	77	14, 441	9, 975	6, 265	4, 671	1, 594	------	872	------	------	------	------	------
Cumberland, Lebanon	3R	Dairy and cattle, hogs, poultry, potatoes.	1929	4	84	69	12, 744	6, 873	7, 382	4, 718	2, 664	------	2, 027	------	------	------	------	------
Erie—Girard—grape study.	3S	Grapes, potatoes, hogs, cattle, work, poultry, asparagus, tomatoes.	1928	25	73	56	24, 833	22, 787	5, 029	3, 381	1, 648	1, 852	406	2.8	639	1, 045	932	204
Northeast—grape study.	3S	Grapes, cherries, dairy, poultry, prunes, tomatoes, asparagus, apples.	1928	76	73	52	30, 841	28, 892	4, 523	3, 866	657	855	−885	−.4	738	−147	765	198
Franklin	3R	Apples, peaches, small fruits, garden, hay.	1929	5	283	229	62, 607	55, 099	27, 324	21, 083	6, 241	------	3, 111	------	------	------	------	------
Juniata	3R	Dairy and cattle, poultry, hogs, wheat.	1928	4	146	112	16, 694	9, 750	5, 543	2, 974	2, 569	------	1, 734	------	------	------	------	------
Juniata, Mifflin	3R	Dairy, poultry	1929	3	156	109	18, 511	12, 073	3, 959	2, 024	1, 935	------	1, 009	------	------	------	------	------
Lancaster	3R	Dairy and cattle, potatoes, poultry, tobacco, fruits, wheat.	1929	7	79	67	28, 904	20, 011	9, 049	6, 161	2, 888	------	1, 443	------	------	------	------	------
Lancaster, York	3R	Dairy and cattle, potatoes, poultry, tobacco, hay, wheat, fruits, hogs.	1928	11	78	65	22, 679	14, 561	9, 234	5, 900	3, 334	------	2, 200	------	------	------	------	------
Lebanon	3R	Dairy and cattle, poultry, hogs, potatoes, corn.	1928	5	96	83	15, 506	10, 643	8, 613	6, 067	2, 546	------	1, 771	------	------	------	------	------
Lehigh	3R	Potatoes, dairy and cattle, wheat, hay.	1928	4	117	97	20, 565	13, 750	5, 053	4, 409	644	------	−384	------	------	------	------	------
Lehigh, Northampton	3R	Potatoes, poultry, dairy, hogs, barley, fruits.	1929	3	65	56	15, 373	9, 333	6, 648	4, 057	2, 591	------	1, 822	------	------	------	------	------
Mifflin	3R	Dairy and cattle, potatoes, poultry, wheat.	1928	3	48	38	11, 477	7, 667	3, 810	2, 637	1, 173	------	599	------	------	------	------	------
Northampton	3R	Potatoes, poultry, dairy and cattle, fruit, hogs.	1928	3	64	44	14, 918	7, 467	5, 755	4, 878	877	------	131	------	------	------	------	------
Northumberland	3R	Fruits, dairy and cattle, hogs, potatoes, hothouse vegetables, poultry.	1928	3	91	61	20, 298	13, 000	5, 686	4, 529	1, 157	------	142	------	------	------	------	------

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms		Capital		Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
					Total	Crops	Total	Real estate										
				No.	Acres	Acres	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Per ct.	Dolls.	Dolls.	Dolls.	Dolls.
Pennsylvania—Continued.																		
Northumberland, Union	3R	Dairy and cattle, fruits, poultry, hogs, potatoes.	1929	5	84	64	16,293	10,144	6,544	4,937	1,607	-------	792	-------	-------	-------	-------	-------
Tioga	3S	Dairy, poultry, cattle	1928	582	165	65	8,241	5,340	2,550	1,691	859		447	-------	[3] 340	[3] 787	-------	-------
Union	3R	Dairy and cattle, potatoes, fruit, poultry.	1928	4	70	61	11,932	7,168	4,096	2,428	1,668	-------	1,071	-------	-------	-------	-------	-------
Wyoming	3S	Dairy, cattle, poultry, fruit, potatoes.	1928	50	156	52	12,510	8,305	3,124	2,138	986	1,298	360	-------	-------	-------	-------	312
Delaware:																		
Kent—East Dover	2S	Wheat, dairy, poultry, corn	1928	57	190	107	14,214	11,291	3,972	3,011	961	1,146	250	2.8	-------	-------	559	185
Do	2S	Dairy, wheat, tomatoes poultry.	1929	63	193	105	13,899	10,930	3,888	2,838	1,050	1,261	355	3.4	-------	-------	581	211
Kent—Kenton	2S	Dairy, wheat, poultry, corn	1928	63	185	110	13,954	10,884	4,329	3,001	1,328	1,454	630	5.3	-------	-------	592	126
Do	2S	Dairy, wheat, poultry, tomatoes.	1929	66	168	98	13,675	10,635	4,175	2,734	1,441	1,544	757	6.3	-------	-------	577	103
New Castle—Hockessin	3S	Dairy, poultry, wheat, potatoes, hogs, cattle.	1925	92	97	55	13,300	10,284	3,654	2,244	1,410	1,705	745	5.2	552	1,297	724	295
Middletown.	2S	Dairy, wheat, cattle	1928	90	219	139	20,954	16,435	5,879	3,930	1,949	2,104	901	6.0	-------	-------	698	155
New Castle	2S	do	1929	105	222	135	19,395	14,992	5,600	3,770	1,830	1,957	860	6.0	-------	-------	670	127
Sussex—Lewes	2S	Dairy, poultry, Lima beans, wheat, soybens.	1928	64	135	74	10,643	8,221	3,803	2,519	1,284	1,430	752	6.5	-------	-------	591	146
Do	2S	Dairy, Lima beans, poultry, wheat, soybeans.	1929	52	133	69	8,939	6,753	3,529	2,240	1,289	1,420	842	7.6	-------	-------	611	131
Maryland:																		
Baltimore	2S	Dairy, crops	1928	55	134	79	20,360	-------	4,086	2,844	1,242	1,426	224	3.6	-------	-------	500	184
Caroline	2S	Poultry	1929	14	78	44	10,084	7,071	5,900	3,227	2,673	2,780	2,169	20.6	-------	-------	600	107
Carroll	2S	Dairy, crops, cattle	1928	61	120	76	12,645	-------	3,191	1,970	1,221	1,364	589	5.7	-------	-------	500	143
Cecil	2S	do	1928	26	133	75	18,139	-------	4,242	2,445	1,797	1,989	890	7.2	-------	-------	500	192
Dorchester	2S	Tomatoes, dairy, wheat, poultry, cantaloupes, corn.	1929	46	174	96	16,682	13,496	4,879	3,051	1,828	2,045	994	7.4	-------	-------	600	217
Harford	2S	Dairy, cattle	1928	20	139	60	21,738	-------	5,549	3,320	2,229	2,274	1,142	8.0	-------	-------	500	45
Howard	2S	Dairy, crops, cattle	1928	76	149	72	16,759	-------	4,421	2,450	1,971	2,151	1,133	8.8	-------	-------	500	180
Kent	2S	Dairy, poultry, wheat, tomatoes.	1929	16	196	118	18,105	12,418	6,506	3,926	2,580	2,761	1,675	10.9	-------	-------	600	181
Montgomery	2S	Cattle, crops, dairy	1928	44	233	109	25,789	-------	3,915	2,543	1,372	1,639	83	3.4	-------	-------	500	267
Queen Annes	2S	Dairy, wheat, poultry, tomatoes.	1929	25	177	104	17,030	11,529	4,502	3,179	1,323	1,507	471	4.2	-------	-------	600	184
Somerset	2S	Potatoes, strawberries, poultry.	1929	55	118	54	11,331	9,034	5,867	3,261	2,606	2,742	2,039	17.7	-------	-------	600	136

Talbot	2S	Wheat, dairy, tomatoes, poultry, sweet corn, cattle.	1929	28	204	118	24, 560	19, 471	5, 299	3, 467	1, 832	1, 950	604	5. 0	------	------	600	118
Worcester	2S	Potatoes, poultry, dairy	1929	84	133	62	11, 264	8, 875	4, 934	2, 746	2, 188	2, 377	1, 625	14. 1	------	------	600	189
Virginia:																		
Accomac, Norfolk, Northampton, Princess Anne—potato study.	3S	Potatoes	1928	169	114	59	22, 463	19, 049	4, 849	6, 361	−1, 512	−1, 279	−2, 635	−9. 1	750	−1, 885	542	233
Do	3S	do	1929	143	110	55	21, 367	18, 180	7, 994	6, 244	1, 750	2, 033	682	5. 6	741	1, 423	548	283
Albemarle—apple study	3R	Apples, peaches, cattle, garden corn, hogs, poultry.	1929	15	224	165	58, 150	48, 671	13, 767	10, 654	3, 113	------	205	------	------	------	------	------
Augusta—apple study	3R	Apples, cattle, sheep, wheat, hay, hogs, poultry.	1929	5	180	135	45, 752	40, 477	12, 086	7, 218	4, 868	------	2, 580	------	------	------	------	------
Augusta, Rockingham—Shenandoah Valley—dairy study.	3S	Dairy, poultry, wheat, cattle	1924 1925	287	153	80	26, 502	23, 491	3, 157	1, 612	1, 545	1, 813	220	3. 9	840	1, 060	516	268
Charlotte—bright tobacco study.	3S	Tobacco, other crops	1924	9	124	32	7, 772	6, 805	1, 207	1, 086	121	350	−268	−5. 3	730	462	532	229
Do	3S	Tobacco, other crops, livestock	1925	8	132	35	7, 509	6, 751	841	841	0	205	−375	−6. 2	[3] 511	[3] 136	468	205
Do	3S	Tobacco, livestock	1926	8	130	------	7, 051	6, 364	1, 482	749	733	951	380	2. 8	734	1, 114	532	218
Do	3S	Tobacco	1927	8	131	------	7, 118	6, 407	1, 855	845	1, 010	1, 310	654	7. 5	701	1, 355	476	300
Do	3S	do	1928	6	120	------	6, 591	5, 792	1, 151	1, 000	151	531	−179	−5. 2	779	600	495	380
Do	3S	do	1929	5	128	29	6, 702	5, 942	1, 039	766	273	537	−62	−3. 7	742	680	522	264
Charlotte—dark tobacco study.	3S	Tobacco, livestock	1924	12	156	36	7, 338	6, 255	1, 397	803	594	748	227	1. 4	545	772	489	154
Do	3S	do	1925	12	148	37	7, 394	6, 385	1, 116	801	315	416	−55	−2. 3	[3] 435	[3] 380	483	101
Do	3S	do	1926	11	150	------	7, 209	6, 263	1, 173	769	404	503	44	−. 9	576	620	472	99
Do	3S	do	1927	11	151	------	7, 188	6, 283	1, 539	777	762	882	403	4. 2	558	961	463	120
Do	3S	Livestock, tobacco	1928	11	153	------	6, 899	5, 871	1, 434	974	460	569	115	. 04	530	645	457	109
Do	3S	Tobacco, livestock	1929	11	161	41	7, 051	6, 073	2, 043	1, 065	978	1, 112	625	7. 4	582	1, 207	457	134
Henrico—Richmond—dairy study.	3R	Dairy	1927	47	212	89	29, 882	22, 858	8, 922	6, 484	2, 438	2, 744	944	5. 6	508	1, 452	758	306
Do	3R	do	1928	44	218	91	30, 747	23, 210	9, 695	7, 513	2, 182	2, 482	645	4. 7	555	1, 200	744	300
Do	3R	do	1929	46	231	91	29, 999	22, 176	10, 573	7, 587	2, 986	3, 212	1, 486	7. 3	594	2, 080	800	226
Montgomery, Pulaski, Smyth, Washington, Wythe—beef-cattle study.	3R	Cattle	1925 or 1926	13	388	101	46, 054	39, 821	4, 643	2, 895	1, 748	1, 836	−555	3. 2	791	236	257	88
Nelson—Apple study	3R	Apples, cattle, wheat, poultry hogs, corn, garden.	1929	6	183	124	99, 406	62, 890	9, 448	7, 669	1, 779	------	−3, 191	------	------	------	------	------
Rappahannock—Apple study.	3R	Apples, cattle, horses, sheep, hogs, wheat, corn.	1929	5	440	112	69, 471	57, 444	16, 154	12, 378	3, 776	------	302	------	------	------	------	------
West Virginia:																		
Berkeley—apple study	3R	Apples, peaches, cattle, poultry, small fruits, sheep, hogs, hay.	1929	3	146	131	29, 901	22, 993	22, 923	15, 412	7, 511	------	6, 016	------	------	------	------	------
Jefferson—apple study	3R	Apples, hogs, poultry, cattle, sheep, peaches, corn, wheat.	1929	5	259	201	69, 312	56, 110	19, 258	9, 567	9, 691	------	6, 225	------	------	------	------	------
Nicholas, Webster	3S	Cattle, work, poultry, sheep, hogs, potatoes, dairy, rent.	1926	175	143	36	5, 838	4, 340	1, 190	[1] 365	------	825	[2] 533	------	------	------	------	------

[1] Does not include other unpaid family labor.

[2] Family-labor income.

[3] Does not include house rent.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms: Total	Size of farms: Crops	Capital: Total	Capital: Real estate	Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
				No.	Acres	Acres	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Perct.	Dolls.	Dolls.	Dolls.	Dolls.
North Carolina:																		
Ashe	3S	Work, cattle, poultry, sheep, wood, hogs.	1927	97	138	27	7,730	6,922	628	614	14	78	−372	−3.2	490	118	259	64
Camden	3S	Cotton, hogs, soybeans, potatoes.	1927	9	104	52	6,415	5,448	1,174	863	311	410	−10	−.2	449	439	321	99
Catawba	3S	Cotton, dairy, poultry, work	1927	99	103	36	6,973	6,115	1,015	732	283	408	−66	−.7	548	482	332	125
Chowan	3S	Peanuts, cotton, tobacco	1927	33	163	79	14,354	12,678	4,649	3,244	1,405	1,553	687	6.7	611	1,298	442	148
Cumberland	3S	Cotton, tobacco, corn	1927	83	136	59	7,818	7,087	1,783	1,415	368	476	−23	.7	453	430	316	108
Currituck	3S	Potatoes, sweetpotatoes, corn, soybeans.	1927	13	171	85	14,042	12,073	4,706	2,761	1,945	2,307	1,243	11.1	636	1,879	382	362
Davidson	3S	Tobacco, dairy, cotton, work, wheat, poultry, hogs.	1927	121	92	28	6,114	5,475	787	576	211	328	−95	−1.5	566	471	304	117
Edgecombe	3S	Cotton, tobacco	1928	25	667	313	48,131	37,256	19,178	14,496	4,682	4,807	2,275	6.7	956	3,231	1,476	125
Hoke	3S	Tobacco, cotton	1927	25	158	54	11,064	10,096	4,086	2,506	1,580	1,826	1,027	10.4	525	1,552	427	246
Do	3S	do	1928	26	145	61	9,656	8,535	2,832	2,252	580	761	97	1.3	537	634	454	181
Jackson	3S	Work, poultry, cattle, hogs, wood, corn.	1927	93	105	16	4,143	3,684	427	331	96	171	−111	−3.3	410	299	232	75
Lenoir	3S	Tobacco, cotton	1927	69	150	62	13,327	12,251	4,405	2,900	1,505	1,699	839	8.5	481	1,320	371	194
Do	3S	do	1928	29	270	126	23,101	19,236	9,071	6,238	2,833	3,035	1,678	8.0	722	2,400	980	202
Macon	3S	Work, dairy, poultry, corn, cattle.	1927	27	89	19	3,729	3,322	257	311	−54	−8	−240	−6.2	335	95	176	46
McDowell	3S	Dairy, work, corn, cattle, poultry.	1927	64	141	27	5,347	4,789	551	481	70	137	−197	−3.4	448	251	251	67
Moore	3S	Tobacco, cotton, dewberries	1927	51	129	34	6,156	5,546	1,883	1,264	619	719	311	5.5	424	735	281	100
Do	3S	Tobacco, cotton, dairy	1928	71	156	41	7,238	6,462	2,026	1,612	414	540	52	1.9	436	488	278	126
Moore and others—sand hills.	3S	Peaches	1927	41	335	125	26,053	18,376	14,404	8,677	5,727	5,800	4,424	18.6	400	4,824	886	73
Do	3S	do	1928	46	252	100	20,842	-------	6,756	8,192	−1,436	−1,379	−2,478	−4.0	326	−2,152	593	57
Pasquotank	3S	Potatoes, dairy, cotton, poultry.	1927	14	72	44	7,302	6,540	1,339	963	376	494	11	.1	487	498	371	118
Pender	3S	Strawberries, vegetables, tobacco, hogs, potatoes.	1927	134	166	29	5,473	4,836	1,422	1,014	408	493	134	2.0	363	497	301	85
Perquimans	3S	Peanuts, cotton, hogs	1927	26	97	47	6,361	5,430	1,847	878	969	1,069	651	8.7	407	1,058	416	100
Person	3S	Tobacco	1927	91	139	39	7,559	6,873	2,290	1,154	1,136	1,333	758	10.4	588	1,346	351	197
Pitt	3S	Tobacco, cotton	1928	27	334	155	30,507	25,399	11,474	8,839	2,635	2,712	1,110	6.2	533	1,643	737	77
Wayne	3S	do	1928	30	291	134	21,528	19,148	5,994	4,711	1,283	1,465	207	2.3	666	873	778	182
Wilson	3S	do	1927	36	94	38	8,739	8,074	2,898	1,888	1,010	1,202	573	7.9	432	1,005	322	192
South Carolina:																		
Aiken, Edgefield, Lexington, Saluda.	2S	Cotton, asparagus	1924	141	185	73	13,708	10,876	2,747	1,832	915	1,040	230	4.9	745	975	238	125

Anderson	2S	Cotton	1924	153	137	76	16,000	13,031	3,241	2,380	861	1,258	61	3.6	466	527	284	397
Do	2S	do	1925	96		70	13,318									81		
Anderson, Pikens	2R	do	1927 1928	70	81	38	9,278	7,252	1,974	1,087	887	1,030	423	5.5	730	1,153	374	143
Georgia:																		
Cobb	2S	Cotton, livestock	1925	37			7,432	5,860	1,554	1,279	275	406	−97					131
Colquitt, Dougherty, Mitcell, Randolph, Tipton, Turner, and others.	3R	Cotton, peanuts, hogs, dairy, tobacco, work, cattle.	1927	69	352	175	23,247	15,112	5,896	4,070	1,826	2,061	664	4.7	[3] 499	[3] 1,163	734	235
Do	3R	Cotton, peanuts, dairy, hogs, tobacco.	1928	44	401	202	26,605	20,590	5,290	4,567	723	924	−607		[3] 469	[3] −138	728	201
Dooly	2S	Cotton, other crops	1925	17	390		26,850	21,042	7,645	5,858	1,787	1,923	445					136
Florida:																		
Alachua — cucumber study.	2S	Cuucmbers, potatoes, peppers, watermelons, string beans, livestock increase.	1927–28	34	207	68	9,361	7,915	3,983	2,876	1,107	1,243	639	7.5			404	136
Alachua, Clay, Flagler, Putnam, St. Johns—potato study.	2S	Potatoes	1925	294	101	53	22,709	20,238	10,120	8,157	1,963	2,102	828	6.3			529	139
Alachua, Clay, Marion—poultry study.	2R	Poultry	1928	19	21	8	7,453	5,873	3,292	2,996	296	427	−77	−5.3	454	377	688	131
Do	2R	do	1929	9	29	6	8,801	6,545	5,661	4,225	1,436	1,572	996	8.0	641	1,637	736	136
Dade — Miami — dairy study.	2S	Milk	1927	36	103	6	28,775	13,607	30,237	26,730	3,507	4,014	2,068	6.8	377	2,445	1,539	507
Duval, Nassaw—poultry study.	2R	Poultry	1926	20	20	1	12,134	10,015	5,420	3,567	1,853	1,971	1,246	10.1			624	118
Do	2R	do	1928	57	26	4	7,640	5,772	3,954	3,252	702	841	320	.1	388	708	698	139
Do	2R	do	1929	36	28	3	8,599	6,461	5,158	3,710	1,448	1,507	1,018	8.1	449	1,467	750	59
Duval—Jacksonville—dairy study.	2S	Milk	1927	64	61	9	13,210	7,557	14,800	12,628	2,172	2,598	1,512	6.2	341	1,853	1,359	426
Hardee — cucumber study.	2S	Cucumbers, strawberries, citrus, peppers, tomatoes.	1927–28	52	37	16	8,225	7,300	3,462	1,908	1,554	1,762	1,143	13.4			450	208
Hillsborough — poultry study.	2R	Poultry	1928	25	8	2	7,756	6,249	3,000	2,474	526	611	138	−2.2	387	525	699	85
Do	2R	do	1929	15	7	2	8,265	6,615	3,312	2,441	871	924	458	2.2	374	832	688	53
Hillsborough — vegetable study.	2S	Strawberries, oranges, tomatoes, string beans, peppers.	1927	113	42	19	16,153	14,762	4,180	2,994	1,186	1,384	378	3.5			625	198
Hillsborough—Tampa—dairy study.	2S	Milk	1927	58	58	4	12,962	6,206	14,301	13,863	438	1,195	−210	−6.6	299	89	1,288	757
Jackson—cotton study	2S	Cotton, peanuts, livestock, melons.	1925	499	132	71	5,818	4,884	1,623	1,086	537	718	246	4.9	448	695	253	181
Do	2S	Cotton, livestock, peanuts, work.	1928	110	154	74	6,948	5,875	1,385	1,168	217	347	−130	−.3	449	319	240	130
Levy—cucumber study	2S	Cucumbers, livestock, watermelons, peanuts.	1927–28	61	137	62	7,914	6,655	2,807	1,674	1,133	1,267	737	9.7			368	134
Marion—Ocala—dairy study.	2S	Milk, poultry	1927	29	171	49	13,490	11,214	4,256	2,777	1,479	1,717	804	6.4	338	1,142	614	238

[3] Does not include house rent.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms		Capital		Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
					Total	Crops	Total	Real estate										
				No.	Acres	Acres	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Per ct.	Dolls.	Dolls.	Dolls.	Dolls.
Florida—Continued.																		
Orange — Orlando — dairy study.	2S	Milk	1927	38	60	9	20,185	16,467	8,953	7,121	1,832	2,387	823	3.7	344	1,167	1,076	555
cucumber study.	2S	Cucumbers, citrus, peppers, cabbage.	1927-28	27	72	48	53,912	51,220	16,022	11,309	4,713	4,868	2,017	6.5	------	------	1,213	155
Pinellas — St. Petersburg—dairy study.	2S	Milk	1927	24	60	14	17,169	10,425	18,618	14,489	4,129	5,116	3,271	15.9	425	3,696	1,396	987
Sumter — cucumber study.	2S	Cucumbers, tomatoes	1927–28	62	91	27	9,419	7,138	3,947	2,630	1,317	1,432	846	10.6	------	------	323	115
Ohio:																		
Allen	2R	Hogs, cattle, poultry, wheat, dairy.	1926	4	261	73	20,235	15,668	4,249	[1] 1,734	------	2,515	[2] 1,503	------	------	------	------	------
Allen, Auglaize, Hardin, Mercer—northwestern Ohio.	2R	Hogs, poultry, dairy, wheat, corn, cattle.	1927	25	108	71	16,437	12,041	3,519	[1] 1,742	------	1,777	[2] 955	------	------	------	------	------
Allen, Putnam	3S	Hogs, cattle, wheat, oats, sugar beets, corn.	1918	40	159	110	35,817	30,279	6,725	2,753	3,972	4,148	2,181	------	------	------	------	176
Do	3S	Hogs, wheat, cattle, corn, dairy, oats.	1919	40	171	120	40,962	33,186	6,607	3,101	3,506	3,717	1,458	------	------	------	------	211
Do	3S	Hogs, cattle, sugar beets, wheat, corn, dairy.	1920	52	163	111	38,394	32,065	4,100	3,393	707	1,007	−1,213	------	------	------	------	300
Do	3S	Hogs, cattle, dairy, poultry, sugar beets, hay.	1921	35	181	131	42,914	36,720	3,109	3,030	79	427	−2,067	------	------	------	------	348
Do	3S	Hogs, cattle, wheat, poultry, sugar beets, dairy.	1922	32	175	125	38,487	33,161	4,235	2,464	1,771	2,141	−153	------	------	------	------	370
Ashland	2R	Dairy, hogs, poultry, cattle, wheat.	1926	5	119	58	13,145	9,476	2,619	[1] 1,247	------	1,372	[2] 715	------	------	------	------	------
Ashland, Coshocton, Holmes, Licking, Muskingum, Wayne—north-central Ohio.	2R	Dairy, hogs, sheep, poultry, wheat.	1927	21	150	71	14,052	9,999	3,060	[1] 1,386	------	1,674	[2] 971	------	------	------	------	------
Ashland, Coshocton, Holmes, Richland, Tuscarawas, Wayne—north-central Ohio.	2R	Dairy, poultry, hogs, wheat	1929	23	127	68	14,397	10,316	3,437	1,726	1,711	1,954	991	------	------	------	------	243
Ashtabula, Lorain, Medina, Portage, Summit, Trumbull—northeastern Ohio.	2R	Dairy, poultry, potatoes, wheat.	1929	40	123	61	14,905	10,197	3,999	2,627	1,372	1,566	627	------	------	------	------	194

Athens, Fairfield, Morgan, Perry—southeastern Ohio.	2R	Dairy, hogs, wheat, poultry, sheep, cattle.	1927	18	157	72	16,078	12,259	3,275	[1] 1,929		1,346	[2] 542					
Athens, Gallia, Pike, Scioto, Vinton—southern Ohio.	2R	Dairy, poultry	1929	26	158	62	9,270	6,930	2441	[1] 1,331		1,110	[2] 646					
Auglaize	2R	Hogs, dairy, poultry	1924	13	96	60	12,550		2,920	[1] 1,433		1,487	[2] 859					
Do	2R	Hogs, dairy, poultry, wheat, cattle.	1925	13	111	64	10,275		3,804	[1] 1,850		1,954	[2] 1,440					
Auglaize, Mercer	2R	do	1926	18	109	68	14,997	11,144	3,947	[1] 1,535		2,412	[2] 1,662					
Do	2R	Hogs, dairy, poultry, wheat, potatoes, sugar beets.	1928	22	163	70	14,989	11,046	3,069	[1] 1,573		1,496	[2] 646					
Do	2R	do	1929	20	112	79	12,287	9,147	3,362	[1] 1,754		1,608	[2] 994					
Belmont	2R	Dairy, poultry, sheep, wheat	1924	6	110	55	13,975					2,205	[2] 1,506					
Do	2R	do	1925	6									[2][4] 1,449					
Belmont, Carroll, Guernsey, Harrison, Jefferson—eastern Ohio.	2R	Dairy, poultry, sheep	1929	28	183	48	9,912	6,285	2,883	[1] 1,628		1,255	[2] 759					
Belmont, Carroll, Guernsey, Harrison, Noble, Tuscarawas—eastern Ohio.	2R	Dairy, poultry, sheep, hogs	1928	30	129	46	11,177	5,762	2,154	[1] 1,118		1,036	[2] 477					
Belmont, Guernsey, Harrison, Jefferson—eastern Ohio.	2R	Dairy, poultry, sheep, hogs, wheat.	1927	30	130	41	8,434	5,575	2,530	[1] 1,376		1,154	[2] 732					
Brown, Clermont, Gallia, Scioto—Ohio River counties.	2R	Dairy, poultry, hogs, cattle, fruits.	1928	25	134	51	10,347	7,872	2,510	[1] 1,491		1,019	[2] 502					
Brown, Clermont, Hamilton—Ohio River counties.	2R	Dairy, hogs, poultry, cattle, corn.	1929	20	116	60	10,036	7,390	2,466	1,536	930	1,145	428					215
Brown, Clermont, Scioto—Ohio River counties.	2R	Dairy, hogs, wheat, poultry	1927	8	138	74	12,714	9,908	2,248	[1] 1,431		817	[2] 181					
Butler	2R	Hogs, dairy, poultry	1924	19	141	74	18,600		3,428	[1] 1,645		1,783	[2] 853					
Do	2R	Hogs, poultry, dairy, wheat	1925	13	145	81	20,670		4,406	[1] 1,860		2,546	[2] 1,512					
Do	2R	Hogs, dairy, poultry, cattle, wheat.	1926	8	150	71	20,629	16,177	4,218	[1] 2,193		2,025	[2] 994					
Do	2R	Hogs, dairy, poultry, wheat, cattle.	1927	13	131	71	18,972	14,726	3,772	[1] 1,821		1,951	[2] 1,002					
Do	2R	Hogs, dairy, wheat, poultry	1928	21	158	87	21,721	16,371	3,627	[1] 2,226		1,401	[2] 315					
Do	2R	Hogs, dairy, poultry, wheat	1929	21	147	77	20,200	15,912	4,087	2,236	1,801	1,953	791					152
Carroll, Columbiana, Jefferson.	2R	Dairy, poultry, potatoes, cattle.	1928	20	111	59	11,998	7,987	4,127	[1] 2,122		2,005	[2] 1,405					
Carroll, Columbiana, Mahoning.	2R	Dairy, poultry, potatoes, hogs	1929	30	119	60	12,754	8,484	4,755	2,925	1,830	2,020	1,192					190

[1] Does not include other unpaid family labor. [2] Family-labor income. [4] Labor income at 4 per cent.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929.*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms: Total	Size of farms: Crops	Capital: Total	Capital: Real estate	Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
Ohio—Continued.				*No.*	*Acres*	*Acres*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Per ct.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Champaign, Clark, Clinton, Greene, Highland Madison, Ross, Shelby—west-central Ohio.	2R	Hogs, dairy, poultry, cattle, wheat, corn.	1928	49	140	85	18,420	14,416	3,205	[1] 1,913	-----	1,292	[2] 371	-----	-----	-----	-----	-----
Champaign, Clark, Clinton, Greene, Highland, Miami, Ross, Shelby—west-central Ohio.	2R	Hogs, dairy, wheat, poultry, cattle.	1927	24	120	70	16,785	13,505	3,711	[1] 1,866	-----	1,845	[2] 1,006	-----	-----	-----	-----	-----
Clark, Clinton, Fayette, Greene, Highland, Logan, Madison, Pickaway, Ross, Shelby, Union—west-central Ohio.	2R	Hogs, dairy, poultry, cattle, wheat, corn.	1929	85	144	88	18,414	14,159	4,019	2,328	1,691	1,883	770	-----	-----	-----	-----	192
Clinton	2R	Hogs, cattle, wheat, dairy	1926	9	174	105	20,507	14,962	5,071	[1] 2,637	-----	2,434	[2] 1,409	-----	-----	-----	-----	-----
Columbiana, Geauga, Portage, Trumbull—northeastern Ohio.	2R	Dairy, poultry, cattle, potatoes, wheat.	1927	17	109	42	11,976	8,767	3,041	[1] 1,662	-----	1,379	[2] 780	-----	-----	-----	-----	-----
Coshocton	2R	Dairy, poultry, hogs, wheat	1928	4	83	46	11,418	7,187	3,049	[1] 1,219	-----	1,830	[2] 1,259	-----	-----	-----	-----	-----
Crawford	2R	Hogs, cattle, dairy, poultry, wheat, sheep.	1928	21	147	91	15,729	11,644	3,410	[1] 2,003	-----	1,407	[2] 621	-----	-----	-----	-----	-----
Do	2R	do	1929	15	158	100	16,993	11,471	4,459	[1] 2,599	-----	1,860	[2] 1,010	-----	-----	-----	-----	-----
Crawford, Delaware, Marion, Seneca, Wyandot—northwestern Ohio.	2R	Hogs, poultry, cattle, dairy, wheat.	1927	38	139	90	17,665	12,982	3,393	[1] 1,895	-----	1,498	[2] 615	-----	-----	-----	-----	-----
Cuyahoga, Erie, Geauga, Lake.	2R	Poultry, fruits and vegetables, dairy, potatoes, wheat.	1926	9	77	46	13,449	10,610	4,125	[1] 1,978	-----	2,147	[2] 1,475	-----	-----	-----	-----	-----
Cuyahoga, Medina, Summit.	2R	Dairy, poultry, cattle, potatoes, wheat.	1927	17	126	64	16,423	13,610	4,564	[1] 2,750	-----	1,814	993	-----	-----	-----	-----	-----
Darke	2R	Hogs, dairy, poultry, tobacco, wheat.	1924	11	-----	-----	-----	-----	-----	-----	-----	-----	[2,4] 602	-----	-----	-----	-----	-----
Do	2R	do	1925	10	-----	-----	-----	-----	-----	-----	-----	-----	[2,4] 1,384	-----	-----	-----	-----	-----
Do	2R	Hogs, dairy, crops (mostly wheat), tobacco, poultry.	1927	9	84	64	13,732	10,727	2,903	[1] 931	-----	1,972	[2] 1,285	-----	-----	-----	-----	-----
Do	2R	Hogs, dairy, poultry, tobacco, wheat.	1928	65	100	69	15,007	11,878	2,772	[1] 1,299	-----	1,473	[2] 723	-----	-----	-----	-----	-----
Do	2R	do	1929	100	101	70	13,771	10,487	3,241	1,753	1,488	1,696	799	-----	-----	-----	-----	208

Defiance	2R	Hogs, poultry, dairy, wheat, corn, oats.	1925	9									[2,4] 1,578					
Defiance, Fulton	2R	Poultry, hogs, wheat, potatoes, sugar beets, dairy, corn, oats.	1929	20	129	93	16,511	11,776	4,763	[1] 2,309		2,454	[2] 1,628					
Defiance, Fulton, Henry, Paulding, Williams—northwestern Ohio.	2R	Poultry, wheat, hogs, dairy, corn, oats, cattle.	1927	39	143	98	22,488	17,373	4,191	[1] 2,275		1,916	[2] 792					
Defiance, Fulton, Williams.	2R	Poultry, hogs, wheat, potatoes, sugar beets, dairy, corn, oats.	1928	19	115	83	16,558	12,251	4,602	[1] 2,307		2,295	[2] 1,467					
Delaware	2R	Dairy, poultry, sheep, hogs, wheat.	1928	11	132	65	14,956	10,832	3,466	[1] 2,290		1,176	[2] 428					
Delaware, Morrow	2R	Dairy, hogs, poultry, sheep, wheat, potatoes, hay.	1929	17	152	79	12,475	10,066	3,593	[1] 2,160		1,433	[2] 809					
Erie	2R	Dairy, poultry, wheat, cattle, potatoes, hogs.	1927	4	137	79	21,050	15,648	5,147	[1] 2,678		2,469	[2] 1,417					
Erie, Geauga, Loraine, Medina, Portage, Summit, Trumbull, Wayne—northeastern Ohio.	2R	Dairy, poultry, cattle, potatoes, wheat.	1928	40	129	65	16,318	11,110	4,510	[1] 2,768		1,742	[2] 926					
Erie, Huron	2R	Dairy, hogs, sheep, wheat	1929	27	169	110	19,999	12,795	4,201	2,368	1,833	2,033	833					200
Fairfield	2R	Hogs, dairy, poultry, wheat, cattle, hay.	1924	3									[2,4] 1,055					
Do.	2R	do	1925	4									[2,4] 1,600					
Do.	2R	Hogs, poultry, dairy, sheep, wheat, cattle.	1928	5	134	89	21,812	17,717	5,929	[1] 3,888		2,041	[2] 950					
Fairfield, Licking, Perry	2R	Hogs, dairy, poultry, wheat, cattle, hay.	1926	4	131	66	15,484	12,128	3,519	[1] 1,274		2,245	[2] 1,471					
Do.	2R	Dairy, hogs, poultry	1929	15	175	82	17,845	12,982	5,490	[1] 2,724		2,766	[2] 1,874					
Franklin	2S	Dairy, wheat, hogs, corn, cattle.	1916	48					4,950	[1] 1,516			[2] 1,800					
Do.	2R	Dairy, hogs, poultry, wheat	1924	24			19,150		3,703	[1] 1,822		1,881	[2] 923					
Do.	2R	do	1925	32			14,825		4,361	[1] 1,756		2,605	[2] 1,864					
Do.	2R	Hogs, dairy, poultry, wheat	1926	23	115	72	15,929	12,362	3,793	[1] 1,411		2,382	[2] 1,586					
Do.	2R	Hogs, dairy, wheat, cattle, poultry.	1927	47	126	80	17,551	13,306	4,257	[1] 2,159		2,098	[2] 1,220					
Do.	2R	Dairy, hogs, poultry, wheat	1928	47	118	73	17,444	13,617	3,809	[1] 1,878		1,931	[2] 1,059					
Do.	2R	do	1929	34	128	87	18,744	14,320	5,004	2,380	2,624	2,853	1,687					229
Geauga	2S	Dairy, cattle poultry, work, maple sirup.	1915	115					1,728	[1] 913			[2] 309					
Do.	2S	Dairy, cattle poultry, wheat	1916	18					4,151	[1] 1,920			[2] 1,209					
Do.	2S	Dairy, cattle, oats, poultry, potatoes.	1917	12					3,615	[1] 1,908			[2] 1,084					
Do.	2R	Dairy, cattle, poultry, wheat	1919	7					4,697	[1] 2,017			[1] 1,778					
Do.	2R	Dairy, cattle, poultry, maple sirup, potatoes.	1920	7					4,177	[1] 2,186			[2] 865					
Do.	2R	Dairy, cattle, hay, maple sirup poultry, potatoes.	1921	9					3,348	[1] 2,458			[2] −319					

[1] Does not include other unpaid family labor. [2] Family-labor income. [4] Labor income at 4 per cent.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms: Total	Size of farms: Crops	Capital: Total	Capital: Real estate	Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
				No.	Acres	Acres	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Pe ct.	Dolls.	Dolls.	Dolls.	Dolls.
Ohio—Continued.																		
Geauga	2R	Dairy, cattle, maple sirup, poultry.	1922	12					4,179	[1] 2,336			[2] 643					
Do	2R	Dairy, cattle, poultry, maple sirup, potatoes, wheat.	1925	13			12,675					1,487	[2] 853					
Greene	2S	Hogs, wheat, dairy, cattle	1918	73					7,087	[1] 2,414			[2] 3,176					
Do	3R	Hogs, cattle, wheat, corn, dairy, sheep.	1920	13	154	104	21,595	14,753	3,379	[1] 3,292		87	[2] −993					
Do	3R	Hogs, wheat, cattle, dairy, poultry, sheep.	1921	18	150	104	21,372	15,896	3,012	[1] 2,554		458	[2] −611					
Do	3R	Hogs, wheat, dairy, cattle, corn, sheep.	1922	19	160	115	23,728	18,357	4,376	[1] 2,368		2,008	[2] 822					
Do	3R	Hogs, wheat, cattle, dairy, sheep, poultry.	1923	20	167	114	23,560	18,112	3,213	[1] 2,639		574	[2] −604					
Do	3R	do	1924	17	180	127	24,397	18,820	5,095	[1] 2,985		2,110	[2] 890					
Do	3R	do	1925	5									[2, 4] 1,226					
Guernsey	2R	Poultry, sheep, dairy, cattle	1924	27	147	43	8,808		2,065	[1] 1,199		866	[2] 426					
Do	2R	Dairy, poultry, sheep, cattle, hogs.	1925	17	142	38	7,754		1,988	[1] 951		1,037	[2] 649					
Do	2R	Poultry, dairy, cattle, sheep, hogs.	1926	13	155	38	8,125	5,584	2,116	[1] 842		1,274	[2] 868					
Hamilton	2R	Tomatoes, potatoes, cabbage, poultry, dairy, strawberries, beans, hogs, mangoes, asparagus.	1929	5	43	27	10,575	8,080	4,160	1,993	2,167	2,447	1,638					280
Hancock	2R	Hogs, sheep, wheat, dairy, cattle.	1924	12	98	73	19,680					1,708	[2] 724					
Do	2R	do	1925	9									[2, 4] 1,216					
Do	2R	do	1926	10	158	104	20,388	16,572	3,520	[1] 1,236		2,284	[2] 1,265					
Do	2R	Dairy, sheep, hogs, wheat, poultry.	1927	3	213	149	27,265	22,367	5,251	[1] 1,500		3,751	[2] 2,388					
Henry	2R	Corn, poultry, hogs, dairy	1921	28					2,766	[1] 1,814			[2] 102					
Do	2R	Hogs, poultry, corn, wheat, dairy.	1925	15			26,340		4,155	[1] 1,498		2,657	[2] 1,340					
Do	2R	Hogs, wheat, poultry, sheep, dairy.	1926	12	123	100	24,728	20,344	4,134	[1] 1,284		2,850	[2] 1,614					
Do	2R	Hogs, poultry, dairy, corn, oats, cattle.	1928	18	120	94	21,065	17,523	4,612	[1] 2,459		2,153	[2] 1,100					
Do	2R	Hogs, dairy, poultry, corn, oats, cattle.	1929	24	122	91	17,592	14,445	4,322	[1] 2,141		2,181	[2] 1,301					

Highland	2R	Hogs, dairy, wheat, poultry	1924	5									[2] [4] 412					
Huron	2R	Dairy, sheep, wheat, hogs, poultry.	1924	16	131	81	18,408	13,485	3,931	[1] 2,024		1,907	[2] 987					
Do	2R	Dairy, sheep, hogs, wheat, cattle, poultry.	1925	15	154	101	21,249		6,025	[1] 3,218		2,807	[2] 1,745					
Do	2R	Dairy, hogs, wheat, cattle, sheep, poultry.	1926	18	160	108	20,673	14,543	4,983	[1] 2,302		2,681	[2] 1,647					
Do	2R	Dairy, wheat, hogs, sheep, cattle, poultry.	1927	16	173	116	22,031	15,229	5,506	[1] 3,314		2,192	[2] 1,090					
Do	2R	Dairy, hogs, sheep, wheat	1928	16	173	115	20,849	15,266	4,848	2,790	2,058	2,123	1,016					65
Jackson	3S	Poultry, dairy, work, cattle	1926	120	134	34	4,531	3,717	1,099	581	518	574	291	4.9	394	685	296	56
Jefferson	2R	Dairy, poultry, sheep, cattle	1924	8	141	51						1,581	[2] [4] 1,258					
Do	2R	do	1926	6	128	43	10,661	7,177	3,784	[1] 2,052		1,732	[2] 1,199					
Knox	2R	Hogs, sheep, dairy, poultry, wheat.	1926	16	136	61	14,907	11,501	2,626	[1] 1,101		1,525	[2] 780					
Do	2R	Dairy, hogs, sheep, wheat, cattle, poultry.	1927	33	146	68	13,718	9,983	2,744	[1] 1,495		1,249	[2] 563					
Do	2R	Dairy, hogs, sheep, poultry, wheat.	1928	67	135	69	14,460	10,506	3,274	1,743	1,531	1,745	808		[5] 343	[5] 1,151		214
Do	2R	do	1929	100	144	72	15,877	11,498	3,556	1,877	1,679	1,934	885		[5] 356	[5] 1,241		255
Logan	2R	Hogs, dairy, sheep, cattle, poultry.	1926	10	123	64	13,363	10,037	3,614	[1] 1,473		2,141	[2] 1,473					
Lucas, Ottawa, Sandusky, Seneca—Toledo.	2R	Hogs, dairy, poultry, vegetables, wheat, hay, cattle, sheep.	1929	13	109	75	17,720	12,898	3,651	[1] 1,731		1,920	[2] 1,034					
Lucas, Sandusky	2R	do	1928	5	109	69	22,105	16,626	4,672	[1] 2,519		2,153	[2] 1,048					
Madison	2R	Hogs, wheat, cattle, sheep, poultry.	1927	9	129	86	21,172	14,325	3,077	[1] 1,483		1,594	[2] 535					
Marion	2R	Hogs, dairy, poultry, sheep, wheat.	1924	8	173	115	15,180					1,906	[2] 1,147					
Do	2R	do	1925	4									[2] [4] 1,923					
Medina	3R	Dairy, cattle, wheat, hay, poultry, hogs.	1920	15	134	73	25,267	18,837	5,701	[1] 3,833	1,868	1,934	605					66
Do	3R	do	1921	16	133	75	24,101	18,561	3,947	2,947	1,000	1,085	−205					85
Do	3R	Dairy, cattle, hay, poultry, wheat, hogs.	1922	15	131	78	22,735	17,393	3,419	2,375	1,044	1,163	−93					119
Do	3R	Dairy, cattle, poultry, hay, wheat, potatoes.	1923	17	142	89	22,388	17,147	4,928	2,795	2,133	2,384	1,014					251
Do	3R	Dairy, cattle, poultry, hay, wheat, hogs.	1924	15	133	84	21,567	15,658	4,101	3,385	716	985	−362					269
Do	2R	Dairy, poultry, potatoes, wheat, cattle.	1925	8	102	60	12,425					1,777	[2] 1,156					
Do	2R	Dairy, poultry, cattle, wheat, hay.	1926	7	131	79	23,568	17,532	4,349	[1] 2,745		1,604	[2] 426					
Do	2R	Dairy, poultry, potatoes, wheat.	1929	21	132	61	14,836	13,890	3,785	2,522	1,263	1,477	521					214
Meigs	3S	Work, dairy, poultry, sheep, cattle.	1926	83	133	40	5,218	4,277	1,082	627	455	514	194	2.9	379	573	306	59
Mercer	2R	Hogs, poultry, wheat, dairy	1924	11	98	61	15,201		2,607	[1] 1,335		1,272	[2] 512					
Do	2R	Hogs, poultry, dairy, wheat	1925	10					3,043	[1] 1,464			[2] [4] 1,332					

[1] Does not include other unpaid family labor.
[2] Family-labor income.
[4] Labor income at 4 per cent.
[5] Food only.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms		Capital		Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
					Total	Crops	Total	Real estate										
				No.	*Acres*	*Acres*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Per ct.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Ohio—Continued.																		
Miami	2S	Hogs, dairy, tobacco, wheat, cattle.	1915	89			12,840		1,704	569	1,135		493					
Miami, Montgomery	2R	Hogs, dairy, wheat, tobacco	1929	31	145	93	20,818	15,618	5,548	3,012	2,536	2,720	1,495					
Montgomery	2R	Hogs, tobacco, dairy, corn, poultry.	1925	5									[2,4] 2,125					184
Do	2R	do	1926	9	114	75	15,906	11,451	3,641	[1] 1,786		1,855	[2] 1,060					
Do	2R	Hogs, dairy, tobacco, wheat, poultry.	1927	14	80	46	17,424	14,140	2,340	[1] 986		1,354	[2] 483					
Montgomery, Preble	2R	Hogs, dairy, wheat, tobacco	1928	20	140	86	21,296	16,167	4,805	[1] 2,905		1,900	[2] 835					
Ottawa	2R	Dairy, poultry, hogs, fruits	1925	9									[2,4] 1,230					
Paulding	2R	Hogs, dairy, poultry, wheat, cattle.	1925	7									[2,4] 768					
Do	2R	do	1926	12	160	123	16,201	12,564	3,859	[1] 1,519		2,340	[2] 1,530					
Perry	2R	Dairy, poultry, sheep, wheat, hogs.	1925	6									[2,4] 1,700					
Portage	2R	Dairy, poultry, cattle, maple sirup, potatoes, wheat.	1924	8	87	42	9,840		2,922	[1] 2,259		663	[2] 171					
Do	2R	do	1925	5	82	47	8,300		3,806	[1] 2,092		1,714	[2] 1,299					
Do	2R	Dairy, poultry, cattle, hogs, wheat, sheep.	1926	8	107	48	12,259	9,791	1,978	[1] 1,189		789	[2] 176					
Portage, Trumbull	3S	Dairy, cattle, wheat, potatoes, hay, poultry.	1918	40	201	84	18,778	14,510	5,074	2,688	2,386	2,630	1,447					244
Do	3S	Dairy, cattle, wheat, potatoes, poultry, maple sirup.	1919	40	203	88	20,263	15,180	5,645	3,296	2,349	2,689	1,336					340
Do	3S	Dairy, cattle, wheat, potatoes, poultry, hay.	1920	40	218	100	23,434	16,460	5,043	3,977	1,066	1,363	−106					297
Do	3S	Dairy, cattle, potatoes, poultry, hay, wheat.	1921	44	201	90	21,954	16,636	3,454	3,076	378	599	−720					221
Do	3S	Dairy, cattle, poultry, potatoes, wheat, maple sirup.	1922	36	198	86	21,202	16,755	4,189	3,048	1,141	1,317	81					176
Preble	2R	Hogs, dairy, cattle, poultry, wheat.	1925	7									[2,4] 2,620					
Do	2R	do	1927	18	114	74	16,806	12,471	3,518	[1] 1,453		2,065	[2] 1,225					
Do	2R	Hogs, dairy, wheat, cattle	1929	25	157	103	20,419	14,801	5,946	3,432	2,514	2,726	1,493					212
Putnam	2R	Hogs, dairy, sugar beets, poultry wheat.	1924	7	195	134	39,360					3,291	[2] 1,323					
Do	2S	do	1925	21	130	95	23,433	19,430	4,018	2,135	1,883	2,011	711					128
Do	2R	Hogs, wheat, poultry, cattle, dairy.	1926	10	144	101	22,004	16,921	4,317	[1] 1,876		2,441	[2] 1,341					

Do	2R	Hogs, wheat, dairy, poultry, sugar beets, cattle.	1926	20	135	101	22,684	18,351	4,999	2,257	2,742	2,926	1,608	----	----	----	----	184
Do	2R	Hogs, dairy, cattle, wheat, poultry, sugar beets.	1927	20	143	105	24,909	19,732	4,284	2,720	1,564	1,727	319	----	----	----	----	163
Do	2R	Hogs, dairy, cattle, poultry, oats, sugar beets.	1928	17	145	110	24,709	19,860	4,990	2,866	2,124	2,286	889	----	----	----	----	162
Ross	2R	Hogs, dairy, poultry, wheat	1925	4	----	----	----	----	----	----	----	----	[2,4] 1,205	----	----	----	----	----
Sandusky	2R	Hogs, dairy, wheat, poultry, potatoes.	1926	6	136	78	15,515	12,601	4,404	1,907	----	2,497	1,721	----	----	----	----	----
Scioto	2R	Dairy, potatoes, hogs, wheat	1924	12	155	----	12,780	----	2,995	1,721	----	1,274	635	----	----	----	----	----
Do	2R	Dairy, poultry, cattle, potatoes, hogs.	1925	13	160	54	12,340	----	2,640	1,590	----	1,050	433	----	----	----	----	----
Do	2R	Dairy, cattle, poultry, vegetables, wheat.	1926	9	147	59	9,924	6,844	2,749	1,403	----	1,346	850	----	----	----	----	----
Do	2R	Dairy, cattle, hogs, poultry, vegetables.	1927	7	190	59	9,505	7,011	2,834	1,693	----	1,141	366	----	----	----	----	----
Seneca	2R	Hogs, poultry, wheat, dairy, cattle.	1924	5	131	85	17,550	----	----	----	----	2,173	[2] 1,295	----	----	----	----	----
Do	2R	do	1925	8	----	----	----	----	----	----	----	----	[2,4] 1,440	----	----	----	----	----
Do	2R	do	1926	13	121	72	17,494	12,878	2,961	[1] 1,257	----	1,704	[2] 829	----	----	----	----	----
Stark	2S	Dairy, wheat, hogs, vegetables	1916	69	----	----	----	----	2,055	[1] 851	----	----	[2] 472	----	----	----	----	----
Summit	2R	Dairy, poultry, hogs, cattle, potatoes.	1926	9	109	58	15,317	11,310	4,349	[1] 2,517	----	1,832	[2] 1,066	----	----	----	----	----
Trumbull	2R	Vegetables, dairy, apples poultry, cattle.	1923	7	59	24	9,182	----	1,580	[1] 904	----	676	[2] 217	----	----	----	----	----
Do	2R	Dairy, poultry, cattle	1926	5	104	45	9,790	7,139	2,251	[1] 1,273	----	978	[2] 489	----	----	----	----	----
Vinton	3S	Work, poultry, dairy, cattle, apples, hogs.	1926	97	123	34	3,477	2,831	868	494	374	430	200	2.5	428	628	288	56
Warren	2R	Hogs, dairy, cattle, corn, poultry.	1924	8	----	----	----	----	----	----	----	----	[2,4] 822	----	----	----	----	----
Do	2R	do	1925	7	----	----	----	----	----	----	----	----	[2,4] 1,514	----	----	----	----	----
Do	2R	do	1926	9	106	78	23,209	17,321	5,119	[1] 3,466	----	1,653	[2] 493	----	----	----	----	----
Do	2R	Hogs, cattle, dairy, wheat, poultry.	1927	18	124	74	20,725	15,969	4,619	[1] 2,728	----	1,891	[2] 855	----	----	----	----	----
Do	2R	Hogs, dairy, poultry, cattle, wheat.	1928	30	139	79	19,208	14,542	5,277	[1] 3,683	----	1,594	[2] 634	----	----	----	----	----
Do	2R	do	1929	51	130	74	17,142	13,014	3,955	2,366	1,589	1,738	732	----	----	----	----	149
Wayne	2R	Wheat, dairy, poultry, cattle, hogs, sheep.	1925	6	121	75	17,350	----	4,338	[1] 2,038	----	2,300	[2] 1,432	----	----	----	----	----
Do	2R	Wheat, dairy, hogs, poultry, cattle, sheep.	1926	6	94	59	12,523	9,176	3,103	[1] 1,247	----	1,856	[2] 1,230	----	----	----	----	----
Williams	2R	Hogs, dairy, poultry, wheat, vegetables, hay, sheep.	1924	6	131	85	14,675	----	----	----	----	2,264	[2] 1,530	----	----	----	----	----
Do	2R	do	1925	12	----	----	----	----	----	----	----	----	[2,4] 1,520	----	----	----	----	----
Do	2R	Poultry, hogs, dairy, cattle, wheat.	1926	4	92	62	12,842	9,753	3,169	[1] 1,132	----	2,037	[2] 1,395	----	----	----	----	----
Do	2R	Hogs, dairy, poultry, wheat, vegetables, hay, sheep.	1929	18	136	78	13,131	11,493	3,087	[1] 1,686	----	1,401	[2] 744	----	----	----	----	----
Wood	2R	Cattle, hogs, wheat, dairy, corn, sugar beets.	1925	3	----	----	----	----	----	----	----	----	[2,4] 1,835	----	----	----	----	----

[1] Does not include other unpaid family labor. [2] Family-labor income. [4] Labor income at 4 per cent.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms: Total	Size of farms: Crops	Capital: Total	Capital: Real estate	Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
				No.	*Acres*	*Acres*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Per ct.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Ohio—Continued.																		
Wood	2R	Cattle, hogs, wheat, dairy, corn, sugar beets.	1927	16	141	110	26,363	20,754	5,403	[1] 3,012	------	2,391	[2] 1,073	------	------	------	------	------
Do	2R	Corn, oats, dairy, hogs, poultry, cattle, wheat, sugar beets, tomatoes.	1928	19	141	115	25,877	19,519	6,232	[1] 3,626	------	2,606	[2] 1,312	------	------	------	------	------
Do	2R	do	1929	12	137	102	21,120	16,867	4,509	[1] 2,617	------	1,892	[2] 836	------	------	------	------	------
Indiana:																		
Adams, Allen	2R	Dairy and cattle, hogs, poultry	1929	18	144	96	22,959	18,144	4,065	1,962	2,103	2,324	955	------	------	------	------	221
Benton	2S	Hogs, corn, wheat, cattle, oats, dairy.	1926	18	276	------	50,130	43,453	6,613	3,078	3,535	3,737	1,029	------	------	------	------	202
Do	2S	Corn, oats, hogs, cattle, dairy	1927	20	228	------	38,586	32,232	5,627	2,534	3,098	3,107	1,164	6.1	------	------	739	14
Do	2S	Do	1928	23	230	------	36,982	30,962	5,915	2,701	3,214	3,247	1,365	6.7	------	------	736	33
Do	2R	Crops, cattle and dairy, hogs	1929	26	238	186	38,080	30,940	5,738	2,653	3,085	3,244	1,181	------	------	------	------	159
Clinton, Delaware, Grant, Hamilton, Howard, Madison, and others.	3R	Hogs, dairy, wheat, poultry, cattle.	1929	107	207	146	32,102	25,029	6,464	3,640	2,824	2,977	1,219	6.4	------	------	778	153
De Kalb	2R	Dairy and cattle, hogs, crops	1929	34	145	96	16,465	12,180	3,274	1,528	1,746	1,863	923	------	------	------	------	117
Delaware	2R	Hogs, dairy and cattle, crops	1929	46	130	86	18,066	14,820	3,244	1,621	1,623	1,684	720	------	------	------	------	61
Elkhart, Fulton, Jasper, Lake, Laporte, Marshall, northwestern Indiana.	2R	Dairy and cattle, hogs, poultry, wheat.	1929	102	216	141	26,990	20,520	5,426	2,643	2,783	2,910	1,433	------	------	------	------	127
Floyd, Washington	2R	Dairy and cattle, poultry, crops.	1929	20	161	74	11,694	8,050	3,347	1,991	1,356	1,479	771	------	------	------	------	123
Fountain	2R	Crops, hogs, dairy and cattle	1929	46	238	167	28,083	22,848	4,687	2,515	2,172	2,352	768	------	------	------	------	180
Grant	2S	Hogs, corn, dairy, oats, poultry.	1927	6	128	------	14,255	9,592	4,040	2,730	1,310	1,337	597	4.1	------	------	726	27
Grant, Wabash	2R	Hogs, cattle and dairy, crops, poultry.	1929	32	172	126	24,140	18,748	5,444	2,930	2,514	2,629	1,307	------	------	------	------	115
Huntington, Wells	2R	Hogs, dairy and cattle, poultry	1929	27	189	121	21,446	17,010	3,966	2,378	1,588	1,766	516	------	------	------	------	178
Knox	2S	Hogs, dairy, poultry, corn, wheat.	1927	7	197	------	19,302	16,251	3,094	1,745	1,349	1,413	384	3.3	------	------	712	64
Do	2R	Hogs, crops, poultry, dairy and cattle.	1929	14	175	129	15,982	12,425	4,604	2,253	2,351	2,466	1,552	------	------	------	------	115
Lake	2S	Dairy, hogs, cattle, poultry, sheep, corn, oats.	1928	18	212	------	31,189	24,706	5,883	3,612	2,271	2,307	712	5.0	------	------	712	36
Do	2R	Dairy and cattle, crops, hogs	1929	29	222	155	31,430	24,864	5,373	2,547	2,826	2,919	1,254	------	------	------	------	93
Morgan	2S	Dairy, poultry, hogs, wheat	1927	14	130	------	18,177	14,068	3,966	2,057	1,909	1,909	1,000	6.5	------	------	727	------
Do	2S	Dairy, hogs, poultry	1928	11	144	------	18,360	14,014	5,262	3,096	2,166	2,170	1,248	7.9	------	------	716	4
Do	2R	Hogs, dairy, poultry, cattle	1929	7	156	110	18,611	16,914	6,023	3,688	2,335	2,335	1,404	8.5	------	------	750	------

Noble	2S	Dairy, hogs, sheep, cattle, poultry.	1928	44	183		18,161	13,613	4,553	2,734	1,819	1,935	911	6.0			729	116
Do	2R	Cattle and dairy, hogs, crops	1929	64	192	119	20,336	14,592	4,702	2,213	2,489	2,636	1,472					147
Putnam	2S	Dairy, poultry, hogs, wheat, corn.	1927	15	226		19,418	15,675	3,282	2,037	1,245	1,378	274	2.7			721	133
Do	2S	Hogs, cattle, poultry, dairy, sheep.	1928	13	202		15,030	11,360	3,391	2,320	1,071	1,222	319	3.0			625	151
Do	2R	Hogs, cattle and dairy, poultry, crops.	1929	14	246	122	18,674	14,268	3,728	2,266	1,462	1,589	528					127
Tippecanoe	2R	Crops, hogs, cattle and dairy	1929	48	220	164	28,728	22,880	5,349	2,556	2,793	2,898	1,357					105
Washington	2S	Dairy, hogs, poultry, wheat	1928	70	153		9,047	6,902	2,436	1,178	1,258	1,288	806	6.0			715	30
Whitley	2S	Hogs, dairy, poultry, sheep	1928	14	120		11,875	8,436	3,494	1,823	1,671	1,790	1,077	8.0			721	119
Do	2R	Hogs, dairy and cattle, poultry, crops.	1929	27	135	88	14,599	10,665	3,355	1,529	1,826	1,967	1,096					141
Illinois: [6]																		
Adams	2R	Hogs, cattle, dairy	1928	28	196		30,035	24,721	4,153	1,681	2,472	2,682	970	5.9			704	210
Do	2R	Hogs, dairy	1929	30	192		30,031	24,255	3,519	1,934	1,585	1,836	83	3.0			692	251
Adams, Brown, Hancock, Pike, Schuyler.	2R	Livestock	1925	38	216		40,430	33,471	5,024	1,996	3,028	3,247	1,006	6.0			593	219
Adams, Brown, Pike, Schuyler.	2R	Hogs, cattle	1927	37	212		33,688	27,871	3,366	2,070	1,296	1,542	−388	1.9			657	246
Adams, Hancock	2R	do	1926	32	236		45,034	37,098	4,711	2,581	2,130	2,301	−122	3.4			593	171
Bond, Macoupin, Madison, Montgomery.	2R	Hogs, dairy, cattle	1925	30	190		23,550	18,440	3,437	1,346	2,091	2,245	913	6.5			556	154
Do	2R	do	1926	30	224		24,462	18,854	2,871	1,933	938	1,224	−285	1.6			554	286
Bond, Madison	2R	Dairy, hogs, crops	1927	27	161		17,189	13,220	2,608	1,252	1,356	1,617	497	4.4			599	261
Bond, Madison, Montgomery.	2R	do	1928	33	184		21,566	17,108	3,080	1,494	1,586	1,848	508	4.6			586	262
Do	2R	Hogs, dairy, cattle	1929	42	175		18,557	13,591	3,576	1,831	1,745	1,987	817	6.2			598	242
Boone, DeKalb	2R	Dairy, cattle, hogs	1928	40	211		39,574	31,373	5,272	2,305	2,967	3,273	988	5.7			702	306
Boone, McHenry, Winnebago.	2R	do	1929	51	194		34,475	26,134	5,472	2,602	2,870	3,158	1,146	6.3			712	288
Brown, Cass, Mason, Morgan, Pike.	2R	Hogs, crops, cattle	1928	62	240		41,832	34,924	4,923	2,039	2,884	3,051	792	5.3			681	167
Brown, Cass, Mason, Pike.	2R	do	1929	52	267		39,820	32,357	5,080	1,973	3,107	3,321	1,116	6.0			715	214
Brown, Morgan, Pike, Schuyler.	2R	Hogs, cattle	1926	26	224		40,270	33,593	3,798	1,771	2,027	2,146	13	3.4			637	119
Bureau, Knox, Stark	2R	Hogs, crops, cattle	1929	50	232		50,858	41,825	6,210	2,224	3,986	4,190	1,443	6.4			713	204
Bureau, Marshall, Putnam, Stark.	2R	Hogs, cattle, crops	1927	46	207		50,336	41,857	4,563	2,067	2,496	2,690	−21	3.7			639	194
Bureau, Peoria, Stark	2R	Hogs, crops, cattle	1928	43	196		43,923	36,724	4,976	1,856	3,120	3,304	924	5.5			689	184
Carroll, Jo Daviess	2R	Hogs, dairy, cattle	1927	33	206		34,645	28,463	4,457	2,985	1,472	1,844	−260	2.5			602	372
Do	2R	do	1928	53	205		33,497	26,512	4,517	1,946	2,571	2,870	896	5.6			691	299
Carroll, Jo Daviess, Stephenson.	2R	do	1925	44	188		32,027	25,891	4,539	1,693	2,846	3,187	1,245	7.5			461	341
Carroll, Lee, Ogle, Rock Island, Whiteside.	2R	Hogs, cattle, dairy	1929	71	208		39,463	30,886	4,868	2,097	2,771	3,062	798	5.2			719	291

[1] Does not include other unpaid family labor.
[2] Family-labor income.
[6] In all of the localities of Illinois expenses for feeds purchased have not been included in expenses but deducted from crop sales. Receipts and expenses therefore are lower for the localities in Illinois than for those in other States by the amounts of feeds purchased.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms		Capital		Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
					Total	Crops	Total	Real estate										
				No.	*Acres*	*Acres*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Per ct.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Illinois—Continued.																		
Carroll, Rock Island, Whiteside.	2R	Hog, cattle, dairy	1926	32	194		38,134	30,685	4,852	2,350	2,502	2,812	595	4.7			694	310
Cass, Mason, Peoria	2R	Hogs, crops, cattle, dairy	1927	34	229		41,098	33,999	4,116	2,113	2,003	2,185	−52	3.1			713	182
Champaign	2R	Crops, hogs	1925	30	215		53,997	46,475	4,438	1,939	2,499	2,592	−201	3.5			598	93
Do	2R	do	1926	30	225		55,343	48,985	5,062	2,110	2,952	3,179	185	4.1			685	227
Do	2R	do	1927	30	229		58,313	51,114	5,279	2,059	3,220	3,481	304	4.4			671	261
Champaign, Dewitt, Piatt.	2R	do	1929	31	232		53,761	46,267	6,381	2,180	4,201	4,385	1,513	6.5			687	184
Champaign, Vermilion	2R	do	1928	36	215		46,819	40,513	5,582	1,971	3,611	3,793	1,270	6.2			719	182
Christian, Clark, Crawford, Cumberland, Shelby.	2R	Hogs, cattle, dairy, poultry	1928	47	206		25,848	21,205	3,001	1,631	1,370	1,594	78	3.0			607	224
Christian, Clark, Crawford, Shelby.	2R	Crops, hogs, cattle	1929	43	228		35,654	29,439	4,865	2,487	2,378	2,582	595	4.8			660	204
Christian, Clark, Cumberland, Shelby.	2R	Hogs, cattle, poultry	1926	20	202		28,148	23,031	3,101	1,570	1,531	1,686	124	3.3			600	155
Christian, Douglas, Moultries, Shelby.	2R	Hogs, crops, cattle	1925	31	193		39,062	33,065	3,902	1,775	2,127	2,288	174	4.0			594	161
Christian, Macoupin, Montgomery, Shelby.	2R	Hogs, dairy, cattle	1927	20	211		34,658	28,999	2,914	2,013	901	1,144	832	.7			642	243
Clark, Coles, Douglas, Vermilion.	2R	Crops, hogs, cattle	1927	40	218		43,634	37,599	4,054	1,954	2,100	2,219	−82	3.3			641	119
Clark, Crawford, Cumberland.	2R	Hogs, poultry, crops	1925	19	160		19,659	15,815	2,671	1,065	1,606	1,740	623	5.5			521	134
Clay, Jefferson, Marion, Richland, Wayne.	2R	Poultry, dairy, crops, cattle	1929	46	181		12,105	8,687	2,028	839	1,189	1,386	584	4.9			599	197
Clinton	2R	Dairy, crops, poultry	1925	60	165		17,370	13,358	3,005	1,373	1,632	1,993	764	5.9			600	361
Do	2R	Dairy, poultry, hogs	1926	56	172		18,604	14,087	2,633	1,383	1,250	1,615	320	3.5			600	365
Do	2R	Dairy, poultry, cattle	1927	35	153		17,195	12,956	2,574	1,234	1,340	1,716	480	4.4			589	376
Do	2R	do	1928	33	161		18,193	13,491	3,067	1,371	1,696	2,116	786	6.1			594	420
Do	2R	Dairy, poultry, hogs	1929	44	167		19,463	14,079	3,098	1,360	1,738	2,060	765	5.8			603	322
Coles	2R	Hogs, crops, cattle	1925	30	184		44,817	38,651	4,064	1,654	2,410	2,521	169	4.1			557	111
Coles, Douglas	2R	Crops, hogs	1926	39	197		44,030	38,556	4,309	1,832	2,477	2,578	275	4.2			609	101
Do	2R	do	1928	30	233		47,828	41,490	5,212	2,141	3,071	3,251	680	5.0			668	180
Coles, Douglas, Edgar	2R	Crops, hogs, cattle	1929	49	224		48,323	41,071	4,993	2,170	2,823	2,961	407	4.5			668	138
Cook, Du Page, Kane	2R	Dairy, cattle, hogs	1929	47	152		36,978	28,610	5,284	2,443	2,841	3,195	992	5.9			674	354
Cook, Du Page, Kane, McHenry.	2R	Dairy	1927	60	154		34,494	26,140	5,057	2,624	2,433	2,783	708	5.0			696	350
Do	2R	Dairy, cattle	1928	54	144		32,297	24,814	4,958	2,134	2,824	3,196	1,209	6.5			719	372

40442°—31——64

Cook, Du Page, McHenry.	2R	Dairy	1926	35	161		36,429	27,978	5,170	2,697	2,473	2,885	652	4.9			676	412
De Kalb	2R	Hogs, cattle, dairy	1929	35	215		47,478	37,027	6,162	2,431	3,731	3,947	1,357	6.4			700	216
De Witt, Logan, Macon, McLean.	2R	Crops, cattle, hogs	1927	31	259		61,861	53,957	4,901	2,473	2,428	2,757	−665	2.8			699	329
De Witt, Logan, Macon, McLean, Piatt, Tazewell.	2R	Crops, hogs, cattle	1928	53	244		55,157	47,817	6,248	2,444	3,804	4,088	1,046	5.6			698	284
Du Page, Kane, Lake	2R	Livestock	1925	28	168		37,376	29,830	4,705	2,272	2,433	2,751	564	4.8			647	318
Edwards, Gallatin, Johnson, Saline, Wabash, White, Williamson.	2R	Hogs, crops, poultry	1929	52	166		17,218	13,415	2,905	1,242	1,663	1,880	802	6.3			577	217
Edwards, Lawrence, Richland, Wabash.	2R	Hogs, dairy, crops, poultry	1926	30	172		21,990	17,707	3,400	1,698	1,702	1,954	602	5.6			471	252
Do	2R	Hogs, dairy, cattle	1928	29	196		20,348	16,216	2,584	1,511	1,073	1,398	56	2.4			577	325
Edwards, Lawrence, Wabash.	2R	Hogs, crops, poultry	1925	32	188		22,524	18,108	3,230	1,371	1,859	2,055	733	6.2			451	196
Effingham, Marion, Richland.	2R	Poultry, dairy, hogs, crops	1925	18	200		11,818	9,178	1,657	776	881	1,043	290	3.4			480	162
Ford	2R	Crops, hogs	1925	31	252		63,659	55,062	4,391	2,219	2,172	2,394	−1,011	2.5			580	222
Ford, Iroquois	2R	do	1926	31	231		56,731	50,071	4,845	1,956	2,889	3,179	52	3.9			677	290
Do	2R	do	1927	28	233		56,920	49,723	5,096	2,032	3,064	3,300	218	4.1			705	236
Do	2R	do	1928	34	259		59,741	52,773	6,519	2,250	4,269	4,526	1,282	6.0			692	257
Do	2R	do	1929	41	271		61,242	53,854	6,451	2,563	3,888	4,154	826	5.2			703	266
Fulton, Knox, Warren	2R	Hogs, cattle, crops	1927	34	246		51,181	42,771	4,608	2,279	2,329	2,541	−230	3.2			696	212
Fulton, Schuyler	2R	Hogs, crops, cattle	1928	41	238		39,809	33,726	5,024	1,862	3,162	3,333	1,172	6.2			699	171
Do	2R	Hogs, cattle	1929	33	235		37,709	30,456	4,509	2,092	2,417	2,607	532	4.5			720	190
Gallatin, Jefferson, Marion, Saline, White, Williamson.	2R	Hogs, poultry, dairy, crops	1928	43	168		15,410	11,860	2,112	1,093	1,019	1,237	249	2.7			597	218
Gallatin, Johnson, Pulaski, Saline, White.	2R	Hogs, crops, dairy	1925	31	202		23,171	18,896	3,222	1,431	1,791	2,004	632	5.7			465	213
Do	2R	Crops, hogs, poultry	1926	25	205		23,785	19,393	3,644	1,498	2,146	2,374	957	6.6			566	228
Gallatin, Johnson, Pulaski, Saline, White, Williamson.	2R	Hogs, dairy, crops, poultry	1927	30	180		19,187	15,261	2,623	1,225	1,398	1,656	439	4.2			590	258
Green, Jersey	2R	Hogs, cattle, dairy	1926	31	207		33,294	26,367	4,632	2,106	2,526	2,698	861	6.1			509	172
Do	2R	do	1927	28	215		32,984	26,571	4,074	2,249	1,825	2,052	176	3.9			547	227
Do	2R	Hogs, dairy, cattle	1929	38	198		31,593	25,070	4,458	2,074	2,384	2,634	804	5.4			664	250
Green, Jersey, Macoupin.	2R	Hogs, crops, dairy, cattle	1928	38	204		33,355	26,780	4,746	2,201	2,545	2,848	877	6.0			550	303
Green, Jersey, Morgan	2R	do	1925	40	186		29,412	24,399	4,332	1,708	2,624	2,793	1,153	7.1			533	169
Grundy	2R	Crops, hogs, dairy	1929	32	212		43,014	35,669	5,056	1,742	3,314	3,553	1,163	6.0			720	239
Grundy, Kendall	2R	Livestock	1925	21	179		39,919	32,879	4,429	1,864	2,565	2,717	569	4.7			674	152
Do	2R	Hogs, crops, cattle	1926	34	202		45,093	37,971	4,469	1,679	2,790	2,769	535	4.2			872	−21
Do	2R	Crops, hogs, cattle	1927	24	221		46,890	39,733	5,080	1,919	3,161	3,390	817	5.2			700	229
Do	2R	Crops, hogs, dairy	1928	34	222		46,874	39,668	5,461	1,864	3,597	3,781	1,253	6.2			710	184
Hancock	2R	Hogs, cattle	1927	31	218		42,540	35,479	3,602	2,128	1,474	1,621	−653	1.8			694	147
Do	2R	Hogs, crops, cattle	1929	32	229		43,804	36,597	5,085	2,090	2,995	3,165	805	5.2			711	170
Henderson	2R	Hogs, cattle, crops	1928	30	250		44,564	37,066	5,825	2,005	3,820	4,027	1,592	7.0			720	200
Do	2R	Hogs, crops, cattle	1929	30	239		43,876	36,357	5,249	2,013	3,236	3,443	1,042	5.7			720	207

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms		Capital		Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
					Total	Crops	Total	Real estate										
Illinois—Continued.				No.	Acres	Acres	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Per ct	Dolls.	Dolls.	Dolls.	Dolls.
Henderson, Knox, Warren.	2R	Hogs, cattle	1926	32	252	------	49,198	39,889	5,199	2,679	2,520	2,699	60	3.7	------	------	690	179
Henderson, Mercer, Rock Island, Whiteside.	2R	do	1925	34	205	------	40,323	33,101	4,896	2,180	2,716	2,896	700	5.3		------	591	180
Henry	2R	do	1925	45	202	------	48,286	39,589	6,154	2,165	3,989	4,216	1,575	7.1	------	------	573	227
Do	2R	do	1926	59	199	------	47,547	38,348	4,933	2,178	2,755	2,972	378	4.3	------	------	715	217
Do	2R	Hogs, cattle, crops	1927	60	206	------	47,572	38,314	4,884	2,096	2,788	2,993	409	4.4	------	------	718	205
Do	2R	Hogs, cattle, dairy	1928	60	197	------	44,637	36,160	4,875	1,924	2,951	3,188	719	5.0	------	------	708	237
Do	2R	Hogs, cattle	1929	69	194	------	44,147	34,758	5,292	1,985	3,307	3,486	1,100	5.9	------	------	710	179
Jefferson, Marion, Washington.	2R	Crops, dairy, poultry, cattle	1927	29	197	------	15,617	12,165	2,203	1,019	1,184	1,388	403	3.9	------	------	568	204
Jo Daviess	2R	Hogs, dairy, cattle	1929	32	215	------	33,258	25,488	4,759	2,185	2,574	2,909	911	5.7	------	------	682	335
Jo Daviess, Stephenson	2R	Hogs, dairy	1926	37	182	------	34,222	26,828	4,504	1,964	2,540	2,845	829	5.6	------	------	630	305
Kendall, Will	2R	Dairy, crops, hogs	1929	40	217	------	49,545	41,025	4,919	2,100	2,819	3,036	342	4.3	------	------	676	217
Knox, Mercer, Warren	2R	Hogs, cattle, crops	1928	30	208	------	48,223	39,395	5,846	2,284	3,562	3,739	1,151	5.9	------	------	714	177
Lake	2S	Dairy, poultry	1928	100	151	------	29,669	25,406	3,067	1,890	1,177	1,552	−306	1.6	------	------	713	375
La Salle	2R	Crops, cattle, dairy	1925	32	242	------	67,466	57,349	5,031	1,745	3,286	2,639	−87	------	------	------	------	647
Do	2R	Crops, dairy, hogs	1926	40	204	------	57,649	49,657	4,545	2,405	2,140	2,395	−742	2.5	------	------	703	255
Do	2R	Crops, hogs, dairy	1927	32	224	------	61,784	53,756	5,396	2,379	3,017	3,256	−72	3.7	------	------	716	239
Do	2R	do	1928	30	223	------	60,511	51,808	5,832	2,452	3,380	3,612	354	4.4	------	------	729	232
Do	2R	do	1929	39	207	------	50,982	43,207	5,447	1,998	3,449	3,628	900	5.4	------	------	718	179
Lee, Ogle, Rock Island, Whiteside.	2R	Hogs, cattle, dairy	1928	49	205	------	38,855	31,587	4,584	1,998	2,586	2,928	643	4.9	------	------	683	342
Livingston, McLean, Tazewell, Woodford.	2R	Crops, hogs, cattle	1925	225	232	------	59,890	50,134	5,356	2,744	2,612	2,842	−382	3.2	876	494	692	230
Do	2R	Crops, hogs	1926	210	232	------	59,403	50,460	4,813	2,459	2,354	2,579	−616	2.8	937	321	689	225
Do	2R	do	1927	200	232	------	58,756	50,182	5,274	2,382	2,892	3,138	−46	3.7	912	866	705	246
Do	2R	do	1928	150	235	------	59,059	50,288	6,535	2,498	4,037	4,282	1,084	5.7	[5] 396	------	693	245
Do	2R	do	1929	380	228	------	56,022	47,527	6,185	2,381	3,804	4,023	1,003	5.6	792	1,795	691	219
Logan, Macon	2R	Crops, hogs, cattle	1929	40	223	------	53,461	45,348	5,860	2,280	3,580	3,782	907	5.4	------	------	714	202
Logan, Macon, Mason, McLean, Piatt	2R	Crops, hogs	1925	35	256	------	60,436	51,555	5,506	2,440	3,066	3,260	44	4.1	------	------	583	194
Logan Macon, Piatt	2R	Crops, hogs, cattle	1926	28	227	------	55,312	47,312	4,752	2,251	2,501	2,750	−265	3.3	------	------	691	249
Marion, Monroe, Randolph, Washington	2R	Crops, poultry, dairy	1926	33	188	------	15,595	11,737	2,614	1,092	1,522	1,753	742	6.0	------	------	587	231
Marshall, Putnam	2R	Crops, hogs	1925	27	227	------	62,085	52,495	5,714	2,447	3,267	3,455	163	4.3	------	------	581	188
Do	2R	Hogs, cattle, crops	1928	30	232	------	53,214	44,353	6,030	2,194	3,836	4,062	1,175	5.9	------	------	720	226
Do	2R	Hogs, crops, cattle	1929	47	243	------	49,907	41,213	6,054	2,336	3,718	3,976	1,223	6.0	------	------	720	258

Marshall, Putnam, Stark.	2R	do	1926	41	195	------	50, 365	42, 199	4, 752	1, 905	2, 847	2, 973	329	4. 4	------	------	640	126
Mason, Peoria, Tazewell.	2R	Crops, hogs	1926	26	198	------	35, 795	29, 511	3, 482	1, 485	1, 997	2, 099	207	3. 6	------	------	706	102
McDonough	2R	Livestock	1925	30	180	------	42, 847	35, 844	5, 204	2, 125	3, 079	3, 299	937	5. 8	------	------	605	220
Do	2R	Hogs, crops, cattle	1926	26	181	------	42, 610	35, 485	4, 197	1, 855	2, 342	2, 636	212	3. 8	------	------	715	294
Do	2R	Hogs, cattle, poultry	1927	28	181	------	39, 911	33, 286	3, 170	1, 816	1, 354	1, 619	−642	1. 6	------	------	707	265
Do	2R	Hogs, crops, cattle	1928	31	205	------	42, 948	36, 144	4, 931	2, 045	2, 886	3, 091	739	5. 0	------	------	720	205
Do	2R	Hogs, Cattle	1929	32	207	------	42, 869	35, 185	5, 534	2, 022	3, 512	3, 688	1, 369	6. 5	------	------	720	176
McLean-Gridley	2S	Crops	1925	113	189	------	47, 642	45, 146	3, 218	1, 883	1, 335	1, 477	−1, 047	1. 5	------	------	616	142
Mercer, Rock Island, Whiteside.	2R	Hogs, cattle	1927	29	196	------	41, 629	33, 199	5, 265	2, 801	2, 464	2, 775	383	4. 2	------	------	706	311
Mercer, Warren	2R	do	1929	30	248	------	51, 481	40, 986	7, 644	3, 564	4, 080	4, 249	1, 506	6. 5	------	------	720	169
Monroe, Randolph	2R	Crops, dairy, poultry	1925	30	173	------	14, 805	11, 264	2, 666	1, 170	1, 496	1, 812	756	6. 7	------	------	508	316
Monroe, Randolph, St. Clair.	2R	Crops, dairy, hogs	1927	36	172	------	19, 526	14, 967	2, 691	1, 332	1, 359	1, 622	383	4. 0	------	------	582	263
Monroe, Randolph, Washington.	2R	Crops, dairy, poultry	1928	27	200	------	18, 204	13, 979	2, 778	1, 267	1, 511	1, 797	601	5. 0	------	------	592	286
Do	2R	Dairy, crops, poultry	1929	30	179	------	17, 407	12, 717	2, 828	1, 317	1, 511	1, 753	641	5. 4	------	------	575	242
Morgan	2R	Hogs, crops	1929	31	242	------	47, 921	40, 741	6, 170	2, 041	4, 129	4, 277	1, 733	7. 1	------	------	708	148
Morgan, Scott	2R	do	1927	39	226	------	42, 190	36, 804	4, 125	1, 985	2, 140	2, 266	30	3. 6	------	------	634	126
Peoria	2R	Hogs, crops, dairy	1929	41	200	------	39, 162	32, 123	4, 948	1, 945	3, 003	3, 287	1, 045	6. 0	------	------	667	284
Peoria, Stark	2R	Hogs, crops	1925	30	187	------	46, 767	39, 347	5, 228	1, 882	3, 346	3, 526	1, 008	6. 1	------	------	513	180
Sangamon	2R	Hogs, crops, cattle	1928	38	280	------	60, 237	52, 713	6, 334	2, 646	3, 688	3, 887	676	5. 0	------	------	702	199
Do	2R	do	1929	33	246	------	52, 915	45, 520	6, 131	2, 453	3, 678	3, 887	1, 032	5. 6	------	------	693	209
Scott	2R	Hogs, crops	1926	27	210	------	33, 387	28, 215	3, 448	1, 907	1, 541	1, 692	−128	2. 8	------	------	609	151
Do	2R	Crops, poultry	1928	30	240	------	32, 854	27, 755	4, 421	1, 641	2, 780	2, 899	1, 137	6. 3	------	------	696	119
Do	2R	Hogs, crops	1929	30	207	------	30, 686	25, 169	4, 059	1, 745	2, 314	2, 470	780	5. 3	------	------	696	156
St. Clair	2R	Crops, dairy, poultry	1928	32	151	------	21, 111	16, 600	3, 448	1, 518	1, 930	2, 259	874	6. 3	------	------	598	329
Do	2R	Crops, dairy, hogs	1929	31	158	------	21, 636	16, 617	3, 663	1, 560	2, 103	2, 510	1, 021	7. 0	------	------	596	407
Stephenson	2R	Hogs, dairy, cattle	1928	32	152	------	29, 129	22, 159	4, 329	1, 606	2, 723	2, 970	1, 267	6. 9	------	------	719	247
Do	2R	do	1929	30	157	------	31, 221	23, 352	5, 186	2, 293	2, 893	3, 137	1, 332	7. 0	------	------	720	244
Vermilion	2R	Crops, hogs, dairy	1929	30	220	------	38, 899	32, 325	5, 084	2, 102	2, 982	3, 163	1, 037	5. 8	------	------	712	181
Will	2R	Livestock	1925	33	186	------	42, 647	35, 244	4, 249	1, 920	2, 329	2, 558	197	4. 1	------	------	567	229
Do	2R	Crops, dairy, hogs	1926	30	179	------	40, 564	33, 908	4, 163	1, 744	2, 419	2, 650	391	4. 3	------	------	669	231
Do	2R	do	1927	27	200	------	46, 087	39, 238	4, 723	1, 906	2, 817	3, 034	513	4. 6	------	------	697	217
Do	2R	do	1928	30	188	------	43, 621	36, 796	4, 595	1, 823	2, 772	2, 963	591	4. 8	------	------	698	191
Woodford	2R	Crops, hogs	1925	44	190	------	50, 513	43, 494	4, 192	1, 785	2, 407	2, 600	−119	3. 3	------	------	715	193
Do	2R	do	1926	55	191	------	47, 787	41, 525	3, 814	1, 686	2, 128	2, 304	−261	2. 9	------	------	719	176
Do	2R	do	1927	54	201	------	47, 267	41, 172	4, 042	1, 662	2, 380	2, 604	17	3. 5	------	------	710	224
Do	2R	do	1928	45	187	------	44, 779	38, 245	4, 822	1, 640	3, 182	3, 382	943	5. 5	------	------	697	200
Michigan:																		
Allegan, Kent, Ottawa	2R	Dairy, poultry, crops (mostly celery, onions, cucumbers).	1929	24	120	70	[7] 14, 814	[7] 10, 460	3, 736	2, 366	1, 370	1, 562	629	4. 6	------	------	688	192
Antrim, Charlevoix	2R	Crops (mostly apples, cherries, peaches, pears, potatoes), dairy.	1929	33	149	65	[7] 10, 802	[7] 8, 002	3, 206	1, 661	1, 545	1, 774	1, 005	8. 8	------	------	592	229
Antrim, Charlevoix, Manistee, Otsego, Wexford.	2R	Dairy, crops (mostly potatoes, hay), cattle.	1929	23	190	72	[7] 9, 157	[7] 5, 877	2, 616	1, 347	1, 269	1, 500	811	7. 2	------	------	607	231

[5] Food only.

[7] Does not include value of farmers' dwellings.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms: Total	Size of farms: Crops	Capital: Total	Capital: Real estate	Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
				No.	Acres	Acres	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Dolls.	Per ct.	Dolls.	Dolls.	Dolls.	Dolls.
Michigan—Continued.																		
Barry, Eaton, Ingham, Kent, Livingston, Washtenaw.	2R	Dairy, crops (mostly wheat, sugar beets), cattle, hogs.	1929	72	175	98	[7]20,161	[7]14,399	3,735	2,230	1,505	1,750	497	4.0	------	------	698	245
Bay, Clinton, Genesee, Gratiot, Midland, Saginaw, Tuscola.	2R	Dairy, crops (mostly beans, sugar beets, wheat), cattle.	1929	86	147	92	[7]19,912	[7]14,534	3,679	2,246	1,433	1,711	437	3.7	------	------	704	278
Cass, Kalamazoo	2R	Dairy, crops (mostly wheat, potatoes, rye), hogs.	1929	33	229	137	[7]22,216	[7]16,722	4,017	2,386	1,631	1,838	520	4.1	------	------	713	207
Chippewa, Dickinson, Menominee, Ontonagon.	2R	Dairy, crops (mostly potatoes, oats, barley, peas), cattle.	1929	22	140	57	[7]11,086	[7]7,606	2,957	1,605	1,352	1,691	798	7.4	------	------	533	339
Clare, Ogenaw	2R	Dairy, cattle, crops (mostly hay, beans, potatoes).	1929	22	181	81	[7]12,254	[7]8,280	2,504	1,529	975	1,216	362	3.2	------	------	583	241
Eaton	2S	Crops (mostly wheat, beans), dairy and cattle, sheep.	1927	114	131	76	[7]11,535	[7]8,807	2,508	1,322	1,186	------	609	4.0	------	------	720	------
Do	2S	Crops (mostly wheat, beans), dairy and cattle.	1928	101	131	80	[7]12,158	[7]8,884	3,409	1,373	2,036	------	1,428	10.8	------	------	720	------
Huron, Sanilac, St. Clair.	2R	Dairy, crops (mostly hay, oats, wheat, beans, sugar beets, chickory).	1929	28	174	106	[7]17,135	[7]12,036	3,580	2,013	1,567	1,986	710	5.1	------	------	686	419
Kalamazoo	2S	Dairy and cattle, crops (mostly wheat, potatoes), hogs.	1928	49	155	90	[7]12,101	[7]9,405	2,501	1,423	1,078	------	473	3.0	------	------	720	------
Kent	2R	Dairy and cattle, poultry, crops (mostly potatoes, beans.)	1928	13	128	73	17,263	12,687	4,388	2,481	1,907	------	1,044	6.9	------	------	720	------
Do	2R	Dairy, crops (mostly potatoes, apples), poultry.	1929	25	144	82	[7]17,204	[7]12,305	4,187	2,339	1,848	2,095	988	6.6	------	------	713	247
Macomb, St. Clair, Washtenaw.	2R	Dairy, poultry, cattle	1929	19	149	82	[7]21,374	[7]15,916	3,966	2,374	1,592	1,782	523	4.3	------	------	667	190
Muskegon, Newaygo, Oceana.	2R	Crops (mostly apples, cherries, peaches, pears, potatoes, beans), dairy, poultry.	1929	47	119	67	[7]14,528	[7]11,192	3,014	1,702	1,312	1,536	586	4.3	------	------	690	224
Oakland, Tuscola	2R	Crops (mostly potatoes, beans, fruit), dairy.	1929	18	146	86	[7]19,597	[7]15,013	3,913	2,389	1,524	1,852	544	4.0	------	------	746	328
Van Buren	3S	Grapes, work, dairy, cattle	1928	90	84	54	14,920	13,450	2,905	2,303	602	850	−144	−1.2	466	322	784	248
Wisconsin:																		
Barron	3R	Dairy, cattle, hogs, poultry	1927	21	117	62	20,344	14,243	4,192	2,681	1,511	1,912	494	------	600	1,094	------	401
Do	3R	do	1928	21	119	------	20,640	14,537	4,161	2,480	1,681	2,021	649	------	458	1,107	------	340
Do	3R	do	1929	22	133	70	22,898	15,868	4,192	2,643	1,549	1,936	404	------	462	866	------	387

Dunn	3S	Dairy, cattle, hogs	1928	119	107	58	14,070	11,414	2,375	1,563	812	957	109	-----	542	651	-----	145
Fon du Lac	3R	Livestock (mostly dairy)	1924	19	137	-----	27,153	20,263	3,467	3,460	7	602	−1,351	-----	565	−786	-----	595
Do	3R	do	1925	19	143	-----	26,477	20,014	3,846	2,905	941	1,496	−383	-----	562	179	-----	555
Do	3R	Livestock (mostly dairy), crops.	1926	19	136	-----	25,587	19,230	4,272	2,533	1,739	2,339	460	-----	543	1,003	-----	600
Green	3S	Dairy, hogs	1929	143	144	90	18,408	13,806	3,881	2,161	1,720	1,897	800	-----	559	1,359	-----	177
Langlade	3S	Dairy, potatoes, cattle	1929	105	104	34	8,759	6,615	2,262	1,256	1,006	1,190	568	-----	459	1,027	-----	184
Portage, Waupaca	3S	Dairy, potatoes	1929	159	127	60	11,070	8,875	2,456	1,227	1,229	1,378	676	-----	483	1,159	-----	149
Sawyer	3S	Dairy, cattle, work	1929	106	80	22	4,154	3,018	1,110	558	552	663	344	-----	394	738	-----	111
Shawano	2R	Dairy, cattle	1929	10	161	58	17,108	12,714	3,144	[1] 1,815	-----	1,329	[2] 474	-----	-----	-----	-----	-----
Walworth	2R	Livestock (mostly dairy)	1922	24	144	-----	25,157	19,498	2,831	2,166	665	847	−593	-----	445	−148	-----	182
Do	2R	do	1923	22	124	-----	25,828	19,667	3,872	2,250	1,622	1,852	331	-----	483	814	-----	230
Do	2R	do	1924	19	126	-----	23,777	17,964	3,713	1,998	1,715	1,949	526	-----	398	924	-----	234
Do	2S	Dairy, cattle, hogs	1928	118	140	81	18,594	14,566	3,561	2,070	1,491	1,706	561	3.2	525	1,086	895	215
Scattered counties	2R	Dairy, cattle, hogs, poultry, crops.	1929	28	163	75	22,568	16,416	5,975	[1] 3,736	-----	2,239	[2] 1,111	-----	-----	-----	-----	-----
Kentucky:																		
Adair, Green, Taylor	2S	Dairy and cattle, hogs, tobacco, poultry, wheat, sheep.	1926	163	122	53	6,884	5,342	1,470	722	748	866	404	6.3	500	904	317	118
Do	2R	Dairy and cattle, hogs, poultry tobacco, sheep.	1927	156	126	53	7,513	5,567	1,452	828	624	730	248	5.2	455	703	234	106
Do	2R	Dairy and cattle, tobacco, poultry, hogs, sheep.	1928	110	132	59	8,044	5,902	1,846	1,005	841	965	439	6.9	442	881	286	124
Do	2R	Tobacco, dairy and cattle, hogs, poultry.	1929	87	123	54	7,584	5,616	1,837	948	889	1,016	510	8.1	418	928	278	127
Ballard, Calloway, Carlisle, Graves, Marshall, McCracken — purchase region.	2S	Tobacco, hogs, dairy and cattle, poultry.	1921	115	133	67	11,985	9,683	1,530	924	606	742	7	-----	-----	-----	-----	136
Ballard, Calloway, Graves, Marshall, McCracken—purchase region.	3S	Tobacco, dairy and cattle, hogs, poultry, vegetables.	1925	226	127	60	8,045	6,627	1,730	1,100	630	749	228	-----	529	757	-----	119
Do	2R	Dairy and cattle, tobacco, hogs, poultry.	1929	22	122	56	6,015	4,363	2,257	1,038	1,219	1,284	918	-----	426	1,344	-----	65
Boone, Campbell, Kenton.	2R	Dairy and cattle, poultry, hogs, sheep, tobacco.	1926	19	108	33	11,007	8,760	-----	1,147	-----	-----	-----	-----	-----	1,206	-----	212
Do	2R	Dairy and cattle, poultry, tobacco, hogs.	1927	44	111	37	13,068	10,477	2,673	1,482	1,191	1,324	538	5.4	655	1,193	482	133
Do	2R	Diary and cattle, poultry, tobacco, fruits, vegetables.	1928	25	111	38	14,270	11,401	3,122	1,968	1,154	-----	440	-----	621	1,061	-----	-----
Do	2R	Dairy and cattle, poultry, vegetables, fruits.	1929	31	99	36	11,462	9,260	3,219	1,778	1,441	1,596	868	-----	589	1,457	-----	155
Bourbon, Clark, Fayette, Jessamine, Scott, Woodford—farm tenancy in central Kentucky.	3S	Tobacco, corn	1924	176	43	32	10,964	10,379	2,991	1,010	1,981	2,116	1,433	-----	391	1,824	-----	135
Do	3S	do	1924	55	45	33	11,264	10,630	3,081	1,016	2,065	2,185	1,502	-----	400	1,902	-----	120
Do	2S	Tobacco, livestock, corn	1926	55	48	36	10,896	10,217	2,190	1,157	1,033	1,210	488	-----	459	947	-----	177
Do	2S	Tobacco	1927	46	54	39	11,107	10,340	3,910	1,045	2,865	3,026	2,310	-----	426	2,736	-----	161

[1] Does not include other unpaid family labor.

[2] Family-labor income.

[7] Does not include value of farmers' dwellings.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms: Total	Size of farms: Crops	Capital: Total	Capital: Real estate	Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
				No.	*Acres*	*Acres*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Per ct.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Kentucky—Continued.																		
Bourbon, Clark, Montgomery.	3S	Tobacco, cattle and dairy, sheep.	1929	64	539	366	88,477	77,527	11,577	6,350	5,227	5,378	803		1,053	1,856		151
Boyle	2R	Dairy and cattle, hogs, wheat, sheep, tobacco.	1926	17	232	105	33,995	28,588	6,190	2,831	3,359	3,555	1,659	8.9	1,155	2,814	347	196
Do	2R	Dairy and cattle, tobacco, hogs, sheep, poultry.	1927	29	214	102	27,314	22,570	5,333	3,216	2,117	2,256	751		867	1,618		139
Do	2R	Tobacco, cattle and dairy, sheep, hogs.	1928	15	238	92	32,827	26,902	7,653	4,077	3,576		1,935		859	2,794		
Boyle, Grant, Montgomery, Owen.	2R	Tobacco, dairy and cattle, sheep, hogs, poultry.	1929	28	169	59	17,885	14,586	3,870	2,178	1,692	1,842	798		607	1,405		150
Boyle, Jefferson, Kenton.	2R	Dairy and cattle, potatoes, vegetables, fruits.	1929	14	169	59	17,948	13,997	6,204	3,797	2,407	2,804	1,510		796	2,306		397
Calloway, Graves, Marshall — purchase region.	3R	Tobacco, dairy and cattle, hogs.	1924	21	128	58	8,121	5,996	1,497	772	725	871	319	5.2	479	798	301	146
Do	3R	do	1925	21	130	60	8,114	6,095	1,490	821	669	824	263	4.5	510	773	307	155
Do	3R	Dairy and cattle, tobacco, hogs.	1926	21	130	60	8,178	6,052	1,592	766	826	969	417	6.3	488	905	313	143
Christian	3S	Tobacco, cattle, hogs, clover seed, corn.	1929	67	391	192	30,384	25,767	7,941	3,992	3,949	4,093	2,430		761	3,191		144
Christian, Todd	2S	Hogs, tobacco, dairy and cattle, wheat, poultry.	1926	56	272	130	22,520	17,246	5,096	3,081	2,015	2,158	889	7.8	941	1,830	248	143
Do	2S	Tobacco, dairy and cattle, hogs, wheat.	1927	50	296	164	24,093	18,924	5,097	3,051	2,046	2,155	841	7.4	794	1,635	251	109
Grayson	3S	Poultry, cattle, dairy, hogs, sheep, work.	1928	233	134	43	4,523	3,450	897	554	343	400	117	2.9	330	447	214	57
Jefferson	2R	Dairy and cattle, potatoes, vegetables.	1928	6	162	78	27,974	22,662	5,892	4,682	1,210	1,746	−189	2.7	774	585	463	536
Jefferson, Oldham	2R	Dairy and cattle, hogs, seeds (mostly orchard grass), wheat.	1926	49	241	110	22,933	18,447	4,865	2,644	2,221	2,467	1,074	7.6	461	1,535	468	246
Do	2R	Dairy and cattle, hogs, poultry, wheat, sheep.	1927	29	182	99	26,245	20,799	6,026	3,757	2,269	2,420	957		812	1,769		151
Kenton	2S	Dairy, tobacco, cattle, hogs, sheep.	1916	80	123	42	10,642	7,763	1,743	757	986	1,126	454		417	871		140
Knott	3S	Work, rent, cattle and dairy, poultry, vegetables, wood.	1929	273	107	13	2,629	2,268	505	213	292	359	161	6.6	465	626	118	67
Laurel	3S	Work, poultry, dairy, cattle, tobacco.	1927	203	76	26	2,721	2,220	592	261	331	379	195	6.4	365	560	158	48

Montgomery	2R	Tobacco, cattle and dairy, sheep, hogs.	1927	21	302	105	31,718	26,182	7,234	4,620	2,614	2,650	1,028	------	782	1,810	------	36
Do	2R	do	1928	11	284	------	30,342	------	7,623	4,406	3,217	------	1,700	------	728	2,428	------	------
Oldham	2R	Dairy and cattle, hogs, potatoes, vegetables, sheep, poultry.	1928	4	304	------	11,989	------	6,996	4,764	2,232	------	1,633	------	517	2,150	------	------
Todd	3S	Tobacco, cattle, hogs	1929	139	271	113	16,428	13,953	4,432	2,200	2,232	2,315	1,411	11.0	625	2,036	423	83
Warren	3S	Tobacco, dairy and cattle, hogs.	1929	97	198	105	20,984	17,972	4,750	2,545	2,205	2,287	1,156	8.4	536	1,692	439	82
Tennessee:																		
Bradley	3R	Dairy, cattle, tobacco, poultry	1929	7	202	59	12,064	8,804	2,453	1,363	1,090	1,297	487	6.8	521	1,008	268	207
Cheatham	3R	Tobacco, hogs	1928	2	127	40	7,376	5,912	4,029	2,208	1,821	1,921	1,452	19.9	352	1,804	350	100
Cheatham, Robertson	3R	do	1929	19	254	70	12,939	10,827	4,764	2,389	2,375	2,515	1,728	15.5	660	2,388	375	140
Davidson	3R	Dairy, sweetpotatoes, tomatoes, hogs, vegetables, work.	1929	10	89	39	6,494	4,874	2,729	1,110	1,619	1,892	1,294	20.7	354	1,648	276	273
Gibson, Haywood, Henderson, Madison, Weakley.	3R	Cotton, tomatoes, corn, dairy, sweetpotatoes.	1929	43	192	76	11,778	9,353	4,506	2,593	1,913	2,063	1,324	13.7	464	1,788	297	150
Green, Washington	3R	Tobacco, dairy, poultry	1928	15	168	76	19,846	16,020	3,859	2,084	1,775	1,900	783	7.6	582	1,365	266	125
Do	3R	do	1929	20	161	69	18,398	14,265	3,472	2,022	1,450	1,606	530	6.0	617	1,147	341	156
Hardin	3R	Cotton, hogs, corn	1929	10	360	162	14,744	10,518	4,126	3,165	961	1,136	224	3.5	449	673	445	175
Henderson	3R	Cotton, poultry	1928	9	194	79	6,995	5,008	2,599	1,496	1,103	1,301	753	11.4	471	1,224	308	198
Humphreys	3R	Corn, dairy, hogs, cattle	1929	13	263	78	13,718	10,893	2,284	1,184	1,100	1,305	414	5.2	412	826	385	205
Lawrence	3R	Cotton, hay, dairy, cattle, corn, potatoes, poultry.	1929	5	119	63	8,575	6,048	2,643	1,482	1,161	1,406	732	9.7	420	1,152	325	245
Monroe	3R	Cattle, dairy, hogs, tobacco	1928	5	289	130	21,706	15,712	5,982	2,932	3,050	3,161	1,965	12.5	664	2,629	330	111
Obion	3R	Cattle, hogs, dairy, corn	1928	5	236	101	26,313	20,020	5,025	3,085	1,940	2,005	624	6.4	424	1,048	260	65
Do	3R	Hogs, dairy, cattle, corn	1929	15	206	110	20,595	16,381	4,441	2,321	2,120	2,192	1,090	8.9	393	1,483	291	72
Overton	3S	Poultry, work, cattle, hay, corn.	1925	50	118	42	4,335	3,499	500	328	172	234	−45	−1.8	454	409	251	62
Putnam	3R	Cattle, poultry, dairy, hogs, corn.	1928	10	150	55	6,909	5,192	1,108	600	508	605	163	2.9	493	656	306	97
Do	3R	Dairy, poultry, cattle, hogs, wood.	1929	11	119	48	5,545	4,019	1,177	689	488	678	211	3.0	439	650	320	190
Shelby	3R	Cotton, work, sweetpotatoes	1929	8	126	56	10,012	8,592	2,611	1,016	1,595	1,914	1,094	13.1	563	1,657	282	319
Sumner	3R	Hogs, cattle, sheep, dairy, tobacco.	1928	14	202	110	26,152	21,282	4,833	2,244	2,589	2,684	1,281	8.4	644	1,925	384	95
Do	3R	Tobacco, hogs, dairy, cattle, sheep.	1929	20	313	112	31,713	25,430	5,298	3,206	2,092	2,184	506	5.4	651	1,157	382	92
Warren, White	3R	Dairy, cattle, poultry, corn, hogs.	1929	23	185	88	12,088	8,429	2,110	1,319	791	903	187	3.8	438	625	326	112
Washington	3S	Dairy, poultry, wheat, cattle, tobacco.	1926	25	162	77	21,242	18,492	2,778	1,600	1,178	1,300	116	3.9	716	832	356	122
Do	3R	Dairy, cattle, poultry, hogs, tobacco.	1927	16	182	81	19,774	16,637	3,443	1,546	1,897	2,127	908	7.9	650	1,558	337	230
Weakley	3R	Sweetpotatoes, hogs, dairy, tobacco, poultry.	1928	3	156	50	7,171	5,833	1,970	962	1,008	1,122	649	10.1	407	1,056	283	114
Alabama:																		
Coffee, Dade, Geneva, Henry, Houston, Pike—southeastern.	3R	Cotton, peanuts, hogs	1927	102	296	152	19,994	15,741	4,584	3,393	1,191	1,273	191	2.7	[3] 556	[3] 747	660	82
Do	3R	do	1928	86	325	171	20,091	15,719	4,540	3,495	1,045	1,120	40	1.6	[3] 542	[3] 582	724	75

[3] Does not include house rent.

TABLE 526.—*Farm business studies: Summaries of 30,191 farm records from 336 localities in 25 States, 1924–1929*—Continued

State, county, locality	Key	Principal sources of receipts	Year covered by study	Farms included	Size of farms		Capital		Receipts	Expenses	Farm income	Family income	Labor income	Return to capital	Family living from the farm	Operator's earnings	Farmer's labor	Other unpaid family labor
					Total	Crops	Total	Real estate										
				No.	*Acres*	*Acres*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Per ct.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Alabama—Continued.																		
De Kalb, Marshall	2S	Cotton, poultry	1927	77	61	38	7, 457	6, 560	1, 453	688	765	984	392	6. 6	------	------	274	219
Do	2S	do	1928	101	68	40	6, 892	5, 798	1, 655	912	743	1, 039	398	2. 1	------	------	596	296
Do	2S	do	1929	98	70	42	7, 111	6, 052	1, 523	1, 004	519	759	163	−. 5	------	------	553	240
Mississippi:																		
Choctaw	3S	Cotton, dairy	1920	15	110	30	3, 729	2, 653	224	479	−255	−211	−441	------	------	------	------	44
Do	3S	Dairy, cotton, livestock	1921	12	116	32	3, 669	2, 683	479	259	220	224	37	------	------	------	------	4
Do	3S	Cotton, dairy, work	1922	16	122	34	3, 687	2, 637	756	398	358	415	174	------	------	------	------	57
Do	3S	do	1923	21	116	33	3, 674	2, 613	910	412	498	582	314	------	------	------	------	84
Do	3R	do	1924	24	120	37	4, 020	2, 858	909	477	432	------	231	------	[3] 466	[3] 697	------	------
Do	3R	Cotton, work, dairy	1925	19	------	------	4, 187	3, 024	1, 258	923	335	470	126	. 5	[3] 490	[3] 616	313	135
Do	3R	Cotton, work, cattle, dairy	1926	19	------	------	4, 229	2, 973	1, 065	797	268	423	57	−. 3	[3] 475	[3] 532	282	155
Jones	3R	Cotton, work, vegetables, poultry, horses, cattle, wood.	1927	19	125	46	6, 299	4, 616	2, 079	1, 408	671	845	356	5. 8	398	754	303	174
Do	3R	Cotton, poultry, work, horses, hogs.	1928	15	111	40	5, 546	4, 161	1, 075	1, 048	27	118	−250	−5. 2	323	73	313	91
Several counties	------	Cotton	1921	84	262	------	14, 872	11, 678	2, 287	1, 979	308	736	−436	------	------	------	------	428

Bureau of Agricultural Economics.

[3] Does not include house rent.

TABLE 527.—*Wheat: Cost of production by yield groups and geographical divisions, 1929*

Yield group (bushels per acre) and geographical division [1]	Reports	Average acreage in wheat per farm	Average yield per acre	Gross cost per acre									Credit per acre (straw)	Net cost	
				Prepare and plant	Harvest and thresh	Market	Miscellaneous labor [2]	Fertilizer and manure	Seed	Land rent	Miscellaneous [3]	Total		Per acre	Per bushel
	Number	*Acres*	*Bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Winter-wheat belt: [4]															
12 and under	378	96	9	3.12	3.03	0.61	0.10	1.13	1.43	4.02	1.65	15.09	0.58	14.51	1.61
13 to 18	251	111	15	3.18	3.84	.81	.13	1.04	1.37	4.79	1.94	17.10	.45	16.65	1.11
19 to 24	127	153	21	3.20	4.07	.93	.11	.80	1.34	6.31	2.45	19.21	.30	18.91	.90
25 and over	37	40	29	3.50	5.22	1.04	.03	1.01	1.55	7.04	2.11	21.50	.27	21.23	.73
Total or average	793	108	14	3.17	3.56	.75	.10	1.04	1.40	4.75	1.89	16.66	.48	16.18	1.16
Spring-wheat belt: [5]															
12 and under	187	178	9	3.00	2.75	.64	.21	.18	1.51	2.64	1.99	12.92	.20	12.72	1.41
13 to 18	70	89	15	3.00	3.41	.89	.13	.89	1.77	3.78	2.20	16.07	.35	15.72	1.05
19 and over	27	87	22	2.88	4.27	.96	.17	.67	1.77	5.66	2.56	18.94	.34	18.60	.85
Total or average	284	145	12	2.99	3.06	.73	.19	.40	1.60	3.17	2.09	14.23	.25	13.98	1.16
Geographical division:															
North Atlantic	364	15	20	6.02	5.32	1.40	.18	6.51	2.80	5.99	3.44	31.66	5.19	26.47	1.32
South Atlantic	224	15	15	4.52	4.18	1.38	.15	4.52	2.10	6.05	2.43	25.33	2.10	23.23	1.55
East North Central	657	23	19	4.44	4.37	1.08	.12	3.93	2.30	5.79	2.51	24.54	1.85	22.69	1.19
West North Central	1,089	107	14	3.11	3.45	.76	.13	.93	1.51	4.61	2.00	16.50	.48	16.02	1.14
South Central	215	117	12	3.16	3.32	.87	.11	1.09	1.42	5.00	1.98	16.95	.80	16.15	1.35
Western	349	138	23	4.38	4.29	1.25	1.08	.90	1.66	11.14	3.03	27.73	.76	26.97	1.17
United States	2,898	74	17	4.04	4.04	1.02	.26	2.59	1.91	6.35	2.43	22.64	1.57	21.07	1.24

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters. For figures by yield groups for 6 years, 1923–1928, see Agriculture Yearbooks, 1924, p. 1133; 1925, p. 1328; 1926, p. 1210; 1927, p. 1136; 1928, p. 1041; and 1930, p. 984. For figures by geographical divisions for 6 years, 1923–1928, see June issues of Monthly Supplement, Crops and Markets, 1924, p. 176; 1925, p. 180; 1926, p. 170; Crops and Markets, June issues, 1927, p. 202; 1928, p. 196; 1929, p. 202.

[1] The States included in the geographical divisions are as follows: North Atlantic—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. South Atlantic—Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. East North Central—Ohio, Indiana, Illinois Michigan, and Wisconsin. West North Central—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas. Western—Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, and California.

[2] Includes miscellaneous labor, irrigating and water, and seed treatment and material.

[3] Sacks and twine, crop insurance, use of implements, use of storage buildings, and overhead.

[4] Winter-wheat belt as used here included Kansas, Nebraska, Missouri, and Oklahoma.

[5] Spring-wheat belt as used here includes western Minnesota, North Dakota, eastern South Dakota, and eastern Montana.

TABLE 528.—*Corn: Cost of production by yield groups and geographical divisions, 1929*

Yield group (bushels per acre) and geographical division [1]	Reports	Average acreage in corn per farm	Average yield per acre	Gross cost per acre										Credit per acre (stover and fodder)	Net cost	
				Prepare and plant	Cultivate	Harvest	Market	Miscellaneous labor [2]	Fertilizer and manure	Seed	Land rent	Miscellaneous laneous [3]	Total		Per acre	Per bushel
All reports:	*Number*	*Acres*	*Bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
7 and under	137	49	4	3.76	2.64	1.44	0.35	0.13	3.02	0.49	3.57	2.14	17.54	1.89	15.65	3.91
8 to 17	634	42	13	3.39	2.73	2.07	1.04	.07	2.18	.38	3.81	1.70	17.37	1.04	16.33	1.26
18 to 27	1,100	40	22	3.71	2.83	2.53	1.50	.09	2.76	.41	4.76	1.85	20.44	1.35	19.09	.87
28 to 37	884	40	32	4.23	2.98	3.33	1.84	.13	3.29	.45	5.68	2.13	24.06	1.79	22.27	.70
38 to 47	704	43	41	4.73	3.27	4.31	2.17	.14	4.74	.49	6.79	2.38	29.02	2.38	26.64	.65
48 to 57	427	39	51	5.03	3.48	5.24	2.41	.10	5.91	.55	7.86	2.52	33.10	2.49	30.61	.60
58 and over	264	31	66	5.59	3.79	6.32	3.11	.26	7.24	.57	8.10	2.65	37.63	3.27	34.36	.52
Corn belt: [4]																
17 and under	98	45	12	3.25	2.41	1.96	.86	.01	1.61	.31	4.42	1.56	16.39	.83	15.56	1.30
18 to 27	220	49	22	3.47	2.21	2.19	1.19	.05	1.92	.37	4.99	1.66	18.05	1.03	17.02	.77
28 to 37	304	58	32	3.60	2.30	2.75	1.53	.10	1.95	.39	6.06	1.89	20.57	.74	19.83	.62
38 to 47	316	68	41	3.92	2.65	3.31	1.82	.09	2.65	.46	7.24	1.95	24.09	.97	23.12	.56
48 to 57	203	66	51	4.03	2.71	3.93	1.90	.07	3.60	.49	8.40	2.28	27.41	1.06	26.35	.52
58 and over	95	55	62	4.25	2.86	4.91	2.33	.03	3.71	.44	8.73	2.08	29.34	1.30	28.04	.45
Total or average	1,236	59	37	3.75	2.49	3.10	1.62	.08	2.51	.42	6.66	1.93	22.56	.95	21.61	.58
Geographical division:																
North Atlantic	399	12	42	6.69	3.95	7.21	2.51	.05	10.47	.66	6.05	3.29	40.88	5.36	35.52	.85
South Atlantic	452	19	30	4.97	4.02	3.44	2.10	.14	5.17	.43	6.34	2.43	29.04	2.88	26.16	.87
East North Central	921	35	39	4.96	3.23	4.46	1.91	.09	4.89	.53	6.20	2.36	28.63	2.27	26.36	.68
West North Central	1,451	66	29	3.16	2.31	2.59	1.42	.07	1.64	.39	5.33	1.70	18.61	.80	17.81	.61
South Central	824	29	23	3.56	3.23	1.94	1.82	.12	2.31	.40	5.08	1.88	20.34	.91	19.43	.84
Western	103	34	27	3.96	2.48	3.03	1.90	1.26	2.12	.48	6.32	1.59	23.14	1.41	21.73	.80
United States	4,150	41	31	4.20	3.04	3.43	1.79	.12	3.74	.46	5.66	2.10	24.54	1.83	22.71	.73

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters. For figures by yield groups for 6 years, 1923–1928, see Agriculture Yearbooks, 1924, p. 1135; 1925, p. 1332; 1926, p. 1213; 1927, p. 1139; 1928, p. 1044; and 1930, p. 985. For figures by geographical divisions for 6 years, 1923–1928, see June issues of Monthly Supplement, Crops and Markets, 1924, p. 176; 1925, p. 180; 1926, p. 170; Crops and Markets, June issues, 1927, p. 202; 1928, p. 196; and 1929, p. 202.

[1] The States included in the geographical divisions are as follows: North Atlantic—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. South Atlantic—Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. East North Central—Ohio, Indiana, Illinois, Michigan, and Wisconsin. West North Central—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas. Western—Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, and California.

[2] Includes miscellaneous labor, irrigating and water, and seed treatment and material.

[3] Sacks and twine, crop insurance, use of implements, use of storage buildings, and overhead.

[4] Corn Belt as used here includes Indiana, Illinois, Iowa, western Ohio, southeast corner of South Dakota, eastern Nebraska, northeast corner of Kansas, and the northern three-fourths of Missouri.

TABLE 529.—*Oats: Cost of production by yield groups and geographical divisions, 1929*

Yield group (bushels per acre) and geographical division [1]	Reports	Average acreage in oats per farm	Average yield per acre	Gross cost per acre: Prepare and plant	Gross cost per acre: Harvest and thresh	Gross cost per acre: Market	Gross cost per acre: Miscellaneous labor [2]	Gross cost per acre: Fertilizer and manure	Gross cost per acre: Seed	Gross cost per acre: Land rent	Gross cost per acre: Miscellaneous [3]	Gross cost per acre: Total	Credit per acre (straw)	Net cost: Per acre	Net cost: Per bushel
	Number	*Acres*	*Bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
17 and under	378	27	12	3.16	2.78	0.61	0.14	0.92	1.38	3.52	1.73	14.24	0.90	13.34	1.11
18 to 22	414	21	20	3.21	3.43	.95	.12	1.02	1.36	4.26	1.91	16.26	1.31	14.95	.75
23 to 27	334	23	25	3.41	3.74	1.00	.17	1.53	1.39	4.60	2.07	17.91	1.64	16.27	.65
28 to 32	582	26	30	3.57	4.00	1.10	.17	1.38	1.47	4.95	2.25	18.89	1.76	17.13	.57
33 to 37	306	26	35	3.49	4.39	1.24	.16	1.38	1.48	5.56	2.33	20.03	2.09	17.94	.51
38 to 42	478	25	40	3.62	4.52	1.34	.20	1.66	1.49	5.81	2.56	21.20	1.78	19.42	.49
43 to 47	157	27	45	3.52	4.93	1.43	.31	2.05	1.50	6.81	2.53	23.08	1.94	21.14	.47
48 to 52	206	30	50	3.67	5.13	1.59	.23	1.18	1.50	7.60	2.51	23.41	2.18	21.23	.42
53 to 57	53	26	55	3.32	5.27	1.73	.32	1.48	1.49	6.90	2.52	23.03	2.06	20.97	.38
58 to 62	92	26	60	3.90	5.63	1.72	.45	1.20	1.59	7.95	3.06	25.50	2.01	23.49	.39
63 and over	81	25	77	4.41	7.20	1.76	.63	2.22	1.99	10.48	3.49	32.18	2.10	30.08	.39
Geographical division:															
North Atlantic	410	12	33	5.76	5.04	1.38	.19	3.01	1.95	5.33	3.07	25.73	4.08	21.65	.66
South Atlantic	196	9	28	4.31	4.37	1.41	.24	2.91	1.84	5.62	1.99	22.69	1.87	20.82	.74
East North Central	780	22	35	3.60	4.20	1.23	.18	1.64	1.37	5.83	2.39	20.44	1.98	18.46	.53
West North Central	1,234	35	31	2.45	3.66	.99	.13	.52	1.25	4.86	1.93	15.79	.84	14.95	.48
South Central	256	24	26	2.75	3.83	1.25	.10	.88	1.47	4.81	1.86	16.95	1.01	15.94	.61
Western	205	25	46	4.81	5.39	1.50	.78	1.31	1.70	8.58	3.26	27.33	1.40	25.93	.56
United States	3,081	25	33	3.48	4.15	1.18	.20	1.37	1.46	5.44	2.27	19.55	1.68	17.87	.54

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters. For figures by yield groups for 6 years, 1923–1928, see Agriculture Yearbooks, 1924, p. 1137; 1925, p. 1335; 1926, p. 1217; 1927, p. 1143; 1928, p. 1048; and 1930, p. 986. For figures by geographical divisions for 6 years, 1923–1928, see June issues of Monthly Supplement, Crops and Markets, 1924, p. 176; 1925, p. 180; 1926, p. 170; Crops and Markets, June issues, 1927, p. 202; 1928, p. 196; 1929, p. 202.

[1] The States included in the geographical divisions are as follows: North Atlantic—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. South Atlantic—Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. East North Central—Ohio, Indiana, Illinois, Michigan, and Wisconsin. West North Central—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas. Western—Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, and California.

[2] Includes miscellaneous labor, irrigating and water, and seed treatment and material.

[3] Sacks and twine, crop insurance, use of implements, use of storage buildings, and overhead.

TABLE 530.—*Cotton: Cost of production by yield groups, 1929*

Yield group (pounds of lint per acre)	Reports	Average acreage in cotton per farm	Average yield of lint per acre	Gross cost per acre										Credit per acre (cottonseed)	Net cost of lint	
				Prepare and plant	Cultivate	Harvest and market	Miscellaneous labor [1]	Fertilizer and manure	Seed	Ginning	Land rent	Miscellaneous [2]	Total		Per acre	Per pound
	Number	*Acres*	*Pounds*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
100 and under	204	68	71	3.37	4.44	3.63	0.49	2.04	1.03	1.02	4.29	2.17	22.48	2.05	20.43	0.29
101 to 180	273	68	147	3.30	4.86	6.19	.33	3.43	1.11	1.80	4.98	2.37	28.37	4.26	24.11	.16
181 to 260	219	53	223	4.35	6.14	8.36	.79	6.06	1.19	2.32	5.96	2.95	38.12	6.45	31.67	.14
261 to 340	101	48	299	5.13	6.75	10.59	.64	6.51	1.22	3.13	6.09	2.59	42.65	7.69	34.96	.12
341 to 420	81	67	380	4.95	6.54	12.59	1.16	8.19	1.34	4.07	8.35	3.14	50.33	9.01	41.32	.11
421 and over	51	45	511	5.14	7.64	16.53	1.53	8.26	1.35	5.18	9.43	3.19	58.25	12.10	46.15	.09

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters.

[1] Includes miscellaneous labor, irrigating and water, dusting, and dusting material.
[2] Includes picking sacks and sheets, crop insurance, use of implements, use of storage buildings, and overhead.

TABLE 531.—*Cotton: Cost of production by yield groups, 1924–1929*

Yield group (pounds of lint per acre)[1]	Farms reporting						Average yield of lint per acre						Net cost of lint per pound [2]					
	1924	1925	1926	1927	1928	1929	1924	1925	1926	1927	1928	1929	1924	1925	1926	1927	1928	1929
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
100 and under	131	126	123	117	136	204	82	68	76	68	80	71	29	39	29	32	28	29
101 to 180	470	319	280	225	311	273	147	149	148	149	147	147	18	19	17	17	17	16
181 to 260	509	464	330	314	362	219	226	228	228	229	227	223	14	14	13	13	13	14
261 to 340	195	212	154	134	157	101	299	301	303	299	299	299	12	12	12	12	12	12
341 to 420	106	149	102	106	90	81	383	381	382	381	381	380	11	11	11	10	10	11
421 and over	60	135	81	96	63	51	491	506	505	509	512	511	9	9	9	9	8	9

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters.

[1] The average yield of lint cotton in the United States has been as follows: 1924, 157.4 pounds; 1925, 167.2 pounds; 1926, 182.6 pounds; 1927, 154.5 pounds; 1928, 152.9 pounds; 1929, 155.0 pounds.
[2] The average cost per pound for the yield groups which closely approximated the average yields for the United States are as follows: 1924, 18 cents; 1925, 18 cents; 1926, 15.5 cents; 1927, 17 cents; 1928, 17 cents; 1929, 16 cents. At least a part of the yearly variations in costs in some of the upper and lower yield groups may be due to the small number of reports, and to the relative number of reports received each year from various sections of the Cotton Belt.

TABLE 532.—*Cost of producing wheat, corn, and oats, 1924–1929*

Crop and geographical division [1]	Number of reports						Net cost per acre (dollars)						Net cost per bushel (cents)						Yield per acre (bushels)					
	1924	1925	1926	1927	1928	1929	1924	1925	1926	1927	1928	1929	1924	1925	1926	1927	1928	1929	1924	1925	1926	1927	1928	1929
Wheat:																								
North Atlantic	427	310	258	279	196	364	28.46	30.43	29.41	28.48	27.12	26.47	142	132	128	129	151	132	20	23	23	22	18	20
South Atlantic	478	400	277	263	252	224	23.92	25.49	24.24	22.58	24.20	23.23	160	150	121	151	142	155	15	17	20	15	17	15
East North Central	1,183	1,084	969	762	535	657	23.05	23.29	23.37	22.58	21.57	22.69	115	129	102	113	154	119	20	18	23	20	14	19
West North Central	1,524	1,326	1,335	1,168	851	1,089	17.38	17.16	16.31	16.95	16.75	16.02	97	123	116	113	99	114	18	14	14	15	17	14
South Central	408	241	260	227	242	215	17.74	17.89	18.61	17.80	17.90	16.15	118	149	98	148	149	135	15	12	19	12	12	12
Western	596	398	446	420	324	349	24.05	26.20	23.93	24.43	24.90	26.97	120	119	120	106	104	117	20	22	20	23	24	23
United States	4,616	3,759	3,545	3,119	2,400	2,898	21.88	22.41	21.33	21.30	21.01	21.07	122	132	112	118	124	124	18	17	19	18	17	17
Corn:																								
North Atlantic	585	432	317	319	206	399	41.99	44.23	42.70	38.91	38.88	35.52	102	87	91	85	88	85	41	51	47	46	44	42
South Atlantic	881	772	472	503	481	452	27.07	27.71	26.13	25.62	26.22	26.16	97	96	84	83	87	87	28	29	31	31	30	30
East North Central	1,690	1,664	1,394	1,110	811	921	25.60	27.35	26.06	26.00	25.75	26.36	75	56	61	68	63	68	34	49	43	38	41	39
West North Central	2,242	1,988	1,837	1,741	1,045	1,451	18.96	19.98	18.28	19.24	18.35	17.81	70	59	68	57	56	61	27	34	27	34	33	29
South Central	1,456	1,176	895	945	1,145	824	21.18	21.87	20.72	20.99	20.29	19.43	88	99	74	81	92	84	24	22	28	26	22	23
Western	299	150	205	160	102	103	18.58	20.77	19.59	21.80	18.75	21.73	88	83	93	84	82	80	21	25	21	26	23	27
United States	7,153	6,182	5,120	4,778	3,790	4,150	23.77	24.97	23.10	23.21	22.65	22.71	82	69	70	70	73	73	29	36	33	33	31	31
Oats:																								
North Atlantic	647	473	381	411	284	410	25.76	26.09	26.07	25.03	25.15	21.65	63	61	64	63	66	66	41	43	41	40	38	33
South Atlantic	421	351	230	239	201	196	20.12	21.28	20.31	20.27	20.43	20.82	75	76	70	72	70	74	27	28	29	28	29	28
East North Central	1,480	1,477	1,242	973	732	780	18.84	19.07	18.34	18.77	18.53	18.46	44	45	46	51	44	53	43	42	40	37	42	35
West North Central	2,029	1,798	1,587	1,464	998	1,234	16.43	16.38	15.01	15.91	15.98	14.95	44	46	56	50	44	48	37	36	27	32	36	31
South Central	510	347	361	259	246	256	16.23	16.90	17.71	15.98	16.55	15.94	58	77	47	67	59	61	28	22	38	24	28	26
Western	422	229	244	214	160	205	22.62	24.64	21.56	22.53	21.68	25.93	65	65	65	55	54	56	35	38	33	41	40	46
United States	5,509	4,675	4,045	3,590	2,621	3,081	18.93	19.01	17.99	18.47	18.40	17.87	50	51	53	54	50	54	38	37	34	34	37	33

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters.

[1] The States in the geographical divisions are as follows: North Atlantic—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. South Atlantic—Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. East North Central—Ohio, Indiana, Illinois, Michigan, and Wisconsin. West North Central—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas. Western—Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, and California.

TABLE 533.—*Index numbers of farm prices, 1910–1929: By groups, crop-year averages*

[August, 1909–July, 1914=100]

Year beginning July	Grains	Fruits and vegetables	Meat animals	Dairy products	Poultry products	Cotton and cottonseed	All groups
1910	95	96	94	98	95	114	98
1911	107	120	88	101	98	84	97
1912	93	87	104	101	97	93	97
1913	98	105	111	101	106	99	103
1914	120	85	108	99	104	69	101
1915	109	98	110	98	104	94	104
1916	172	186	143	112	138	148	146
1917	229	162	192	139	169	229	192
1918	226	170	210	162	364	234	203
1919	246	252	190	185	217	286	220
1920	164	163	140	170	191	140	152
1921	102	175	107	137	150	129	119
1922	111	129	110	141	142	194	130
1923	112	131	104	144	141	224	132
1924	155	134	125	131	158	188	142
1925	140	200	144	139	157	151	143
1926	124	153	142	137	148	106	129
1927	136	160	141	138	146	154	138
1928	119	119	158	141	154	150	137
1929	117	169	150	133	152	130	133

Bureau of Agricultural Economics.

See footnotes, Table 534.

TABLE 534.—*Index numbers of farm prices, United States, 1910–1930*

[August, 1909–July, 1914=100]

GRAINS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	110	112	112	109	107	106	107	106	102	97	92	90	104
1911	91	90	88	89	92	94	97	99	101	104	103	102	96
1912	104	107	110	116	123	122	115	106	100	95	87	82	106
1913	84	86	86	88	91	94	93	95	98	97	96	97	92
1914	97	98	99	100	101	100	97	104	111	110	108	111	103
1915	123	134	136	138	139	127	118	115	106	101	99	102	120
1916	112	115	111	111	113	110	113	127	138	147	158	157	126
1917	161	169	179	217	251	246	250	248	233	223	213	213	217
1918	218	227	234	235	231	227	228	230	229	222	216	217	226
1919	217	214	220	234	245	245	248	246	233	222	220	229	231
1920	241	242	246	261	277	283	266	252	222	193	157	138	231
1921	138	136	131	118	116	117	109	103	100	94	88	88	112
1922	91	102	111	114	115	111	105	100	97	101	106	111	105
1923	113	114	117	121	123	119	112	109	111	113	110	108	114
1924	110	113	114	113	114	116	130	141	140	150	147	155	129
1925	172	178	172	152	159	164	152	157	148	135	138	140	156
1926 [1]	143	140	133	131	131	130	125	128	121	123	121	120	129
1927 [1]	120	122	121	119	127	140	139	138	134	128	120	123	128
1928 [1]	125	128	136	144	160	152	142	120	117	116	110	112	130
1929 [1]	115	123	124	120	113	111	122	129	131	128	118	119	121
1930 [1]	118	115	107	110	105	106	92	101	109	92	80	80	100

[1] Kafir omitted.

TABLE 534.—*Index numbers of farm prices, United States, 1910–1930*—Continued

[August, 1909–July, 1914=100]

FRUITS AND VEGETABLES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	90	93	92	92	96	93	90	94	94	88	84	87	91
1911	92	94	97	106	108	121	129	125	109	94	93	102	106
1912	109	118	130	144	150	135	116	104	86	74	73	78	110
1913	79	81	81	83	92	99	103	102	96	97	96	97	92
1914	101	106	110	115	117	119	113	102	92	79	71	72	100
1915	75	78	77	82	90	91	89	85	76	79	84	89	83
1916	99	108	112	114	117	124	125	123	121	129	147	156	123
1917	167	208	241	265	283	270	219	165	146	150	155	156	202
1918	158	162	157	156	160	160	172	177	166	160	158	155	162
1919	154	156	167	179	197	205	216	219	194	186	187	206	189
1920	226	252	279	323	373	366	314	239	180	150	141	144	249
1921	136	127	125	124	132	140	156	178	171	162	162	165	148
1922	159	173	181	190	206	197	174	129	109	101	101	104	152
1923	117	122	130	146	157	161	165	151	131	123	114	114	136
1924	118	123	123	128	132	146	142	138	113	109	108	110	124
1925	122	131	138	146	162	184	178	178	142	152	194	194	160
1926 [2]	214	218	220	253	240	216	195	166	136	136	142	137	189
1927 [2]	140	142	140	147	158	201	195	172	145	138	136	141	155
1928 [2]	144	153	174	179	181	168	156	137	127	114	109	108	146
1929 [2]	109	111	112	110	119	120	136	160	160	168	159	163	136
1930 [2]	167	168	169	187	193	193	173	149	148	127	114	108	158

MEAT ANIMALS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	99	100	109	115	110	109	103	98	102	101	96	93	103
1911	96	93	92	88	84	82	83	88	88	84	83	82	87
1912	83	85	87	96	98	96	95	100	103	104	99	99	95
1913	99	103	109	113	109	110	111	110	109	110	108	107	108
1914	109	112	114	114	113	112	114	118	117	111	106	104	112
1915	103	101	101	103	106	107	106	105	106	108	101	98	104
1916	101	108	116	121	123	124	124	123	127	122	123	125	120
1917	131	144	162	177	179	177	173	178	190	194	186	190	173
1918	187	188	194	204	210	207	205	211	214	204	198	199	202
1919	201	204	211	224	227	221	228	227	197	185	177	173	206
1920	181	184	184	186	181	182	181	177	177	169	150	124	173
1921	123	119	125	114	111	105	109	112	101	98	92	91	108
1922	95	108	118	117	119	121	120	114	112	113	108	107	113
1923	110	110	110	110	108	103	105	104	112	106	100	98	106
1924	101	102	104	106	107	105	103	116	115	121	115	113	109
1925	123	126	145	146	139	139	148	149	143	141	136	136	139
1926	140	146	147	146	148	154	152	144	148	148	142	140	146
1927	140	143	144	143	137	129	131	136	142	145	141	138	139
1928	138	139	139	142	151	150	157	162	174	160	150	143	150
1929	146	150	160	164	164	163	167	165	156	151	144	143	156
1930	146	150	151	146	142	141	127	119	128	123	118	112	134

DAIRY PRODUCTS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	106	103	98	101	97	96	95	97	100	102	103	105	100
1911	104	99	96	94	92	90	92	95	97	97	101	104	97
1912	107	108	106	103	102	99	99	100	102	105	103	103	103
1913	102	100	100	99	98	96	96	102	106	100	104	104	100
1914	105	102	100	98	96	95	96	99	101	101	103	102	100
1915	102	101	98	97	97	94	93	95	96	98	100	102	98
1916	102	99	100	99	99	97	96	100	101	106	112	116	102
1917	115	117	116	119	123	120	119	123	129	138	142	146	125
1918	149	150	148	144	142	142	141	146	152	163	169	172	152
1919	173	165	164	166	166	166	167	170	175	181	190	197	173
1920	196	194	189	192	187	182	181	185	186	190	189	182	188
1921	172	165	160	154	141	132	133	138	140	146	148	147	148
1922	140	134	133	131	126	128	127	129	133	136	140	147	134
1923	151	151	148	147	142	142	139	142	145	153	157	155	148
1924	152	150	146	134	128	126	123	120	126	130	132	137	134
1925	134	134	137	132	132	130	131	135	137	146	146	146	137
1926	147	143	141	133	130	128	129	128	133	134	141	144	136
1927	144	143	139	140	136	132	130	129	135	139	141	145	138
1928	145	145	142	139	136	134	134	135	141	143	144	146	140
1929	145	144	144	142	139	135	135	137	139	141	142	140	140
1930	135	129	126	126	123	118	115	117	123	125	124	117	123

[2] Onions and cabbage omitted.

TABLE 534.—*Index numbers of farm prices, United States, 1910–1930*—Continued

[August, 1909–July, 1914=100]

POULTRY PRODUCTS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	130	116	98	91	90	89	88	90	98	109	120	129	104
1911	116	90	77	74	74	73	75	81	89	100	115	125	91
1912	127	118	97	84	82	81	83	88	97	109	123	124	101
1913	111	98	87	81	82	84	85	90	101	116	133	138	101
1914	130	119	99	86	85	87	89	95	105	112	123	133	105
1915	133	114	91	84	84	84	84	88	97	111	126	134	103
1916	127	110	95	90	93	96	99	106	120	137	156	166	116
1917	162	156	139	134	145	141	138	147	162	174	185	198	157
1918	210	201	168	150	148	149	160	172	185	205	229	247	185
1919	234	190	165	175	185	185	186	195	203	225	255	275	206
1920	267	236	205	189	186	185	191	204	222	243	267	272	222
1921	243	185	131	114	111	114	128	143	156	180	210	211	161
1922	176	140	118	110	114	113	111	114	132	159	187	198	139
1923	175	151	130	117	117	114	116	126	144	165	191	198	145
1924	162	157	109	105	109	115	121	132	153	176	203	217	147
1925	213	166	124	127	131	135	141	148	152	175	208	213	161
1926	172	145	128	133	135	138	137	137	155	173	202	212	156
1927	173	145	115	114	112	102	112	122	143	167	189	195	141
1928	177	144	122	121	128	127	134	140	156	168	185	197	150
1929	161	158	144	127	134	140	143	151	165	181	200	204	159
1930	178	154	115	117	110	103	101	107	125	129	146	127	126

COTTON AND COTTONSEED

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	116	113	113	113	114	113	113	115	112	111	113	115	113
1911	117	114	113	114	116	116	110	100	88	77	72	70	101
1912	71	76	81	85	89	89	93	92	89	88	91	97	87
1913	97	96	95	95	94	94	94	93	101	106	102	98	97
1914	96	99	99	98	100	101	100	86	66	58	54	57	85
1915	60	65	67	73	74	72	70	70	81	99	99	100	78
1916	100	100	99	102	104	107	109	115	128	144	163	160	119
1917	148	144	149	160	169	189	204	199	197	214	232	237	187
1918	244	249	257	251	235	234	235	246	264	253	236	235	245
1919	225	208	206	213	232	249	260	259	252	277	295	292	247
1920	293	295	298	304	303	301	297	266	218	175	132	101	248
1921	93	89	80	76	78	78	79	91	130	150	137	131	101
1922	129	128	131	135	144	160	166	166	160	168	186	195	156
1923	203	215	224	222	211	207	199	190	204	221	238	253	216
1924	255	247	219	226	222	219	215	219	175	182	179	176	211
1925	182	183	195	189	184	183	186	186	178	171	144	139	177
1926	138	142	133	135	130	132	126	130	134	94	88	81	122
1927	85	94	102	101	113	119	125	136	179	169	162	153	128
1928	152	141	147	154	166	162	170	153	142	147	146	148	152
1929	148	149	155	152	148	146	145	146	146	141	132	130	145
1930	128	121	113	120	119	115	99	94	83	76	80	73	102

ALL GROUPS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	106	105	107	108	105	104	102	102	102	101	99	99	103
1911	100	97	95	94	94	95	95	96	95	92	92	92	95
1912	94	97	99	104	107	104	101	100	98	97	95	95	99
1913	95	96	97	98	98	99	99	101	103	104	104	103	100
1914	104	105	104	104	104	104	103	104	102	98	96	97	102
1915	100	101	100	102	104	101	99	97	97	101	99	100	100
1916	104	106	108	110	111	112	113	117	123	128	137	139	117
1917	140	148	159	176	188	188	185	183	184	187	187	191	176
1918	194	197	199	200	198	196	197	203	207	204	200	201	200
1919	200	194	197	207	215	216	222	222	208	206	209	212	209
1920	219	221	222	230	235	234	224	209	194	178	158	140	205
1921	135	128	123	115	112	110	111	116	118	120	116	115	116
1922	114	118	123	123	127	128	126	120	119	123	126	131	124
1923	134	136	136	137	135	133	130	128	132	134	136	137	135
1924	137	136	131	130	129	130	132	139	132	138	137	139	134
1925	146	146	151	147	146	148	149	152	144	143	144	143	147
1926 [3]	143	143	140	140	139	139	136	133	134	130	130	127	136
1927 [3]	126	127	126	125	126	130	130	132	140	139	137	137	131
1928 [3]	137	135	137	140	148	145	145	139	141	137	134	134	139
1929 [3]	133	136	140	138	136	135	140	143	141	140	136	135	138
1930 [3]	134	131	126	127	124	123	111	108	111	106	103	97	117

Bureau of Agricultural Economics. Prices of farm production received by producers collected monthly from a list of about 12,000 special price reporters. This list is made up almost entirely of country-town dealers, elevator managers, buyers, and merchants.

The commodities by groups are as follows: Grains—wheat, corn, oats, barley, rye, kafir; fruits and vegetables—apples, oranges, grapefruit, potatoes, sweetpotatoes, beans, onions, cabbage; meat animals—beef cattle, calves, hogs, sheep, lambs; dairy products—butter (represents butter, butterfat, and cream), milk; poultry products—chickens, eggs; cotton and cottonseed; all groups includes also horses (represents horses and mules), hay, flax, tobacco, and wool.

[3] Kafir, onions, and cabbage omitted.

TABLE 535.—*Index numbers of prices paid by farmers, 1910-1930*

[Base 1910-1914=100]

Year or date	Commodities used in production: Feed	Machinery	Fertilizer	Building materials for other than house	Equipment and supplies	Seed [1]	All commodities bought for use in production	Wages paid to hired labor	Commodities bought for use in production plus wages paid to hired labor	Commodities bought for family maintenance [2]	All commodities bought for use in production and family maintenance	Taxes on farm property [3]
1910	92	101	97	100	101	------	98	97	98	98	98	------
1911	108	103	97	102	100	------	103	97	101	100	101	------
1912	90	100	102	103	100	105	98	101	99	101	100	------
1913	108	98	104	101	100	94	102	104	102	99	100	------
1914	103	98	101	93	99	101	99	101	100	102	101	100
1915	98	101	113	102	106	117	103	102	103	107	106	102
1916	129	111	122	118	129	112	121	112	119	125	123	104
1917	186	132	139	137	156	141	152	140	149	148	150	106
1918	196	160	173	161	180	188	176	176	176	180	178	118
1919	208	178	185	189	179	264	192	206	196	214	205	130
1920	133	188	189	205	188	149	175	239	189	227	206	155
1921	91	175	159	156	151	125	142	150	144	165	156	217
1922	118	156	131	159	139	133	140	146	142	160	152	232
1923	128	151	128	160	138	142	142	166	147	161	153	246
1924	135	155	122	159	131	148	143	166	148	162	154	249
1925	145	158	131	163	136	170	149	168	154	165	159	250
1926	120	156	129	163	142	190	144	171	150	164	156	253
1927	124	157	123	164	134	192	144	170	150	161	154	258
1928	133	158	133	161	131	179	146	169	151	162	156	262
1929	131	162	132	162	129	190	146	170	152	160	155	267
1930	119	159	128	158	124	169	140	152	142	151	146	------
1923:												
Jan. 15	121	149	123	158	137	138	138	137	138	158	150	------
Apr. 15	129	150	127	160	143	143	142	148	144	163	154	------
July 15	132	153	130	163	141	139	144	169	150	163	155	------
Oct. 15	131	153	130	161	130	146	142	174	149	162	154	------
1924:												
Jan. 15	127	154	127	160	130	142	141	159	145	163	154	------
Apr. 15	128	154	117	160	137	155	142	163	147	162	154	------
July 15	138	155	119	158	132	148	143	168	149	159	153	------
Oct. 15	148	155	125	159	125	148	145	171	151	161	155	------
1925:												
Jan. 15	154	157	127	161	126	163	149	156	150	164	158	------
Apr. 15	146	158	130	161	138	178	150	163	153	166	160	------
July 15	147	157	132	165	141	178	152	169	156	166	160	------
Oct. 15	134	157	134	164	140	159	147	173	153	165	158	------
1926:												
Jan. 15	126	155	130	162	140	183	145	159	148	165	157	------
Apr. 15	119	156	128	163	143	191	144	166	149	164	156	------
June 15	119	156	132	163	146	196	145	174	152	165	157	------
Sept. 15	122	156	127	162	144	188	145	176	152	163	156	------
Dec. 15	115	156	128	162	140	192	143	162	147	163	155	------
1927:												
Mar. 15	117	157	121	164	137	202	143	166	148	161	154	------
June 15	128	157	121	164	133	202	145	172	151	161	155	------
Sept. 15	130	157	125	164	133	181	145	175	152	161	154	------
Dec. 15	123	157	125	161	132	181	142	161	146	161	153	------
1928:												
Mar. 15	130	156	133	160	132	181	145	166	149	162	155	------
June 15	143	156	133	161	130	181	148	170	153	163	157	------
Sept. 15	131	156	132	162	131	177	144	175	151	163	156	------
Dec. 15	129	162	132	162	131	177	146	162	150	161	155	------
1929:												
Mar 15	136	162	134	163	129	201	148	167	153	161	156	------
June 15	128	162	134	163	129	201	146	173	152	160	155	------
Sept. 15	133	162	131	162	129	179	146	174	153	161	155	------
Dec. 15	127	163	131	162	129	179	145	159	148	160	154	------
1930:												
Mar. 15	120	161	128	161	126	169	141	162	146	157	151	------
June 15	121	160	128	160	126	169	141	160	145	154	149	------
Sept. 15	126	160	127	156	125	169	141	150	143	149	146	------
Dec. 15	109	154	127	153	122	169	135	129	133	142	139	------

Bureau of Agricultural Economics. Compiled from prices reported to the Department of Agriculture by retail dealers throughout the United States. The index numbers include only commodities bought by farmers; the commodities being weighted according to purchases reported by actual farmers in farm management and rural-life studies from 1920 to 1925.

[1] 1912-1914=100.

[2] Includes food, clothing, household operating expenses, furniture and furnishing, and building material for house.

[3] 1914=100.

TABLE 536.—*Index numbers of general trend of prices and wages 1910–1930*

[1910-1914=100]

Year and month	Wholesale prices of all commodities [1]	Industrial wages [2]	Prices paid by farmers for commodities used in— Living	Production	Living and production	Farm wages	Taxes [3]
1910	103		98	98	98	97	
1911	95		100	103	101	97	
1912	101		101	98	100	101	
1913	102		100	102	100	104	
1914	100		102	99	101	101	100
1915	103	101	107	103	106	102	102
1916	129	114	125	121	123	112	104
1917	180	129	148	152	150	140	106
1918	198	160	180	176	178	176	118
1919	210	185	214	192	205	206	130
1920	230	222	227	175	206	239	155
1921	150	203	165	142	156	150	217
1922	152	197	160	140	152	146	232
1923	156	214	161	142	153	166	246
1924	152	218	162	143	154	166	249
1925	162	223	165	149	159	168	250
1926	154	229	164	144	156	171	253
1927	149	231	161	144	154	170	258
1928	153	232	162	146	156	169	263
1929	151	236	160	146	155	170	267
1930	135	226	151	140	146	152	
1930							
January	146	234				159	
February	144	231					
March	142	235	157	141	151		
April	142	231				162	
May	140	228					
June	136	227	154	141	149		
July	132	224				160	
August	132	224					
September	132	227	149	141	146		
October	129	220				150	
November	126	215					
December	123	216	142	135	139		

Bureau of Agricultural Economics.

[1] Bureau of Labor Statistics. Index for 1930 obtained by multiplying new series by 156.6.
[2] Average weekly earnings, New York State factories. June, 1914=100.
[3] Index of estimate of total taxes paid on all farm property. 1914=100.

TABLE 537.—*Estimated average property tax per acre on farm real estate, by geographic divisions, and United States, 1924–1929*

Geographic division	1924	1925	1926	1927	1928	1929
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New England	0.95	0.96	1.00	1.03	1.05	1.07
Middle Atlantic	1.17	1.21	1.20	1.22	1.22	1.23
East North Central	1.34	1.34	1.35	1.38	1.37	1.40
West North Central	.69	.68	.69	.70	.71	.72
South Atlantic	.46	.48	.51	.52	.52	.54
East South Central	.45	.45	.46	.46	.47	.48
West South Central	.32	.32	.32	.33	.34	.35
Mountain	.22	.23	.23	.23	.23	.24
Pacific	.92	.93	.95	.97	1.01	1.01
United States	.64	.64	.65	.66	.67	.68

Bureau of Agricultural Economics. Average tax per acre in 1924 based on the 1925 Census of Agriculture. Trends in the United States as a whole and in each geographic division since 1924 are based on weighted averages of replies to questionnaires sent each year to farmers in all parts of the country.

TABLE 538.—*Farm wage rates and index numbers, 1866–1930*

[1910-1914=100]

Year	Average yearly farm wage[1]: Per month—With board	Per month—Without board	Per day—With board	Per day—Without board	Weighted average wage rate per month[2]	Index numbers of farm wages
	Doll.	*Doll.*	*Doll.*	*Doll.*	*Doll.*	
1866[3]	10.09	15.50	0.64	0.90	13.14	55
1869	9.97	15.50	.63	.87	12.93	54
1874 or 1875	11.16	17.10	.68	.94	14.19	59
1877 or 1879[4]	10.86	16.79	.61	.84	13.34	56
1879 or 1880	11.70	17.53	.64	.89	14.14	59
1880 or 1881	12.32	18.52	.67	.92	14.82	62
1881 or 1882	12.88	19.11	.70	.97	15.48	65
1884 or 1885	13.08	19.22	.71	.96	15.58	65
1887 or 1888	13.29	19.67	.72	.98	15.87	66
1889 or 1890	13.29	19.45	.72	.97	15.79	66
1891 or 1892	13.48	20.02	.73	.98	16.06	67
1893	13.85	19.97	.72	.92	15.93	67
1894	12.70	18.57	.65	.84	14.60	61
1895	12.75	18.74	.65	.85	14.69	62
1898	13.29	19.16	.71	.94	15.58	65
1899	13.90	19.97	.75	.99	16.34	68
1902	15.51	22.12	.83	1.09	18.12	76
1906	18.73	26.19	1.03	1.32	21.92	92
1909	20.48	28.09	1.04	1.31	23.00	96
1910	19.58	28.04	1.07	1.40	23.08	97
1911	19.85	28.33	1.07	1.40	23.25	97
1912	20.46	29.14	1.12	1.44	24.01	101
1913	21.27	30.21	1.15	1.48	24.83	104
1914	20.90	29.72	1.11	1.44	24.26	101
1915	21.08	29.97	1.12	1.45	24.46	102
1916	23.04	32.58	1.24	1.60	26.83	112
1917	28.64	40.19	1.56	2.00	33.42	140
1918	35.12	49.13	2.05	2.61	42.12	176
1919	40.14	56.77	2.44	3.10	49.11	206
1920	47.24	65.05	2.84	3.56	57.01	239
1921	30.25	43.58	1.66	2.17	35.77	150
1922	29.31	42.09	1.64	2.14	34.91	146
1923	33.09	46.74	1.91	2.45	39.64	166
1924[5]	33.34	47.22	1.88	2.44	39.67	166
1925[5]	33.88	47.80	1.89	2.46	40.12	168
1926[5]	34.86	48.86	1.91	2.48	40.88	171

Year	Average yearly farm wage[1]: Per month—With board	Per month—Without board	Per day—With board	Per day—Without board	Weighted average wage rate per month[2]	Index numbers of farm wages
	Doll.	*Doll.*	*Doll.*	*Doll.*	*Doll.*	
1927[5]	34.58	48.63	1.90	2.46	40.60	170
1928[5]	34.66	48.65	1.88	2.43	40.44	169
1929[5]	34.74	49.08	1.88	3.42	40.52	170
1930[5]	31.14	44.59	1.65	2.16	36.24	152
1923—January	27.87	40.50	1.46	1.97	32.61	137
April	30.90	44.41	1.55	2.09	35.42	148
July	34.64	48.61	1.84	2.44	40.30	169
October	34.56	48.42	2.02	2.58	41.52	174
1924—January	31.55	45.53	1.79	2.38	38.01	159
April	33.57	47.38	1.77	2.34	38.95	163
July	34.34	48.02	1.87	2.43	40.15	168
October	34.38	48.46	1.93	2.51	40.81	171
1925—January	31.07	45.04	1.74	2.31	37.24	156
April	33.86	47.40	1.77	2.33	39.04	164
July	34.94	48.55	1.89	2.44	40.62	170
October	34.91	48.99	1.95	2.53	41.28	173
1926—January	31.82	46.26	1.76	2.33	37.94	159
April	34.38	48.40	1.78	2.35	39.56	166
July	36.10	49.89	1.91	2.47	41.55	174
October	36.00	50.10	1.97	2.55	42.10	176
1927—January	32.94	47.07	1.79	2.36	38.79	162
April	34.53	48.47	1.78	2.37	39.71	166
July	35.59	49.52	1.89	2.44	41.07	172
October	35.68	49.77	1.96	2.51	41.71	175
1928—January	32.50	46.75	1.76	2.34	38.35	161
April	34.46	48.44	1.78	2.34	39.56	166
July	35.39	49.32	1.84	2.39	40.55	170
October	35.75	49.60	1.96	2.51	41.71	175
1929—January	33.04	47.24	1.78	2.34	38.75	162
April	34.68	49.00	1.79	2.34	39.80	167
July	36.08	50.53	1.89	2.43	41.42	173
October	35.90	50.09	1.92	2.46	41.49	174
1930—January	32.29	46.80	1.73	2.27	37.88	159
April	33.83	47.81	1.72	2.27	38.66	162
July	33.47	47.24	1.72	2.23	38.26	160
October	31.23	44.28	1.61	2.12	35.90	150

Bureau of Agricultural Economics.

[1] Yearly averages are from reports by crop reporters, giving average wages for the year in their localities.
[2] This column has significance only as an essential step in computing the wage index.
[3] Years 1866 to 1878 in gold.
[4] 1877 or 1878, 1878 or 1879 (combined).
[5] Weighted average of quarterly reports, April (weight 1), July (weight 5), October (weight 5), and January of the following year (weight 1).

TABLE 539.—*Male farm labor, by States, quarterly, 1930*

State and division	Per month, with board				Per month, without board				Per day, with board [1]				Per day, without board [1]			
	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.
	Dol.	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Maine	45.00	44.00	47.75	45.00	65.00	64.00	67.00	66.00	2.25	2.25	2.35	2.60	2.95	3.00	3.10	3.20
New Hampshire	45.00	46.00	46.00	45.00	69.00	72.00	74.00	73.00	2.40	2.50	2.40	2.35	3.35	3.35	3.35	3.20
Vermont	47.00	47.00	45.00	44.00	68.00	70.00	67.75	67.75	2.40	2.30	2.45	2.30	3.25	3.15	3.25	3.10
Massachusetts	50.00	49.00	51.75	48.75	81.00	78.00	78.50	78.50	2.55	2.65	2.80	2.35	3.70	3.65	3.70	3.45
Rhode Island	56.00	62.00	55.25	52.50	87.00	82.00	84.75	81.00	2.70	2.85	2.85	2.70	3.45	3.70	3.60	3.60
Connecticut	54.00	53.00	47.00	47.00	85.00	84.00	80.50	77.25	2.70	2.80	2.50	2.45	3.75	3.65	3.60	3.55
New York	44.75	46.50	47.25	45.00	66.75	67.50	67.50	64.75	2.65	2.70	2.75	2.70	3.25	3.55	3.50	3.50
New Jersey	46.00	48.00	50.00	45.25	73.00	72.75	78.00	71.25	2.75	2.70	2.70	2.70	3.65	3.55	3.40	3.40
Pennsylvania	39.75	39.00	39.00	36.00	59.50	58.50	58.25	54.25	2.45	2.35	2.40	2.25	3.20	3.10	3.05	2.90
North Atlantic	44.57	45.05	45.43	42.89	67.46	67.23	67.62	64.65	2.55	2.55	2.59	2.50	3.31	3.38	3.34	3.27
Ohio	36.00	36.00	35.00	32.75	53.00	52.00	51.00	48.25	2.25	2.15	2.05	2.05	2.95	2.85	2.75	2.70
Indiana	35.50	36.50	34.50	32.25	48.00	48.00	47.00	43.25	2.05	2.00	1.95	1.85	2.60	2.55	2.45	2.40
Illinois	40.00	41.00	39.50	38.00	52.00	52.50	50.00	49.25	2.10	2.15	2.05	1.90	2.65	2.70	2.50	2.45
Michigan	38.50	38.50	36.00	32.50	56.50	55.50	52.00	47.75	2.45	2.35	2.10	1.95	3.15	3.05	2.80	2.60
Wisconsin	37.75	44.00	43.50	40.25	55.25	62.25	59.25	56.25	2.10	2.15	2.15	2.00	2.80	2.85	2.80	2.65
North Central East	37.69	39.37	37.93	35.50	52.82	53.97	51.80	49.13	2.18	2.15	2.06	1.95	2.81	2.79	2.65	2.56
Minnesota	30.00	43.00	42.50	40.25	47.00	58.00	57.50	54.75	1.95	2.15	2.15	2.15	2.70	2.90	2.90	2.85
Iowa	40.00	48.00	47.25	44.50	53.50	58.75	58.00	55.10	2.30	2.35	2.35	2.20	2.85	3.00	2.95	2.85
Missouri	33.50	32.75	33.25	31.25	45.00	44.25	44.00	41.50	1.50	1.60	1.65	1.55	2.15	2.10	2.05	2.00
North Dakota	26.00	40.00	41.00	37.50	43.50	57.75	56.25	53.50	1.65	1.95	1.85	1.85	2.50	2.80	2.75	2.70
South Dakota	35.75	47.25	46.50	43.00	55.50	64.00	62.25	57.00	2.25	2.30	2.30	2.20	2.95	3.35	3.15	2.90
Nebraska	41.50	43.50	42.75	41.00	56.00	58.00	57.75	54.25	2.30	2.30	2.35	2.25	3.10	3.00	3.15	2.90
Kansas	36.00	36.75	37.00	34.50	51.25	52.00	52.50	49.00	2.25	2.15	2.45	2.00	2.90	2.85	3.10	2.70
North Central West	34.83	41.03	40.86	38.41	49.63	54.69	54.18	51.11	1.99	2.08	2.12	2.00	2.67	2.77	2.77	2.64
Delaware	31.00	31.25	33.25	33.25	48.00	47.00	49.00	45.00	2.10	2.00	2.05	2.05	2.55	2.50	2.55	2.55
Maryland	35.25	34.25	34.50	34.25	50.50	49.50	49.25	49.00	1.95	1.85	1.95	1.85	2.55	2.45	2.55	2.40
Virginia	28.00	30.00	28.00	26.75	40.00	43.00	41.00	38.50	1.50	1.50	1.50	1.40	1.95	1.95	1.95	1.85
West Virginia	31.00	30.25	30.25	28.50	45.75	45.75	44.00	43.25	1.55	1.50	1.45	1.35	2.10	2.05	2.05	1.90
North Carolina	25.00	23.75	23.25	22.25	35.00	34.00	33.25	31.25	1.35	1.25	1.25	1.10	1.75	1.65	1.55	1.45
South Carolina	18.75	18.50	18.50	16.50	26.75	26.25	26.00	24.25	.95	.90	.85	.80	1.20	1.15	1.10	1.05
Georgia	17.00	17.75	18.25	17.00	27.00	26.00	26.00	24.50	.95	.95	.95	.85	1.25	1.20	1.20	1.10
Florida	23.75	22.00	22.25	20.50	36.50	35.00	35.25	35.00	1.10	1.10	1.15	1.00	1.55	1.60	1.50	1.50
South Atlantic	23.28	23.30	23.05	21.75	34.12	33.88	33.28	31.65	1.24	1.20	1.20	1.10	1.62	1.57	1.55	1.46
Kentucky	25.75	26.25	26.00	24.25	35.75	36.25	35.75	34.25	1.25	1.25	1.25	1.20	1.65	1.65	1.60	1.55
Tennessee	23.25	24.75	24.25	21.50	32.25	33.50	33.75	30.25	1.15	1.15	1.15	1.05	1.45	1.50	1.40	1.30
Alabama	20.00	20.00	19.00	17.00	28.00	29.00	30.00	25.00	1.10	1.05	.95	.85	1.40	1.40	1.25	1.10
Mississippi	22.25	21.75	22.00	17.75	32.25	31.25	30.50	25.75	1.10	1.10	1.10	.85	1.50	1.50	1.45	1.15
Arkansas	23.50	24.00	25.00	21.00	35.50	34.50	35.75	26.25	1.20	1.20	1.15	1.00	1.60	1.60	1.50	1.40
Louisiana	24.25	23.25	22.75	20.50	35.75	34.75	32.75	30.25	1.15	1.10	1.05	1.00	1.50	1.45	1.40	1.30
Oklahoma	27.25	27.90	27.50	25.00	40.25	40.00	40.00	36.25	1.50	1.45	1.60	1.30	2.00	1.95	1.90	1.70
Texas	28.50	27.50	27.25	25.50	40.75	39.75	39.75	36.75	1.35	1.35	1.35	1.20	1.80	1.70	1.75	1.60
South Central	24.75	24.71	24.48	21.96	35.53	35.30	35.27	31.23	1.23	1.22	1.21	1.07	1.63	1.60	1.55	1.40
Montana	44.75	50.50	47.00	45.00	65.75	67.50	67.25	60.00	2.40	2.50	2.40	2.20	3.30	3.30	3.35	3.05
Idaho	49.25	56.50	55.75	52.50	71.00	76.00	73.00	73.00	2.35	2.55	2.55	2.50	3.20	3.25	3.15	3.15
Wyoming	49.00	49.50	47.75	47.75	68.50	71.00	70.75	67.50	2.40	2.30	2.35	2.35	3.30	3.40	3.25	3.25
Colorado	35.00	40.75	41.00	40.50	61.75	63.00	55.75	57.00	2.45	2.35	2.15	2.15	2.95	2.90	3.00	2.90
New Mexico	36.00	35.50	38.50	37.75	53.25	52.25	55.25	52.00	1.80	1.75	1.85	1.70	2.20	2.10	2.20	2.10
Arizona	50.00	53.00	48.50	48.50	68.00	76.00	75.25	70.00	1.95	1.90	2.10	2.10	2.65	2.60	2.50	2.50
Utah	55.00	58.50	61.75	56.25	75.00	76.25	80.50	75.00	2.30	2.60	2.55	2.40	3.00	2.95	3.15	3.00
Nevada	65.00	60.00	65.00	54.00	85.00	86.00	86.75	84.50	2.50	2.40	2.35	2.35	3.50	3.40	3.35	3.00
Washington	46.50	50.00	46.75	43.75	71.25	74.25	71.25	69.75	2.50	2.55	2.45	2.25	3.50	3.60	3.50	3.40
Oregon	43.25	49.25	48.25	48.00	68.25	73.50	68.50	69.50	2.40	2.35	2.40	2.40	2.95	3.10	3.10	3.40
California	61.00	63.00	63.00	60.00	89.00	90.00	91.00	88.00	2.50	2.50	2.60	2.60	3.50	3.55	3.60	3.40
Western	50.66	53.99	53.52	51.23	75.10	77.27	76.36	73.97	2.38	2.39	2.42	2.36	3.19	3.22	3.25	3.14
United States	32.29	33.83	33.47	31.23	46.80	47.81	47.24	44.28	1.73	1.72	1.72	1.61	2.27	2.27	2.23	2.12

Bureau of Agricultural Economics. As reported by field and crop reporters.

[1] Includes piecework.

TABLE 540.—*Farm real estate: Index numbers of estimated value per acre, by geographic divisions and States, 1912–1930* [1]

[1912–1914=100 per cent]

Geographic division and State	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
United States	97	100	103	103	108	117	129	140	170	157	139	135	130	127	124	119	117	116	115
Geographic divisions:																			
New England	99	101	100	99	102	112	117	123	140	135	134	130	128	127	128	127	127	126	127
Middle Atlantic	98	100	102	100	104	112	117	121	136	127	118	116	114	114	113	111	110	109	106
E. North Central	97	100	103	104	110	116	127	135	161	151	132	128	121	116	111	104	101	100	96
W. North Central	97	100	103	105	114	122	134	147	184	174	150	142	132	126	121	115	113	112	109
South Atlantic	98	100	103	98	108	119	135	161	198	174	146	152	151	148	149	137	134	132	128
E. South Central	97	100	103	99	109	120	140	162	199	163	149	149	142	141	139	133	130	129	128
W. South Central	96	100	104	100	103	116	134	143	177	159	136	132	136	144	144	139	137	136	136
Mountain	98	102	100	98	98	106	117	130	151	133	122	115	110	105	103	101	101	101	102
Pacific	94	99	106	107	111	122	129	134	156	155	151	148	147	146	144	143	142	142	142
New England:																			
Maine	100	102	98	96	98	110	115	124	142	132	127	129	127	124	126	124	124	122	124
New Hampshire	97	101	102	101	98	103	111	116	129	123	126	111	109	111	113	112	112	111	111
Vermont	101	101	98	104	115	127	133	136	150	150	145	134	130	125	126	125	123	123	123
Massachusetts	98	100	102	98	100	110	114	119	140	134	134	132	131	132	134	131	131	131	131
Rhode Island	100	101	100	102	106	112	118	123	130	130	127	124	126	128	130	133	134	134	134
Connecticut	98	100	102	100	102	110	116	121	137	134	140	137	140	137	137	138	139	139	140
Middle Atlantic:																			
New York	98	100	102	100	103	109	115	118	133	123	116	115	112	111	109	108	106	105	103
New Jersey	98	100	102	100	102	111	115	119	130	130	121	115	120	124	129	128	127	127	125
Pennsylvania	98	100	102	100	105	114	119	124	140	131	120	118	116	114	114	112	111	110	107
East North Central:																			
Ohio	98	100	102	107	113	119	131	135	159	134	124	122	118	110	105	99	96	94	90
Indiana	97	100	103	102	110	116	128	135	161	148	120	116	108	102	95	87	84	83	80
Illinois	97	100	103	102	105	111	119	130	160	153	126	123	116	115	109	99	96	95	91
Michigan	98	99	103	105	111	120	134	137	154	152	148	145	138	133	129	127	125	124	121
Wisconsin	97	100	103	104	117	124	133	143	171	168	154	147	139	130	125	122	120	119	117
West North Central:																			
Minnesota	95	100	105	107	122	138	155	167	213	212	187	177	170	159	155	145	140	138	133
Iowa	96	99	104	112	128	134	145	160	213	197	162	156	143	136	130	121	117	116	113
Missouri	97	100	103	102	108	115	125	137	167	156	133	127	117	112	104	99	96	95	92
North Dakota	97	100	103	103	112	118	124	130	145	141	136	128	114	109	105	100	99	98	95
South Dakota	96	101	103	101	108	116	126	145	181	173	146	126	117	115	107	97	96	95	93
Nebraska	98	100	102	101	104	110	127	145	179	166	144	139	128	123	123	119	117	116	113
Kansas	101	99	99	103	109	115	122	132	151	149	130	127	118	115	113	113	113	113	113
South Atlantic:																			
Delaware	100	101	99	100	105	115	124	129	139	129	119	119	107	112	114	111	111	111	111
Maryland	97	100	103	104	109	118	129	136	166	146	141	136	133	131	130	126	124	123	123
Virginia	97	100	103	97	117	125	142	167	189	180	157	170	162	154	148	138	137	136	134
West Virginia	97	100	103	101	104	112	122	135	154	141	125	127	125	120	116	110	109	108	105
North Carolina	97	99	104	102	114	130	152	176	223	196	166	195	192	187	185	178	172	165	158
South Carolina	101	98	101	94	98	107	122	162	230	186	126	128	136	138	128	113	110	110	104
Georgia	98	101	101	94	105	116	131	172	217	172	136	125	123	116	112	104	102	101	100
Florida	96	99	105	97	103	109	126	143	178	176	157	155	163	172	223	183	176	174	172
East South Central:																			
Kentucky	97	100	103	100	111	127	146	170	200	172	151	147	141	140	139	134	130	129	127
Tennessee	96	100	104	100	110	121	145	168	200	169	154	158	148	137	134	130	127	125	123
Alabama	98	98	103	98	98	103	128	143	177	147	135	143	144	154	154	145	145	143	143
Mississippi	97	102	102	97	111	121	131	155	218	150	148	143	134	136	134	126	123	122	122
West South Central:																			
Arkansas	98	101	101	95	109	129	149	169	222	186	174	170	160	160	153	150	147	145	141
Louisiana	99	102	99	95	106	112	143	157	198	163	140	144	137	141	143	135	132	132	132
Oklahoma	98	101	101	95	104	114	130	140	166	160	139	133	125	131	130	128	127	127	127
Texas	95	100	105	103	103	115	133	141	174	156	133	128	137	146	146	141	139	138	138
Mountain:																			
Montana	97	100	103	100	94	100	106	114	126	105	96	87	81	75	72	70	71	72	72
Idaho	100	101	99	96	99	114	130	146	172	162	136	133	129	123	119	117	116	116	116
Wyoming	97	103	100	103	94	97	121	147	176	146	134	121	112	100	95	94	95	96	98
Colorado	98	103	98	93	102	107	110	118	141	132	123	113	98	92	89	82	82	82	83
New Mexico	100	104	96	100	96	111	118	127	144	125	115	110	110	108	106	108	108	109	110
Arizona	95	100	105	97	95	105	125	140	165	148	135	124	128	121	125	123	122	123	123
Utah	100	102	98	98	104	117	122	144	167	137	133	133	131	130	129	128	127	127	126
Nevada	96	100	103	102	99	96	103	117	135	123	119	112	108	102	99	99	99	99	99
Pacific:																			
Washington	98	100	103	100	102	112	118	122	140	132	124	117	115	113	112	111	110	110	110
Oregon	97	100	103	99	100	104	112	118	130	130	122	115	113	110	107	106	106	106	107
California	93	99	108	111	116	130	136	142	167	168	166	165	164	164	163	162	161	160	160

Bureau of Agricultural Economics. Based on values as reported by crop reporters. Values as reported by the census for 1910, 1920, and 1925 will be found in Table 511 of the 1927 Yearbook.

[1] All farm land with improvements, as of Mar. 1. Owing to rounding of figures, 1912–1914 will not always equal exactly 100 per cent.

TABLE 541.—*Number of farms per 1,000 changing ownership by various methods, by States and geographic divisions, 12 months ended March 15, 1927–1930*

Geographic division and State	Voluntary sales and trades [1]				Forced sales and related defaults												Inheritance and gift				Administrators' and executors' sales [3]				Miscellaneous and unclassified				Total, all classes			
					Delinquent taxes				Foreclosure of mortgages, bankruptcy, etc. [2]				Total																			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
United States	28.3	26.3	23.5	23.7	5.1	5.2	4.7	5.1	18.2	17.6	14.8	15.7	23.3	22.8	19.5	20.8	8.8	8.9	8.5	9.3	7.0	6.7	5.4	6.1	1.1	1.3	1.1	1.6	68.5	66.0	58.0	61.5
New England	32.4	34.9	30.4	30.7	3.8	3.0	3.6	3.9	8.6	7.7	7.3	7.3	12.4	10.7	10.9	11.2	9.9	10.4	9.6	10.3	7.5	7.1	6.5	6.1	.7	1.0	.8	1.9	62.9	64.1	58.2	60.2
Middle Atlantic	37.0	33.7	28.2	28.2	3.0	3.4	3.6	3.5	8.8	8.4	8.4	9.6	11.8	11.8	12.0	13.1	8.8	8.6	8.0	8.2	8.7	8.2	7.2	7.0	1.5	1.8	1.2	1.4	67.8	64.1	56.6	58.0
East North Central	25.8	24.0	21.0	20.8	3.8	4.2	3.3	4.8	16.6	16.5	15.8	17.5	20.4	20.7	19.1	22.3	9.8	9.7	8.9	9.4	9.1	8.3	6.7	7.8	1.4	1.2	1.3	1.3	66.5	63.9	57.0	61.6
West North Central	24.3	23.9	22.4	22.9	5.3	5.1	3.6	4.2	26.7	27.3	22.3	23.3	32.0	32.4	25.9	27.5	8.1	8.4	8.5	9.8	6.5	6.5	6.1	6.2	1.3	1.5	1.2	1.6	72.2	72.7	64.1	68.0
South Atlantic	24.2	20.0	18.3	18.2	6.9	6.9	9.0	8.4	14.1	16.4	14.0	14.8	21.0	23.3	23.0	23.2	10.2	10.6	10.4	11.4	7.7	7.9	7.5	7.9	.9	1.1	1.1	2.0	64.0	62.9	60.3	62.7
East South Central	29.3	27.5	23.4	23.9	5.8	5.4	4.0	4.9	15.9	14.6	11.2	11.2	21.7	20.0	15.2	16.1	9.3	9.2	8.8	9.3	7.5	6.6	5.4	5.8	.8	1.1	.9	1.4	68.6	64.4	53.7	56.5
West South Central	31.1	27.9	25.5	24.2	3.8	4.1	3.2	3.4	16.1	14.4	12.0	13.4	19.9	18.5	15.2	16.8	7.8	7.8	7.2	7.6	4.4	4.2	3.6	3.3	.7	1.2	1.0	1.4	63.9	59.6	52.5	53.3
Mountain	33.7	34.8	35.6	38.7	9.5	12.0	10.8	11.2	35.8	27.4	18.3	18.2	45.3	39.4	29.1	29.4	5.8	5.6	6.0	7.0	4.4	3.7	4.1	4.7	2.3	1.9	1.4	1.9	91.5	85.4	76.2	81.7
Pacific	36.3	34.3	28.3	30.1	4.5	4.2	3.9	3.0	15.6	15.7	13.6	12.2	20.1	19.9	17.5	15.2	6.9	7.1	6.5	7.3	4.0	4.4	3.7	3.6	1.4	1.4	1.5	1.4	68.7	67.1	57.5	57.6
New England:																																
Maine	32.8	33.2	29.1	29.7	6.0	5.2	7.8	7.4	10.5	8.8	11.0	9.6	16.5	14.0	18.8	17.0	11.8	11.5	12.9	13.0	6.5	5.7	4.5	4.5	.6	1.0	.4	2.3	68.2	65.4	65.7	66.5
New Hampshire	33.5	37.8	29.7	31.8	5.0	5.1	2.5	5.4	8.8	9.0	4.6	5.4	13.8	14.1	7.1	10.8	8.4	7.9	7.3	7.4	6.0	5.0	5.7	4.9	.4	.5	.5	2.1	62.1	65.3	50.3	57.0
Vermont	42.6	40.6	33.7	37.5	1.7	1.2	.9	1.3	10.8	8.8	8.0	8.5	12.5	10.0	8.9	9.8	10.4	10.9	8.5	7.7	9.8	10.2	12.0	12.0	1.0	1.5	1.4	2.0	76.3	73.2	64.5	69.0
Massachusetts	28.0	35.1	32.6	28.2	2.0	1.3	2.2	2.4	6.0	5.7	6.2	7.4	8.0	7.0	8.4	9.8	8.3	9.5	8.3	9.6	6.8	6.0	4.0	5.0	.3	.9	1.4	1.9	51.4	58.5	54.7	54.5
Rhode Island	35.0	30.0	25.8	31.0	4.0	1.2	1.0	.8	6.5	2.5	5.5	2.3	10.5	3.7	6.5	3.1	9.0	8.9	10.8	7.0	8.0	5.0	2.0	2.0	.0	.5	.0	.3	62.5	48.1	45.1	43.4
Connecticut	23.9	29.7	27.8	27.2	3.0	1.0	.9	1.0	6.0	3.0	3.0	3.2	9.0	4.0	3.9	4.2	9.0	11.0	7.3	12.0	9.1	10.5	9.0	5.6	1.5	.8	.4	1.2	52.5	56.0	48.4	50.2
Middle Atlantic:																																
New York	37.5	35.6	30.1	30.4	3.9	5.2	5.2	5.0	12.7	12.2	12.0	11.6	16.6	17.4	17.2	16.6	10.4	9.2	8.1	8.1	8.0	7.5	5.9	5.9	1.8	1.9	1.5	1.3	74.3	71.6	62.8	62.3
New Jersey	54.4	44.4	30.8	30.6	3.4	4.0	2.0	2.2	6.0	6.9	4.0	5.4	9.4	10.9	6.0	7.6	7.0	7.2	6.2	6.2	6.8	9.3	5.0	5.7	.4	.9	.8	.7	78.0	72.7	48.8	50.8
Pennsylvania	34.0	30.2	26.0	26.0	2.1	1.7	2.4	2.3	5.6	5.5	5.6	8.4	7.7	7.2	8.0	10.7	7.6	8.2	8.1	8.5	9.6	8.6	8.8	8.2	1.3	1.9	1.0	1.5	60.2	56.1	51.9	54.9
East North Central:																																
Ohio	30.8	27.3	23.1	22.7	2.1	1.8	1.5	1.8	11.5	11.4	13.3	13.5	13.6	13.2	14.8	15.3	9.0	9.1	9.2	9.5	9.7	9.2	8.3	8.4	1.2	1.0	1.0	.9	64.3	59.8	56.4	56.8
Indiana	25.8	23.6	19.2	19.2	5.4	6.3	5.4	7.1	16.9	17.3	15.7	20.5	22.3	23.6	21.1	27.6	10.5	9.9	10.0	11.2	10.5	9.8	7.6	10.2	1.0	.8	1.2	2.2	70.1	67.7	59.1	70.4
Illinois	21.7	20.0	19.7	18.8	1.8	3.1	1.9	3.9	16.8	17.9	16.7	17.2	18.6	21.0	18.6	21.1	12.4	12.7	11.9	12.7	11.0	9.5	8.4	9.6	1.4	1.0	.5	1.0	65.1	64.2	59.1	63.2
Michigan	30.5	30.5	24.8	24.9	6.4	7.0	4.7	8.9	18.8	18.0	17.1	21.2	25.2	25.0	21.8	30.1	9.8	10.0	7.3	7.5	7.9	6.9	4.1	5.6	1.2	1.5	2.1	1.0	74.6	73.9	60.1	69.1
Wisconsin	19.8	18.2	18.1	18.1	4.0	3.7	3.5	3.3	20.5	19.0	16.5	16.4	24.5	22.7	20.0	19.7	6.9	6.2	5.7	5.5	5.8	5.4	4.6	4.6	2.0	1.8	1.9	1.8	59.0	54.3	50.3	49.7
West North Central:																																
Minnesota	18.5	18.4	16.8	17.7	4.5	5.5	3.7	3.7	24.7	26.4	26.4	27.9	29.2	31.9	30.1	31.6	6.7	6.3	6.6	8.8	5.3	4.3	4.2	5.3	1.7	1.5	.8	2.1	61.4	62.4	58.5	65.5
Iowa	18.7	17.2	17.4	17.6	2.5	2.3	2.0	2.2	27.3	28.1	25.2	25.1	29.8	30.4	27.2	27.3	8.5	8.6	8.6	9.1	7.0	7.6	7.1	7.4	1.2	1.4	1.3	1.7	65.2	65.2	61.6	63.1
Missouri	29.9	27.7	26.7	26.1	4.0	3.7	3.5	5.4	22.7	24.1	21.7	24.6	26.7	27.8	25.2	30.0	9.5	9.6	10.1	12.0	6.6	6.8	5.7	5.5	1.1	1.8	1.0	1.7	73.8	73.7	68.7	75.3
North Dakota	23.9	28.6	26.6	26.5	18.1	16.5	10.7	12.2	43.0	39.4	[4]32.0	30.1	61.1	55.9	[4]42.7	42.3	6.5	8.0	8.6	7.6	5.1	5.2	5.5	4.5	1.0	.8	1.8	1.5	97.6	98.5	85.2	82.4
South Dakota	20.8	26.9	21.1	21.1	15.0	11.1	7.8	7.9	51.1	46.8	27.2	27.1	66.1	57.9	35.0	35.0	8.0	8.1	8.2	9.1	5.5	5.2	5.8	5.6	1.3	1.5	1.7	1.6	101.7	99.6	71.8	72.4
Nebraska	26.2	26.4	26.5	27.8	3.2	3.4	1.9	1.1	25.3	24.9	15.7	15.9	28.5	28.3	17.6	17.0	8.0	8.4	8.6	8.7	7.8	9.2	8.1	7.1	1.4	2.0	1.6	1.3	71.9	74.3	62.4	61.9
Kansas	29.6	27.3	24.1	26.0	2.9	3.6	1.5	2.6	16.0	19.4	13.0	14.8	18.9	23.0	14.5	17.4	8.1	9.1	8.3	10.7	7.2	6.5	6.8	7.2	1.2	1.2	.8	1.2	65.0	67.1	54.5	62.5

South Atlantic:																																
Delaware	20.9	17.9	24.4	24.4	2.5	2.0	1.5	1.4	10.0	8.0	9.9	5.6	12.5	10.0	11.4	7.0	9.5	9.6	9.2	5.0	10.0	9.7	5.4	11.8	.5	.9	.2	.2	53.4	48.1	50.6	48.4
Maryland	30.0	28.5	23.6	20.6	5.0	3.8	5.1	7.2	12.2	13.6	13.6	13.4	17.2	17.4	18.7	20.6	9.4	8.1	9.8	11.7	9.2	7.8	10.8	10.2	.6	.8	.9	2.0	66.4	62.6	63.8	65.1
Virginia	19.3	17.3	16.3	16.3	2.5	2.6	3.5	2.6	11.8	12.0	10.6	10.4	14.3	14.6	14.1	13.0	10.2	11.0	9.1	10.1	6.8	7.2	6.2	7.1	.3	1.0	.9	1.5	50.9	51.1	46.6	48.0
West Virginia	28.2	22.5	19.1	23.6	9.4	10.2	10.0	12.0	7.8	7.6	6.6	7.5	17.2	17.8	16.6	19.5	13.8	13.0	12.3	13.7	6.8	5.0	5.6	5.5	1.6	1.1	.9	2.5	67.6	59.4	54.5	64.8
North Carolina	21.3	19.1	19.2	19.1	8.6	8.4	13.7	10.8	11.5	14.0	15.0	15.0	20.1	22.4	28.7	25.8	11.1	10.1	12.7	12.7	8.8	8.8	8.5	8.7	1.6	1.1	1.2	2.6	62.9	61.5	70.3	68.9
South Carolina	14.7	14.1	14.4	14.2	8.1	8.6	11.7	15.5	22.6	27.6	22.2	25.0	30.7	36.2	33.9	40.5	8.0	11.5	9.0	13.3	7.0	9.2	8.0	7.3	.4	1.0	1.8	1.1	60.8	72.0	67.1	76.4
Georgia	24.0	21.3	17.9	17.5	8.2	6.0	7.7	5.5	19.7	23.7	17.4	18.5	27.9	29.7	25.1	24.0	10.7	11.9	9.9	10.2	9.0	9.9	9.3	9.7	.8	1.5	1.2	2.8	72.4	74.3	63.4	64.2
Florida	63.5	31.7	23.4	20.5	6.6	11.7	8.6	5.1	8.5	12.4	6.0	8.0	15.1	24.1	14.6	13.1	4.3	4.2	7.2	6.8	3.0	2.7	1.5	4.1	.5	.0	.3	.5	86.4	62.7	47.0	45.0
East South Central:																																
Kentucky	31.0	30.5	25.7	30.0	7.5	8.0	4.5	6.4	16.1	16.1	11.6	12.6	23.6	24.1	16.1	19.0	9.3	9.5	10.5	12.1	8.0	7.7	5.5	8.4	1.0	1.2	1.5	2.0	72.9	73.0	59.3	71.5
Tennessee	25.3	21.3	18.9	18.5	4.5	3.8	2.3	2.3	15.3	13.6	9.6	8.8	19.8	17.4	11.9	11.1	9.4	9.2	7.7	9.1	7.7	7.0	6.5	5.7	.8	1.1	.6	1.8	63.0	56.0	45.6	46.2
Alabama	30.3	27.8	23.1	20.6	1.5	1.5	1.2	1.5	14.2	12.8	9.7	9.7	15.7	14.3	10.9	11.2	9.2	9.0	7.7	6.8	6.6	5.9	3.8	3.8	.3	1.0	.6	.8	62.1	58.0	46.1	43.2
Mississippi	30.9	31.2	26.2	26.1	10.4	8.3	8.9	10.5	18.7	15.9	14.4	14.3	29.1	24.2	23.3	24.8	9.3	8.9	9.3	8.2	7.4	5.0	5.5	4.2	.9	1.0	1.0	.8	77.6	70.3	65.3	64.1
West South Central:																																
Arkansas	38.2	34.1	25.4	27.7	3.0	5.8	4.8	4.3	19.9	15.1	16.0	16.3	22.9	20.9	20.8	20.6	7.4	8.3	7.7	7.5	3.5	3.6	3.8	3.3	.6	1.4	1.2	1.8	72.6	68.3	58.9	60.9
Louisiana	29.4	29.0	29.5	28.8	4.8	5.3	6.0	7.6	16.1	18.4	14.0	14.2	20.9	23.7	20.0	21.8	9.1	10.5	11.4	12.7	9.0	8.8	5.9	6.7	.9	1.5	1.0	.9	69.3	73.5	67.8	70.9
Oklahoma	29.0	25.0	25.0	22.9	8.2	7.2	3.2	3.4	24.2	21.8	14.3	18.2	32.4	29.0	17.5	21.6	5.5	4.9	4.7	5.6	4.1	4.9	3.0	2.4	.9	1.3	1.4	.7	71.9	65.1	51.6	53.2
Texas	29.4	26.3	24.8	22.0	1.8	1.4	1.8	1.8	10.5	9.5	8.5	9.6	12.3	10.9	10.3	11.4	8.7	8.3	7.1	7.4	3.8	3.0	3.3	2.8	.6	1.0	.8	1.7	54.8	49.5	46.3	45.3
Mountain:																																
Montana	35.2	45.5	49.8	46.6	13.0	15.5	18.1	22.0	56.0	40.9	21.1	25.1	69.0	56.4	39.2	47.1	5.7	5.1	7.0	7.0	5.2	5.0	5.5	5.3	2.5	2.0	2.6	1.9	117.6	114.0	104.1	107.9
Idaho	26.5	34.5	29.0	30.4	8.1	14.5	10.7	9.8	32.6	28.5	20.9	20.9	40.7	43.0	31.6	30.7	5.1	7.0	5.8	6.1	3.2	4.9	4.0	4.0	2.3	2.3	.7	1.7	77.8	91.7	71.1	72.9
Wyoming	32.2	38.4	34.3	42.3	13.7	12.9	9.0	13.1	25.6	19.3	17.8	17.3	39.3	32.2	26.8	30.4	6.0	6.1	6.3	6.4	4.3	3.5	3.5	5.2	3.0	1.8	1.4	1.4	84.8	82.0	72.3	85.7
Colorado	35.7	30.0	37.6	39.5	10.2	12.0	12.0	9.4	36.3	26.1	21.6	18.8	46.5	38.1	33.6	28.2	6.8	5.9	7.3	9.0	5.3	2.8	4.8	5.8	1.6	2.0	1.7	3.2	95.9	78.8	85.0	85.7
New Mexico	50.1	35.9	35.9	44.2	5.4	5.4	6.0	4.1	30.3	20.6	12.4	12.4	35.7	26.0	18.4	16.5	5.6	4.6	4.6	7.3	3.9	2.9	2.2	2.0	3.9	2.2	.8	1.8	99.2	71.6	61.9	71.8
Arizona	30.0	39.3	34.4	41.1	5.5	5.1	3.0	1.7	40.3	38.7	20.4	19.3	45.8	43.8	23.4	21.0	5.8	5.4	3.8	6.2	3.8	2.4	2.0	3.4	3.2	1.4	1.0	1.0	88.6	92.3	64.6	72.7
Utah	22.0	23.0	18.2	27.2	9.5	13.9	7.0	10.9	16.0	13.8	9.5	8.3	25.5	27.7	16.5	19.2	5.0	4.5	4.4	4.0	4.1	3.1	4.1	5.7	1.4	.8	.3	.5	58.0	59.1	43.5	56.6
Nevada	23.8	21.7	25.7	29.5	2.0	1.4	1.0	1.2	24.6	18.3	9.8	12.0	26.6	19.7	10.8	13.2	3.5	5.2	5.0	7.0	3.0	4.0	3.0	2.8	1.0	1.7	2.0	1.2	57.9	52.3	46.5	53.7
Pacific:																																
Washington	35.7	35.5	29.7	29.6	8.7	8.0	5.3	5.7	20.3	15.3	13.9	13.4	29.0	23.3	19.2	19.1	7.4	7.0	5.9	6.2	4.2	3.8	3.3	4.0	1.5	1.6	2.1	2.3	77.8	71.2	60.2	61.2
Oregon	34.1	37.4	31.0	38.9	5.2	6.0	5.2	3.7	16.0	17.9	10.0	11.2	21.2	23.9	15.2	14.9	7.9	7.4	5.8	9.0	5.6	5.6	3.4	3.6	1.3	1.8	.8	.6	70.1	76.1	56.2	67.0
California	37.5	32.3	26.4	26.7	2.0	1.5	2.7	1.3	13.0	15.0	15.0	12.0	15.0	16.5	17.7	13.3	6.3	7.1	7.2	7.1	3.3	4.2	4.0	3.3	1.4	1.2	1.4	1.3	63.5	61.3	56.7	51.7

Bureau of Agricultural Economics. Based on returns from crop reporters.

[1] Including contracts to purchase (but not options).
[2] Including loss of title by default of contract, sales to avoid foreclosure, and surrender of title or other transfers to avoid foreclosure.
[3] Includes all other sales in settlement of estates.
[4] Revised figures.

TABLE 542.—*Bankruptcies among farmers and per cent the farmer cases are of all bankruptcies, years ended June 30, 1926–1930*

Geographic division and State	1926			1927			1928			1929			1930		
	Total	Farmers		Total	Farmers		Total	Farmers		Total	Farmers		Total	Farmers	
		Number	Per cent of all cases		Number	Per cent of all cases		Number	Per cent of all cases		Number	Per cent of all cases		Number	Per cent of all cases
Maine	853	101	11.8	810	51	6.3	837	77	9.2	832	69	8.3	827	65	7.9
New Hampshire	108	7	6.5	105	7	6.7	110	7	6.4	135	6	4.4	115	5	4.3
Vermont	197	17	8.6	125	21	16.8	195	29	14.9	211	28	13.3	226	33	14.6
Massachusetts	1,438	12	.8	1,646	10	.6	2,468	18	.7	2,550	26	1.0	2,840	22	.8
Rhode Island	111	0	.0	195	2	1.0	208	0	.0	179	2	1.1	238	0	.0
Connecticut	458	8	1.7	531	14	2.6	848	31	3.7	670	14	2.1	727	16	2.2
New England	3,165	145	4.6	3,412	105	3.1	4,666	162	3.5	4,577	145	3.2	4,973	141	2.8
New York	4,410	122	2.8	4,758	145	3.0	5,548	152	2.7	5,484	149	2.7	5,333	172	3.2
New Jersey	802	33	4.1	846	16	1.9	576	12	2.1	1,041	18	1.7	1,003	12	1.2
Pennsylvania	1,296	69	5.3	1,585	63	4.0	1,754	110	6.3	1,857	103	5.5	2,069	121	5.8
Middle Atlantic	6,508	224	3.4	7,189	224	3.1	7,878	274	3.5	8,382	270	3.2	8,405	305	3.6
Ohio	2,171	188	8.7	2,396	137	5.7	2,802	157	5.6	3,414	220	6.4	4,773	270	5.7
Indiana	471	112	23.8	413	76	18.4	547	114	20.9	691	110	15.9	803	144	17.9
Illinois	2,590	234	9.0	2,943	257	8.7	3,143	374	11.9	3,778	410	10.9	3,165	364	11.5
Michigan	930	50	5.4	818	34	4.2	1,192	41	3.4	1,536	36	2.3	1,399	39	2.8
Wisconsin	1,308	260	19.9	1,272	215	16.9	1,670	188	11.3	1,703	204	12.0	1,966	156	7.9
East North Central	7,470	844	11.3	7,842	719	9.2	9,354	874	9.3	11,122	980	8.8	12,106	973	8.0
Minnesota	1,962	419	21.4	1,840	294	16.0	2,104	266	12.6	2,010	193	9.6	1,800	185	10.3
Iowa	1,759	791	45.0	1,593	656	41.2	1,297	534	41.2	1,109	420	37.9	976	328	33.6
Missouri	1,530	301	19.7	1,614	314	19.5	1,741	288	16.5	1,771	211	11.9	1,910	214	11.2
North Dakota	773	536	69.3	567	376	66.3	258	153	59.3	452	287	63.5	298	168	56.4
South Dakota	623	368	59.1	626	352	56.2	478	239	50.0	250	106	42.4	262	114	43.5
Nebraska	658	238	36.2	689	181	26.3	578	135	23.4	684	157	23.0	682	148	21.7
Kansas	648	160	24.7	1,015	231	22.8	693	114	16.5	666	97	14.6	629	100	15.9
West North Central	7,953	2,813	35.4	7,944	2,404	30.3	7,149	1,729	24.2	6,942	1,471	21.2	6,557	1,257	19.2
Delaware	44	5	11.4	30	4	13.3	35	10	28.6	32	8	25.0	36	7	19.4
Maryland	315	54	17.1	267	35	13.1	317	49	15.5	375	48	12.8	376	49	13.0
District of Columbia	112	0	.0	131	0	.0	147	1	.7	169	0	.0	187	0	.0
Virginia	1,689	111	6.6	1,844	97	5.3	1,976	109	5.5	2,193	98	4.5	2,672	110	4.1
West Virginia	482	10	2.1	657	16	2.4	794	25	3.1	976	41	4.2	1,047	30	2.9
North Carolina	319	37	11.6	389	50	12.9	377	38	10.1	317	25	7.9	529	39	7.4
South Carolina	275	53	19.3	280	47	16.8	289	46	15.9	239	34	14.2	230	25	10.9
Georgia	2,502	467	18.7	1,973	327	16.6	2,380	394	16.6	2,319	248	10.7	2,564	218	8.5
Florida	151	10	6.6	303	9	3.0	580	13	2.2	634	13	2.1	673	13	1.9
South Atlantic	5,889	747	12.7	5,874	585	10.0	6,895	685	9.9	7,254	515	7.0	8,314	491	5.9
Kentucky	1,027	117	11.4	1,209	164	13.6	1,748	191	10.9	1,860	131	7.0	1,913	122	6.4
Tennessee	2,052	134	6.5	2,132	101	4.7	2,376	102	4.3	2,964	118	4.0	3,104	83	2.7
Alabama	2,670	295	11.0	2,600	318	12.2	2,622	211	8.0	2,637	85	3.2	3,230	117	3.6
Mississippi	370	33	8.9	423	32	7.6	816	17	2.1	364	18	4.9	529	14	2.6
East South Central	6,119	579	9.5	6,364	615	9.7	7,562	521	6.9	7,825	352	4.5	8,776	336	3.8
Arkansas	448	101	22.5	416	94	22.6	379	89	23.5	484	83	17.1	461	94	20.4
Louisiana	473	159	33.6	471	119	25.3	481	93	19.3	531	85	16.0	544	85	15.6
Oklahoma	844	170	20.1	782	145	18.5	820	108	13.2	740	65	8.8	748	55	7.4
Texas	1,214	334	27.5	1,072	209	19.5	1,190	271	22.8	1,050	251	23.9	803	141	17.6
West South Central	2,979	764	25.6	2,741	567	20.7	2,870	561	19.5	2,805	484	17.3	2,556	375	14.7
Montana	1,052	624	59.3	536	245	45.7	346	126	36.4	379	131	34.6	336	104	31.0
Idaho	433	223	51.5	337	161	47.8	284	101	35.6	260	78	30.0	161	39	24.2
Wyoming	117	38	32.5	114	31	27.2	148	44	29.7	68	17	25.0	57	12	21.1
Colorado	479	143	29.9	400	90	22.5	387	63	16.3	426	50	11.7	433	49	11.3
New Mexico	141	50	35.5	67	22	32.8	98	27	27.6	84	26	31.0	73	6	8.2
Arizona	84	29	34.5	114	30	26.3	86	23	26.7	63	7	11.1	58	6	10.3
Utah	358	33	9.2	325	26	8.0	380	34	8.9	297	25	8.4	339	36	10.6
Nevada	13	2	15.4	22	4	18.2	18	2	11.1	24	1	4.2	66	8	12.1
Mountain	2,677	1,142	42.7	1,915	609	31.8	1,747	420	24.0	1,601	335	20.9	1,523	260	17.1
Washington	951	182	19.1	1,097	160	14.6	1,143	144	12.6	1,451	107	7.4	1,763	90	5.1
Oregon	1,085	109	10.0	1,044	72	6.9	1,213	67	5.5	1,277	83	6.5	1,732	50	2.9
California	2,253	220	9.8	2,644	236	8.9	2,967	242	8.2	3,661	197	5.4	3,650	186	5.1
Pacific	4,289	511	11.9	4,785	468	10.0	5,323	453	8.5	6,389	387	6.1	7,145	326	4.6
United States	47,049	7,769	16.5	48,066	6,296	13.1	53,444	5,679	10.6	56,897	4,939	8.7	60,355	4,464	7.4

Bureau of Agricultural Economics. Compiled from annual reports of the Attorney General.

TABLE 543.—*Bankruptcies among farmers, number and percentage of total, by geographic divisions, fiscal years ended June 30, 1910–1930*

Year	United States		New England		Middle Atlantic		East North Central		West North Central	
	Bankruptcies among farmers	Per cent of total bankruptcies	Bankruptcies among farmers	Per cent of total bankruptcies	Bankruptcies among farmers	Per cent of total bankruptcies	Bankruptcies among farmers	Per cent of total bankruptcies	Bankruptcies among farmers	Per cent of total bankruptcies
	Number	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*
1910	849	5.7	123	6.0	52	1.8	98	3.2	287	15.9
1911	679	4.8	85	4.4	48	1.6	89	3.4	167	11.0
1912	837	5.4	148	7.4	58	1.7	78	2.7	219	14.2
1913	942	5.4	81	4.0	66	1.8	143	5.0	258	13.7
1914	1,045	5.6	88	4.0	63	2.0	91	2.8	289	14.6
1915	1,246	5.9	112	4.8	90	2.4	94	2.8	290	13.8
1916	1,658	6.9	143	5.3	88	2.0	146	3.9	276	12.6
1917	1,906	7.5	152	4.8	130	2.7	142	3.6	325	13.6
1918	1,632	7.0	125	4.3	97	2.4	126	3.6	267	11.4
1919	1,207	6.3	104	4.1	89	2.4	75	2.2	156	8.1
1920	997	6.4	72	3.8	67	2.2	83	3.3	213	12.0
1921	1,363	9.0	91	6.2	91	3.3	62	3.6	324	20.6
1922	3,236	14.4	92	4.9	77	2.6	247	9.0	1,066	40.3
1923	5,940	17.4	146	4.9	148	3.1	569	11.5	2,005	46.1
1924	7,772	18.7	196	5.8	171	3.2	684	12.2	2,785	42.5
1925	7,872	17.8	169	5.2	190	2.6	760	13.4	2,889	39.2
1926	7,769	16.5	145	4.6	224	3.4	844	11.3	2,813	35.4
1927	6,296	13.1	105	3.1	224	3.1	719	9.2	2,404	30.3
1928	5,679	10.6	162	3.5	274	3.5	874	9.3	1,729	24.2
1929	4,939	8.7	145	3.2	270	3.2	980	8.8	1,471	21.2
1930	4,464	7.4	141	2.8	305	3.6	973	8.0	1,257	19.2

Year	South Atlantic		East South Central		West South Central		Mountain		Pacific	
	Bankruptcies among farmers	Per cent of total bankruptcies	Bankruptcies among farmers	Per cent of total bankruptcies	Bankruptcies among farmers	Per cent of total bankruptcies	Bankruptcies among farmers	Per cent of total bankruptcies	Bankruptcies among farmers	Per cent of total bankruptcies
	Number	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*
1910	63	4.5	38	2.8	66	8.3	35	7.1	87	9.0
1911	78	5.1	65	5.3	72	8.2	35	7.0	40	4.2
1912	79	4.7	91	5.7	62	7.0	55	9.1	47	4.6
1913	85	4.5	83	4.1	89	7.4	66	8.9	71	5.4
1914	100	4.5	100	4.2	81	6.8	118	15.7	115	6.9
1915	177	5.5	127	4.4	97	9.3	159	19.2	100	5.9
1916	369	9.8	164	6.8	178	9.4	179	17.0	115	6.1
1917	407	12.2	184	6.8	217	12.2	193	17.4	156	7.3
1918	410	13.8	179	5.3	186	15.1	105	11.4	137	6.7
1919	291	15.8	126	5.6	164	14.9	102	11.9	100	5.8
1920	169	10.1	108	6.8	95	10.0	104	16.2	86	5.9
1921	297	13.7	100	3.9	124	15.7	177	23.8	97	7.2
1922	678	17.0	201	4.9	264	19.5	419	38.2	192	11.0
1923	959	17.0	420	9.1	539	20.4	730	43.3	424	16.3
1924	1,085	16.9	483	9.7	788	22.3	1,040	46.3	540	15.7
1925	1,037	17.6	517	9.7	650	23.6	1,071	41.8	589	14.6
1926	747	12.7	579	9.5	764	25.6	1,142	42.7	511	11.9
1927	585	10.0	615	9.7	567	20.7	609	31.8	468	10.0
1928	685	9.9	521	6.9	561	19.5	420	24.0	453	8.5
1929	515	7.0	352	4.5	484	17.3	335	20.9	387	6.1
1930	491	5.9	336	3.8	375	14.7	260	17.1	326	4.6

Bureau of Agricultural Economics. Compiled from annual reports of the Attorney General.

TABLE 544.—*Farms: Number in United States, 1920, 1925, and 1930*

State and division	Jan. 1, 1920	Jan. 1, 1925	Apr. 1, 1930 [1]	Change, 1920–1930	Change, 1925–1930
	Number	*Number*	*Number*	*Per cent*	*Per cent*
Maine	48, 227	50, 033	39, 404	−18. 3	−21. 2
New Hampshire	20, 523	21, 065	14, 859	−27. 6	−29. 5
Vermont	29, 075	27, 786	24, 991	−14. 0	−10. 1
Massachusetts	32, 001	33, 454	25, 600	−20. 0	−23. 5
Rhode Island	4, 083	3, 911	3, 366	−17. 6	−13. 9
Connecticut	22, 655	23, 240	17, 481	−22. 8	−24. 8
New England	156, 564	159, 489	125, 701	−19. 7	−21. 2
New York	193, 195	188, 754	160, 120	−17. 1	−15. 2
New Jersey	29, 702	29, 671	24, 563	−17. 3	−17. 2
Pennsylvania	202, 250	200, 443	172, 046	−14. 9	−14. 2
Middle Atlantic	425, 147	418, 868	356, 729	−16. 1	−14. 8
Ohio	256, 695	244, 703	219, 659	−14. 4	−10. 2
Indiana	205, 126	195, 786	182, 092	−11. 2	−7. 0
Illinois	237, 181	225, 601	214, 871	−9. 4	−4. 8
Michigan	196, 447	192, 327	169, 915	−13. 5	−11. 7
Wisconsin	189, 295	193, 155	182, 028	−3. 8	−5. 8
East North Central	1, 084, 744	1, 051, 572	968, 565	−10. 7	−7. 9
Minnesota	178, 478	188, 231	185, 476	+3. 9	−1. 5
Iowa	213, 439	213, 490	215, 361	+0. 9	+0. 9
Missouri	263, 004	260, 473	256, 131	−2. 6	−1. 7
North Dakota	77, 690	75, 970	78, 050	+0. 5	+2. 7
South Dakota	74, 637	79, 537	83, 138	+11. 4	+4. 5
Nebraska	124, 417	127, 734	129, 532	+4. 1	+1. 4
Kansas	165, 286	165, 879	166, 055	+0. 5	+0. 1
West North Central	1, 096, 951	1, 111, 314	1, 113, 743	+1. 5	+0. 2
Delaware	10, 140	10, 257	9, 758	−3. 8	−4. 9
Maryland	47, 908	49, 001	43, 313	−9. 6	−11. 6
District of Columbia	204	139	106	−48. 0	−23. 7
Virginia	186, 242	193, 723	171, 029	−8. 2	−11. 7
West Virginia	87, 289	90, 380	82, 641	−5. 3	−8. 6
North Carolina	269, 763	283, 482	279, 723	+3. 7	−1. 3
South Carolina	192, 693	172, 767	157, 894	−18. 1	−8. 6
Georgia	310, 732	249, 095	256, 252	−17. 5	+2. 9
Florida	54, 005	59, 217	59, 601	+10. 4	+0. 6
South Atlantic	1, 158, 976	1, 108, 061	1, 060, 317	−8. 5	−4. 3
Kentucky	270, 626	258, 524	247, 011	−8. 7	−4. 5
Tennessee	252, 774	252, 669	245, 968	−2. 7	−2. 7
Alabama	256, 099	237, 631	257, 328	+0. 5	+8. 3
Mississippi	272, 101	257, 228	312, 453	+14. 8	+21. 5
East South Central	1, 051, 600	1, 006, 052	1, 062, 760	+1. 1	+5. 6
Arkansas	232, 604	221, 991	243, 216	+4. 6	+9. 6
Louisiana	135, 463	132, 450	161, 514	+19. 2	+21. 9
Oklahoma	191, 988	197, 218	204, 268	+6. 4	+3. 6
Texas	436, 033	465, 646	496, 007	+13. 8	+6. 5
West South Central	996, 088	1, 017, 305	1, 105, 005	+10. 9	+8. 6
Montana	57, 677	46, 904	47, 563	−17. 5	+1. 4
Idaho	42, 106	40, 592	41, 678	−1. 0	+2. 7
Wyoming	15, 748	15, 512	16, 066	+2. 0	+3. 6
Colorado	59, 934	58, 020	60, 563	+1. 0	+4. 4
New Mexico	29, 844	31, 687	31, 393	+5. 2	−0. 9
Arizona	9, 975	10, 802	13, 260	+32. 9	+22. 8
Utah	25, 662	25, 992	27, 048	+5. 4	+4. 1
Nevada	3, 163	3, 883	3, 437	+8. 7	−11. 5
Mountain	244, 109	233, 392	241, 008	−1. 3	+3. 3
Washington	66, 288	73, 267	71, 335	+7. 6	−2. 6
Oregon	50, 206	55, 911	55, 259	+10. 1	−1. 2
California	117, 670	136, 409	136, 455	+16. 0	(2)
Pacific	234, 164	265, 587	263, 049	+12. 3	−1. 0
United States	6, 448, 343	6, 371, 640	6, 296, 877	−2. 3	−1. 2

Bureau of Agricultural Economics. Compiled from the Bureau of the Census figures. Owing to a change in the instructions to the census enumerators in connection with farm population, it appears that a large number of small farms, mostly only those requiring a part of the farmer's time, which had been included in 1925, and a lesser number included in 1920, were omitted in 1930.

[1] Preliminary. [2] Less than 0.1 per cent.

TABLE 545.—*Changes in farm population and land utilization, United States, census years 1850–1930*

Item	Unit	1850	1860	1870	1880	1890	1900	1910	1920	1925	1930
Number of farms	Thousands	1, 449	2, 044	2, 660	4, 009	4, 565	5, 737	6, 362	6, 448	[1] 6, 372	6, 298
Farm population.	do							32, 077	31, 614	28, 982	[2] 27, 222
Do	Number per farm.							5. 0	4. 9	4. 5	4. 3
Land in farms	1,000 acres	293, 561	407, 213	407, 735	536, 082	623, 219	838, 592	878, 798	955, 884	924, 319	
Improved land in farms.	do	113, 033	163, 111	188, 921	284, 771	357, 617	414, 498	478, 452	503, 073	([3])	
Farm land per farm.	Acres	202. 6	199. 2	153. 3	133. 7	136. 5	146. 2	138. 1	148. 2	145. 1	
Improved land per farm.	do	78. 0	79. 8	71. 0	71. 0	78. 3	72. 2	75. 2	78. 0	([3])	
Land in harvested crops.	1,000 acres				177, 500	232, 500	293, 000	321, 500	358, 000	349, 600	
Intertilled crops	do				89, 814	110, 530	143, 727	161, 706	160, 097	152, 300	
Small grain crops	do				57, 523	69, 929	92, 408	93, 796	128, 669	103, 900	
Hay	do				31, 131	53, 549	59, 284	69, 027	72, 880	93, 341	
Pasture	do							291, 440	([3])	407, 936	
Forest and woodland.	do							190, 866	167, 731	143, 794	

Bureau of Agricultural Economics. Based on census data.

[1] Preliminary.
[2] Estimate of Bureau of Agricultural Economics.
[3] Data not available.

TABLE 546.—*Farm population: Number, movements, and net loss, United States, 1910–1925, annual 1910 and 1920–1931*

Year	Farm population Jan. 1 [1]	Leaving farms for cities [1]	Arriving at farms from cities [1]	Net movement from farms [1]	Net loss of farm population [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1910–1920					[1] 463
1920–1925					[3] 2,000
1910	[4] 32, 077				
1920	[1] 31, 000				
1921	[5] 30, 600				
1922	[5] 30, 200	2, 000	880	1, 120	
1923	[5] 29, 800	([6])	([6])	([6])	
1924	[5] 29, 400	2, 075	1, 396	679	
1925	28, 982	1, 900	1, 066	834	441
1926	28, 541	2, 155	1, 135	1, 020	649
1927	27, 892	1, 978	1, 374	604	193
1928	27, 699	1, 923	1, 347	576	186
1929	27, 491	1, 876	1, 257	619	269
1930	27, 222	1, 543	1, 392	151	[7] +208
1931	27, 430				

[1] Estimated.
[2] Net loss equals number of persons leaving farms for cities plus deaths on farms, minus the number of persons going to farms from cities plus births.
[3] From census enumerations.
[4] Estimated, Census Bureau.
[5] Estimated by distributing decrease in farm population Jan. 1, 1920, to Jan. 1, 1925, evenly, by years.
[6] Not estimated.
[7] Net gain in farm population during 1930, the first gain reported during the entire period.

TABLE 547.—*Rural and farm population, percentage of total population gainfully employed in agriculture, and percentage of total in stated years*

Census year	Percentage of population			Percentage gainfully employed in agriculture
	"Rural" outside of places 8,000 or more	"Rural" outside of places 2,500 or more	On farms	
1820	95.1			83.1
1830	93.3			
1840	91.5			77.5
1850	87.5			
1860	83.9			
1870	79.1			47.5
1880	77.4	70.5		44.3
1890	71.0	63.9		39.2
1900	67.1	60.0		35.7
1910	61.3	54.2	34.7	33.2
1920	56.2	48.6	29.5	26.3
1925			25.3	
1930				

Bureau of Agricultural Economics. Compiled from reports of Bureau of the Census.

TABLE 548.—*Population, United States: Census years, 1870–1930*

	1870	1880	1890	1900	1910	1920	1930
Alabama	996,992	1,262,505	1,513,401	1,828,697	2,138,093	2,348,174	2,646,248
Arizona	9,658	40,440	88,243	122,931	204,354	334,162	435,573
Arkansas	484,471	802,525	1,128,211	1,311,564	1,574,449	1,752,204	1,854,482
California	560,247	864,694	1,213,398	1,485,053	2,377,549	3,426,861	5,677,251
Colorado	39,864	194,327	413,249	539,700	799,024	939,629	1,035,791
Connecticut	537,454	622,700	746,258	908,420	1,114,756	1,380,631	1,606,903
Delaware	125,015	146,608	168,493	184,735	202,322	223,003	238,380
District of Columbia	131,700	177,624	230,392	278,718	331,069	437,571	486,869
Florida	187,748	269,493	391,422	528,542	752,619	968,470	1,468,211
Georgia	1,184,109	1,542,180	1,837,353	2,216,331	2,609,121	2,895,832	2,908,506
Idaho	14,999	32,610	88,548	161,772	325,594	431,866	445,032
Illinois	2,539,891	3,077,871	3,826,352	4,821,550	5,638,591	6,485,280	7,630,654
Indiana	1,680,637	1,978,301	2,192,404	2,516,462	2,700,876	2,930,390	3,238,503
Iowa	1,194,020	1,624,615	1,912,297	2,231,853	2,224,771	2,404,021	2,470,939
Kansas	364,399	996,096	1,428,108	1,470,495	1,690,949	1,769,257	1,880,999
Kentucky	1,321,011	1,648,690	1,858,635	2,147,174	2,289,905	2,416,630	2,614,589
Louisiana	726,915	939,946	1,118,588	1,381,625	1,656,388	1,798,509	2,101,593
Maine	626,915	648,936	661,086	694,466	742,371	768,014	797,423
Maryland	780,894	934,943	1,042,390	1,188,044	1,295,346	1,449,661	1,631,526
Massachusetts	1,457,351	1,783,085	2,238,947	2,805,346	3,366,416	3,852,356	4,249,614
Michigan	1,184,059	1,636,937	2,093,890	2,420,982	2,810,173	3,668,412	4,842,325
Minnesota	439,706	780,773	1,310,283	1,751,394	2,075,708	2,387,125	2,563,953
Mississippi	827,922	1,131,597	1,289,600	1,551,270	1,797,114	1,790,618	2,009,821
Missouri	1,721,295	2,168,380	2,679,185	3,106,665	3,293,335	3,404,055	3,629,367
Montana	20,595	39,159	142,924	243,329	376,053	548,889	537,606
Nebraska	122,993	452,402	1,062,656	1,066,300	1,192,214	1,296,372	1,377,963
Nevada	42,491	62,266	47,355	42,335	81,875	77,407	91,058
New Hampshire	318,300	346,991	376,530	411,588	430,572	443,083	465,293
New Jersey	906,096	1,131,116	1,444,933	1,883,669	2,537,167	3,155,900	4,041,334
New Mexico	91,874	119,565	160,282	195,310	327,301	360,350	423,317
New York	4,382,759	5,082,871	6,003,174	7,268,894	9,113,614	10,385,227	12,588,066
North Carolina	1,071,361	1,399,750	1,617,949	1,893,810	2,206,287	2,559,123	3,170,276
North Dakota	2,405	36,909	190,983	319,146	577,056	646,872	680,845
Ohio	2,665,260	3,198,062	3,672,329	4,157,545	4,767,121	5,759,394	6,646,697
Oklahoma			[2] 258,657	[2] 790,391	1,657,155	2,028,283	2,396,040
Oregon	90,923	174,768	317,704	413,536	672,765	783,389	953,786
Pennsylvania	3,521,951	4,282,891	5,258,113	6,302,115	7,665,111	8,720,017	9,631,350
Rhode Island	217,353	276,531	345,506	428,556	542,610	604,397	687,497
South Carolina	705,606	995,577	1,151,149	1,340,316	1,515,400	1,683,724	1,738,765
South Dakota	11,776	98,268	348,600	401,570	583,888	636,547	692,849
Tennessee	1,258,520	1,542,359	1,767,518	2,020,616	2,184,789	2,337,885	2,616,556
Texas	818,579	1,591,749	2,235,527	3,048,710	3,896,542	4,663,228	5,824,715
Utah	86,786	143,963	210,779	276,749	373,351	449,396	507,847
Vermont	330,551	332,286	332,422	343,641	355,956	352,428	359,611
Virginia	1,225,163	1,512,565	1,655,980	1,854,184	2,061,612	2,309,187	2,421,851
Washington	23,955	75,116	357,232	518,103	1,141,990	1,356,621	1,563,396
West Virginia	442,014	618,457	762,794	958,800	1,221,119	1,463,701	1,729,205
Wisconsin	1,054,670	1,315,497	1,693,330	2,069,042	2,333,860	2,632,067	2,939,006
Wyoming	9,118	20,789	62,555	92,531	145,965	194,402	225,565
United States	38,558,371	50,155,783	[1] 62,947,714	75,994,575	91,972,266	105,710,620	122,775,046

Bureau of the Census.

[1] Includes population (325,464) of Indian Territory and Indian reservations, specially enumerated in 1890, but not included in the general report on population for 1890.
[2] Includes population (180,182 in 1890 and 392,060 in 1900) of Indian Territory.

TABLE 549.—*Family living furnished by the farm and purchased*

Item	203 families of Laurel County, Ky. [1]		300 families of southeastern Ohio [2]		120 families of Dunn County, Wis. [3]		118 families of Walworth County, Wis. [4]		2,886 families of selected localities in 11 States [5]	
	Dollars	*P. ct. of total*	*Dollars*	*P. ct. of total*	*Dollars*	*P. ct. of total*	*Dollars*	*P. ct. of total*	*Dollars*	*P. ct. of total*
Total value of all goods	689	100.0	933	100.0	1,536	100.0	1,730	100.0	1,598	100.0
Furnished by farm	365	52.9	401	43.0	540	35.2	523	30.2	684	42.8
Purchased	324	47.1	532	57.0	996	64.8	1,207	69.8	914	57.2
Food	422	61.2	457	49.0	593	38.6	580	33.5	659	41.2
Furnished by farm	308	44.6	322	34.5	268	17.5	231	13.3	441	27.6
Purchased	114	16.6	135	14.5	325	21.1	349	20.2	218	13.6
Clothing	94	13.6	156	16.7	197	12.8	252	14.6	235	14.7
Furnished by farm	[6] 1	.1								
Purchased	93	13.5	156	16.7	197	12.8	252	14.6	235	14.7
Rent (furnished by farm) [7]	44	6.5	67	7.2	231	15.0	276	16.0	200	12.5
Furnishings and equipment	15	2.1	31	3.3	64	4.2	61	3.5	40	2.5
Operation goods	47	6.8	98	10.5	209	13.6	256	14.8	213	13.3
Furnished by farm	11	1.6	12	1.3	41	2.7	16	.9	43	2.7
Purchased	36	5.2	86	9.2	168	10.9	240	13.9	170	10.6
Maintenance of health	16	2.3	31	3.3	88	5.8	78	4.5	61	3.8
Advancement goods	30	4.4	46	4.9	71	4.6	90	5.2	105	6.6
Personal goods	18	2.6	29	3.1	49	3.2	63	3.6	41	2.6
Furnished by farm	[8] 1	.1								
Purchased	17	2.5	29	3.1	49	3.2	63	3.6	41	2.6
Insurance, life and health	3	.5	13	1.4	28	1.8	70	4.0	41	2.6
Unclassified	(9)	0	5	.6	6	.4	4	.3	3	.2

Bureau of Agricultural Economics.

[1] OYLER, M., COST OF LIVING AND POPULATION TRENDS IN LAUREL COUNTY, KENTUCKY., Ky. Agr. Expt. Sta. Bul. 301, p. 71. 1930.
[2] KIRKPATRICK, E. L., and HAWTHORHE, H. W., SOURCES AND USES OF INCOME AMONG 300 FARM FAMILIES OF VINTON, JACKSON, AND MEIGS COUNTIES, OHIO, 1926. U. S. Dept. Agr. Bur. Agri. Econ., p. 9. May, 1928. [Mimeographed.]
[3] KIRKPATRICK, E. L., MCNALL, P. E., and COWLES, M. L., RURAL STANDARDS OF LIVING IN DUNN COUNTY, WISCONSIN, Wis. Agri. Expt. Sta. Stencil Bul. 104, p. 6, 1930.
[4] KIRKPATRICK, E. L., MCNALL, P. E., and COWLES M. L., RURAL STANDARDS OF LIVING IN WALWORTH COUNTY, WISCONSIN, Wis. Agr. Expt. Sta., Stencil Bul. 105, p. 5., 1930.
[5] KIRKPATRICK, E. L., THE FARMERS STANDARD OF LIVING. U. S. Dept. Agr. Bul. 1466, p. 16-17. 1926.
[6] Wool grown on the farm and made into clothing.
[7] 10 per cent of the total value of house as used as annual cost of rent.
[8] Tobacco grown on the farm.
[9] Less than half a dollar.

TABLE 550.—*Temperature: Normal* [1] *and 1930, by months, at selected points in the United States*

Station	January		February		March		April		May		June		July		August		September		October		November		December		Annual	
	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.
Greenville, Me	12.5	14.3	13.1	16.8	24.6	24.6	37.0	35.8	49.3	51.2	58.8	65.4	65.2	64.1	61.8	61.4	55.0	57.0	45.0	46.4	31.1	34.0	17.9	19.9	39.3	40.9
Burlington, Vt	18.8	20.2	19.4	20.8	29.1	28.8	43.3	40.7	56.5	56.0	65.7	68.8	70.3	67.2	67.9	65.6	60.3	61.6	49.2	48.1	36.3	39.0	24.4	24.6	45.1	45.1
Boston, Mass	27.9	31.8	28.8	34.1	35.6	38.3	46.4	47.6	57.1	59.4	66.5	72.4	71.7	72.6	69.9	70.5	63.2	69.4	53.6	53.0	42.0	45.0	32.5	33.2	49.6	52.3
Buffalo, N. Y	24.6	24.6	24.3	29.0	31.1	30.0	42.8	41.4	54.6	54.1	64.4	65.7	69.8	68.8	68.6	68.7	62.4	64.9	51.9	51.4	39.4	42.7	29.8	29.3	47.0	47.6
Canton, N. Y	16.3	19.6	18.0	18.8	27.7	26.8	42.5	40.1	56.2	56.0	65.1	67.6	68.9	67.1	66.6	65.4	59.3	61.0	47.2	47.0	33.9	38.8	22.7	23.9	43.7	44.3
Trenton, N. J	30.5	33.0	30.7	37.6	39.1	41.0	49.8	48.4	61.1	63.4	69.5	73.0	74.5	75.6	73.0	72.8	66.9	70.8	55.6	54.0	44.4	44.8	34.4	33.7	52.5	54.0
Pittsburgh, Pa	30.7	31.8	32.3	39.0	39.6	37.8	51.2	51.5	62.4	63.0	70.7	69.9	74.6	75.0	72.9	71.6	66.4	69.8	55.7	52.4	43.2	43.9	34.2	31.5	52.8	53.1
Scranton, Pa	26.6	28.8	27.3	32.4	35.7	36.6	48.1	46.4	59.4	60.1	67.8	69.8	71.7	71.2	69.8	70.2	62.9	66.4	51.9	50.6	40.5	43.0	30.7	29.9	49.4	50.4
Cincinnati, Ohio	30.3	30.8	32.8	43.0	40.9	41.0	52.4	56.6	63.1	65.4	71.2	72.7	75.1	78.8	73.6	75.4	67.1	70.2	55.7	54.0	42.5	45.0	33.4	32.6	53.2	55.5
Cleveland, Ohio	26.5	27.6	27.4	37.5	34.6	35.7	46.2	48.3	57.9	61.8	67.1	70.2	71.4	73.6	70.0	71.1	63.9	67.2	53.6	51.8	40.9	44.8	31.2	32.0	49.2	51.8
Evansville, Ind	33.5	29.8	36.3	45.4	45.9	44.5	56.7	59.8	66.7	67.8	75.1	75.4	78.9	82.2	77.4	78.8	70.7	72.8	59.4	57.2	46.6	47.6	37.1	35.3	57.0	58.0
Indianapolis, Ind	28.4	24.8	31.1	41.6	40.0	39.1	52.1	55.1	62.9	64.1	71.6	71.6	75.7	78.0	73.7	75.4	66.9	69.2	55.7	53.6	42.3	44.0	32.2	31.1	52.7	54.0
Fort Wayne, Ind	26.4	22.2	26.5	38.6	38.0	35.6	48.6	50.6	59.3	61.6	68.6	69.7	73.6	75.0	71.6	72.3	65.2	66.3	53.8	51.2	40.9	42.0	29.5	29.8	50.2	51.2
Chicago, Ill	23.7	20.1	26.3	37.1	35.3	36.1	46.9	49.2	57.5	61.2	67.3	70.1	72.5	74.2	71.6	73.4	65.2	66.9	54.0	51.6	40.1	40.6	28.8	29.7	49.1	51.0
Peoria, Ill	23.1	17.0	25.9	38.4	37.0	38.8	50.9	55.0	61.7	63.3	70.9	71.6	75.4	78.2	72.5	76.1	64.3	69.8	52.0	53.0	37.5	42.4	28.1	29.8	49.9	52.8
Cairo, Ill	34.9	30.6	38.5	48.0	47.2	46.8	58.1	62.2	68.4	68.4	76.3	76.1	79.6	83.2	77.8	79.4	71.5	74.0	60.4	58.6	47.3	48.6	37.8	37.0	58.2	59.4
Grand Rapids, Mich	24.5	21.4	23.7	32.9	33.4	33.6	47.0	47.6	58.0	59.8	67.8	68.7	72.3	73.6	69.7	73.0	62.7	65.2	51.2	49.9	38.4	42.2	28.5	28.6	48.1	49.7
Alpena, Mich	19.1	17.8	18.0	22.0	25.5	26.6	38.6	38.0	50.5	54.1	60.4	63.5	65.9	66.0	64.1	67.6	57.6	58.7	47.1	44.3	34.4	37.4	24.8	25.4	42.2	43.4
Marquette, Mich	16.3	13.3	16.3	21.8	24.8	26.4	37.8	40.0	49.0	52.0	58.9	62.6	64.9	65.4	63.8	68.1	57.5	58.8	46.7	46.8	33.3	37.6	22.6	24.6	41.0	43.1
Madison, Wis	16.7	11.4	19.1	30.0	30.6	32.9	45.4	47.4	57.6	58.2	67.2	67.8	72.1	72.8	69.8	72.5	62.4	63.8	50.3	48.1	35.2	39.0	22.8	24.4	45.8	47.4
Green Bay, Wis	15.7	11.0	17.4	24.8	28.6	30.4	43.2	44.6	54.9	56.8	64.9	67.4	70.0	71.7	67.7	71.2	60.4	62.4	48.5	47.6	34.0	38.8	22.3	23.8	44.0	45.9
Duluth, Minn	7.9	2.0	11.4	18.8	23.7	25.0	37.0	40.7	47.3	49.0	57.2	62.8	63.9	66.5	62.6	70.2	55.1	55.8	44.1	41.8	30.0	31.6	15.9	19.0	38.0	40.3
St. Paul, Minn	12.6	6.4	15.8	26.9	29.1	31.9	45.6	49.3	57.9	57.6	67.1	67.6	72.1	74.4	69.4	74.0	61.3	61.5	48.6	47.2	32.5	36.4	19.0	22.6	44.2	46.3
Des Moines, Iowa	20.1	12.4	23.7	38.2	35.9	38.1	50.1	53.6	61.3	61.1	70.6	70.2	75.4	80.4	73.1	75.8	65.6	68.2	53.4	52.3	38.4	43.4	26.0	28.6	49.5	51.9
Dubuque, Iowa	19.1	11.8	22.2	33.7	34.0	35.6	48.6	50.6	60.3	60.3	69.4	69.0	74.1	76.0	71.7	74.2	64.0	65.6	51.9	50.1	37.0	40.6	24.7	25.4	48.1	49.4
St. Louis, Mo	31.1	24.7	34.8	45.3	44.1	44.4	56.1	61.2	67.0	67.3	75.0	75.1	78.8	83.6	77.5	80.4	70.5	72.6	58.8	57.1	45.4	47.6	34.9	35.8	56.2	57.9
St. Joseph, Mo	27.5	15.4	31.6	44.3	42.5	42.6	53.8	59.0	64.2	63.2	73.7	72.0	78.6	81.5	76.7	78.8	68.8	70.2	56.7	55.0	43.6	46.0	30.2	32.6	54.0	55.0
Springfield, Mo	33.5	23.8	35.2	46.8	45.2	44.3	56.0	60.4	64.5	63.8	72.5	71.4	76.8	80.2	75.7	78.9	68.9	71.4	58.2	55.5	45.7	46.2	36.2	35.2	55.7	56.5
Bismarck, N. Dak	7.8	−0.4	10.3	24.3	24.2	28.0	42.1	49.4	54.5	51.5	63.7	64.5	69.8	74.8	67.3	71.3	58.1	57.7	44.9	41.4	28.5	31.1	14.7	22.8	40.5	43.0
Devils Lake, N. Dak	1.8	−5.2	5.1	17.1	19.8	23.4	38.8	46.2	52.6	49.9	61.9	63.3	67.4	71.0	64.8	69.5	55.9	55.5	42.4	39.7	24.5	27.8	9.5	17.0	37.0	39.6
Pierre, S. Dak	16.0	8.0	18.6	35.0	31.5	33.0	46.8	52.6	58.0	53.3	68.5	69.2	75.3	81.3	72.8	75.4	63.8	64.0	49.8	48.0	33.6	36.2	21.8	29.0	46.4	49.0
North Platte, Nebr	22.9	10.6	26.6	40.3	36.6	36.5	48.6	54.2	58.7	56.8	67.5	68.4	72.9	78.1	70.8	75.4	62.1	65.6	49.7	50.6	36.6	37.2	26.7	29.4	48.3	50.3
Omaha, Nebr	21.9	14.0	25.5	40.8	37.0	39.4	51.2	55.9	62.4	61.6	71.6	71.6	76.7	83.0	74.4	76.7	66.8	68.6	54.3	53.6	38.5	44.0	26.4	31.1	50.6	53.4
Concordia, Kans	26.4	16.4	29.8	45.2	41.0	40.4	53.5	57.4	63.2	62.2	73.0	71.7	78.0	82.0	76.5	79.6	68.3	70.2	55.9	53.8	41.4	44.8	30.7	32.4	53.1	54.7
Dodge City, Kans	29.0	19.6	33.2	47.2	42.8	41.2	53.6	59.4	63.5	61.8	72.5	74.7	78.4	81.2	77.7	80.4	69.4	71.3	56.1	54.8	42.6	45.8	32.6	33.2	54.3	55.9
Iola, Kans	29.8	18.0	33.2	47.1	44.5	44.4	56.2	61.2	65.2	63.9	74.1	72.8	78.2	81.8	77.1	81.0	69.8	72.4	57.8	55.8	44.1	46.2	33.9	35.5	55.3	56.7
Washington, D. C	33.4	35.6	35.3	41.9	42.6	45.0	53.3	53.2	63.7	67.3	72.2	75.1	76.8	80.4	75.0	76.8	68.1	76.0	57.4	56.2	45.2	46.7	36.6	35.7	55.0	57.5
Lynchburg, Va	37.5	39.2	40.3	45.8	47.3	45.4	57.3	56.3	67.3	68.4	74.6	72.7	77.5	80.5	75.6	75.4	69.0	74.5	58.5	55.6	47.2	46.0	39.5	36.5	57.6	58.0
Norfolk, Va	40.6	44.0	42.7	48.2	48.2	48.2	56.8	57.0	66.2	69.0	74.4	75.0	78.7	79.8	77.4	77.4	71.6	77.7	62.5	59.7	51.4	51.0	43.1	40.4	59.5	60.6
Parkersburg, W. Va	32.5	34.4	34.2	41.4	42.8	40.8	53.4	56.0	63.8	65.6	71.4	72.4	75.4	78.4	73.9	73.8	67.3	70.8	56.1	53.4	43.8	44.8	35.2	33.4	54.2	55.4

Lexington, Ky	32.9	32.6	35.4	43.8	43.7	40.8	54.3	57.6	64.3	65.4	72.2	72.8	75.9	79.6	74.5	76.2	68.5	71.2	57.4	54.7	44.8	45.6	35.8	32.2	55.0	56.0
Charlotte, N. C	41.2	44.0	43.9	50.6	50.4	48.8	59.8	62.2	68.9	71.9	75.5	75.2	78.4	81.6	77.1	76.7	71.5	76.2	61.7	59.2	50.6	48.8	43.0	38.6	60.2	61.2
Wilmington, N. C	46.5	48.8	47.9	53.2	53.3	52.1	62.0	63.5	70.8	72.4	76.8	75.2	79.1	81.6	77.6	76.7	73.1	78.6	65.3	61.2	56.0	53.5	49.1	44.6	63.1	63.4
Charleston, S. C	49.9	51.2	52.4	55.7	57.4	54.8	64.5	65.6	72.7	75.0	78.9	76.8	81.4	83.9	81.0	79.6	76.6	80.2	67.8	64.9	58.1	56.0	51.7	47.2	66.0	65.9
Greenville, S. C	40.3	44.6	43.3	50.6	49.9	48.6	58.6	62.9	67.2	70.6	74.1	74.9	76.9	81.0	75.8	77.0	70.6	75.3	60.2	60.0	49.6	49.0	42.2	39.5	59.1	61.2
Atlanta, Ga	42.6	42.8	45.3	51.8	52.0	49.3	61.0	63.4	69.9	70.4	76.0	75.2	78.1	81.3	77.0	78.8	72.4	75.6	63.0	60.0	52.1	49.6	44.7	39.6	61.2	61.5
Thomasville, Ga	51.0	53.2	55.0	58.6	60.2	55.7	66.7	67.6	74.0	76.1	79.5	77.4	81.8	81.9	81.0	79.6	76.8	79.1	68.2	65.4	58.5	58.1	52.5	47.9	67.1	66.7
Jacksonville, Fla	55.4	57.0	58.0	60.8	62.6	58.7	68.7	68.8	75.0	75.7	79.9	76.9	82.1	82.8	81.7	79.8	78.3	81.0	71.1	67.8	62.2	60.6	56.3	51.1	69.3	68.4
Miami, Fla	66.5	71.4	67.1	70.5	70.2	69.0	72.8	73.9	76.4	78.6	80.0	79.2	81.0	82.6	81.4	82.4	80.1	82.2	77.0	76.8	71.8	70.6	68.0	64.4	74.4	75.1
Memphis, Tenn	40.9	36.2	44.3	52.7	52.3	51.2	61.8	65.8	70.6	70.6	77.6	78.9	80.7	85.4	79.4	81.4	73.6	76.8	63.3	61.5	51.7	52.0	43.6	41.0	61.6	62.8
Nashville, Tenn	38.6	36.6	41.6	49.3	49.2	47.4	59.0	62.0	68.2	68.0	75.6	74.8	79.1	83.4	77.8	79.2	71.8	74.4	61.0	58.6	49.0	49.0	41.0	38.2	59.3	60.1
Birmingham, Ala	45.1	44.2	48.0	54.0	55.4	52.2	63.3	66.0	71.1	72.0	77.9	77.4	80.2	83.9	79.2	79.8	74.8	76.6	64.8	62.3	53.9	53.6	46.4	43.2	63.3	63.8
Mobile, Ala	51.5	50.5	54.7	58.4	59.7	56.4	66.3	68.8	74.4	74.6	80.3	80.2	81.4	83.9	81.0	81.2	78.1	78.4	69.3	67.2	58.6	58.8	52.2	49.4	67.3	67.3
Meridian, Miss	47.0	45.2	49.6	55.1	57.1	53.3	64.0	66.6	71.3	72.7	78.1	77.0	80.4	83.6	79.5	79.4	74.5	76.4	64.3	62.8	54.2	55.4	47.7	44.8	64.0	64.4
Vicksburg, Miss	48.2	45.2	51.8	57.2	58.5	54.4	65.6	68.7	72.9	73.1	79.0	78.6	81.3	84.4	80.8	82.2	76.3	77.2	66.7	64.8	56.6	56.2	50.0	46.0	65.6	65.7
New Orleans, La	54.2	52.6	57.3	61.6	62.8	59.2	68.8	70.8	75.4	76.5	80.6	80.8	82.4	83.4	82.2	82.8	79.2	79.2	71.0	70.8	61.6	62.5	55.6	52.6	69.3	69.4
Shreveport, La	47.0	41.4	50.9	57.4	58.3	55.0	65.8	71.0	73.6	73.0	80.7	81.0	83.2	86.9	82.0	84.4	76.9	78.3	66.6	64.7	56.0	55.6	49.1	46.7	65.8	66.3
Amarillo, Tex	35.3	25.8	38.1	49.5	46.9	44.7	55.8	63.4	64.1	64.6	72.8	75.6	76.8	79.6	75.7	79.8	69.3	73.8	57.7	56.8	45.5	48.2	37.0	37.6	56.3	58.3
Brownsville, Tex	59.8	53.8	62.6	66.6	68.2	64.5	73.7	73.8	78.6	78.6	82.4	80.8	83.6	83.3	83.9	83.8	80.6	82.6	74.9	75.6	67.2	65.7	61.2	58.2	73.1	72.3
El Paso, Tex	45.0	43.8	49.0	53.2	55.8	53.3	63.4	68.6	71.5	69.1	79.6	81.6	81.1	82.0	79.2	81.6	73.9	77.3	63.5	65.8	52.7	51.6	44.9	43.0	63.3	64.2
Fort Worth, Tex	45.4	35.2	48.3	57.6	57.7	55.4	65.0	71.1	72.3	71.2	79.9	80.2	83.6	86.5	83.0	85.2	76.9	78.9	66.7	65.6	55.5	56.6	47.5	47.4	65.2	65.9
Galveston, Tex	53.8	48.6	56.3	60.0	62.4	58.4	68.7	70.9	74.8	75.5	80.7	80.6	83.4	83.2	83.0	83.4	80.1	79.8	72.7	71.5	63.3	60.8	56.4	52.8	69.6	68.8
San Antonio, Tex	52.3	43.2	55.4	61.6	62.8	58.8	69.1	72.2	75.1	75.0	81.0	79.6	83.8	84.2	83.5	85.8	79.0	80.7	70.5	69.8	60.3	59.7	53.7	51.0	68.9	68.5
Oklahoma City, Okla	36.4	23.2	39.6	50.8	50.0	48.8	59.8	66.8	67.7	67.4	76.0	77.1	80.6	84.0	79.7	83.6	72.8	77.6	61.5	60.5	48.8	51.2	39.3	40.4	59.4	61.0
Little Rock, Ark	41.4	35.0	44.9	54.0	53.0	52.1	62.1	66.4	70.3	69.9	77.4	78.8	80.9	86.4	79.8	82.8	74.1	76.5	63.6	61.1	52.1	51.6	44.2	42.3	62.0	63.1
Havre, Mont	12.9	2.6	13.6	33.3	27.1	29.6	43.7	52.0	53.4	54.2	62.0	63.6	68.3	73.6	65.4	72.2	56.4	57.6	44.5	39.7	31.2	30.7	20.4	29.2	41.6	44.9
Miles City, Mont	14.5	3.6	16.8	33.4	28.6	33.4	44.7	53.8	56.7	55.2	66.0	66.0	72.9	77.6	71.5	75.6	61.2	60.8	46.5	42.0	30.9	34.4	21.0	30.4	44.3	47.2
Kalispell, Mont	20.4	5.4	23.3	32.4	32.9	34.0	43.6	49.4	51.4	51.3	57.7	57.5	64.1	67.5	62.8	68.0	53.5	56.9	43.5	41.4	32.4	29.6	24.9	24.4	42.5	43.2
Cheyenne, Wyo	25.5	13.0	27.3	34.5	33.1	29.6	40.9	49.2	50.3	46.8	60.4	61.2	66.7	68.8	65.6	66.2	57.0	56.8	44.8	44.4	34.8	36.0	28.5	28.9	44.6	44.6
Sheridan, Wyo	19.3	5.6	21.3	33.6	30.8	31.5	43.2	51.2	51.8	52.3	61.2	60.9	67.6	71.8	66.1	70.2	56.5	57.2	44.2	41.4	32.4	35.5	22.8	29.0	43.1	45.0
Pueblo, Colo	29.9	18.8	32.9	43.2	41.6	38.4	50.1	56.9	59.2	57.8	69.0	71.2	74.2	75.0	72.7	73.7	64.6	65.6	52.0	51.3	39.4	40.5	31.5	29.7	51.4	51.8
Grand Junction, Colo	24.0	19.2	32.9	31.6	43.6	42.8	52.4	58.2	61.1	59.0	71.4	72.0	77.7	78.2	75.4	75.9	66.2	65.6	52.8	52.9	39.3	37.8	27.5	26.1	52.0	51.6
Santa Fe, N. Mex	28.8	25.6	33.1	38.6	39.7	37.2	46.7	52.4	55.7	52.4	64.8	67.1	69.0	68.4	67.4	67.6	60.9	60.4	50.4	50.5	38.9	36.4	30.7	27.8	48.8	48.7
Roswell, N. Mex	39.2	33.2	42.5	49.9	51.3	47.4	60.6	63.6	69.4	66.0	76.3	76.6	78.9	79.4	76.6	78.9	70.3	73.3	59.5	60.4	48.1	47.2	41.2	38.2	59.5	59.5
Phoenix, Ariz	51.2	52.0	55.1	60.4	60.7	60.6	67.0	72.2	75.0	71.7	84.5	86.8	89.8	91.3	88.5	89.6	82.7	82.2	70.6	70.4	59.7	60.2	52.0	52.2	69.7	70.8
Modena, Utah	26.7	20.4	31.0	36.4	38.2	39.4	46.0	50.0	53.5	49.2	63.3	65.0	70.6	70.8	69.2	68.4	60.0	59.4	48.0	46.0	36.4	31.2	28.1	20.6	47.6	46.4
Salt Lake City, Utah	29.2	23.6	33.8	39.9	41.7	42.8	49.6	56.8	57.4	56.5	67.4	68.9	75.7	79.2	74.5	74.8	64.4	64.4	52.5	49.8	41.1	34.6	31.9	22.5	51.6	51.2
Winnemucca, Nev	28.6	19.6	33.5	37.8	40.0	41.7	46.7	51.4	53.9	51.6	62.8	64.2	70.6	72.8	69.3	70.3	59.2	58.7	48.3	46.0	38.4	35.4	30.0	25.8	48.4	47.9
Boise, Idaho	29.8	17.9	34.8	40.4	42.7	44.3	50.4	55.6	57.1	55.8	65.3	64.4	72.9	76.0	71.8	74.8	61.9	63.2	51.1	49.6	41.0	37.1	32.1	23.9	50.9	50.2
Seattle, Wash	39.5	32.8	41.1	44.3	44.9	46.8	49.4	52.8	54.5	53.4	59.0	58.8	63.1	63.0	63.1	65.3	58.1	59.4	51.4	51.0	45.6	44.8	41.7	43.1	51.0	51.3
Walla Walla, Wash	32.7	15.1	37.1	44.8	46.1	47.6	53.1	58.2	59.6	58.6	66.5	65.8	74.0	76.7	72.7	76.4	63.8	65.4	53.5	50.6	42.8	41.0	35.5	32.7	53.1	52.7
Portland, Oreg	39.4	28.0	42.1	46.3	46.9	50.3	51.8	55.8	56.9	55.0	62.4	62.2	66.7	66.6	66.7	69.8	61.7	63.7	54.2	53.7	46.8	46.0	41.2	40.4	53.1	53.2
Roseburg, Oreg	41.2	34.2	43.4	47.8	47.1	49.2	51.0	55.2	56.0	53.6	62.5	61.2	67.4	67.0	68.0	68.3	62.9	61.2	53.9	53.4	40.9	45.0	41.8	41.0	53.4	53.1
Eureka, Calif	46.9	45.4	47.2	50.5	48.3	50.5	49.9	53.6	52.0	51.5	54.3	54.2	55.5	55.0	56.0	59.8	55.9	56.8	53.6	52.6	51.1	51.2	48.2	48.0	51.6	52.4
Fresno, Calif	46.2	46.4	51.1	55.8	55.0	57.2	60.2	63.2	67.1	63.2	75.8	76.6	82.1	81.6	80.7	78.8	73.4	69.6	64.0	64.6	54.2	55.9	46.2	46.6	63.0	63.3
Los Angeles, Calif	54.6	56.0	55.5	59.4	57.5	60.8	59.4	63.6	62.2	61.8	66.4	67.6	70.2	72.8	71.1	73.8	69.0	67.9	65.3	68.7	60.9	66.2	56.6	60.1	62.4	64.9
Sacramento, Calif	45.8	44.4	50.1	53.6	54.3	56.3	58.1	59.3	63.3	60.2	69.4	71.6	73.2	73.2	72.9	72.8	69.3	65.6	62.9	63.0	53.6	54.8	46.2	46.0	59.9	60.1
San Diego, Calif	54.3	55.8	55.1	57.9	56.7	59.6	58.5	62.0	60.8	60.0	63.9	64.6	67.2	69.6	68.7	70.3	67.1	66.9	63.7	64.8	59.7	63.0	56.0	57.1	61.0	62.6
San Francisco, Calif	49.9	49.6	52.2	56.5	54.2	57.4	55.0	59.2	56.8	56.1	58.5	59.9	58.5	58.6	59.1	61.5	60.9	62.4	60.5	63.2	56.3	58.0	51.3	52.1	56.1	57.9

Weather Bureau.

[1] Normals are based on records of 30 or more years of observations.

TABLE 551.—*Precipitation: Normal*[1] *and 1930, by months, at selected points in the United States*

Station	January		February		March		April		May		June		July		August		September		October		November		December		Annual	
	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930	Normal	1930
	Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.	
Greenville, Me.	2.83	2.59	2.97	1.81	3.15	6.22	2.93	2.11	3.30	5.17	4.09	4.48	4.72	4.59	3.63	4.24	4.08	2.28	3.91	2.80	3.46	3.47	3.17	2.74	42.24	42.50
Burlington, Vt.	1.76	2.56	1.57	.48	2.04	3.62	2.15	2.10	2.85	5.18	3.38	3.90	3.50	3.07	3.37	1.61	3.48	1.85	2.97	2.48	2.66	1.82	1.88	.82	31.61	20.49
Boston, Mass.	3.61	2.77	3.37	2.23	3.57	3.02	3.34	2.08	3.18	3.39	2.89	2.24	3.49	3.36	3.62	3.03	3.14	.26	3.15	5.83	3.33	4.09	3.45	2.99	40.14	35.29
Buffalo, N. Y.	3.30	6.23	2.95	2.20	2.57	3.34	2.56	1.29	3.10	1.17	2.82	3.31	3.03	2.02	3.08	.69	2.92	1.56	3.29	1.79	3.02	1.16	3.36	1.93	36.00	26.69
Canton, N. Y.	2.50	3.98	2.27	.50	2.50	4.38	2.18	2.18	3.00	3.10	3.29	4.39	3.50	3.54	3.65	1.24	3.35	1.51	3.03	1.83	3.16	1.55	2.69	.83	35.12	29.03
Trenton, N. J.	3.31	2.73	3.27	3.81	3.40	2.66	2.94	1.74	3.08	1.99	3.09	4.25	3.94	3.94	4.75	3.30	3.40	1.55	2.78	2.08	2.73	2.19	3.35	2.38	40.04	32.62
Pittsburgh, Pa.	3.05	1.67	2.62	3.12	3.03	2.82	2.92	2.60	3.21	1.95	3.81	3.41	4.05	1.33	3.23	1.10	2.58	.74	2.52	1.17	2.29	1.02	2.86	1.72	36.17	22.65
Scranton, Pa.	3.03	1.20	3.04	1.87	3.20	2.26	2.77	2.52	3.27	2.58	3.67	2.83	4.03	2.78	3.69	1.85	3.17	2.76	3.03	1.34	2.77	2.09	3.02	2.04	38.69	26.12
Cincinnati, Ohio	3.48	4.25	2.99	2.95	3.89	1.91	3.12	2.05	3.70	1.01	3.66	.98	3.31	2.46	3.41	1.24	3.65	4.38	2.51	.78	2.85	1.28	2.98	1.20	38.55	24.49
Cleveland, Ohio	2.51	5.01	2.51	2.45	2.71	2.68	2.44	2.08	3.12	1.87	3.12	1.84	3.45	.74	2.77	1.84	3.33	1.69	2.78	1.52	2.64	2.27	2.44	.89	33.82	24.88
Evansville, Ind.	3.74	6.20	3.24	3.12	4.19	1.97	3.90	1.10	3.86	1.02	3.50	2.28	2.43	1.23	3.36	1.29	3.31	3.39	2.82	1.31	3.74	1.00	3.54	1.69	43.16	25.60
Indianapolis, Ind.	2.95	7.34	2.73	2.76	3.93	1.80	3.62	4.05	3.89	1.69	3.62	1.55	3.34	.90	3.31	2.08	3.40	2.86	2.78	1.77	3.35	2.06	2.98	.80	39.90	29.66
Fort Wayne, Ind.	2.33	5.62	2.35	1.11	3.22	1.60	3.07	2.27	3.85	2.99	3.57	4.06	3.60	1.71	3.11	1.43	3.06	3.45	2.60	2.18	2.88	2.14	2.58	.61	36.22	29.17
Chicago, Ill.	1.90	2.23	2.14	1.42	2.58	2.82	2.78	2.30	3.54	2.16	3.30	2.49	3.33	2.63	3.21	1.17	3.14	1.29	2.53	2.81	2.37	1.75	2.04	.27	32.86	23.34
Peoria, Ill.	1.78	2.81	2.01	2.10	2.73	1.55	3.38	3.58	4.06	1.07	3.77	2.53	3.58	1.02	3.12	1.56	4.03	1.31	2.29	3.14	2.37	3.07	1.77	.29	34.89	24.03
Cairo, Ill.	3.76	9.44	3.13	2.53	3.75	2.54	3.72	.79	3.71	2.49	3.83	1.59	3.07	.04	3.02	.76	2.89	2.65	2.76	1.05	3.68	1.83	3.40	1.97	40.72	27.68
Grand Rapids, Mich.	2.35	3.21	2.24	1.83	2.48	1.20	2.77	2.07	3.44	2.39	3.48	2.66	2.92	.56	2.61	.40	3.53	1.48	2.81	2.27	2.77	1.51	2.57	1.34	33.97	20.92
Alpena, Mich.	1.89	1.36	1.71	1.42	1.99	1.86	2.24	2.08	3.05	3.67	3.30	6.05	2.76	1.16	2.86	1.14	2.98	1.47	2.71	1.11	2.60	.88	2.08	.86	30.17	23.06
Marquette, Mich.	2.33	2.23	1.90	1.56	2.26	1.76	2.43	1.34	2.96	2.45	3.22	5.62	3.12	1.41	2.67	1.16	3.25	3.63	2.76	1.75	2.91	1.98	2.66	1.97	32.47	26.86
Madison, Wis.	1.38	1.86	1.50	.78	2.07	1.29	2.77	2.95	3.85	4.23	3.76	6.60	3.88	2.84	3.21	1.58	3.72	4.79	2.43	1.63	1.78	.65	1.63	.68	31.98	29.88
Green Bay, Wis.	1.54	.90	1.56	1.67	2.04	.72	2.65	1.01	3.52	1.94	3.70	3.02	3.46	2.15	3.18	.59	3.52	1.64	2.54	1.70	2.16	.64	1.71	.33	31.58	16.31
Duluth, Minn.	.97	.54	1.05	2.11	1.54	.30	2.06	1.89	3.25	3.47	3.91	3.74	3.76	1.57	3.18	.29	3.31	4.68	2.31	1.53	1.45	2.96	1.15	.20	27.94	23.28
St. Paul, Minn.	.92	1.00	.92	2.09	1.43	.59	2.35	.75	3.27	3.39	4.14	4.44	3.57	1.00	3.01	.48	3.07	2.90	2.20	1.50	1.30	1.72	1.06	.19	27.24	20.05
Des Moines, Iowa	1.07	1.41	1.12	.50	1.78	1.12	2.91	2.35	4.56	3.36	4.76	3.69	3.50	.56	3.52	1.00	3.67	1.53	2.50	2.64	1.43	1.05	1.22	.36	32.04	19.57
Dubuque, Iowa	1.30	2.05	1.38	1.19	2.03	1.23	2.85	4.34	4.22	4.33	4.31	5.21	3.94	.94	3.24	1.92	4.01	2.52	2.48	2.59	1.70	.79	1.44	1.24	32.90	28.35
St. Louis, Mo.	2.34	5.70	2.56	2.35	3.38	.99	3.81	1.32	4.34	1.69	3.82	2.63	2.98	.25	2.99	.28	3.46	3.51	2.72	1.84	2.83	1.77	2.21	.90	37.44	23.23
St. Joseph, Mo.	1.05	1.30	1.38	.83	2.04	.83	3.02	2.92	4.24	4.45	4.94	5.32	3.68	1.46	3.50	3.29	3.87	2.75	2.69	3.99	1.63	3.87	.97	.70	33.01	31.71
Springfield, Mo.	2.34	5.27	2.35	1.59	3.39	.77	3.86	1.04	5.19	4.40	4.68	4.31	4.21	.62	4.09	3.02	3.52	3.25	3.05	3.05	2.79	2.11	2.31	1.30	41.78	30.73
Bismarck, N. Dak.	.45	.23	.44	1.36	.89	T	1.52	1.37	2.32	2.19	3.35	2.19	2.24	1.90	1.82	1.71	1.23	2.70	.94	1.94	.57	.98	.57	.19	16.34	16.76
Devils Lake, N. Dak.	.47	.06	.50	1.32	.78	.13	1.52	1.05	2.03	3.61	3.56	3.65	2.57	.67	2.48	.62	1.63	.96	1.25	2.26	.72	.81	.54	.23	18.05	15.37
Pierre, S. Dak.	.46	.28	.46	1.32	.86	.49	1.81	3.68	2.49	1.68	2.96	1.34	2.68	.69	2.09	2.61	1.10	.25	.82	2.34	.47	1.01	.50	.02	16.70	15.71
North Platte, Nebr.	.39	.51	.53	.24	.86	.29	2.06	3.46	2.78	6.10	3.22	4.06	2.74	.60	2.39	1.72	1.35	1.52	1.07	4.15	.47	1.93	.53	.17	18.39	24.75
Omaha, Nebr.	.70	1.73	.89	.21	1.37	.65	2.51	2.37	3.77	2.74	4.56	1.56	3.54	1.03	3.05	6.28	3.21	.65	2.17	.81	1.07	2.17	.93	.15	27.77	20.35
Concordia, Kans.	.61	.68	.88	.14	1.23	.24	2.36	3.51	4.18	5.52	4.41	3.58	3.78	2.17	2.91	1.85	2.60	1.78	1.97	2.32	.99	3.14	.63	.10	26.55	25.03
Dodge City, Kans.	.41	.32	.77	.04	.89	.07	1.94	2.79	2.89	3.28	3.30	1.27	3.14	1.54	2.67	.55	1.90	2.70	1.30	4.24	.73	1.77	.57	.57	20.51	19.14
Iola, Kans.	1.32	2.34	1.67	.05	2.62	.16	3.49	4.14	4.70	4.12	5.47	6.03	3.75	.45	3.49	1.60	4.93	6.72	2.99	3.43	1.83	2.85	1.39	.98	37.65	32.87
Washington, D. C.	3.55	2.85	3.27	1.64	3.75	2.26	3.27	3.12	3.70	1.81	4.13	3.19	4.71	2.30	4.01	.62	3.24	.76	2.84	.28	2.37	.79	3.32	2.04	42.16	21.66
Lynchburg, Va.	3.43	2.77	3.15	.95	3.54	2.26	2.95	1.45	3.63	1.75	3.79	2.57	4.21	.90	3.78	.42	3.31	.90	3.15	.62	2.33	2.44	3.26	2.80	40.53	19.83
Norfolk, Va.	3.10	4.09	3.22	1.24	3.77	1.68	3.23	2.38	3.81	1.63	4.22	5.90	5.75	2.50	5.22	.64	3.23	.57	3.04	2.00	2.16	1.26	3.34	3.02	44.00	26.91
Parkersburg, W. Va.	3.58	2.16	3.13	2.30	3.49	3.55	2.19	1.45	3.38	1.29	4.00	1.17	4.29	1.24	3.51	1.63	2.76	1.01	2.48	.68	2.57	1.11	3.03	2.11	39.41	19.70
Lexington, Ky.	4.18	4.44	3.62	2.91	4.32	2.54	3.50	.81	3.81	3.35	4.05	1.89	3.65	.45	3.45	1.69	3.07	2.80	2.59	.63	3.34	1.59	3.77	1.79	43.35	24.89

Charlotte, N. C	4.00	3.90	4.18	.92	4.17	2.45	3.31	.86	3.63	3.08	4.22	4.92	5.10	2.84	5.07	3.41	2.99	2.90	2.95	1.19	2.57	5.17	3.86	3.43	46.05	35.07
Wilmington, N. C	3.29	3.69	3.26	.38	3.17	2.98	2.66	1.62	3.44	1.51	5.10	3.89	7.13	7.48	6.36	1.56	4.51	5.82	3.27	1.86	1.96	1.92	2.78	4.55	46.93	37.26
Charleston, S. C	3.02	2.37	2.98	.81	3.02	4.17	2.53	2.60	3.00	.76	4.59	6.59	6.89	6.09	6.53	1.75	4.53	3.22	3.27	.79	2.14	1.23	2.72	2.05	45.22	32.43
Greenville, S. C	4.87	4.18	5.18	1.24	5.15	3.51	3.72	2.58	4.03	2.27	4.55	5.23	5.36	3.76	5.50	2.65	3.68	2.74	3.12	1.45	3.18	5.82	4.84	4.60	53.18	40.03
Atlanta, Ga	4.95	5.35	4.79	1.02	5.30	4.34	3.61	1.40	3.47	6.50	3.74	1.44	4.65	1.48	4.45	.96	2.99	3.52	2.59	1.25	3.03	5.94	4.70	3.46	48.27	36.66
Thomasville, Ga	4.10	5.70	4.46	3.17	4.09	10.92	3.34	4.49	3.63	1.29	5.45	5.15	6.70	5.94	5.75	2.99	4.88	8.09	2.95	.80	2.68	6.74	4.31	2.34	52.35	57.62
Jacksonville, Fla	2.80	2.55	2.97	2.61	2.91	10.00	2.38	1.86	4.02	3.70	5.33	10.13	6.71	4.74	5.81	.76	7.35	3.62	4.16	1.57	1.98	2.69	3.02	3.11	49.74	47.34
Miami, Fla	2.52	2.72	1.83	3.86	2.17	3.76	3.09	5.98	6.22	8.85	6.86	25.34	5.42	3.58	6.17	4.72	8.34	5.05	8.44	5.09	2.91	3.18	1.69	1.38	55.66	73.51
Memphis, Tenn	4.81	12.12	4.36	4.78	5.26	3.12	4.78	1.45	4.19	5.86	3.55	.19	3.18	.14	3.36	.49	2.80	2.12	2.68	1.96	4.24	2.42	4.51	2.81	47.72	37.46
Nashville, Tenn	4.76	3.82	4.13	3.68	5.11	5.14	4.13	1.16	3.87	5.23	4.00	1.59	3.88	1.22	3.71	4.69	3.42	3.88	2.49	2.11	3.50	3.19	4.20	2.09	47.20	37.80
Birmingham, Ala	5.52	4.25	5.06	1.71	5.70	6.80	4.81	1.38	3.95	7.94	4.46	1.55	5.17	3.58	4.26	4.93	3.38	3.08	2.42	2.55	3.31	7.38	5.14	2.48	53.18	47.63
Mobile, Ala	4.85	4.74	5.33	1.94	5.98	3.22	4.63	.77	4.32	3.54	5.43	.56	6.89	3.34	6.92	3.71	5.00	11.49	3.60	4.27	3.64	7.57	5.02	3.12	61.61	48.27
Meridian, Miss	5.32	4.56	5.45	3.11	5.23	6.41	4.78	1.86	4.32	8.54	4.55	1.57	4.89	3.15	4.54	3.73	2.96	2.35	2.39	4.40	3.32	9.15	5.23	3.04	52.98	51.87
Vicksburg, Miss	5.37	3.79	4.82	2.72	5.57	4.15	5.19	.20	4.32	10.54	3.99	.03	4.53	.68	3.46	3.41	2.87	2.93	2.77	1.94	3.71	5.13	5.33	4.10	51.93	39.62
New Orleans, La	4.34	6.89	4.25	2.98	4.72	5.88	5.24	2.89	4.60	4.31	5.88	1.27	6.37	6.11	5.80	9.49	5.03	7.30	3.30	4.81	3.14	8.57	4.79	1.80	57.46	62.30
Shreveport, La	3.93	9.13	3.29	4.72	4.11	1.24	4.63	.75	4.22	6.42	3.50	.76	3.56	.21	2.70	2.40	2.80	4.88	2.69	4.72	3.65	4.29	4.29	3.89	43.37	43.41
Amarillo, Tex	.51	.57	.71	.00	.71	1.27	1.83	2.19	2.79	1.49	2.84	4.47	2.84	2.42	3.08	1.61	2.30	.20	1.66	2.57	.92	.33	.80	.46	20.99	17.58
Brownsville, Tex	1.50	.56	1.21	1.09	1.26	1.41	1.43	3.09	2.27	5.07	2.87	3.01	1.96	.42	2.55	.53	5.52	2.80	3.29	9.36	1.98	5.95	1.56	.42	27.40	33.71
El Paso, Tex	.46	.17	.41	.16	.36	.03	.26	T.	.33	.62	.58	.53	1.99	1.33	1.70	1.29	1.25	.04	.80	.75	.50	.74	.52	.43	9.16	6.09
Fort Worth, Tex	2.05	.84	1.76	1.08	2.32	2.86	4.02	2.37	4.65	10.37	3.35	1.87	2.61	.37	2.62	3.12	2.49	1.19	2.81	7.96	2.58	1.71	1.87	2.08	33.13	35.82
Galveston, Tex	3.41	5.07	2.83	2.74	2.68	1.05	3.06	3.99	3.42	2.69	4.37	.01	3.71	.31	4.28	2.73	5.57	4.41	4.36	6.92	2.33	4.45	3.75	3.26	44.77	37.63
San Antonio, Tex	1.46	1.25	1.65	.94	1.84	1.76	3.19	2.20	3.20	.89	2.46	4.03	2.17	1.99	2.42	.41	3.05	1.74	2.23	4.01	1.90	2.69	1.61	.88	27.18	22.79
Oklahoma City, Okla	1.19	2.69	1.11	1.29	1.98	.25	3.29	2.30	4.88	7.53	3.67	8.76	2.86	.60	2.89	3.12	3.05	.16	2.86	6.10	1.87	2.11	1.50	3.52	31.15	38.43
Little Rock, Ark	4.73	12.47	3.84	4.40	4.62	1.99	5.19	.17	4.78	11.12	3.76	.12	3.50	.01	3.75	.65	3.17	2.86	2.71	3.12	4.19	2.38	4.14	2.28	48.38	41.57
Havre, Mont	.73	.18	.50	.27	.51	.58	.99	1.12	2.04	.88	2.86	1.65	1.87	.76	1.22	.34	1.29	1.39	.67	.48	.61	.82	.61	.25	13.90	8.72
Miles City, Mont	.66	.35	.49	.36	.86	.29	1.12	1.88	2.24	1.30	2.66	1.75	1.54	1.09	1.08	.93	1.04	1.08	.90	.66	.57	.38	.63	.31	13.79	10.38
Kalispell, Mont	1.57	.80	1.11	.62	.95	.35	.80	1.32	1.46	1.87	2.06	2.52	1.10	1.02	.87	.23	1.24	2.67	1.06	1.61	1.35	2.49	1.45	.35	15.02	15.85
Cheyenne, Wyo	.42	.88	.64	1.03	1.02	.88	1.99	1.19	2.43	4.95	1.61	.34	2.10	.92	1.55	6.73	1.20	1.28	.96	1.49	.52	.83	.55	.12	14.99	20.64
Sheridan, Wyo	.85	.69	.70	.48	1.16	.73	1.92	.64	2.65	1.50	2.04	1.39	1.22	1.20	.91	.36	1.27	T.	1.07	2.02	.63	.19	.64	.03	15.06	9.23
Pueblo, Colo	.31	.51	.47	.06	.59	.56	1.31	1.24	1.60	2.12	1.36	1.89	1.94	2.64	1.82	3.03	.75	1.03	.66	.57	.36	.44	.50	.13	11.67	14.22
Grand Junction, Colo	.60	1.73	.58	.45	.76	.36	.83	.84	.81	1.50	.40	.31	.61	.99	1.17	.86	.92	.70	.95	.62	.57	1.02	.63	.11	8.83	9.49
Santa Fe, N. Mex	.67	.46	.75	.49	.80	.68	1.00	.81	1.26	.41	1.08	.37	2.38	4.32	2.28	1.99	1.45	1.89	1.18	.64	.68	1.12	.74	.06	14.27	13.24
Roswell, N. Mex	.53	.26	.57	T.	.74	.96	.89	.53	1.09	.48	1.67	1.72	2.26	.60	2.15	1.92	2.11	.55	1.42	2.76	.85	.43	.66	.26	14.94	10.47
Phoenix, Ariz	.80	1.69	.77	.19	.68	1.77	.40	.20	.12	1.31	.07	.16	1.07	.68	.95	.86	.75	.51	.47	.16	.70	.51	1.00	T.	7.78	8.04
Modena, Utah	.85	1.89	.95	.56	1.03	.39	.89	.65	.79	1.28	.32	.71	1.08	.58	1.29	2.72	.78	.27	.74	1.09	.59	1.17	.83	T.	10.14	11.31
Salt Lake City, Utah	1.31	1.38	1.51	2.15	1.98	.74	2.05	1.48	1.92	1.52	.80	.32	.51	.84	.85	1.87	.98	2.40	1.44	1.42	1.35	1.07	1.43	.54	16.13	15.73
Winnemucca, Nev	1.03	2.29	.91	.61	.96	.68	.84	.34	.88	2.54	.72	.06	.21	.04	.20	.38	.41	1.06	.62	.26	.68	1.28	1.08	.06	8.54	9.60
Boise, Idaho	1.73	2.18	1.44	2.63	1.35	1.59	1.18	2.04	1.43	1.68	.92	.20	.24	T.	.19	.78	.53	.96	1.24	.87	1.28	.99	1.57	.54	13.10	14.46
Seattle, Wash	4.94	2.62	3.89	3.82	3.05	1.86	2.38	1.82	1.87	2.41	1.33	1.71	.63	T.	.70	.08	1.77	1.14	2.84	2.72	5.03	1.75	5.60	1.85	34.03	21.78
Walla Walla, Wash	1.96	1.13	1.76	1.87	1.61	1.24	1.51	.68	1.61	2.85	1.12	.58	.39	.02	.49	.14	.95	1.33	1.53	1.00	2.02	1.64	2.06	.74	17.01	13.22
Portland, Oreg	6.60	3.43	5.36	5.03	3.91	2.21	2.87	2.72	2.19	3.08	1.52	.69	.61	T.	.64	.06	1.98	1.79	3.12	2.15	6.10	2.84	6.72	3.16	41.62	27.16
Roseburg, Oreg	5.31	3.94	4.49	2.96	3.28	.90	2.27	2.67	1.93	2.45	1.09	.47	.32	T.	.34	T.	1.27	1.18	2.61	.80	4.66	3.78	5.34	2.02	32.91	21.17
Eureka, Calif	7.11	6.32	6.48	4.92	5.23	1.23	3.33	2.54	1.80	1.04	.72	.13	.11	T.	.18	T.	1.01	1.12	2.33	1.21	5.18	3.20	6.28	2.50	39.76	24.21
Fresno, Calif	1.73	1.90	1.43	1.89	1.58	1.38	.95	.45	.44	.29	.08	.00	.01	T.	.01	T.	.21	.20	.57	.18	.93	.88	1.45	.01	9.39	7.18
Los Angeles, Calif	3.10	5.57	3.07	.45	2.78	3.99	1.04	.15	.45	1.04	.08	T.	.01	.00	.02	.00	.17	.01	.68	.10	1.20	1.71	2.63	.00	15.23	13.02
Sacramento, Calif	3.72	3.65	3.02	1.62	2.57	2.86	1.51	.94	.77	.34	.15	T.	.00	.00	.00	T.	.38	.29	.92	.47	1.88	1.11	3.03	.56	17.95	11.84
San Diego, Calif	2.06	3.90	2.03	.66	1.72	3.02	.77	1.06	.35	1.81	.05	.02	.03	T.	.04	T.	.08	T.	.54	.22	.76	1.04	1.87	.00	10.30	11.73
San Francisco, Calif	4.54	4.99	3.85	2.94	3.14	3.53	1.61	1.56	.80	.16	.18	T.	.02	.00	.01	.00	.45	.10	1.12	.89	2.35	1.56	3.95	.98	22.02	16.71

Weather Bureau.

T. = Trace, indicates an amount too small to measure.

[1] Normals are based on records of 20 or more years of observations.

TABLE 552.—*Frost: Dates of killing frosts, with length of growing season*

Station	Date of last killing frost in spring, 1930	Date of first killing frost in fall, 1930	Averages and extremes for 30 to 50 years: Spring frosts: Latest date of killing frost	Averages and extremes for 30 to 50 years: Spring frosts: Average date of last killing frost	Averages and extremes for 30 to 50 years: Fall frosts: Earliest date of killing frost	Averages and extremes for 30 to 50 years: Fall frosts: Average date of first killing frost	Length of growing season between average dates of killing frosts
							Days
Greenville, Me	May 12[1]	Oct. 8	June 23	May 30	Aug. 26	Sept. 14	107
Portland, Me	Apr. 24	Oct. 21	June 20	May 14	Sept. 11	Oct. 18	157
Concord, N. H	do	do	June 5	May 7	Sept. 6	Sept. 30	146
Northfield, Vt	June 2[1]	Oct. 4	June 20	May 22	Aug. 27	Sept. 18	120
Boston, Mass	Apr. 24	Oct. 21	May 16	Apr. 14	Sept. 26	Oct. 24	193
Hartford, Conn	Apr. 24[1]	do	May 22	Apr. 23	Sept. 16	Oct. 13	173
Albany, N. Y	do	do	May 30	do	Sept. 15	Oct. 16	176
Buffalo, N. Y	Apr. 24	Oct. 26	May 21	Apr. 28	Oct. 3	Oct. 21	176
Canton, N. Y	Apr. 29	Oct. 4	June 2	May 8	Sept. 11	Sept. 28	143
Setauket, N. Y	Apr. 24	Oct. 21	May 17	Apr. 16	Oct. 21	Nov. 10	208
Syracuse, N. Y	Apr. 25	Oct. 20	May 5	Apr. 24	Sept. 21	Oct. 22	181
Atlantic City, N. J	Apr. 24	Oct. 21[1]	Apr. 30	Apr. 11	Oct. 1	Nov. 5	208
Trenton, N. J	do	do	May 17	Apr. 20	Sept. 22	Oct. 19	182
Erie, Pa	Apr. 23	Oct. 19	do	do	Oct. 9	Nov. 2	196
Harrisburg, Pa	Apr. 24	Oct. 21	May 12	Apr. 10	Oct. 3	Oct. 27	200
Pittsburgh, Pa	do	Oct. 20	May 29	Apr. 21	Sept. 19	Oct. 22	184
Scranton, Pa	Apr. 27	do	May 10	Apr. 20	Sept. 14	Oct. 13	176
Cincinnati, Ohio	Apr. 25	do	Apr. 26	Apr. 14	Sept. 30	Oct. 25	194
Cleveland, Ohio	Apr. 24	Oct. 18	May 21	Apr. 15	Oct. 2	Nov. 2	201
Columbus, Ohio	do	Oct. 20	May 17	Apr. 17	Sept. 21	Oct. 18	184
Dayton, Ohio	do	do	May 11	Apr. 15	Oct. 9	Oct. 27	195
Toledo, Ohio	Apr. 23	Oct. 18	May 29	Apr. 22	Sept. 9	Oct. 18	179
Evansville, Ind	Mar. 31	Oct. 20	Apr. 26	Apr. 6	Sept. 30	Oct. 27	204
Fort Wayne, Ind	Apr. 25	Oct. 18	May 28	Apr. 25	Sept. 14	Oct. 13	171
Indianapolis, Ind	Apr. 24[1]	Oct. 20	May 25	Apr. 16	Sept. 21	Oct. 19	186
Cairo, Ill	Mar. 29	Oct. 24	Apr. 30	Mar. 31	Sept. 30	Oct. 29	212
Chicago, Ill	Apr. 2[1]	Oct. 18	May 23	Apr. 18	Sept. 20	Oct. 18	183
Peoria, Ill	Apr. 24[1]	Oct. 20	May 11	Apr. 15	Sept. 26	Oct. 19	187
Springfield, Ill	Apr. 2[1]	Oct. 18	May 25	do	Sept. 25	do	187
Alpena, Mich	May 18	do	June 9	May 13	Sept. 6	Sept. 30	140
Detroit, Mich	Apr. 23	Oct. 20	May 31	Apr. 30	Sept. 21	Oct. 14	167
Grand Haven, Mich	Apr. 26	Oct. 19	May 28	May 1	Sept. 23	Oct. 17	169
Grand Rapids, Mich	May 30	Oct. 18	May 30	Apr. 28	do	do	172
Ludington, Mich	Apr. 26	Oct. 17	June 17	May 2	Sept. 4	Oct. 21	172
Marquette, Mich	May 26	do	June 6	May 13	Aug. 23	Oct. 9	149
Green Bay, Wis	May 25	Sept. 30	May 30	May 5	Sept. 16	do	157
La Crosse, Wis	May 17	Oct. 17	May 24	Apr. 28	Sept. 10	Oct. 10	165
Madison, Wis	do	do	May 25	Apr. 25	Sept. 16	Oct. 17	175
Milwaukee, Wis	Apr. 24	Oct. 18[1]	May 29	Apr. 28	Sept. 25	Oct. 16	171
Duluth, Minn	May 27[1]	Sept. 29	June 14	May 7	Sept. 10	Oct. 4	150
Minneapolis, Minn	May 17[1]	Oct. 17[1]	May 20	Apr. 26	Sept. 13	Oct. 10	167
Moorhead, Minn	May 24	Sept. 28	June 8	May 13	Aug. 25	Sept. 24	134
Charles City, Iowa	May 17[1]	do	May 21	Apr. 30	Sept. 12	Oct. 7	160
Des Moines, Iowa	Apr. 2	Oct. 17	May 31	Apr. 21	Sept. 13	Oct. 10	172
Dubuque, Iowa	Apr. 24	do	May 21	Apr. 20	Sept. 21	Oct. 15	178
Keokuk, Iowa	Apr. 2[1]	Oct. 20	May 4	Apr. 14	Sept. 18	Oct. 13	182
Columbia, Mo	Mar. 30	Oct. 17	May 9	Apr. 12	do	Oct. 14	185
St. Joseph, Mo	Apr. 1[1]	do	Apr. 28	Apr. 11	Sept. 26	do	186
St. Louis, Mo	Mar. 28[1]	Oct. 20	May 22	Apr. 4	Sept. 30	Oct. 28	207
Springfield, Mo	Mar. 30	Oct. 31	May 19	Apr. 14	do	Oct. 21	190
Bismarck, N. Dak	May 17	Sept. 27	June 7	May 11	Aug. 23	Sept. 20	132
Devils Lake, N. Dak	May 24	Sept. 28	do	May 16	Aug. 8	Sept. 19	126
Williston, N. Dak	May 16	Sept. 25	June 16	May 15	Aug. 22	Sept. 20	128
Huron, S. Dak	May 17[1]	Sept. 27	June 21	May 10	Aug. 23	Sept. 23	136
Pierre, S. Dak	do	Oct. 16	May 19	Apr. 30	Sept. 12	Oct. 5	158
Rapid City, S. Dak	May 18[1]	do	May 21	May 4	Sept. 13	Sept. 29	148
Yankton, S. Dak	Apr. 17[1]	Oct. 17	May 27	May 1	Sept. 14	Oct. 6	158
North Platte, Nebr	May 18	Oct. 16	May 24	do	Sept. 10	Sept. 30	152
Omaha, Nebr	Apr. 1[1]	Oct. 17	May 19	Apr. 15	Sept. 18	Oct. 13	181
Valentine, Nebr	May 17[1]	Oct. 16	June 21	May 6	Sept. 12	Oct. 1	148
Concordia, Kans	Apr. 2	Oct. 20	May 19	Apr. 17	Sept. 20	Oct. 17	182
Dodge City, Kans	Apr. 1[1]	Oct. 24	May 27	Apr. 21	Sept. 23	Oct. 21	183
Iola, Kans	Mar. 30	do	May 4	Apr. 7	Sept. 26	Oct. 23	199
Wichita, Kans	Mar. 28	Oct. 31	May 15	Apr. 10	Sept. 23	Oct. 25	198
Washington, D. C	Apr. 24	Oct. 21	May 12	Apr. 8	Oct. 2	Oct. 20	195
Lynchburg, Va	Apr. 1	do	May 7	Apr. 28	do	Oct. 27	182
Norfolk, Va	Mar. 5	Oct. 23	Apr. 26	Mar. 25	Oct. 11	Nov. 17	237
Richmond, Va	Apr. 9[1]	Oct. 22	do	Apr. 7	Oct. 12	Oct. 31	207
Wytheville, Va	Apr. 27	Oct. 20	May 15	Apr. 15	Sept. 19	Oct. 13	181
Elkins, W. Va	June 1[1]	do	June 1	May 8	Sept. 20	Oct. 8	153
Parkersburg, W. Va	Apr. 25	Oct. 20	May 22	Apr. 16	Oct. 1	Oct. 16	183
Asheville, N. C	Apr. 1	Oct. 21	May 10	Apr. 15	Oct. 3	Oct. 20	188
Charlotte, N. C	Mar. 5	Nov. 1	Apr. 26	Mar. 28	Oct. 8	Nov. 5	222
Raleigh, N. C	Mar. 23	do	do	Mar. 29	do	do	221
Wilmington, N. C	Mar. 5	Nov. 2	May 1	Mar. 23	Oct. 16	Nov. 13	235
Charleston, S. C	Mar. 31[1]	Nov. 28	Apr. 2	Feb. 20	Nov. 8	Dec. 10	293

[1] Temperature 32° F. or below.

TABLE 552.—*Frost: Dates of killing frosts, with length of growing season*—Continued

Station	Date of last killing frost in spring, 1930	Date of first killing frost in fall, 1930	Averages and extremes for 30 to 50 years: Spring frosts: Latest date of killing frost	Spring frosts: Average date of last killing frost	Fall frosts: Earliest date of killing frost	Fall frosts: Average date of first killing frost	Length of growing season between average dates of killing frosts
							Days
Columbia, S. C.	Mar. 4	Nov. 1	Apr. 17	Mar. 18	Oct. 30	Nov. 18	245
Greenville, S. C.	Mar. 5	do	Apr. 24	Apr. 3	Oct. 10	Nov. 2	213
Atlanta, Ga.	Mar. 4	do	Apr. 17	Mar. 31	Oct. 11	Nov. 7	221
Augusta, Ga.	Mar. 5	Nov. 8	do	Mar. 22	Oct. 21	Nov. 10	233
Macon, Ga.	Mar. 4	Nov. 1	Apr. 18	Mar. 23	Oct. 11	Nov. 7	229
Savannah, Ga.	do	Nov. 27	Apr. 13	Feb. 26	Oct. 25	Nov. 24	271
Thomasville, Ga.	do	do	Apr. 26	Mar. 14	Oct. 21	Nov. 15	246
Apalachicola, Fla.	Jan. 24	Dec. 24	Mar. 23	Feb. 14	Nov. 13	Dec. 7	296
Avon Park, Fla.	Mar. 4	do	Mar. 4	Jan. 12	Nov. 14	Dec. 26	348
Jacksonville, Fla.	Jan. 24[1]	None	Apr. 10	Feb. 16	Nov. 12	Dec. 6	293
Miami, Fla.	None	do	Feb. 19	(2)	Dec. 26	(2)	(2)
Tampa, Fla.	do	do	Apr. 7	Jan. 26	Nov. 21	Jan. 3[3]	342
Chattanooga, Tenn.	Mar. 4	Nov. 25	May 14	Apr. 2	Sept. 30	Oct. 26	207
Knoxville, Tenn.	Mar. 26	Oct. 22	Apr. 26	do	Oct. 1	Oct. 28	209
Memphis, Tenn.	Mar. 3[1]	Oct. 31	Apr. 25	Mar. 22	Oct. 2	Nov. 3	226
Nashville, Tenn.	Mar. 4	Oct. 26	Apr. 24	Apr. 2	Oct. 8	Oct. 27	208
Birmingham, Ala.	Mar. 9	Nov. 1	Apr. 20	Mar. 16	Oct. 21	Nov. 9	238
Mobile, Ala.	Jan. 30	Nov. 27	Apr. 6	Feb. 17	Oct. 31	Dec. 5	291
Montgomery, Ala.	Mar. 3[1]	Nov. 1	Apr. 5	Mar. 10	Oct. 21	Nov. 11	246
New Orleans, La.	Jan. 25	None	Mar. 27	Jan. 25	Nov. 11	Dec. 16	325
Shreveport, La.	Mar. 4	Nov. 25	Apr. 9	Mar. 6	Oct. 20	Nov. 10	249
Abilene, Tex.	Mar. 28	Nov. 21	Apr. 23	Mar. 21	Oct. 19	do	234
Amarillo, Tex.	Mar. 29	Nov. 20	May 23	Apr. 17	Sept. 22	Oct. 29	195
Brownsville, Tex.	Jan. 23[1]	None	Mar. 8	Jan. 28	Nov. 15	Dec. 22	328
Corpus Christi, Tex.	Jan. 23	do	Mar. 19	Jan. 21	Nov. 29	Dec. 28	341
Del Rio, Tex.	Jan. 31[1]	Dec. 17	Mar. 27	Feb. 28	Oct. 27	Nov. 17	262
El Paso, Tex.	Mar. 4	Nov. 20	Apr. 26	Mar. 14	do	Nov. 15	246
Fort Worth, Tex.	Mar. 3	Dec. 17	Apr. 9	Mar. 11	Oct. 22	Nov. 12	246
Galveston, Tex.	Jan. 24	None	Mar. 1	Jan. 19	Nov. 16	Dec. 26	341
Palestine, Tex.	Mar. 3	Dec. 17	Apr. 5	Mar. 13	Oct. 20	Nov. 13	245
San Antonio, Tex.	Jan. 30	do	do	Feb. 24	Oct. 30	Nov. 28	277
Taylor, Tex.	Mar. 3	Nov. 25	do	Mar. 13	do	Nov. 22	254
Oklahoma City, Okla.	Mar. 28	Nov. 6	Apr. 30	Mar. 31	Oct. 7	Nov. 2	216
Fort Smith, Ark.	Mar. 30	Oct. 31	Apr. 17	Mar. 21	Oct. 9	Nov. 6	230
Little Rock, Ark.	Mar. 26	Nov. 25	Apr. 26	Mar. 18	Oct. 22	Nov. 14	241
Havre, Mont.	May 16[1]	Oct. 13	June 6	May 16	Aug. 25	Sept. 19	126
Helena, Mont.	May 23[1]	Oct. 14	June 9	May 9	do	Sept. 28	142
Kalispell, Mont.	May 26	Oct. 13	June 7	May 5	Sept. 6	Oct. 2	150
Miles City, Mont.	Apr. 5[1]	Sept. 26	May 31	do	Sept. 7	do	150
Cheyenne, Wyo.	May 18	Oct. 16	June 13	May 20	Aug. 25	Sept. 19	122
Lander, Wyo.	June 14	Sept. 24	June 18	May 19	Aug. 23	Sept. 18	122
Sheridan, Wyo.	May 23	Sept. 26	June 6	May 20	Aug. 25	Sept. 20	123
Yellowstone Park, Wyo.	June 5	Sept. 1	June 22	May 21	do	Sept. 16	118
Denver, Colo.	May 22[1]	Oct. 17	June 6	May 4	Sept. 12	Oct. 8	157
Grand Junction, Colo.	May 10	do	May 14	Apr. 19	Sept. 14	Oct. 19	183
Pueblo, Colo.	May 11	do	June 2	Apr. 27	Sept. 12	Oct. 8	164
Roswell, N. Mex.	Mar. 27	Nov. 16	May 7	Apr. 12	Oct. 10	Oct. 27	198
Santa Fe, N. Mex.	May 23[1]	Oct. 27	May 23	Apr. 25	Sept. 25	Oct. 18	176
Flagstaff, Ariz.	June 3	Sept. 25[1]	June 17	May 31	Sept. 12	Sept. 24	116
Phœnix, Ariz.	Jan. 23	Nov. 20	Mar. 31	Feb. 16	Nov. 5	Dec. 3	290
Tucson, Ariz.	Mar. 1[1]		Apr. 6	Mar. 11	Oct. 22	Nov. 9	243
Yuma, Ariz.	Jan. 9	Dec. 27	Feb. 18	Jan. 2	Nov. 30	Dec. 25	357
Modena, Utah	May 10	Sept. 26	July 3	May 23	Sept. 5	Sept. 26	126
Salt Lake City, Utah	Mar. 27	Oct. 16	June 18	Apr. 20	Sept. 22	Oct. 20	183
Reno, Nev.	May 22[1]	Oct. 10	June 13	May 13	Sept. 6	Oct. 3	143
Winnemucca, Nev.	May 22	do	June 22	May 16	Aug. 22	Sept. 26	133
Boise, Idaho	Mar. 31[1]	Oct. 11	June 16	Apr. 27	Sept. 11	Oct. 12	168
Lewiston, Idaho	Mar. 16	Oct. 12	May 10	Apr. 5	Sept. 21	Oct. 25	203
Pocatello, Idaho	May 8[1]	Oct. 16	June 1	May 1	Sept. 8	Oct. 6	158
Seattle, Wash.	Feb. 28[1]	Nov. 14	May 10	Mar. 17	Oct. 18	Nov. 21	249
Spokane, Wash.	Apr. 10[1]	Oct. 11	June 8	Apr. 14	Sept. 7	Oct. 13	182
Walla Walla, Wash.	Mar. 16	Oct. 30	Apr. 28	Mar. 30	Sept. 28	Nov. 5	220
Baker, Oreg.	May 22[1]	Oct. 9	June 23	May 8	Aug. 30	Sept. 30	145
Portland, Oreg.	Mar. 1	Nov. 24	May 2	Mar. 18	Oct. 13	Nov. 19	246
Roseburg, Oreg.	Mar. 17	Dec. 20	May 24	Apr. 14	Sept. 24	Nov. 12	212
Eureka, Calif.	Jan. 11	None	Apr. 7	Feb. 8	Nov. 11	Nov. 26	291
Fresno, Calif.	Jan. 3	Nov. 20	Apr. 14	Feb. 22	Oct. 31	Dec. 2	283
Independence, Calif.	May 5[1]	Oct. 1	May 24	Apr. 6	Sept. 24	Oct. 28	205
Los Angeles, Calif.	None	None	Feb. 17	(2)	Nov. 2	(2)	(2)
Red Bluff, Calif.	Mar. 1[1]	Dec. 22	May 9	Mar. 10	Nov. 8	Dec. 6	271
Sacramento, Calif.	Jan. 13	do	May 7	Feb. 19	Nov. 11	Nov. 29	283
San Bernardino, Calif.	Jan. 8[1]	Dec. 13	Apr. 18	Mar. 8	Oct. 23	Nov. 22	259
San Diego, Calif.	None	None	Jan. 20	(2)	Dec. 26	(2)	(2)
San Francisco, Calif.	do	do	Mar. 27	Jan. 25	Dec. 4	Dec. 10	319

Weather Bureau.

[1] Temperature 32° F. or below. [2] Frosts do not occur every year. [3] Of year following.

TABLE 553.—*Depth of frost penetration into ground* [1]

State	Average annual penetration	Average of extreme penetration	Average winter temperature	State	Average annual penetration	Average of extreme penetration	Average winter temperature
	Inches	*Inches*	*F.°*		*Inches*	*Inches*	*F.°*
Alabama	2	6	47	Nebraska	27	48	24
Arizona	6	10	45	Nevada	12	23	32
Arkansas	5	14	42	New Hampshire and Vermont	38	60	20
California	2	5	46	New Jersey	10	34	31
Colorado	25	44	26	New Mexico	9	18	35
Connecticut and Rhode Island	26	49	28	New York	32	50	24
Florida	0	0	58	North Carolina	5	10	42
Georgia	2	5	47	North Dakota	50	75	5
Idaho	12	31	26	Ohio	14	32	30
Illinois	23	36	29	Oklahoma	7	20	31
Indiana	20	36	30	Oregon	7	18	35
Iowa	31	58	22	Pennsylvania	21	44	29
Kansas	16	30	31	South Carolina	2	4	46
Kentucky	7	15	36	South Dakota	39	64	18
Louisiana	1	4	52	Tennessee	3	12	40
Maine	40	74	18	Texas	4	10	50
Maryland and Delaware	11	25	34	Utah	5	30	28
Massachusetts	38	60	27	Virginia	8	18	37
Michigan	28	55	21	Washington	9	24	31
Minnesota	48	80	12	West Virginia	9	23	33
Mississippi	2	8	48	Wisconsin	39	65	17
Missouri	15	20	32	Wyoming	33	56	26
Montana	34	61	21				

Weather Bureau.

[1] Based upon over 1,300 reports on frost penetration within the limits of the United States.

TABLE 554.—*National forest areas*

NATIONAL FOREST AREAS, BY REGIONS, JUNE 30, 1930

Region No.	Region Name	Region Headquarters	Gross area	Alienated lands	Net area
			Acres	*Acres*	*Acres*
1	Northern	Missoula, Mont	26, 776, 976	3, 947, 237	22, 829, 739
2	Rocky Mountain	Denver, Colo	20, 937, 593	1, 760, 004	19, 177, 589
3	Southwestern	Albuquerque, N. Mex	21, 306, 677	2, 180, 392	19, 126, 285
4	Intermountain	Ogden, Utah	30, 712, 977	1, 160, 218	29, 552, 759
5	California	San Francisco, Calif	24, 144, 950	4, 928, 618	19, 216, 332
6	North Pacific	Portland, Oreg	26, 984, 884	3, 916, 762	23, 068, 122
7	Eastern	Washington, D. C	9, 148, 117	4, 747, 409	4, 400, 708
8	Alaska	Juneau, Alaska	21, 397, 347	52, 734	21, 344, 613
9	Lake States	Milwaukee, Wis	2, 566, 409	1, 191, 739	1, 374, 670
	Total		183, 975, 930	23, 885, 113	160, 090, 817

REGIONAL HEADQUARTERS

Region 1.—Northern region: Office, Federal Building, Missoula, Mont. Embracing Montana, northeastern Washington, northern Idaho, and northwestern South Dakota.

Region 2.—Rocky Mountain region: Office, Federal Building, Denver, Colo. Embracing Colorado, eastern Wyoming, South Dakota, Nebraska, and western Oklahoma.

Region 3.—Southwestern region: Office, Gas and Electric Building, Albuquerque, N. Mex. Embracing Arizona and New Mexico.

Region 4.—Intermountain region: Office, Forest Service Building, Ogden, Utah. Embracing Utah, southern Idaho, western Wyoming, Nevada, and northwestern Arizona.

Region 5.—California region: Office, Ferry Building, San Francisco, Calif. Embracing California and southwestern Nevada.

Region 6.—North Pacific region: Office, Post Office Building, Portland, Oreg. Embracing Washington and Oregon.

Region 7.—Eastern region: Office, Atlantic Building, Washington, D. C. Embracing Alabama, Arkansas, Florida, Georgia, Louisiana, Maine, New Hampshire, North Carolina, Pennsylvania, Porto Rico, South Carolina, Tennessee, Virginia, and West Virginia.

Region 8.—Alaska region: Office, Goldstein Building, Juneau, Alaska. Located in Alaska.

Region 9.—Lake States region: Office, Customs Service Building, Milwaukee, Wis. Embracing Illinois, Michigan, Minnesota, and Wisconsin.

TABLE 554.—*National forest areas*—Continued

NATIONAL MONUMENTS

The following national monuments situated within national forests and administered by the Department of Agriculture have been created under the act of June 8, 1906 (34 Stat. 225), for the perservation of objects of historic or scientific interest:

Name	National forest	State	Area	Latest change in boundary
			Acres	
Bandelier	Santa Fe	New Mexico	22,075	Feb. 11, 1916
Chiricahua	Coronado	Arizona	4,480	Apr. 18, 1924
Devil Postpile	Sierra	California	800	July 6, 1911
Gila Cliff Dwellings	Gila	New Mexico	160	Nov. 16, 1907
Holy Cross	Holy Cross	Colorado	1,392	May 11, 1929
Jewel Cave	Harney	South Dakota	1,280	Feb. 7, 1908
Lava Beds	Modoc	California	45,967	Nov. 21, 1925
Lehman Caves	Nevada	Nevada	593	Jan. 24, 1922
Mount Olympus	Olympic	Washington	298,730	Jan. 7, 1929
Old Kasaan	Tongass	Alaska	38	Oct. 25, 1916
Oregon Caves	Siskiyou	Oregon	480	July 12, 1909
Sunset Crater	Coconino	Arizona	3,040	May 26, 1930
Timpanogos Cave	Wasatch	Utah	250	Oct. 14, 1922
Tonto	Tonto	Arizona	640	Dec. 19, 1907
Walnut Canyon	Coconino	do	960	Nov. 30, 1915
Wheeler	Cochetopa Rio Grande	Colorado	300	Dec. 7, 1908
Total area			381,185	

NATIONAL GAME REFUGES

The following national refuges situated wholly or in part within national forests have been designated under special act of Congress for the protection of game:

Name	National forest	State	Area	Latest change in boundary
			Acres	
Cherokee National Game Refuge No. 1	Cherokee	Tennessee	30,000	Aug. 5, 1924
Cherokee National Game Refuge No. 2	do	Georgia	14,000	Do.
Custer State Park Game Sanctuary	Harney	South Dakota	44,840	Jan. 14, 1929
Grand Canyon	Tusayan Kaibab	Arizona	792,163	Feb. 26, 1919
Ozark National Game Refuge No. 1	Ozark	Arkansas	8,420	Apr. 26, 1926
Ozark National Game Refuge No. 2	do	do	5,300	Do.
Ozark National Game Refuge No. 3	do	do	3,620	Do.
Ozark National Game Refuge No. 4	do	do	4,160	Do.
Pisgah	Pisgah	North Carolina	98,381	Oct. 17, 1916
Sequoia	Sequoia	California	15,770	July 3, 1926
Sheep Mountain	Medicine Bow	Wyoming	28,318	Aug. 8, 1924
Tahquitz	San Bernardino	California	27,573	July 3, 1926
Wichita	Wichita	Oklahoma	60,800	June 2, 1905

The following national forests, or parts of national forests, established under section 9 of the Clarke-McNary Act of June 7, 1924 (43 Stat. 653), were on July 1, 1925, designated game refuges by the acting Secretaries of War and Agriculture:

National forest	State	Area
		Acres
Black Hills (Meade district)	South Dakota	5,548
Manzano (Zuni district)	New Mexico	45,515
Medicine Bow (Pole Mountain district)	Wyoming	56,132
Michigan (Brady district)	Michigan	2,680

RANGE RESERVES

The following reserves have been established by Executive order for use by the Forest Service in conducting studies of grazing and range management:

Name	State	Area	Latest change in boundary
		Acres	
Jornada	New Mexico	193,686	July 10, 1925
Santa Rita	Arizona	52,399	Mar. 2, 1927

Forest Service.

TABLE 555.—*Lumber consumption, per capita census years* [1]

Year	Per capita consumption	Year	Apparent per capita consumption
	Feet b. m.		*Feet b. m.*
1809	55	1904	505
1819	55	1909	475
1829	65	1914	400
1839	95	1919	325
1849	235	1924	310
1859	260	1925	325
1869	340	1926	305
1879	365	1927	280
1889	435	1928	270
1899	460	1929	290

Forest Service.

[1] This table takes into account the exports and imports of lumber, but not the increases and decreases of mill and yard stocks.

TABLE 556.—*Lumber consumption of softwoods and hardwoods per capita, 1928*

State	Per capita consumption	State	Per capita consumption	State	Per capita consumption
	Feet b. m.		*Feet b. m.*		*Feet b. m.*
Alabama	205	Maine	330	Oklahoma	190
Arizona	180	Maryland	315	Oregon	1,160
Arkansas	205	Massachusetts	210	Pennsylvania	180
California	680	Michigan	375	Rhode Island	225
Colorado	210	Minnesota	265	South Carolina	70
Connecticut	180	Mississippi	245	South Dakota	250
Delaware	195	Missouri	215	Tennessee	320
District of Columbia	85	Montana	485	Texas	290
Florida	295	Nebraska	220	Utah	240
Georgia	115	Nevada	695	Vermont	330
Idaho	390	New Hampshire	495	Virginia	175
Illinois	315	New Jersey	220	Washington	1,075
Indiana	265	New Mexico	280	West Virginia	135
Iowa	235	New York	265	Wisconsin	350
Kansas	220	North Carolina	210	Wyoming	545
Kentucky	175	North Dakota	220		
Louisiana	365	Ohio	225		

Forest Service in cooperation with the Bureau of the Census.

TABLE 557.—*Lumber used in manufacture, 1928* [1]

BY STATES AND REGIONS

	Quantity		Quantity		Quantity
State and region:	*1,000 ft. b. m.*	State and region—Continued.	*1,000 ft. b. m.*	State and region—Continued.	*1,000 ft. b. m.*
Alabama	417,556	Missouri	275,675	West Virginia	115,746
Arizona	33,284	Montana	100,011	Wisconsin	695,029
Arkansas	459,865	Nebraska	46,881	Wyoming	2,477
California	1,385,822	Nevada	6,836		
Colorado	64,918	New Hampshire	189,869	All States	18,698,440
Connecticut	68,169	New Jersey	237,197		
Delaware	35,888	New Mexico	59,291	Regional summary:	
District of Columbia	4,385	New York	817,284	New England	1,002,870
Florida	266,316	North Carolina	690,607	Middle Atlantic	1,888,278
Georgia	427,190	North Dakota	3,286	Lake States	2,229,495
Idaho	297,087	Ohio	560,592	Central hardwood	3,057,192
Illinois	784,534	Oklahoma	72,806	North Carolina pine	1,439,566
Indiana	561,128	Oregon	1,338,179	Southern pine	3,381,939
Iowa	220,388	Pennsylvania	632,049	Pacific (north)	3,385,273
Kansas	62,154	Rhode Island	22,547	Pacific (south)	1,392,658
Kentucky	245,486	South Carolina	271,162	Rocky Mountain (north)	397,098
Louisiana	648,970	South Dakota	21,508		
Maine	219,575	Tennessee	514,031	Rocky Mountain (south)	169,854
Maryland	161,475	Texas	444,902		
Massachusetts	414,202	Utah	9,884	Prairie	354,217
Michigan	1,252,627	Vermont	88,508		
Minnesota	281,839	Virginia	477,797	All regions	18,698,440
Mississippi	644,334	Washington	2,047,094		

[1] In addition to lumber the amounts given in this table include also 2 other classes of raw material quantities for which have been converted into board feet; bolts and logs comprise 3 per cent and veneer and ply wood 2 per cent of the total.

TABLE 557.—*Lumber used in manufacture, 1928*—Continued

BY INDUSTRIES

Industry	Quantity	Industry	Quantity
	1,000 ft. b. m.		*1,000 ft. b. m.*
Airplanes	9,044	Matches	115,943
Agricultural implements	142,943	Toothpicks	7,483
Artificial limbs	698	Mine equipment	22
Boot and shoe findings	48,742	Motion picture and theatrical scenery	16,223
Baskets and fruit packages	261,530	Patterns and flasks	29,996
Boxes and crates	4,719,700	Paving material and conduits	3,350
Boxes, cigar and tobacco	38,429	Pencils and penholders	39,982
Brooms and carpet sweepers	28,452	Pipes, tobacco	1,411
Brushes	17,033	Planing-mill products	[2] 5,063,583
Bungs and faucets	2,980	Plumbers' woodwork	16,273
Butcher's blocks and skewers	4,888	Printing material	5,984
Car construction and repair	1,009,408	Pulleys and conveyors	900
Caskets and coffins	156,108	Pumps and wood pipe	10,831
Chairs and chair stock	165,392	Refrigerators and kitchen cabinets	145,745
Clocks	3,511	Rollers, shade and map	24,236
Dairymen's, poulterers' and apiarists' supplies	41,037	Saddles and harness	751
Woodenware and novelties	142,299	Sash, doors, blinds, and general millwork	3,317,346
Dowels	15,087	Sewing machines	12,760
Elevators	46	Ship and boat building	128,342
Equipment, playground	4,672	Shuttles, spools, and bobbins	44,022
Firearms	1,741	Signs and supplies	48,597
Fixtures	130,030	Sporting and athletic goods	29,973
Frames and molding, picture	20,947	Tanks and silos	66,328
Furniture	1,198,612	Toys	39,410
Gates and fencing	1,572	Trunks and valises	21,346
Handles	124,654	Vehicles (nonmotor)	80,841
Instruments, professional and scientific	15,510	Vehicles (motor)	867,875
Instruments, musical	107,502	Weighing apparatus	19
Laundry appliances	38,674	Whips, canes, and umbrella sticks	1,250
Machine construction	39,627		
Machinery and apparatus, electrical	66,750	All industries	18,698,440

[2] "Planing-mill products" includes products worked to pattern, such as flooring, ceiling, and siding, but excludes lumber merely dressed.

BY KINDS OF WOOD

Kind of wood	Quantity	Kind of wood	Quantity	Kind of wood	Quantity
	1,000 ft. b. m.		*1,000 ft. b. m.*		*1,000 ft. b. m.*
Cedar, eastern red	31,600	Cottonwood	182,309	Cedar, Spanish	6,964
Cedar, eastern white	11,206	Dogwood	3,414	Cocobola	542
Cedar, western	204,835	Elm	166,136	Ebony	175
Cypress	279,276	Hackberry	4,559	Eucalyptus	311
Douglas fir	2,547,429	Hickory	145,720	Hazel	18
True firs	72,598	Holly	32	Khaya ("African mahogany")	1,852
Hemlock	575,124	Hornbeam	65	Laurel	75
Larch	34,646	Locust	9,273	Lignum-vitæ	709
Pine, southern yellow	4,708,833	Maple	752,371	Mahogany	63,305
Pine, western yellow	[3] 2,109,344	Myrtle	70	Oak, Japanese or English	155
Pine, white	[4] 1,407,092	Oak	1,408,756	Padouk	22
Redwood	145,920	Osage-orange	20	Philippine hardwoods	24,341
Spruce	503,097	Pecan	2,523	Prima vera	31
Yew	2	Persimmon	2,158	Rakuda	25
Miscellaneous native softwoods	30	Red (and sap) gum	1,226,285	Rosewood	521
Alder	18,358	Sycamore	37,477	Satinwood	61
Apple	60	Tupelo	255,723	Snakewood	103
Ash	179,979	Walnut	78,210	Teak	1,297
Basswood	163,324	Willow	7,170	Walnut, Circassian	224
Beech	148,387	Yellow poplar	[5] 450,549	Miscellaneous foreign woods	2,084
Birch	515,230	Miscellaneous native hardwoods	920		
Buckeye	2,357	Balsa	306	All woods	18,698,440
Butternut	372	Beech, European	10		
Cherry	7,255	Box, Turkish	129		
Chestnut	194,664	Box, West Indian	422		

Forest Service in cooperation with the Bureau of the Census.

[3] Includes lodgepole pine.
[4] White pine includes northern white pine, western white pine (often called Idaho white pine), sugar pine, and Norway pine.
[5] Yellow poplar includes also cucumber and magnolia.

TABLE 558.—*Production of lumber, by States, 1899, 1909, 1919, 1926–1929*

State	1899	1909	1919	1926	1927	1928	1929
	M ft. b. m.	*M ft. b. m.*	*M ft. b. m.*	*M ft. b. m.*	*M ft. b. m.*	*M ft. b. m.*	*M ft. b. m.*
Alabama	1, 101, 386	1, 691, 001	1, 798, 746	2, 105, 122	2, 171, 687	1, 980, 082	2, 058, 964
Arizona	36, 182	62, 731	73, 655	115, 232	169, 085	158, 047	174, 594
Arkansas	1, 623, 987	2, 111, 300	1, 772, 157	1, 441, 018	1, 229, 481	1, 129, 731	1, 348, 318
California	737, 035	1, 143, 507	1, 259, 363	[1] 2, 187, 959	[1] 2, 070, 811	[1] 1, 952, 659	[1] 2, 063, 229
Colorado	133, 746	141, 710	64, 864	75, 278	67, 321	72, 257	71, 535
Connecticut	108, 093	168, 371	86, 708	47, 367	55, 949	35, 356	30, 157
Delaware	35, 955	55, 440	27, 437	9, 433	16, 824	13, 161	9, 641
Florida	790, 373	1, 201, 734	1, 137, 432	920, 585	907, 128	995, 072	1, 136, 897
Georgia	1, 311, 917	1, 342, 249	893, 965	1, 145, 489	1, 201, 008	1, 039, 475	1, 386, 250
Idaho	65, 363	645, 800	765, 388	947, 471	923, 986	977, 468	1, 028, 791
Illinois	388, 469	170, 181	64, 628	38, 357	28, 663	29, 623	37, 681
Indiana	1, 036, 999	556, 418	282, 487	139, 472	148, 492	126, 790	169, 970
Iowa	352, 411	132, 021	18, 493	(2)	(2)	(2)	(2)
Kansas	10, 665	4, 716	2, 840	(2)	(2)	(2)	(2)
Kentucky	774, 651	860, 712	512, 078	216, 759	197, 618	174, 340	339, 146
Louisiana	1, 115, 366	3, 551, 918	3, 163, 871	2, 889, 530	2, 385, 724	2, 278, 422	2, 232, 360
Maine	784, 647	1, 111, 565	596, 116	340, 893	263, 818	266, 523	257, 910
Maryland	183, 711	267, 939	113, 362	68, 444	67, 541	59, 729	54, 870
Massachusetts	344, 190	361, 200	166, 841	86, 168	88, 298	112, 299	71, 863
Michigan	3, 018, 338	1, 889, 724	875, 891	663, 344	578, 254	572, 059	571, 017
Minnesota	2, 342, 338	1, 561, 508	699, 639	471, 090	396, 891	412, 343	357, 180
Mississippi	1, 206, 265	2, 572, 669	2, 390, 135	2, 894, 994	2, 556, 612	2, 524, 319	2, 669, 496
Missouri	723, 754	660, 159	321, 383	178, 568	189, 136	141, 990	228, 078
Montana	255, 685	308, 582	287, 378	378, 698	396, 267	387, 879	388, 711
Nebraska	4, 655	(2)	505	------------	------------	------------	(2)
Nevada	725	(2)	20, 335	(3)	(3)	(3)	(3)
New Hampshire	572, 447	649, 606	338, 777	243, 007	215, 912	239, 261	191, 703
New Jersey	74, 118	61, 620	36, 888	6, 953	5, 044	3, 220	15, 576
New Mexico	30, 880	91, 987	86, 808	127, 110	172, 517	162, 030	148, 287
New York	878, 448	681, 440	357, 764	170, 963	142, 505	130, 106	159, 591
North Carolina	1, 286, 638	2, 177, 715	1, 654, 435	970, 965	1, 055, 222	1, 020, 893	1, 202, 377
Ohio	990, 497	542, 904	280, 076	141, 499	127, 880	112, 229	175, 537
Oklahoma	22, 104	225, 730	168, 403	149, 929	169, 943	193, 793	199, 744
Oregon	734, 538	1, 898, 995	2, 577, 403	4, 454, 735	3, 992, 852	4, 371, 924	4, 784, 009
Pennsylvania	2, 333, 278	1, 462, 771	630, 471	318, 797	277, 722	238, 615	300, 350
Rhode Island	18, 528	25, 489	11, 030	5, 426	6, 815	4, 622	6, 514
South Carolina	466, 429	897, 660	621, 679	920, 825	817, 016	821, 900	1, 067, 987
South Dakota	[4] 33, 734	31, 057	42, 970	49, 281	46, 909	53, 967	61, 126
Tennessee	950, 958	1, 223, 849	792, 132	683, 323	595, 297	530, 306	763, 828
Texas	1, 232, 404	2, 099, 130	1, 379, 774	1, 456, 121	1, 446, 460	1, 146, 686	1, 451, 640
Utah	17, 548	12, 638	11, 917	6, 479	6, 152	7, 623	5, 301
Vermont	375, 809	351, 571	218, 479	111, 638	90, 880	107, 358	119, 622
Virginia	959, 119	2, 101, 716	1, 098, 038	676, 663	535, 616	547, 706	708, 452
Washington	1, 429, 032	3, 862, 916	4, 961, 220	7, 546, 239	7, 325, 862	7, 305, 277	7, 302, 063
West Virginia	778, 051	1, 472, 942	763, 103	588, 788	541, 870	547, 823	632, 992
Wisconsin	3, 389, 166	2, 025, 038	1, 116, 338	912, 524	819, 507	818, 850	842, 814
Wyoming	16, 963	28, 602	8, 674	19, 392	12, 863	24, 402	25, 629
All other	[5] 6, 571	[6] 11, 230	------------	14, 002	16, 982	13, 908	20, 332
United States	[7] 35, 084, 166	44, 509, 761	[7] [8] 34, 552, 076	[9] [10] 36, 935, 930	[9] [10] 34, 532, 420	[9] [10] 34, 142, 123	[9] 36, 872, 132

SUMMARY BY LUMBER-PRODUCING REGIONS

REGIONS	1899	1909	1919	1926	1927	1928	1929
Northeastern	5, 709, 224	5, 197, 012	2, 583, 873	1, 409, 098	1, 231, 308	1, 210, 250	1, 217, 797
Lake	8, 749, 842	5, 476, 270	2, 696, 868	2, 046, 958	1, 794, 652	1, 803, 252	1, 771, 011
Central	5, 643, 379	5, 487, 165	3, 015, 887	1, 986, 766	1, 828, 956	1, 663, 101	2, 347, 232
North Carolina pine	2, 712, 186	5, 177, 091	3, 374, 152	2, 568, 453	2, 407, 854	2, 390, 499	2, 978, 816
Southern pine	8, 403, 802	14, 795, 731	12, 704, 483	13, 002, 788	12, 068, 043	11, 587, 580	12, 483, 669
Pacific (north)	2, 163, 570	5, 761, 911	7, 538, 623	12, 000, 974	11, 318, 714	11, 677, 201	12, 086, 072
Pacific (south)	737, 760	1, 143, 507	1, 279, 698	2, 187, 959	2, 070, 811	1, 952, 659	2, 063, 229
Rocky Mountain (north)	321, 048	954, 382	1, 052, 766	1, 326, 169	1, 320, 253	1, 365, 347	1, 417, 502
Rocky Mountain (south)	235, 319	337, 668	245, 918	343, 491	427, 938	424, 359	425, 346
Prairie	[11] 408, 036	[11] 179, 024	64, 808	[11] 63, 283	[11] 63, 891	[11] 67, 875	[11] 81, 458

Forest Service in cooperation with Bureau of the Census.

[1] Includes cut of Nevada.
[2] Included in "All other."
[3] Included with California.
[4] Includes cut of North Dakota.
[5] Reported as cut of Alaska.
[6] Includes cut of Nebraska and Nevada.
[7] Includes both merchant and custom sawing.
[8] Includes 2,655 mills cutting less than 50,000 feet each per year.
[9] Mills cutting less than 50,000 feet each year excluded.
[10] Excludes custom mills.
[11] Includes "All other."

TABLE 559.—*Average value of lumber at the mill per thousand feet board measure, in stated years*

Kind of wood	1899	1909	1919	1927	1928
Softwoods:	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Balsam fir	(1)	13. 99	32. 23	25. 92	25. 40
Cedar	10. 91	19. 95	33. 80	34. 39	38. 32
Cypress	13. 32	20. 46	38. 38	39. 91	36. 18
Douglas fir	8. 67	12. 44	24. 62	19. 45	19. 02
Hemlock	9. 98	13. 95	29. 16	19. 06	18. 84
Larch (tamarack)	8. 73	12. 68	23. 39	17. 69	18. 34
Lodgepole pine	(1)	16. 25	29. 98	20. 82	19. 29
Redwood	10. 12	14. 80	30. 04	33. 81	31. 39
Spruce	11. 27	16. 91	30. 76	26. 59	26. 50
Sugar pine	12. 30	18. 14	35. 99	43. 22	39. 06
Western yellow pine	9. 70	15. 39	27. 75	26. 04	26. 35
White fir	(1)	13. 10	25. 66	19. 92	20. 00
White pine	12. 69	18. 16	32. 83	29. 90	28. 71
Yellow pine	8. 46	12. 69	28. 71	23. 77	24. 62
Hardwoods:					
Ash	15. 84	24. 44	52. 69	43. 82	45. 61
Basswood	12. 84	19. 50	40. 03	39. 84	39. 72
Beech	(1)	13. 25	29. 98	27. 21	28. 63
Birch	12. 50	16. 95	35. 79	41. 03	40. 30
Chestnut	13. 37	16. 12	32. 30	29. 35	31. 09
Cottonwood	10. 37	18. 05	32. 24	30. 92	27. 54
Elm	11. 47	17. 52	36. 39	36. 22	37. 89
Gum, red and sap	9. 63	13. 20	32. 68	32. 81	31. 91
Hickory	18. 78	30. 80	44. 37	37. 08	38. 83
Maple	11. 83	15. 77	35. 56	35. 35	36. 31
Oak	13. 78	20. 50	37. 87	35. 72	35. 23
Sycamore	11. 04	14. 87	30. 32	29. 31	30. 06
Tupelo	(1)	11. 87	28. 42	24. 45	25. 51
Walnut	36. 49	43. 79	72. 13	111. 64	112. 54
Yellow poplar	14. 03	25. 39	41. 65	38. 58	40. 90
All kinds	11. 13	15. 38	30. 21	25. 80	25. 61

Bureau of the Census in cooperation with the Forest Service.

1 No data available.

TABLE 560.—*Pulpwood consumption, wood-pulp and paper production by States in stated years*

(In thousands—i. e. 000 omitted)

State	Pulpwood consumption			Wood-pulp production			Paper production		
	1909	1919	1928	1909	1919	1928	1925	1927	1928
	Cords	*Cords*	*Cords*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
California	[1] 52	(2)	(2)	[1] 27	(2)	(2)	177	219	184
Louisiana		(3)	414		(3)	227	124	204	238
Maine	904	1, 280	1, 310	604	917	971	868	954	987
Massachusetts	46	52	51	26	33	32	511	540	541
Michigan	133	207	332	64	106	196	847	1, 004	1, 061
Minnesota	47	204	283	37	130	194	224	281	274
New Hampshire	350	376	351	213	232	199	206	207	200
New York	922	1, 055	802	686	812	633	1, 503	1, 458	1, 454
North Carolina	145	159	(3)	54	61	(3)	(3)	(3)	63
Ohio	55	27	(3)	27	10	(3)	777	812	895
Oregon	104	[4] 172	[4] 308	84	[4] 124	[4] 213	146	188	198
Pennsylvania	295	424	405	136	215	219	678	716	713
Vermont	71	112	20	59	86	20	84	87	72
Virginia	92	126	343	49	62	190	143	193	219
Washington	(5)	139	652	(5)	84	349	179	233	309
West Virginia	109	84	(3)	49	39	(3)	49	48	43
Wisconsin	576	854	1, 226	325	507	721	833	892	893
All other States	101	207	663	51	100	347	1, 833	1, 966	2, 059
Total	4, 002	5, 478	7, 160	2, 491	3, 518	4, 511	9, 182	10, 002	10, 403

Bureau of the Census in cooperation with the Forest Service. Cords of 128 cubic feet. Tons of 2,000 pounds.

1 Includes Washington.
2 Included with Oregon.
3 Included in "All other States."
4 Includes California.
5 Included with California.

TABLE 561.—*Pulpwood consumption, by kinds, 1909, 1919, and 1929*

Kind of wood	1909	1919	1929 [1]
	Cords	*Cords*	*Cords*
Spruce:			
Domestic	1, 653, 249	2, 313, 419	2, 038, 500
Imported	768, 332	873, 795	1, 023, 200
Hemlock:			
Domestic	559, 657	795, 154	122, 600
Imported			15, 400
Pine:			
Southern yellow pine	(2)	234, 463	1, 016, 800
Jack pine	(2)	51, 581	194, 600
Miscellaneous pines	90, 885	7, 566	
Poplar:			
Domestic	302, 876	180, 160	334, 600
Imported	25, 622	158, 220	157, 800
Balsam fir:			
Domestic	95. 366	181, 840	316, 500
Imported		106, 974	45, 400
Yellow poplar		72, 605	129, 700
White fir	37, 176	31, 138	77, 900
Beech, birch, and maple	31, 390	[3] 183, 426	77, 000
Gum		30, 355	39, 700
Tamarack (larch)		44, 042	51, 800
Other wood	188, 077	38, 013	147, 100
Slabs and mill waste	248, 977	175, 081	548, 800
Total	4, 001, 607	5, 477, 832	7, 437, 400

Bureau of the Census in cooperation with the Forest Service. Cords of 128 cubic feet.

[1] Preliminary figures as of Dec. 31, 1930. [2] Included in "Miscellaneous pines." [3] Includes chestnut.

TABLE 562.—*Paper: Consumption by kinds, and per capita, specified years, beginning 1810* [1]

Year	Newsprint		Book		Boards		Wrapping	
	Short tons	*Per cent*	*Short tons*	*Per cent*	*Short tons*	*Per cent*	*Short tons*	*Per cent*
1899	569, 000	26	314, 000	15	394, 000	18	535, 000	25
1904	883, 000	29	495, 000	16	521, 000	17	644, 000	21
1909	1, 159, 000	27	689, 000	16	883, 000	21	763, 000	18
1914	1, 576, 000	29	926, 000	17	1, 292, 000	24	892, 000	16
1917	1, 824, 000	29	846, 000	14	1, 805, 000	29	814, 000	13
1918	1, 760, 000	28	800, 000	13	1, 927, 000	30	859, 000	13
1919	1, 892, 000	29	838, 000	13	1, 940, 000	30	825, 000	13
1920	2, 196, 000	28	1, 060, 000	13	2, 301, 000	29	1, 003, 000	13
1921	2, 002, 000	33	707, 000	11	1, 641, 000	27	770, 000	13
1922	2, 451, 000	31	968, 000	12	2, 154, 000	27	1, 059, 000	13
1923	2, 814, 000	30	1, 235, 000	13	2, 802, 000	30	1, 177, 000	13
1925	3, 073, 000	29	1, 365, 000	13	3, 290, 000	31	1, 287, 000	12
1926	3, 517, 000	30	1, 408, 000	12	3, 637, 000	31	1, 435, 000	12
1927	3, 492, 000	29	1, 265, 000	11	3, 737, 000	31	1, 515, 000	13
1928	3, 561, 000	29	1, 321, 000	11	4, 009, 000	32	1, 457, 000	12
1929 [3]	3, 813, 000	29	1, 471, 000	11	4, 398, 000	33	1, 586, 000	12

Year	Fine		All other		All kinds	Per capita
	Short tons	*Per cent*	*Short tons*	*Per cent*	*Short tons*	*Pounds*
1810					[2] 3, 000	1
1819					[2] 12, 000	2
1839					[2] 38, 000	4
1849					[2] 78, 000	7
1859					[2] 127, 000	8
1869					391, 000	20
1879					457, 000	18
1889					1, 121, 000	36
1899	113, 000	5	233, 000	11	2, 158, 000	57
1904	142, 000	5	365, 000	12	3, 050, 000	74
1909	193, 000	5	537, 000	13	4, 224, 000	93
1914	244, 000	4	566, 000	10	5, 496, 000	112
1917	276, 000	4	691, 000	11	6, 256, 000	122
1918	348, 000	5	693, 000	11	6, 387, 000	123
1919	306, 000	5	692, 000	10	6, 493, 000	124
1920	371, 000	5	930, 000	12	7, 861, 000	148
1921	230, 000	4	704, 000	12	6, 054, 000	112
1922	356, 000	4	1, 015, 000	13	8, 003, 000	146
1923	374, 000	4	938, 000	10	9, 340, 000	168
1925	472, 000	5	1, 103, 000	10	10, 590, 000	184
1926	495, 000	4	1, 315, 000	11	11, 807, 000	202
1927	502, 000	4	1, 404, 000	12	11, 915, 000	202
1928	538, 000	4	1, 562, 000	12	12, 448, 000	208
1929 [3]	572, 000	4	1, 461, 000	11	13, 301, 000	219

Forest Service. A computed table based on census and Forest Service bulletins.

[1] Imports added to United States production and domestic exports deducted.
[2] Domestic production only, value of exports and imports being approximately equal.
[3] Preliminary, based on figures in report of the Bureau of the Census released Feb. 2, 1931.

TABLE 563.—*Number of stock grazed on national forests, by States, calendar year 1929, and total grazing receipts, fiscal year 1929*

State	Cattle	Horses	Swine	Sheep	Goats	Receipts from grazing [1]
	Number	*Number*	*Number*	*Number*	*Number*	*Dollars*
Alabama	8	2				
Alaska	28					
Arizona	182, 659	1, 997	391	323, 736	1, 397	148, 652
Arkansas	205					142
California	146, 371	5, 606	265	431, 789	1, 909	202, 307
Colorado	274, 873	4, 111		1, 077, 223	701	386, 206
Florida	164			1, 005	8	388
Idaho	118, 773	8, 118		1, 378, 240		245, 768
Montana	121, 216	9, 255		612, 828	65	168, 288
Nebraska	10, 808	498				9, 160
Nevada	48, 318	2, 021		313, 534		96, 297
New Hampshire	139	38				249
New Mexico	80, 716	3, 341	134	243, 904	10, 427	87, 517
North Carolina	286	1	14	124		177
Oklahoma	2, 528	80				3, 058
Oregon	83, 848	3, 134		657, 172	80	166, 217
South Dakota	25, 271	1, 059		30, 283		21, 139
Tennessee	230	3		149		182
Utah	109, 114	4, 146	49	778, 884	900	199, 662
Virginia	666	1		467		545
Washington	12, 495	538		169, 535		43, 506
West Virginia	82	2		599		441
Wyoming	103, 667	4, 220		631, 247		162, 857
Total	1, 322, 465	48, 171	853	6, 650, 719	15, 847	[2] 1, 942, 914

SUMMARY BY ADMINISTRATIVE REGIONS

Region:	Cattle	Horses	Swine	Sheep	Goats	Receipts from grazing
1	126, 986	9, 552		724, 629	65	191, 825
2	375, 722	9, 163		1, 493, 508	701	516, 648
3	260, 708	5, 338	525	565, 235	11, 824	234, 032
4	314, 527	14, 793	49	2, 606, 507	900	575, 961
5	146, 371	5, 606	265	431, 789	1, 909	212, 371
6	96, 343	3, 672		826, 707	80	209, 976
7	1, 780	47	14	2, 344	8	2, 281
8	28					

Forest Service.

[1] Final, but not approved by General Accounting Office. Includes trespass.
[2] Includes receipts from Georgia, Maine, and South Carolina.

TABLE 564.—*Free-use timber: Cut from national forests, by States and administrative regions, 1910, 1920, 1928, and 1929*

State	Fiscal year 1910		Fiscal year 1920		Calendar year 1928		Calendar year 1929	
	Total quantity	Estimated users	Total quantity	Estimated users	Total quantity	Estimated users	Total quantity	Estimated users
	M ft. b.m.	*Number*	*M ft. b.m.*	*Number*	*M ft. b.m.*	*Number*	*M ft. b.m.*	*Number*
Alabama			1	12				
Alaska	184	6	4,897	503	2,006	508	533	502
Arizona	5,254	1,972	6,418	4,306	6,642	4,448	7,574	5,929
Arkansas	513	536	61	9	23	3	25	17
California	7,647	3,215	5,238	1,606	2,805	2,472	3,905	2,596
Colorado	12,550	3,598	9,783	3,920	9,728	4,241	7,436	2,674
Florida	95	32	330	96				
Georgia			10	8				
Idaho	19,937	6,472	14,455	5,530	16,169	4,700	14,936	4,797
Michigan			216	42	70	19	475	61
Minnesota	381	15	160	64	137	10	167	56
Montana	14,713	5,441	8,151	4,290	7,852	3,826	10,426	6,144
Nebraska			3	3				
Nevada	1,710	678	1,777	528	1,744	439	1,735	419
New Mexico	10,004	3,801	8,859	6,472	7,643	6,163	10,614	7,246
North Carolina			17	12	746	313	778	406
North Dakota	21	62						
Oklahoma	123	192	180	600	55	60	60	65
Oregon	10,068	2,455	7,515	1,428	6,949	1,260	6,360	1,382
Pennsylvania					7	3	25	5
South Dakota	3,476	1,185	2,963	910	1,234	434	1,751	523
Tennessee			1,027	385	985	435	656	407
Utah	8,260	3,426	8,553	4,985	9,637	7,108	11,389	6,788
Virginia			148	97	427	225	316	187
Washington	2,444	503	1,026	251	751	195	727	237
West Virginia			8	3	13	5	31	10
Wyoming	7,416	1,775	6,264	1,276	6,819	1,298	6,849	1,684
Total	104,796	35,364	88,060	37,336	82,442	38,165	86,768	42,135

SUMMARY BY ADMINISTRATIVE REGIONS

Region:								
1	(1)	(1)	8,865	4,510	8,209	3,985	11,292	6,325
2	(1)	(1)	16,443	5,658	13,899	5,304	12,278	4,154
3	(1)	(1)	15,273	10,775	14,233	10,590	17,951	13,097
4	(1)	(1)	27,021	11,383	31,389	12,867	31,249	12,693
5	(1)	(1)	5,238	1,606	2,805	2,472	3,905	2,596
6	(1)	(1)	13,438	2,182	7,700	1,455	7,087	1,619
7	(1)	(1)	1,782	1,222	2,201	984	1,831	1,032
8	(1)	(1)	(2)	(2)	2,006	508	533	502
9							642	117

Forest Service.

[1] Not combined by regions previous to 1918.

[2] Included in region 6.

TABLE 565.—*Stumpage: Prices per 1,000 feet, 1928*

SOFTWOODS

State and region	Pine			Douglas fir	Firs (true) [3]	Spruces [4]	Hemlock [5]	Cypress	Cedars [6]
	White [1]	Southern yellow [2]	Western yellow						
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Alabama		3.12						4.00	
Arkansas		4.76						6.50	
California	3.87		3.25	1.51	1.29				1.74
Connecticut	8.33						3.00		
Florida		6.32							
Georgia		3.66					2.00		
Idaho	7.83		2.82	1.51	1.96	1.01	1.00		1.00
Louisiana		4.09						7.13	
Maine	10.43				6.88	8.44	6.31		8.96
Maryland	10.65	6.33							
Massachusetts	9.10						3.45		
Michigan	9.13				6.68	6.11	3.84		2.59
Minnesota	7.14				3.00	3.14			
Mississippi		10.49						4.67	
Missouri		3.54						5.00	
Montana			2.53	1.41					
New Hampshire	9.10					7.00	6.91		
New York	9.40					10.00	8.79		
North Carolina	4.53	5.44						3.00	
Ohio							5.00		
Oklahoma		3.21							
Oregon	4.51		5.40	2.00	1.39	6.34	.89		10.62
Pennsylvania	7.56						9.01		
Rhode Island	6.50								
South Carolina		4.51						7.26	
Tennessee		2.98						15.00	
Texas		3.66						6.00	
Vermont						6.73	6.85		
Virginia	7.00	5.58						5.00	
Washington	4.27		2.34	3.20	2.76	4.50	1.41		3.47
Wisconsin	12.00				4.10	5.12	3.56		
Regional recapitulation:									
Northeastern	9.33	6.33			6.88	8.38	7.34		8.96
Lake	9.23				6.36	4.08	3.80		2.59
Central		3.19					5.00	13.94	
North Carolina pine	4.96	5.16						7.21	
Southern pine		5.92					2.00	6.94	
Pacific (north)	4.51		4.71	2.70	1.44	6.33	1.33		10.51
Pacific (south)	3.87		3.25	1.51	1.29				1.74
Rocky Mountain (north)	7.83		2.69	1.50	1.96	1.01	1.00		1.00

See footnotes at end of table.

TABLE 565.—*Stumpage: Price per 1,000 feet, 1928*—Continued

HARDWOODS

State and region	Oaks	Maple	Elm	Gums	Cottonwood [7]	Yellow poplar	Birch	Basswood	Chestnut	Beech
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Alabama	3.78			3.46	4.00	3.57		4.00		
Arkansas	8.83		10.00	8.46						
Connecticut	9.21						9.55		6.50	
Florida				3.00						
Georgia	3.89	4.00		1.00		4.58	4.00		2.00	
Illinois	5.78		5.00		5.00					
Indiana	20.12	24.22	15.06	9.68	11.54	21.83	5.00	18.40		8.64
Iowa		3.51			3.50			3.51		
Kansas	10.00		6.00		5.73					
Kentucky	7.75	5.00	6.43	5.70		8.37		5.00		3.00
Louisiana	8.01	3.00	5.00	7.23	7.00					
Maine	4.46	8.16			3.00		4.57	4.00		6.00
Maryland	6.25	4.36		5.30					5.47	
Massachusetts	7.80	8.08					3.50		5.36	6.00
Michigan	9.86	7.68	9.09		3.49		9.78	9.14		3.31
Minnesota	5.00		4.00		1.19		5.83	3.15		
Mississippi	6.86		6.00	3.18		8.00				4.00
Missouri	3.33	10.15	7.00				7.00			
New Hampshire	6.00	5.60					4.00		8.83	6.00
New Jersey	10.36									5.00
New York	8.33	18.38	21.87				8.77	20.67	7.50	7.11
North Carolina	5.56	3.50	1.00	4.00		5.13		3.00	1.00	
Ohio	15.28	10.03	13.87	7.66	10.00	18.96		19.74	7.11	6.15
Oklahoma	2.50									
Pennsylvania	7.33	4.78	4.50			4.56	4.00	8.11	3.94	3.64
Rhode Island	6.50									
South Carolina	3.85	1.50		1.50	1.51	7.96				
Tennessee	10.00			10.00		11.55			2.11	2.00
Texas	2.63		2.67	2.20	2.50			2.50		
Vermont	7.00	7.85			4.29		3.50	8.00		4.78
Virginia	4.65			3.26		6.95			2.58	
West Virginia	5.45	3.41		5.00		5.99			2.38	1.50
Wisconsin	9.91	6.76	9.64				12.12	9.98		8.00
Regional recapitulation:										
Northeastern	7.34	10.34	11.60	5.30	3.19	4.56	4.51	14.92	4.78	4.60
Lake	6.63	7.65	9.10		1.23		10.01	9.17		5.95
Central	8.62	12.34	14.12	7.72	7.65	8.27	5.33	17.66	2.84	6.68
North Carolina pine	4.73	1.62	1.00	2.02	1.51	6.79		3.00	1.93	
Southern pine	8.05	3.63	5.18	7.46	6.79	4.29	4.00	3.89	2.00	4.00
Prairie	10.00	3.51	6.00		4.57			3.51		

Forest Service, with cooperation by the Bureau of the Census.

[1] Northern white pine in States east of the Great Plains. In Lake and Northeastern States may include some Norway pine. Western white pine in Idaho and Washington. Sugar pine in Oregon and California.

[2] Includes all sales of southern pines. Virgin long-leaf in large quantities may sell for $12 or more.

[3] Balsam fir in Eastern States; white fir in Western States.

[4] Red, black, and white spruce in Eastern States; Sitka spruce in Oregon and Washington; Engelmann spruce in Idaho.

[5] Eastern and western hemlock, for Eastern and Western States, respectively.

[6] Northern white cedar in Maine and Michigan; Port Orford cedar in Oregon; western red cedar in other States.

[7] Includes aspen.

Table 566.—*Logs: Price per 1,000 feet, log scale, 1928*

SOFTWOODS

State and region	Pine			Douglas fir	Firs (true) [3]	Eastern spruce	Eastern hemlock	Cypress	Cedars [4]
	White [1]	Southern yellow [2]	Western yellow						
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Alabama		11.09						22.98	50.00
Arkansas		11.34						15.81	
California	12.00		13.95	12.41	10.16				11.00
Connecticut	20.00								
Florida		20.37						20.00	50.00
Georgia		15.74						21.33	
Illinois								20.00	
Kentucky		19.70						20.00	40.00
Louisiana		9.89						16.30	
Maine	17.59				17.84	21.32	14.84		17.35
Maryland		20.33							
Massachusetts	19.02						19.49		
Michigan	29.85				16.90	22.64	17.90		15.88
Minnesota	17.92				14.97	20.81			
Mississippi		14.30						26.15	
Missouri		5.00						16.08	
New Hampshire	15.01				18.00	18.09	15.95		
New York	21.77					27.40	21.92		
North Carolina		15.47					11.67	17.91	
Oklahoma		7.95							
Pennsylvania	27.97						17.15		
South Carolina		15.82						25.01	40.00
Tennessee		11.63					14.00	17.38	38.61
Texas		6.83						17.44	
Vermont	22.19				18.38	18.37	16.42		13.92
Virginia		15.56							
West Virginia		18.76					18.75		
Wisconsin	23.85					25.68	18.12		10.40
Regional recapitulation:									
Northeastern	17.13	20.33			17.90	21.46	16.77		17.23
Lake	22.79				15.53	21.97	18.02		13.19
Central		10.39					18.02	16.35	39.01
North Carolina pine		15.63					11.67	20.66	40.00
Southern pine		11.09						18.79	50.00
Pacific (north)									
Pacific (south)	12.00		13.95	12.41	10.16				11.00
Rocky Mountain (north)									

See footnotes at end of table.

TABLE 566.—*Logs: Price per 1,000 feet, log scale, 1928*—Continued

HARDWOODS

State and region	Oaks	Maple	Elm	Gums	Cotton-wood [5]	Yellow poplar	Birch	Bass-wood	Chest-nut	Beech
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Alabama	16.81			20.49		23.30				
Arkansas	17.99	16.68	21.03	18.78	16.78	23.00				15.25
Florida				17.35		22.82				
Georgia	15.64	15.00	15.00	22.52	18.00	23.95				
Illinois	27.84	64.42	15.00	21.00		25.00				18.00
Indiana	30.34	28.76	30.20	35.52	18.25	43.00	30.00	24.43	25.00	21.31
Iowa		31.00			31.00			31.00		
Kentucky	33.79	25.17	22.75	20.78	18.00	38.44	20.00	18.11	13.32	14.51
Louisiana	20.07	6.00	28.00	18.76	22.96					6.00
Maine	22.31	23.55					24.23	17.95		17.84
Maryland		25.00		25.00		55.00				
Massachusetts	16.62	25.00					20.00		16.46	20.00
Michigan	23.16	24.22	28.14		13.43		28.48	26.38		21.54
Minnesota	13.24	16.00	14.00		14.41		15.41	20.63		
Mississippi	24.56	21.39	20.78	22.21	24.03	24.15		21.45		
Missouri	17.44	18.68	21.48	13.96	27.99	21.00				17.00
New Hampshire	23.13	25.00					23.27	23.20	17.00	20.00
New York	20.47	27.05	24.45			54.74	29.15	26.47	30.71	19.38
North Carolina	19.98	13.51		12.93		17.33				
Ohio	31.15	24.77	27.67		12.14	36.31		36.75		18.37
Oklahoma	20.00	20.00	20.00	18.85	20.00			20.00		
Pennsylvania	25.57	22.15	23.00			24.17	28.00	28.30	18.08	20.42
South Carolina	29.62	28.71	23.78	27.09	16.06	27.20				
Tennessee	29.23	25.08	24.55	24.83	23.12	25.68			16.95	25.00
Texas	12.95			16.72	10.00			10.00		
Vermont	21.99	21.05	10.00		14.31		20.09	26.73		15.62
Virginia	10.23	8.50				12.60			8.67	
West Virginia	30.26	12.82				24.67	12.00	18.07	18.76	15.68
Wisconsin	37.68	24.35	29.43				33.55	30.39		15.00
Regional recapitulation:										
Northeastern	22.95	22.29	23.76	25.00	14.31	40.62	23.84	26.31	18.62	18.95
Lake	23.48	24.28	28.64		14.40		30.42	27.62		20.42
Central	28.61	34.97	24.63	21.31	26.55	32.93	21.76	24.76	16.59	16.93
North Carolina pine	21.65	28.20	23.78	24.76	16.06	27.01			8.67	
Southern pine	20.04	17.00	21.90	20.19	21.42	23.91		20.51		14.67
Prairie		31.00			31.00			31.00		

Forest Service with cooperation by Bureau of the Census. Log prices were not compiled for Oregon, Washington, Idaho, and Montana in 1928.

[1] Sugar pine in California. Northern white pine, which may include some Norway pine, in other States.
[2] Includes all sales of southern pines.
[3] White fir in California; balsam fir in other States.
[4] Western red cedar in California; eastern red cedar in Alabama, Florida, Kentucky, South Carolina, and Tennessee; northern white in other States.
[5] Includes aspen.

TABLE 567.—*Turpentine and rosin: Industrial consumption, calendar years 1927–1929*

Industry	Turpentine			Rosin		
	1927	1928	1929	1927	1928	1929
	Gallons	*Gallons*	*Gallons*	*500-pound barrels*	*500-pound barrels*	*500-pound barrels*
Automobiles and wagons	242,022	158,901	100,815	1,029	1,214	2,797
Chemicals and pharmaceuticals	24,205	55,235	60,474	8,462	3,709	5,332
Foundries and foundry supplies	21,684	15,001	10,136	16,907	18,558	29,349
Linoleum	3,250	2,312	81	37,586	58,204	44,811
Matches		250		2,965	2,810	3,430
Miscellaneous	37,528	36,308	61,633	2,511	2,555	6,204
Oils and greases	113,407	42,969	28,380	56,613	48,609	54,427
Paper and paper size	3,651	4,231	6,159	297,426	333,942	388,310
Paint and varnish	4,701,166	4,306,483	4,630,505	228,776	245,157	283,842
Printing ink	15,060	10,131	14,232	14,553	14,815	15,269
Sealing wax, pitch, insulations, and plastics	59,234	68,248	75,280	38,674	34,537	40,892
Shipyards, car shops, etc	15,847	41,315	62,865	90	104	790
Shoe polish	599,669	561,116	567,920	905	635	719
Soap	1,575	1,599	4,215	200,454	182,538	228,599
Total	5,838,298	5,304,099	5,622,695	906,951	947,387	1,104,771

Bureau of Chemistry and Soils. A few concerns did not report; to cover these, estimates were made. The estimated quantities consumed by the nonreporting concerns are less than 5 per cent of the total.

TABLE 568.—*Hunters' licenses issued by States, with total money returns, for the seasons 1927–28 and 1928–29*

State	Licenses issued						Money returns [1]	
	Resident		Nonresident and alien		Total			
	1927–28	1928–29	1927–28	1928–29	1927–28	1928–29	1927–28	1928–29
Alaska	(2)	(2)	268	227	268	227	$18,870.00	$16,490.00
Alabama	86,843	81,515	201	197	87,044	81,712	99,858.00	124,594.00
Arizona	38,134	[3] 26,697	631	[3] 821	38,765	27,518	52,449.35	85,318.50
Arkansas	100,000	90,000	1,500	1,500	101,500	91,500	117,500.00	112,500.00
California	226,109	238,569	2,587	2,878	228,696	241,447	464,145.00	488,114.32
Colorado	[3] 107,305	[3] 110,084	420	397	107,725	110,481	227,612.50	236,401.50
Connecticut	37,212	35,936	712	601	37,924	36,537	103,402.00	99,959.75
Delaware	[3] 1,970	[3] 2,054	344	[3] 360	2,314	2,414	5,410.00	5,685.00
Florida	59,440	43,606	581	568	60,021	44,174	223,154.25	180,529.00
Georgia	79,592	65,977	211	202	79,803	66,179	108,781.84	91,583.23
Idaho	[3] 75,730	[3] 83,243	352	[3] 439	76,082	83,682	150,567.85	165,213.90
Illinois	303,567	300,413	1,500	2,283	305,067	302,696	319,317.00	335,799.50
Indiana	[3] 310,204	[3] 309,191	[3] 517	[3] 468	310,721	309,659	287,058.80	298,644.00
Iowa	[3] 164,647	[3] 173,116	363	200	165,010	173,316	168,277.00	175,116.00
Kansas	115,165	127,926	92	109	115,257	128,035	116,545.00	128,931.00
Kentucky	108,202	104,213	79	286	108,281	104,499	109,031.50	107,216.00
Louisiana	102,411	99,632	242	435	102,653	100,067	108,536.00	110,382.00
Maine	[3] 39,979	[3] 34,748	3,544	3,864	43,523	38,612	71,578.55	52,350.70
Maryland	69,025	66,766	1,841	1,800	70,866	68,566	132,834.55	130,101.55
Massachusetts	107,615	[3] 118,014	2,881	[3] 3,462	110,496	121,476	231,427.00	255,014.00
Michigan	362,808	317,622	2,465	2,434	365,273	320,056	530,196.48	400,510.99
Minnesota	118,001	110,536	234	364	118,235	110,900	127,497.40	107,674.84
Missouri	[3] 231,101	[3] 254,740	[3] 789	[3] 842	231,890	255,582	275,908.12	303,511.18
Montana	[3] 75,063	[3] 79,227	261	274	75,324	79,501	155,736.00	156,115.20
Nebraska	[3] 163,447	[3] 170,895	[3] 133	[3] 178	163,580	171,073	166,772.00	174,250.00
Nevada	5,327	7,448	151	151	5,478	7,599	9,410.50	11,398.50
New Hampshire	[3] 55,401	[3] 56,241	[3] 2,319	[3] 2,590	57,720	58,831	109,576.35	114,775.35
New Jersey	[3] 183,280	[3] 195,121	[3] 1,941	[3] 2,139	185,221	197,260	266,427.10	314,071.50
New Mexico	[3] 15,971	[3] 17,586	[3] 1,444	[3] 1,381	17,415	18,967	79,660.25	92,000.00
New York	[3] 670,441	[3] 671,728	[3] 5,339	5,409	675,780	677,137	699,873.52	703,047.87
North Carolina	144,274	117,691	994	1,221	145,268	118,912	207,900.00	188,819.50
North Dakota	35,108	34,108	163	163	35,271	34,271	56,737.00	55,237.00
Ohio	368,377	381,817	108	29	368,485	381,846	369,997.00	382,252.00
Oklahoma	153,001	158,822	331	383	153,332	159,205	157,918.00	164,451.50
Oregon	[3] 57,407	[3] 60,818	[3] 779	593	58,186	61,411	210,711.75	222,785.50
Pennsylvania	515,948	516,603	1,781	1,190	517,729	517,793	1,006,159.70	998,834.70
Rhode Island	10,342	9,426	243	299	10,585	9,725	21,527.00	22,900.00
South Carolina	111,070	89,396	1,294	1,384	112,364	90,780	167,590.00	142,026.00
South Dakota	[3] 101,508	[3] 113,229	2,680	2,838	104,188	116,067	174,938.00	192,891.00
Tennessee	63,026	63,741	280	293	63,306	64,034	78,527.32	80,152.00
Texas	104,703	113,833	488	517	105,191	114,350	221,606.00	221,965.05
Utah	[3] 40,792	[3] 15,841	[3] 140	[3] 253	40,932	16,094	93,663.00	33,507.60
Vermont	[3] 37,208	[3] 40,678	[3] 1,058	[3] 1,312	38,266	41,990	54,711.30	60,349.80
Virginia	116,133	[3] 140,607	2,565	[3] 2,687	118,698	143,294	199,637.40	239,560.30
Washington	[3] 201,372	204,696	[3] 703	647	202,075	205,343	371,356.00	371,981.00
West Virginia	[3] 141,706	[3] 135,664	445	489	142,151	136,153	148,381.00	176,916.00
Wisconsin	172,667	158,840	462	229	173,129	159,069	189,892.00	148,881.00
Wyoming	[3] 24,822	[3] 28,045	645	[3] 676	25,467	28,721	69,507.50	110,603.00
Total [4]	6,413,454	6,376,699	49,101	52,062	6,462,555	6,428,761	9,338,173.88	9,391,412.33

Bureau of Biological Survey.

[1] Includes amounts received from combined hunting and fishing licenses, but not from licenses to fish only.
[2] No resident license required.
[3] Combined hunting and fishing license.
[4] Totals are exclusive of Mississippi, for which figures are not available, and include figures for combined hunting and fishing licenses, which for many States can not be separated, many such licenses being taken out by anglers only.

40442°—31——67

TABLE 569.—*Current status of Federal-aid road construction as of June 30, 1930*

State	Completed mileage	Under construction: Estimated total cost	Under construction: Federal aid allotted	Under construction: Mileage: Initial [1]	Under construction: Mileage: Stage [2]	Under construction: Mileage: Total	Approved for construction: Estimated total cost	Approved for construction: Federal aid allotted	Approved for construction: Mileage: Initial [1]	Approved for construction: Mileage: Stage [2]	Approved for construction: Mileage: Total	Balance of Federal-aid funds available for new projects [3]
		Dollars	*Dollars*	*Miles*	*Miles*	*Miles*	*Dollars*	*Dollars*	*Miles*	*Miles*	*Miles*	*Dollars*
Alabama	2,153.8	2,326,218.40	1,148,172.11	83.2	22.2	105.4	13,545.40	6,772.70	----------	----------	----------	4,083,610.18
Arizona	810.3	4,114,720.89	3,088,393.26	136.5	149.1	285.6	116,572.12	87,767.12	----------	15.8	15.8	1,898,927.83
Arkansas	1,741.4	5,523,331.76	2,530,094.42	142.9	46.2	189.1	1,759,692.74	879,846.76	86.4	3.5	89.9	1,518,012.42
California	1,880.2	7,170,064.91	2,901,983.78	119.4	27.8	147.2	1,577,783.43	698,070.27	36.1	2.1	38.2	1,743,512.14
Colorado	1,208.1	4,989,906.87	2,614,893.56	193.6	28.3	221.9	1,232,562.53	617,597.98	29.0	69.0	98.0	2,283,553.54
Connecticut	243.3	2,351,390.33	1,047,625.20	10.9	----------	10.9	446,379.45	117,900.00	7.9	----------	7.9	714,247.71
Delaware	251.0	900,925.60	357,666.32	24.9	----------	24.9	732,886.27	362,874.26	41.2	----------	41.2	91,051.91
Florida	503.5	5,127,463.61	2,358,944.67	97.1	5.5	102.6	----------	----------	----------	----------	----------	1,681,203.79
Georgia	2,703.3	3,140,227.85	1,525,964.76	118.6	32.2	150.8	2,962,085.96	1,360,367.13	59.6	68.4	128.0	2,902,272.18
Idaho	1,194.1	1,315,433.28	793,224.26	85.2	27.8	113.0	996,404.66	541,576.25	54.3	42.4	96.7	1,175,024.06
Illinois	2,056.1	15,980,580.76	7,088,161.17	454.4	----------	454.4	6,282,202.65	2,808,075.49	153.9	63.5	217.4	4,656,255.25
Indiana	1,481.6	4,953,074.92	2,363,937.39	153.2	----------	153.2	241,360.20	120,680.10	9.9	----------	9.9	2,473,551.58
Iowa	2,979.7	7,129,677.69	3,036,286.94	66.0	176.9	242.9	1,140,139.79	475,042.91	11.8	27.8	39.6	1,892.77
Kansas	2,833.9	5,640,308.69	2,707,334.03	248.7	27.8	276.5	645,979.77	321,602.02	20.6	89.5	110.1	2,063,112.86
Kentucky	1,530.2	3,736,246.74	1,638,751.70	121.6	5.5	127.1	4,738,366.79	2,265,599.85	50.5	228.7	279.2	114,878.62
Louisiana	1,352.5	4,992,472.59	2,432,542.49	153.8	14.3	168.1	1,654,549.25	805,908.66	49.0	11.4	60.4	1,224,288.48
Maine	534.8	2,327,133.99	869,119.44	57.6	----------	57.6	934,183.56	326,809.53	23.9	1.5	25.4	1,354,501.03
Maryland	630.7	1,484,021.60	706,596.93	34.8	12.6	47.4	1,213,068.75	571,838.21	26.0	5.8	31.8	5,543.03
Massachusetts	657.4	4,410,279.29	1,389,811.54	66.0	2.6	68.6	2,465,209.61	444,715.17	11.3	----------	11.3	1,944,255.39
Michigan	1,602.0	10,006,110.54	4,233,567.45	230.6	30.4	261.0	824,037.67	363,275.00	30.1	----------	30.1	2,782,145.14
Minnesota	3,936.1	10,791,550.43	3,818,278.31	232.2	237.5	469.7	1,232,803.68	490,675.40	19.4	32.3	51.7	46,352.03
Mississippi	1,820.7	1,795,493.20	691,571.41	55.0	7.7	62.7	48,835.05	24,417.52	.1	----------	.1	3,527,955.68
Missouri	2,486.8	7,687,851.27	2,665,580.20	117.5	61.3	178.8	3,642,322.65	1,248,339.72	61.6	27.7	89.3	831,704.84
Montana	1,717.4	7,874,376.59	4,608,614.27	525.9	43.7	569.6	1,120,677.78	641,330.56	90.2	40.7	130.9	3,540,456.15
Nebraska	3,669.2	7,382,359.82	3,442,551.75	272.9	145.9	418.8	1,578,049.64	636,872.07	54.7	91.1	145.8	2,176,337.14
Nevada	1,219.2	802,672.12	713,174.12	----------	122.1	122.1	348,831.87	307,040.69	----------	81.0	81.0	773,969.02
New Hampshire	352.7	1,542,914.69	552,098.03	36.6	----------	36.6	----------	----------	----------	----------	----------	221,369.45
New Jersey	507.9	5,923,349.51	1,476,271.32	66.7	----------	66.7	----------	----------	----------	----------	----------	977,248.76
New Mexico	1,904.4	3,711,585.77	2,433,941.63	185.3	50.7	236.0	643,139.21	479,303.52	32.6	1.9	34.5	969,531.76
New York	2,491.0	22,301,867.76	4,499,355.00	300.4	----------	300.4	7,348,800.00	1,251,572.50	83.6	----------	83.6	7,315,347.86
North Carolina	1,780.5	3,352,750.01	1,652,180.40	146.6	28.9	175.5	845,693.09	401,143.99	25.8	1.9	27.7	2,560,469.31
North Dakota	4,262.5	1,987,394.70	1,057,103.34	340.5	127.8	468.3	1,221,468.57	605,444.83	151.3	207.1	358.4	1,452,524.56
Ohio	2,185.7	20,373,300.95	6,579,243.04	367.8	35.2	403.0	5,055,233.63	1,732,197.73	83.1	13.1	96.2	939,205.53
Oklahoma	1,890.4	4,057,669.37	1,807,476.30	116.4	56.2	172.6	3,192,412.33	1,482,314.49	92.7	49.7	142.4	184,302.92
Oregon	1,150.4	5,343,938.89	3,150,289.24	204.5	85.4	289.9	819,262.95	490,778.04	49.1	----------	49.1	288,573.31
Pennsylvania	2,341.9	16,972,451.08	4,590,035.23	211.7	14.1	225.8	6,603,495.13	1,978,331.84	87.1	----------	87.1	1,082,376.94
Rhode Island	184.8	1,960,716.15	668,452.68	28.2	----------	28.2	----------	----------	----------	----------	----------	588,570.42
South Carolina	1,868.5	4,495,500.70	1,927,674.94	98.3	80.3	178.6	1,463,356.75	529,064.20	27.2	26.2	53.4	97,283.99

South Dakota	3, 445. 1	4, 526, 179. 47	2, 422, 855. 94	454. 1	142. 0	596. 1	586, 201. 87	368, 755. 17	44. 0	70. 6	114. 6	1, 062, 892. 43
Tennessee	1, 260. 9	3, 278, 768. 07	1, 518, 961. 84	132. 3	12. 5	144. 8	2, 817, 321. 13	1, 107, 295. 27	82. 3	38. 2	120. 5	1, 552, 381. 84
Texas	6, 835. 6	12, 367, 394. 51	5, 019, 494. 74	376. 3	119. 8	496. 1	2, 945, 441. 96	1, 207, 057. 26	101. 6	52. 7	154. 3	4, 647, 819. 57
Utah	981. 1	1, 172, 923. 88	810, 322. 47	56. 3	10. 8	67. 1	704, 739. 73	516, 652. 55	44. 9	78. 8	123. 7	662, 833. 17
Vermont	255. 6	2, 225, 996. 90	778, 211. 81	42. 5	2. 6	45. 1	316, 892. 92	45, 829. 37	5. 7	----------	5. 7	----------
Virginia	1, 467. 9	4, 290, 724. 92	2, 021, 632. 97	203. 1	13. 6	216. 7	833, 708. 70	395, 539. 94	28. 0	----------	28. 0	691, 693. 83
Washington	904. 8	3, 992, 309. 81	1, 713, 300. 00	96. 5	29. 8	126. 3	248, 056. 42	144, 900. 00	2. 1	6. 5	8. 6	1, 211, 773. 29
West Virginia	710. 1	3, 474, 452. 68	1, 322, 067. 98	75. 0	27. 8	102. 8	1, 184, 345. 87	386, 995. 23	20. 5	17. 2	37. 7	628, 588. 82
Wisconsin	2, 246. 1	7, 729. 781. 66	3, 114, 270. 98	197. 6	48. 1	245. 7	992, 121. 83	424, 875. 00	28. 0	----------	28. 0	816, 349. 40
Wyoming	1, 708. 7	2, 122, 570. 69	1, 382, 750. 59	148. 5	92. 6	241. 1	453, 127. 23	339, 821. 63	13. 7	63. 2	76. 9	588, 414. 28
Hawaii	41. 2	853, 565. 90	359, 459. 43	21. 5	----------	21. 5	226, 820. 16	113, 414. 57	9. 2	----------	9. 2	1, 568, 624. 59
Total	83, 975. 1	272, 012, 001. 81	111, 630, 191. 38	7, 709. 2	2, 205. 6	9, 914. 8	76, 450, 170. 75	30, 526, 282. 50	1, 940. 0	1, 529. 3	3, 469. 3	75, 716, 790. 80

Bureau of Public Roads.

[1] Initial Federal-aid construction refers to projects which are being improved with Federal aid for the first time. Such projects may or may not have been previously improved.

[2] The term "stage construction" refers to additional work done on projects previously improved with Federal aid. In general, such additional work consists of the construction of a surface of higher type than was provided in the initial improvement.

[3] Includes apportionment of $125,000,000 for fiscal year 1931 but does not include apportionment of funds for fiscal year 1932 which have since been apportioned.

TABLE 570.—*Federal-aid highway system: Mileage, Federal-aid apportionment for fiscal year 1932, and total apportionment for years 1917 to 1932, inclusive*

State	Mileage in approved system June 30, 1930 [1]	Apportionment for fiscal year 1932	Aggregate of apportionments for fiscal years 1917 to 1932, inclusive
Alabama	3,884	$2,615,434	$24,216,448
Arizona	1,979	1,768,023	16,337,517
Arkansas	5,019	2,174,786	19,785,628
California	4,889	4,181,212	37,899,055
Colorado	3,332	2,315,948	21,114,187
Connecticut	836	792,359	7,348,662
Delaware	550	609,375	4,791,317
Florida	1,926	1,543,232	13,878,252
Georgia	5,554	3,316,029	31,005,929
Idaho	3,116	1,554,594	14,474,770
Illinois	6,650	5,150,396	49,572,978
Indiana	4,694	3,172,253	30,332,895
Iowa	7,212	3,330,593	32,269,480
Kansas	7,917	3,397,874	32,474,739
Kentucky	3,710	2,356,367	22,189,789
Louisiana	2,713	1,745,445	15,815,478
Maine	1,579	1,121,860	10,755,600
Maryland	1,705	1,051,714	9,936,417
Massachusetts	1,343	1,813,916	17,012,196
Michigan	5,238	3,652,393	34,300,769
Minnesota	6,885	3,497,306	32,944,883
Mississippi	3,632	2,209,509	20,478,947
Missouri	7,530	3,957,287	37,926,517
Montana	5,108	2,580,405	23,258,454
Nebraska	5,530	2,644,726	24,687,682
Nevada	1,565	1,598,987	14,866,778
New Hampshire	991	609,375	5,486,751
New Jersey	1,186	1,565,749	14,404,925
New Mexico	3,466	1,984,363	18,511,107
New York	5,558	6,002,475	56,956,553
North Carolina	4,219	2,871,722	26,613,937
North Dakota	7,424	2,001,841	18,346,946
Ohio	5,899	4,584,440	43,192,363
Oklahoma	5,622	2,922,569	27,158,366
Oregon	3,247	1,997,569	18,442,283
Pennsylvania	5,487	5,517,738	52,391,204
Rhode Island	417	609,375	4,984,828
South Carolina	3,232	1,769,848	16,527,262
South Dakota	6,148	2,054,077	18,954,640
Tennessee	3,521	2,687,123	25,492,698
Texas	11,722	7,620,239	69,354,501
Utah	1,751	1,416,493	13,200,582
Vermont	1,043	609,375	5,585,766
Virginia	3,565	2,379,788	22,583,440
Washington	3,033	1,940,922	17,443,182
West Virginia	2,214	1,324,680	12,385,960
Wisconsin	5,493	3,075,234	29,193,493
Wyoming	3,498	1,568,607	14,523,298
Hawaii	217	609,375	3,090,548
Total	[1] 193,049	121,875,000	1,134,500,000

Bureau of Public Roads.

[1] Includes extensions of system where original system has been completed and also mileage within Federal reservations. The latter mileage is not considered in applying the limitation that the Federal-aid system shall not exceed 7 per cent of the certified mileage.

TABLE 571.—*Mileage of roads in State highway systems at end of 1929, as reported by State highway departments*

State	Total system mileage	Earth, nonsurfaced		Surfaced roads, by types								
		Unimproved	Improved to grade	Total surfaced mileage	Sand-clay, topsoil	Gravel, chert, etc.	Water-bound macadam (treated and untreated)	Bituminous macadam	Sheet asphalt	Bituminous concrete	Portland cement concrete	Brick and block
	Miles	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*
Alabama	5, 539	1, 704	543	3, 292	890	1, 707	28	117	6	118	426	------
Arizona	2, 476	451	340	1, 685	------	1, 458	--------	24	15	51	137	------
Arkansas	8, 467	1, 141	1, 311	6, 015	------	4, 996	168	136	32	209	474	------
California	6, 576	1, 872	449	4, 255	------	1, 594	61	393	445	129	1, 633	------
Colorado	9, 203	4, 189	822	4, 192	76	3, 764	--------	-------	------	13	339	------
Connecticut	2, 123	-------	106	2, 017	------	309	829	297	------	155	426	1
Delaware	756	-------	-------	756	------	43	5	48	------	13	641	6
Florida	6, 520	2, 658	280	3, 582	793	8	1, 731	149	159	55	399	288
Georgia	6, 290	2, 092	344	3, 854	1, 818	761	228	276	122	28	620	1
Idaho	4, 245	1, 298	463	2, 484	4	2, 256	--------	22	5	143	54	------
Illinois	9, 889	2, 729	259	6, 901	------	--------	1	3	14	7	6, 751	125
Indiana	5, 003	-------	41	4, 962	------	1, 534	889	467	------	34	1, 955	83
Iowa	7, 206	669	715	5, 822	------	3, 337	--------	-------	------	------	2, 452	33
Kansas	8, 690	4, 557	669	3, 464	2, 014	444	--------	145	------	3	699	159
Kentucky	11, 500	5, 191	781	5, 528	------	2, 072	2, 635	468	------	21	306	26
Louisiana	9, 113	2, 229	286	6, 598	------	6, 363	7	16	1	123	73	15
Maine	2, 041	208	-------	1, 833	4	1, 475	8	240	------	------	106	------
Maryland	2, 831	-------	-------	2, 831	------	433	1, 147	-------	39	78	1, 132	2
Massachusetts	1, 625	-------	-------	1, 625	------	66	215	848	------	228	265	3
Michigan	7, 725	468	118	7, 139	94	3, 394	532	120	------	320	2, 667	12
Minnesota	6, 955	-------	232	6, 723	256	5, 319	--------	-------	------	78	1, 052	18
Mississippi	10, 038	4, 384	544	5, 110	1	4, 625	11	51	8	14	381	19
Missouri	7, 827	1, 613	1, 387	4, 827	------	2, 529	--------	143	------	------	2, 134	21
Montana	8, 148	6, 297	338	1, 513	------	1, 466	--------	6	------	7	34	------
Nebraska	8, 371	3, 449	732	4, 190	104	3, 836	--------	-------	3	14	182	51
Nevada	3, 741	2, 050	131	1, 560	------	1, 482	--------	25	------	2	51	------
New Hampshire	2, 463	72	102	2, 289	------	1, 832	111	173	------	65	108	------
New Jersey	1, 821	15	47	1, 759	------	260	31	116	91	273	937	51
New Mexico	9, 343	5, 592	1, 555	2, 196	------	2, 112	--------	-------	------	1	83	------
New York	13, 959	3, 019	32	10, 908	------	121	1, 822	3, 743	------	330	4, 634	258
North Carolina	8, 309	-------	976	7, 333	2, 825	504	195	522	66	888	2, 288	45
North Dakota	7, 396	3, 147	1, 426	2, 823	------	2, 812	--------	-------	1	------	10	------
Ohio	11, 066	215	-------	10, 851	------	4, 032	1, 611	1, 586	38	174	1, 967	1, 443
Oklahoma	6, 275	2, 671	676	2, 928	------	1, 611	--------	-------	------	289	992	36
Oregon	4, 381	612	226	3, 543	------	2, 480	--------	164	------	683	216	------
Pennsylvania	13, 310	-------	3, 464	9, 846	------	526	3, 169	403	191	299	4, 890	368
Rhode Island	952	237	182	533	------	23	110	179	17	107	97	------
South Carolina	5, 981	939	151	4, 891	3, 078	514	43	11	169	261	815	------
South Dakota	5, 983	827	1, 538	3, 618	20	3, 569	--------	7	------	------	22	------
Tennessee	6, 751	1, 280	465	5, 006	------	2, 355	1, 188	603	35	91	734	------
Texas	18, 034	5, 117	2, 021	10, 896	1, 100	6, 061	955	583	12	190	1, 940	55
Utah	3, 448	459	1, 194	1, 795	------	1, 305	200	5	12	53	220	------
Vermont	4, 217	54	678	3, 485	1, 000	2, 157	49	68	------	------	211	------
Virginia	6, 932	1, 393	556	4, 983	1, 318	879	1, 206	820	10	3	747	------
Washington	3, 289	216	228	2, 845	------	2, 041	--------	32	2	44	714	12
West Virginia	4, 055	661	660	2, 734	------	845	95	890	1	89	681	133
Wisconsin	10, 221	481	860	8, 880	47	5, 139	651	144	4	12	2, 881	2
Wyoming	3, 052	1, 003	625	1, 424	------	1, 389	--------	-------	------	27	8	------
Total, 1929	314, 136	77, 259	28, 553	208, 324	15, 442	97, 838	19, 931	14, 043	1, 498	5, 722	50, 584	3, 266
Total—1928	306, 442	81, 549	31, 755	193, 138	13, 499	93, 124	18, 142	15, 200	1, 498	5, 392	42, 957	3, 326
1927	293, 353	86, 817	29, 970	176, 566	12, 581	86, 095	17, 752	13, 496	1, 332	5, 066	36, 915	3, 329
1926	287, 928	96, 413	28, 456	163, 059	11, 396	79, 286	18, 428	12, 927	890	4, 815	31, 936	3, 381
1925	274, 911	103, 271	26, 786	144, 854	11, 025	68, 771	16, 709	12, 105	853	4, 561	27, 645	3, 185
1924	261, 216	94, 651	34, 456	132, 109	10, 446	63, 158	17, 033	10, 346	784	4, 427	22, 825	3, 090
1923	251, 611	103, 843	36, 368	111, 400	8, 875	52, 917	15, 422	8, 847	651	3, 907	17, 916	2, 865
1921	209, 242	102, 963	21, 421	[1] 84,858	8, 622	36, 458	16, 978	6, 749	396	2, 444	10, 114	2, 089

Bureau of Public Roads.

[1] Includes 1,008 miles of miscellaneous surfacing not allocated by types.

TABLE 572.—*Total State highway income and funds available, 1929, as reported by State authorities*

State	Total funds available	Balances at first of year	Total income for State highways	State taxes and appropriations	Motor vehicle fees	Gasoline tax receipts	From counties and miscellaneous	State highway bonds sold	Federal-aid road funds used
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	21,699	913	20,786	-------	2,924	3,515	774	12,299	1,274
Arizona	5,380	715	4,665	1,097	701	1,400	158	-------	1,309
Arkansas	44,943	4,003	40,940	-------	4,213	6,681	-------	28,814	1,232
California	43,628	10,271	33,357	4,679	4,678	20,259	297	-------	3,444
Colorado	9,312	1,519	7,793	1,007	959	3,909	39	-------	1,879
Connecticut	14,705	1,160	13,545	21	8,228	3,920	1,212	-------	164
Delaware	5,629	234	5,395	1,852	1,546	904	100	480	513
Florida	11,924	344	11,580	-------	3,462	5,855	1,742	-------	521
Georgia	7,758	441	7,317	-------	4,027	2,557	342	-------	391
Idaho	3,824	34	3,790	306	197	2,201	608	-------	478
Illinois	46,392	3,863	42,529	374	17,036	1,616	394	19,627	3,482
Indiana	21,430	1,944	19,486	-------	5,950	9,974	1,193	-------	2,369
Iowa	43,365	6,292	37,073	-------	10,955	5,103	74	18,404	2,537
Kansas	19,063	3,304	15,759	-------	4,314	7,979	759	-------	2,707
Kentucky	19,116	1,124	17,992	934	4,860	7,776	2,592	-------	1,830
Louisiana	24,621	1,597	23,024	-------	4,525	6,449	1,172	10,175	703
Maine	15,026	1,314	13,712	1,490	3,039	2,959	2,656	2,398	1,170
Maryland	17,662	1,877	15,785	3,314	2,460	4,756	585	4,161	509
Massachusetts	25,133	4,220	20,913	1,793	7,259	7,417	3,530	-------	914
Michigan	51,517	4,376	47,141	-------	21,622	19,828	2,623	-------	3,068
Minnesota	35,033	11,252	23,781	1,954	10,775	8,476	834	-------	1,742
Mississippi	5,544	970	4,574	-------	375	2,746	693	-------	760
Missouri	34,147	4,358	29,789	117	9,732	8,327	405	7,525	3,683
Montana	4,646	219	4,427	-------	-------	2,228	258	-------	1,941
Nebraska	9,337	416	8,921	106	1,461	5,565	131	-------	1,658
Nevada	2,898	24	2,874	112	297	555	761	50	1,099
New Hampshire	9,823	1,335	8,488	-------	2,027	1,664	2,506	1,770	521
New Jersey	50,750	7,182	43,568	9,153	13,497	9,886	434	10,000	598
New Mexico	7,778	995	6,783	434	451	2,256	172	2,313	1,157
New York	145,328	75,238	70,090	32,429	20,550	-------	13,482	-------	3,629
North Carolina	33,463	13,992	19,471	-------	6,992	10,334	428	-------	1,717
North Dakota	4,488	224	4,264	376	808	1,410	168	-------	1,502
Ohio	39,257	2,456	36,801	186	6,502	20,496	6,604	-------	3,013
Oklahoma	13,978	1,155	12,823	-------	3,125	5,210	2,874	-------	1,614
Oregon	12,595	769	11,826	-------	5,548	5,036	617	-------	625
Pennsylvania	89,551	20,537	69,014	2,891	30,494	26,934	5,161	-------	3,534
Rhode Island	6,985	3,176	3,809	123	2,150	1,501	-------	-------	35
South Carolina	24,512	6,613	17,899	-------	2,600	4,741	9,431	-------	1,127
South Dakota	6,228	108	6,120	707	1,647	2,586	32	-------	1,148
Tennessee	52,515	5,666	46,849	-------	4,173	4,251	7,775	28,404	2,246
Texas	44,679	10,580	34,099	-------	11,847	11,208	6,755	-------	4,289
Utah	4,969	724	4,245	774	144	1,308	1,040	-------	979
Vermont	13,589	4,341	9,248	3,762	-------	297	589	2,559	2,011
Virginia	17,971	1,953	16,018	1,658	5,657	6,796	610	-------	1,297
Washington	15,702	-------	15,702	-------	8,592	5,732	49	-------	1,329
West Virginia	25,102	2,444	22,658	-------	4,916	5,032	-------	12,250	460
Wisconsin	28,187	6,237	21,950	-------	10,095	6,598	2,818	-------	2,439
Wyoming	3,593	459	3,134	88	683	1,027	440	-------	896
Total	1,194,775	232,968	961,807	71,737	278,093	287,258	85,917	161,229	77,573

Bureau of Public Roads.

TABLE 573.—*Total State highway road and bridge disbursements, 1929, as reported by State authorities*

State	Grand total disbursements	Expenditures for State highway purposes						Other disbursements by State highway department		
		Total expenditure for State highways	Construction and right of way	Maintenance	Miscellaneous expenses	Equipment, material, etc.	Interest on bonds	Retirement of bonds	County fund transfers	Other obligations assumed
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	19, 317	18, 271	14, 694	1, 245		558	1, 774	933		113
Arizona	4, 873	4, 385	3, 119	1, 116		150				488
Arkansas	40, 972	25, 488	20, 642	2, 661	57	291	1, 837	5, 500	1, 800	8, 184
California	30, 352	28, 577	20, 184	5, 174		315	2, 904	1, 775		
Colorado	7, 142	6, 362	3, 883	1, 430	22	435	592	780		
Connecticut	13, 597	12, 751	9, 150	2, 461	754	386				846
Delaware	5, 208	2, 735	1, 864	196	220		455	2, 100		373
Florida	10, 967	10, 702	9, 095	1, 484	1	122				265
Georgia	7, 039	7, 039	5, 889	753	11	338	48			
Idaho	3, 365	2, 980	1, 666	944	7	211	152	71		314
Illinois	39, 728	37, 709	28, 931	2, 619	481	249	5, 429	2, 001		18
Indiana	20, 678	20, 678	16, 195	3, 627		856				
Iowa	36, 084	34, 773	28, 332	4, 622			1, 819	711	600	
Kansas	17, 012	14, 053	10, 064	3, 746		243			2, 445	514
Kentucky	15, 130	15, 110	11, 058	2, 986	240	826				20
Louisiana	17, 143	16, 997	11, 419	3, 756	256	1, 198	368	38		108
Maine	14, 006	12, 041	8, 214	2, 262	372	604	589	531		1, 431
Maryland	13, 618	10, 980	6, 979	2, 875	123	251	752	2, 562		76
Massachusetts	20, 179	13, 846	9, 885	3, 470		128	363	760	3, 415	2, 158
Michigan	48, 666	34, 512	24, 376	7, 496	61	330	2, 249	1, 835	11, 413	906
Minnesota	23, 366	19, 741	12, 166	5, 152		843	1, 580	2, 221	1, 404	
Mississippi	4, 754	4, 683	2, 269	2, 230	12	172				71
Missouri	28, 321	27, 321	20, 545	4, 708			2, 068	1, 000		
Montana	4, 488	4, 482	3, 860	545	5	71	1			6
Nebraska	8, 467	8, 390	5, 227	3, 157	6					77
Nevada	2, 797	2, 647	1, 686	444	50	443	24	150		
New Hampshire	7, 713	7, 621	4, 139	2, 872	529	81			92	
New Jersey	41, 396	32, 967	27, 460	2, 101		17	3, 389	3, 500	4, 929	
New Mexico	6, 675	6, 370	4, 351	1, 357	124	323	215	305		
New York	69, 664	62, 024	47, 852	9, 552	52		4, 568	1, 892	5, 748	
North Carolina	24, 902	20, 682	10, 768	4, 561	493		4, 860	2, 000	2, 220	
North Dakota	4, 129	4, 129	2, 915	899	145	170				
Ohio	30, 281	30, 281	16, 404	13, 877						
Oklahoma	11, 969	11, 766	8, 111	3, 507	133	15				203
Oregon	11, 328	9, 503	4, 177	3, 633	189		1, 504	1, 825		
Pennsylvania	60, 434	51, 904	22, 572	20, 754	711	3, 772	4, 095	2, 901	1, 774	3, 855
Rhode Island	5, 412	4, 949	2, 798	1, 549	100	245	257	163	45	255
South Carolina	18, 581	15, 373	12, 795	1, 933	9	636			2, 996	212
South Dakota	6, 168	5, 060	2, 964	1, 871	13	4	208	500		608
Tennessee	29, 741	27, 741	19, 672	5, 345	136	2, 283	305	2, 000		
Texas	34, 530	33, 681	21, 385	11, 671		625				849
Utah	4, 545	4, 106	2, 352	1, 007	62	350	335	439		
Vermont	12, 516	12, 516	10, 639	1, 416		274	187			
Virginia	14, 213	13, 954	10, 223	3, 415			316			259
Washington	15, 702	12, 734	9, 764	2, 810		160			2, 968	
West Virginia	19, 184	15, 872	10, 439	2, 848	65	23	2, 497	3, 107		205
Wisconsin	21, 010	16, 284	12, 407	3, 792	85			784	3, 942	
Wyoming	3, 123	3, 107	1, 822	1, 131		59	95			16
Total	910, 485	799, 877	557, 401	173, 060	5, 524	18, 057	45, 835	42, 384	45, 791	22, 433

Bureau of Public Roads.

TABLE 574.—*Mileage of county and local roads at end of 1929, from records and reports of local authorities*

State	Total mileage, local roads	Earth nonsurfaced	Surfaced roads, by types								
			Total surfaced mileage	Sand-clay top-soil	Gravel-chert, etc.	Water-bound macadam (treated and untreated)	Bituminous macadam	Sheet asphalt	Bituminous concrete	Portland cement concrete	Brick and block
	Miles	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*
Alabama	62, 404	47, 327	15, 077	7, 559	7, 023	292	55	9	69	64	6
Arizona	19, 808	17, 896	1, 912	332	1, 212	25	------	54	14	275	------
Arkansas	60, 039	58, 096	1, 943	210	1, 674	46	7	1	------	5	------
California	70, 388	49, 262	21, 126	------	12, 116	3, 184	2, 381	2	1, 264	2, 179	------
Colorado	59, 771	56, 806	2, 965	1, 396	1, 563	------	------	------	2	4	------
Connecticut	12, 022	10, 467	1, 555	------	983	389	83	7	------	91	2
Delaware	3, 021	2, 597	424	------	151	227	21	------	20	4	1
Florida	23, 663	12, 122	11, 541	3, 939	954	5, 284	100	626	68	57	513
Georgia	95, 132	84, 155	10, 977	9, 120	1, 291	75	253	41	3	192	2
Idaho	34, 892	28, 492	6, 400	1, 773	4, 535	------	45	------	41	6	------
Illinois	87, 398	72, 924	14, 474	------	12, 394	450	80	23	------	1, 409	118
Indiana	68, 658	22, 306	46, 352	------	42, 935	1, 396	347	21	180	1, 322	151
Iowa	96, 122	83, 923	12, 199	------	12, 182	------	------	------	------	17	------
Kansas	123, 554	121, 333	2, 221	400	1, 650	65	41	8	1	54	2
Kentucky	49, 761	38, 259	11, 502	162	4, 146	7, 098	66	2	5	23	------
Louisiana	26, 440	21, 886	4, 554	60	4, 470	11	5	------	7	1	------
Maine	18, 961	15, 017	3, 944	9	3, 901	13	16	------	------	4	1
Maryland	11, 902	9, 029	2, 873	157	1, 615	959	19	5	------	118	------
Massachusetts	17, 137	9, 438	7, 699	17	5, 175	721	1, 292	10	379	88	17
Michigan	73, 290	55, 286	18, 004	90	14, 748	1, 375	225	79	100	1, 380	7
Minnesota	103, 598	74, 820	28, 778	5, 771	22, 761	96	------	12	19	119	------
Mississippi	51, 919	40, 917	11, 002	204	10, 544	18	57	7	71	95	6
Missouri	102, 765	94, 518	8, 247	1, 400	5, 255	1, 300	105	------	51	136	------
Montana	58, 924	57, 000	1, 924	120	1, 800	2	2	------	------	------	------
Nebraska	85, 540	84, 366	1, 174	450	675	5	2	------	9	31	2
Nevada	19, 799	19, 122	677	40	629	------	6	------	------	2	------
New Hampshire	9, 572	9, 077	495	24	433	23	12	------	2	1	------
New Jersey	15, 386	8, 068	7, 318	162	3, 581	1, 271	582	374	543	753	52
New Mexico	38, 442	38, 099	343	78	265	------	------	------	------	------	------
New York	71, 824	50, 019	21, 805	------	8, 669	6, 055	5, 951	------	------	1, 130	------
North Carolina	63, 220	40, 904	22, 316	18, 512	2, 789	285	312	90	30	273	25
North Dakota	99, 454	98, 685	769	------	769	------	------	------	------	------	------
Ohio	73, 487	35, 835	37, 652	------	27, 246	6, 811	2, 508	50	75	710	252
Oklahoma	114, 485	112, 639	1, 846	169	1, 554	2	11	8	6	96	------
Oregon	47, 265	38, 685	8, 580	234	6, 719	1, 100	9	------	362	156	------
Pennsylvania	77, 366	61, 067	16, 299	------	12, 030	2, 204	536	68	431	603	427
Rhode Island	1, 730	1, 238	492	------	254	124	96	12	------	3	3
South Carolina	51, 697	39, 012	12, 685	12, 032	494	7	7	1	50	91	3
South Dakota	114, 292	111, 763	2, 529	------	2, 529	------	------	------	------	------	------
Tennessee	60, 884	50, 706	10, 178	236	6, 416	2, 924	558	------	------	44	------
Texas	169, 836	154, 720	15, 116	2, 584	11, 800	467	40	26	20	179	------
Utah	19, 981	17, 539	2, 442	30	2, 332	------	2	------	30	48	------
Vermont	10, 825	9, 327	1, 498	144	1, 350	------	1	3	------	------	------
Virginia	52, 766	45, 422	7, 344	3, 815	1, 669	1, 355	353	------	------	152	------
Washington	40, 633	26, 760	13, 873	975	10, 125	1, 704	44	------	124	758	143
West Virginia	30, 744	29, 028	1, 716	------	374	506	462	------	81	227	66
Wisconsin	71, 194	52, 259	18, 935	3, 246	14, 444	891	------	------	------	354	------
Wyoming	38, 106	37, 770	336	97	239	------	------	------	------	------	------
Total, 1929	2, 710, 097	2, 255, 986	454, 111	75, 547	292, 463	48, 760	16, 692	1, 539	4, 057	13, 254	1, 799
Total—1928	2, 709, 839	2, 276, 840	432, 999	74, 562	277, 797	46, 454	14, 953	1, 472	3, 763	12, 317	1, 681
1927	2, 720, 231	2, 308, 076	412, 155	71, 770	263, 088	45, 500	13, 525	1, 454	3, 680	11, 438	1, 700
1926	2, 712, 262	2, 325, 257	387, 005	69, 711	245, 524	42, 732	11, 651	1, 548	3, 607	10, 405	1, 827
1925	2, 731, 172	2, 354, 766	[1] 376, 406	58, 211	224, 036	65, 604	10, 490	1, 921	3, 420	10, 106	2, 059
1924	2, 743, 195	2, 403, 637	[2] 339, 558	53, 638	193, 465	60, 139	7, 853	1, 489	2, 991	8, 363	1, 624
1923	2, 744, 116	2, 416, 175	[3] 327, 941	52, 425	186, 314	59, 200	6, 950	1, 395	2, 824	7, 289	1, 569
1921	2, 732, 052	2, 429, 150	[4] 302, 902	54, 717	163, 441	60, 367	3, 515	1, 205	2, 534	5, 497	1, 331

Bureau of Public Roads.

[1] Includes 559 miles of miscellaneous types.
[2] Includes 9,996 miles of miscellaneous types.
[3] Includes 9,975 miles of miscellaneous types.
[4] Includes 10,295 miles of miscellaneous types.

TABLE 575.—*Income and funds available for local roads, 1929, compiled from records of local authorities*

State	Total funds available	Balance at first of year	Total income for local roads	Local road bond sales	Local road taxes and appropriation	Motor vehicle fees	Gasoline-tax receipts	Funds from State for local roads	Miscellaneous income
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	13, 543	1, 571	11, 972	870	6, 417	88	3, 595	--------	1, 002
Arizona	2, 527	135	2, 392	475	803	--------	843	126	145
Arkansas	9, 202	590	8, 612	750	2, 300	2, 515	2, 937	--------	110
California	47, 518	14, 189	33, 329	3, 270	16, 270	3, 230	9, 435	385	739
Colorado	5, 964	267	5, 697	--------	2, 970	615	1, 493	253	366
Connecticut	3, 353	--------	3, 353	--------	3, 353	--------	--------	--------	--------
Delaware	2, 325	375	1, 950	--------	1, 306	--------	--------	628	16
Florida	29, 068	10, 107	18, 961	1, 893	13, 212	1, 095	1, 626	--------	1, 135
Georgia	13, 179	1, 132	12, 047	557	8, 469	--------	2, 276	--------	745
Idaho	8, 813	2, 375	6, 438	845	3, 684	1, 483	--------	--------	426
Illinois	30, 145	--------	30, 145	1, 197	28, 248	--------	--------	--------	700
Indiana	50, 476	10, 665	39, 811	10, 651	26, 236	--------	2, 921	--------	3
Iowa	27, 815	3, 710	24, 105	488	16, 480	--------	3, 776	466	2, 895
Kansas	27, 570	6, 375	21, 195	1, 100	13, 900	--------	3, 400	2, 445	350
Kentucky	10, 341	--------	10, 341	3, 400	6, 101	590	--------	--------	250
Louisiana	15, 010	4, 450	10, 560	670	9, 280	--------	--------	--------	610
Maine	2, 766	−38	2, 804	40	2, 664	--------	--------	--------	100
Maryland	5, 307	8	5, 299	1, 223	3, 389	--------	--------	--------	687
Massachusetts	14, 631	563	14, 068	1, 200	9, 600	--------	--------	2, 968	300
Michigan	61, 027	13, 461	47, 566	7, 320	25, 942	6, 000	4, 644	2, 101	1, 559
Minnesota	26, 394	854	25, 540	1, 000	18, 558	--------	2, 608	1, 874	1, 500
Mississippi	31, 647	8, 607	23, 040	2, 302	12, 321	2, 742	4, 267	--------	1, 408
Missouri	17, 604	2, 800	14, 804	3, 904	9, 520	--------	--------	--------	1, 380
Montana	5, 650	1, 200	4, 450	100	2, 850	1, 250	--------	50	200
Nebraska	12, 508	925	11, 583	16	6, 425	2, 892	1, 810	--------	440
Nevada	1, 509	625	884	53	633	17	112	36	33
New Hampshire	4, 381	--------	4, 381	--------	4, 282	--------	--------	92	7
New Jersey	24, 349	1, 299	23, 050	5, 917	11, 438	4, 301	--------	154	1, 240
New Mexico	600	68	532	50	256	224	--------	2	--------
New York	49, 596	3, 947	45, 649	--------	30, 845	5, 806	3, 250	5, 748	--------
North Carolina	26, 639	2, 978	23, 661	4, 766	13, 375	--------	--------	2, 220	3, 300
North Dakota	6, 927	2, 008	4, 919	--------	3, 741	798	380	--------	--------
Ohio	79, 280	11, 970	67, 310	20, 926	39, 437	1, 818	4, 812	--------	317
Oklahoma	17, 843	1, 270	16, 573	700	8, 200	3, 979	3, 044	--------	650
Oregon	13, 995	1, 700	12, 295	3, 250	5, 300	1, 805	190	1, 000	750
Pennsylvania	81, 791	20, 233	61, 558	8, 701	35, 085	--------	5, 218	6, 000	6, 554
Rhode Island	1, 037	51	986	40	846	--------	--------	--------	100
South Carolina	24, 954	5, 634	19, 320	7, 057	7, 279	--------	1, 815	--------	3, 169
South Dakota	7, 174	--------	7, 174	--------	5, 662	1, 512	--------	--------	--------
Tennessee	16, 024	3, 702	12, 322	1, 718	9, 440	205	651	--------	308
Texas	44, 151	11, 400	32, 751	6, 000	18, 500	8, 101	--------	--------	150
Utah	1, 910	419	1, 491	--------	1, 425	--------	--------	--------	66
Vermont	1, 052	--------	1, 052	--------	752	--------	--------	300	--------
Virginia	12, 774	3, 797	8, 977	593	5, 244	--------	2, 550	--------	590
Washington	11, 230	700	10, 530	100	7, 310	820	1, 200	600	500
West Virginia	16, 602	3, 076	13, 526	2, 312	11, 078	--------	--------	--------	136
Wisconsin	34, 289	4, 200	30, 089	5, 181	18, 076	--------	1, 437	4, 267	1, 128
Wyoming	1, 040	3	1, 037	--------	669	--------	203	--------	165
Total	953, 530	163, 401	790, 129	110, 635	489, 171	51, 886	70, 493	31, 715	36, 229

Bureau of Public Roads.

TABLE 576.—*Disbursements for local roads, 1929, compiled from records of local authorities*

State	Total disburse-ments	Expenditures for local road purposes: Total expenditures for local roads	Expenditures for local road purposes: Construction	Expenditures for local road purposes: Maintenance	Expenditures for local road purposes: Miscellaneous and overhead [1]	Expenditures for local road purposes: Interest on bonds	Other disbursements by local authorities: Principal payments on bonds	Other disbursements by local authorities: Funds transferred to State [2]
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	12, 701	9, 738	2, 645	5, 734	107	1, 252	2, 250	713
Arizona	2, 350	1, 996	266	1, 218	219	293	337	17
Arkansas	8, 855	6, 455	1, 600	2, 700	55	2, 100	2, 400	--------
California	32, 616	29, 677	9, 214	13, 069	4, 814	2, 580	2, 819	120
Colorado	5, 635	5, 436	1, 110	3, 803	513	10	152	47
Connecticut	3, 349	3, 349	701	2, 648	--------	--------	--------	--------
Delaware	1, 922	1, 675	710	404	122	439	247	--------
Florida	18, 918	14, 818	2, 124	5, 039	1, 179	6, 476	2, 134	1, 966
Georgia	12, 158	10, 097	1, 552	6, 968	71	1, 506	1, 017	1, 044
Idaho	6, 569	4, 843	1, 583	1, 486	803	971	1, 726	--------
Illinois	30, 311	28, 384	8, 900	17, 600	847	1, 037	1, 927	--------
Indiana	40, 219	27, 608	10, 884	12, 138	759	3, 827	11, 896	715
Iowa	26, 133	24, 776	8, 945	13, 799	1, 132	900	1, 357	--------
Kansas	24, 070	20, 185	9, 350	6, 895	3, 037	903	1, 285	2, 600
Kentucky	10, 125	6, 125	1, 075	3, 500	650	900	1, 000	3, 000
Louisiana	11, 972	9, 000	2, 750	3, 120	460	2, 670	2, 780	192
Maine	2, 800	2, 740	350	2, 230	100	60	60	--------
Maryland	5, 364	4, 061	1, 223	2, 201	156	481	358	945
Massachusetts	14, 464	12, 735	5, 750	6, 350	515	120	600	1, 129
Michigan	48, 957	41, 398	21, 523	15, 638	2, 537	1, 700	7, 559	--------
Minnesota	25, 193	23, 507	15, 390	5, 000	2, 320	797	1, 165	521
Mississippi	22, 689	18, 560	5, 280	10, 420	151	2, 709	2, 343	1, 786
Missouri	16, 304	14, 454	7, 150	4, 735	1, 950	619	1, 850	--------
Montana	5, 325	4, 550	1, 300	2, 450	300	500	725	50
Nebraska	11, 148	10, 953	5, 765	4. 315	651	222	64	131
Nevada	945	635	189	328	72	46	102	208
New Hampshire	4, 381	2, 134	249	1, 558	327	--------	--------	2, 247
New Jersey	23, 955	19, 387	9, 218	6, 738	627	2, 804	4, 568	--------
New Mexico	559	476	49	405	22	--------	--------	83
New York	45, 000	45, 000	22, 458	12, 565	6, 754	3, 223	--------	--------
North Carolina	24, 381	16, 859	4, 636	5, 317	1, 448	5, 458	7, 306	216
North Dakota	5, 142	4, 942	3, 898	790	239	15	200	--------
Ohio	69, 562	40, 304	17, 079	14, 197	3, 079	5, 949	19, 100	10, 158
Oklahoma	15, 981	12, 750	3, 200	7, 900	600	1, 050	1, 200	2, 031
Oregon	13, 080	11, 830	7, 500	2, 900	430	1, 000	1, 250	--------
Pennsylvania	63, 382	44, 254	19, 667	12, 195	6, 620	5, 772	9, 657	9, 471
Rhode Island	1, 022	930	289	541	56	44	92	--------
South Carolina	19, 916	9, 052	1, 983	3, 122	104	3, 843	4, 255	6, 609
South Dakota	7, 843	7, 843	4, 773	2, 584	479	7	--------	--------
Tennessee	13, 141	10, 443	2, 761	4, 268	171	3, 243	442	2, 256
Texas	33, 289	23, 000	6, 200	9, 800	500	6, 500	6, 000	4, 289
Utah	1, 322	1, 238	385	682	105	66	84	--------
Vermont	1, 052	845	390	450	--------	5	7	200
Virginia	8, 975	8, 225	2, 101	4, 850	9	1, 265	750	--------
Washington	9, 750	8, 975	4, 100	3, 700	425	750	775	--------
West Virginia	13, 564	12, 164	6, 147	3, 834	13	2, 170	1, 400	--------
Wisconsin	30, 233	25, 324	11, 927	7, 597	3, 845	1, 955	764	4, 145
Wyoming	1, 093	1, 063	243	697	83	40	30	--------
Total	807, 715	644, 793	256, 582	260, 478	49, 456	78, 277	106, 033	56, 889

Bureau of Public Roads.

[1] Administration and engineering included.
[2] Not applicable to local road and bridge disbursements

TABLE 577.—*Motor-vehicle registration, 1929, as reported by State authorities*

State	Registered motor vehicles (private and commercial)			Registered motor cycles	Tax-exempt motor cars	Number of licenses and permits		Year's increase in registration	
	All motor cars and trucks	Passenger autos, taxis, and busses	Motor trucks and road tractors			Dealers' licenses	Operators' and chauffeurs' permits	Number	Per cent
Alabama	285,533	247,701	37,832	704	1,036	4,712	2,714	16,014	6.0
Arizona	109,013	98,327	10,686	396	1,349	182	20,643	14,641	15.5
Arkansas	233,128	193,396	39,732	400	958	515	5,023	18,197	8.5
California	1,974,341	1,760,308	214,033	9,628	16,222	14,000	250,855	174,451	9.7
Colorado	303,489	274,988	28,501	1,142	283	3,684	7,916	18,622	6.5
Connecticut	328,063	278,057	50,006	2,314	2,139	4,073	379,122	18,271	5.9
Delaware	54,960	44,728	10,232	308	44	684	60,887	3,750	7.3
Florida	345,977	288,684	57,293	1,104	3,863	1,906	2,326	−6,984	−2.0
Georgia	358,905	310,362	48,543	1,138	934	----------	2,973	40,049	12.6
Idaho	118,074	104,398	13,676	355	1,195	466	780	9,920	9.2
Illinois	1,615,088	1,411,753	203,335	6,055	979	4,605	106,551	110,729	7.4
Indiana	866,715	741,366	125,349	2,983	8,149	2,794	55,164	42,909	5.2
Iowa	784,450	714,919	69,531	1,650	3,505	2,483	19,067	50,984	6.9
Kansas [2]	581,223	507,529	73,694	1,178	2,662	2,784	----------	47,424	8.9
Kentucky	332,848	298,716	34,132	727	2,006	1,158	11,859	28,617	9.4
Louisiana	280,868	234,565	46,303	600	209	456	22,834	16,575	6.3
Maine	184,506	147,962	36,544	1,258	1,531	1,151	226,087	11,868	6.9
Maryland	319,873	281,034	38,839	1,986	1,969	7,231	82,714	34,562	12.1
Massachusetts	817,704	719,436	98,268	5,568	1,456	3,094	944,338	91,409	12.6
Michigan [2]	1,395,102	1,219,158	175,944	3,985	371	2,282	----------	145,881	11.7
Minnesota	730,399	630,703	99,696	1,900	1,556	2,160	----------	56,826	8.4
Mississippi	250,011	217,362	32,649	204	74	5,567	----------	3,769	1.5
Missouri [2]	756,680	671,237	85,443	1,893	1,915	2,686	33,265	43,715	6.1
Montana	140,387	115,285	25,102	234	229	537	414	14,352	11.4
Nebraska	418,226	375,946	42,280	972	1,327	3,584	----------	26,871	6.9
Nevada	31,915	25,302	6,613	95	510	119	----------	4,539	16.6
New Hampshire	108,880	94,900	13,980	1,263	22	561	129,539	6,236	6.1
New Jersey	832,332	698,959	133,373	6,531	7,881	3,418	971,235	73,902	9.7
New Mexico	78,374	76,000	2,374	203	976	208	----------	12,637	19.2
New York	2,263,259	1,922,068	341,191	13,527	19,165	5,039	2,708,036	179,317	8.6
North Carolina	483,602	430,651	52,951	1,298	7,521	7,614	----------	19,226	4.1
North Dakota	188,046	162,092	25,954	230	3	869	----------	14,521	8.4
Ohio	1,766,614	1,560,182	206,432	9,180	13,205	29,298	4,436	116,915	7.1
Oklahoma	570,791	510,401	60,390	1,196	5,255	3,923	----------	40,948	7.7
Oregon	269,007	247,131	21,876	1,694	1,624	603	52,451	20,889	8.4
Pennsylvania	1,733,283	1,515,875	217,408	13,375	2,440	29,599	2,153,944	91,076	5.5
Rhode Island	134,009	114,010	19,999	917	893	330	157,474	8,311	6.6
South Carolina	231,274	205,683	25,591	451	3,108	628	----------	14,469	6.7
South Dakota [2]	204,199	181,419	22,780	207	1,084	1,110	----------	12,825	6.7
Tennessee [2]	362,431	329,697	32,734	1,203	4,509	711	----------	40,294	12.5
Texas	1,348,107	1,165,150	182,957	4,016	2,505	4,423	14,897	133,810	11.0
Utah	112,661	95,661	17,000	525	1,373	----------	----------	14,120	14.3
Vermont	93,030	84,471	8,559	487	28	365	95,387	6,799	7.9
Virginia	387,205	328,525	58,680	2,141	4,655	4,561	10,376	26,660	7.4
Washington	442,341	379,995	62,346	2,403	4,986	5,109	460,622	39,466	9.8
West Virginia	268,888	228,715	40,173	1,397	2,421	11,854	85,514	17,332	6.9
Wisconsin	793,502	689,447	104,055	2,723	1,035	3,138	----------	51,367	6.9
Wyoming	60,680	51,880	8,800	92	565	338	----------	4,344	7.7
District of Columbia	151,450	135,455	15,995	1,009	2,423	2,107	63,921	24,894	19.7
Total	26,501,443	23,121,589	3,379,854	114,845	[1] 152,007	188,719	9,143,364	2,008,319	8.2

Bureau of Public Roads.

[1] Includes 7,859 U. S. Government owned cars at large not allocated to States.
[2] Busses included with trucks.

TABLE 578.—*Motor-vehicle revenues, 1929, as reported by State authorities*

State	Gross receipts	Motor-car registration receipts			Miscellaneous receipts	Disposition of gross receipts [1]			
		All motor cars	Passenger cars and busses	Trucks, etc.		Collection costs	State highways	Local roads	On road bonds and miscellaneous
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	3,736	-	-	-	-	178	1,324	728	1,506
Arizona	749	526	300	226	223	-	749	-	-
Arkansas	4,212	4,126	-	-	86	84	914	544	2,670
California	10,489	9,027	5,730	3,297	1,462	2,098	4,196	4,195	-
Colorado	1,835	1,692	1,383	309	143	166	835	834	-
Connecticut	7,993	6,075	4,631	1,444	1,918	618	7,375	-	-
Delaware	1,024	825	602	223	199	-	1,024	-	-
Florida	4,959	4,894	3,602	1,292	65	298	3,496	1,165	-
Georgia	4,568	4,491	3,705	786	77	165	4,403	-	-
Idaho	1,788	1,743	1,432	311	45	29	176	1,583	-
Illinois	17,087	15,938	12,249	3,689	1,149	-	9,623	-	7,464
Indiana	6,253	5,728	4,405	1,323	525	276	5,977	-	-
Iowa	11,919	11,049	9,850	1,199	870	417	10,963	392	147
Kansas	5,697	5,678	-	-	19	292	3,805	1,600	-
Kentucky	5,381	5,205	4,024	1,181	176	236	4,555	590	-
Louisiana	4,524	4,456	-	-	68	50	4,474	-	-
Maine	3,030	2,317	1,762	555	713	268	1,958	-	804
Maryland	3,295	2,539	2,263	276	756	329	2,373	-	593
Massachusetts	7,118	4,126	2,927	1,199	2,992	1,392	4,995	-	731
Michigan	23,212	21,188	16,297	4,891	2,024	891	15,239	6,000	1,082
Minnesota	10,847	10,691	8,872	1,819	156	-	6,990	-	3,857
Mississippi	2,963	-	-	-	-	151	253	2,559	-
Missouri	9,691	9,664	-	-	27	455	6,169	-	3,067
Montana	1,550	-	-	-	-	87	-	1,429	34
Nebraska	4,290	4,028	3,412	616	262	106	1,239	2,892	53
Nevada	297	292	-	-	5	16	107	-	174
New Hampshire	2,248	1,797	-	-	451	176	2,057	-	15
New Jersey	14,803	10,814	6,850	3,964	3,989	948	8,717	4,782	356
New Mexico	757	723	640	83	34	75	450	225	7
New York	38,293	34,041	24,411	9,630	4,252	1,416	27,361	5,806	3,710
North Carolina	7,045	-	-	-	-	300	4,239	-	2,506
North Dakota	1,990	1,973	1,564	409	17	263	928	799	-
Ohio	12,861	12,324	-	-	537	390	6,431	6,040	-
Oklahoma	6,964	-	-	-	-	215	2,770	3,979	-
Oregon	7,644	7,346	6,328	1,018	298	351	2,142	1,808	3,343
Pennsylvania	29,265	21,933	15,406	6,527	7,332	1,750	23,821	-	3,694
Rhode Island	2,404	1,986	1,532	454	418	230	2,117	45	12
South Carolina	2,674	2,509	2,109	400	165	30	2,644	-	-
South Dakota	3,151	3,065	2,629	436	86	63	1,576	1,512	-
Tennessee	4,289	-	-	-	-	107	2,091	2,091	-
Texas	20,419	19,678	16,240	3,438	741	797	11,521	8,101	-
Utah	838	-	-	-	-	130	373	-	335
Vermont	2,340	2,008	1,667	341	332	-	2,340	-	-
Virginia	6,145	5,662	4,795	867	483	260	5,885	-	-
Washington	7,547	6,963	5,452	1,511	584	347	4,561	2,231	408
West Virginia	4,566	4,131	3,223	908	435	216	1,210	-	3,140
Wisconsin	11,781	11,383	9,072	2,311	398	650	6,200	4,931	-
Wyoming	647	-	-	-	-	-	647	-	-
Dist. of Columbia	666	159	136	23	507	87	-	-	579
Total	347,844	-	-	-	-	17,403	223,293	66,861	40,287

Bureau of Public Roads.

[1] These figures do not always agree with those shown on highway income tables because of time of disposition and use of fiscal years.

TABLE 579.—*Gasoline taxes, 1929, as reported by State authorities*

State	Total tax (refunds deducted)	Disposition of total taxes collected					Gasoline consumed by motor vehicles	Tax rate per gallon
		Collection costs	Construction, etc.		State and county road bond payments	Miscellaneous uses		
			State highways [1]	Local roads [1]				
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 gallons*	*Cents*
Alabama	7,105	38	2,367	3,522	1,178		178,163	4
Arizona	2,560		1,600	960			63,996	4
Arkansas	6,681	33	4,196	421	2,031		133,621	5
California	34,192	8	23,181	10,961		42	1,139,736	3
Colorado	5,218	47	3,620	1,435		116	141,467	4
Connecticut	4,097		4,097				202,355	2
Delaware	936		936				31,198	3
Florida	12,231	16	5,667	1,544		5,004	223,373	6
Georgia [2]	10,224	4	6,568	2,195		1,457	219,609	6
Idaho	1,946	14	1,932				48,659	4
Illinois	11,660	25	7,757	3,878			388,659	3
Indiana	15,611	33	11,683	2,921		974	410,937	4
Iowa	9,356	32	4,612	4,712			311,859	3
Kansas	8,171		6,371	1,800			288,717	3
Kentucky	7,743	26	7,717				154,718	5
Louisiana	6,979		5,256		1,723		176,646	4
Maine	3,709	26	2,302	1,381			91,610	4
Maryland	6,297	2	5,036			1,259	157,429	4
Massachusetts	9,759	20	6,771	2,968			487,941	2
Michigan	21,313	40	11,058	6,811	3,000	404	710,300	3
Minnesota	8,892		6,284	2,608			338,632	3
Mississippi	7,176	6	2,737	4,223		210	140,902	5
Missouri	7,681	55	7,626				384,034	2
Montana	2,802	14	2,788				57,514	5
Nebraska	7,799	7	5,982	1,810			208,869	4
Nevada	652		599	53			16,307	4
New Hampshire	2,267		1,700		567		56,676	4
New Jersey	9,996	20	9,886			90	498,064	2
New Mexico	2,290	46	1,753		491		45,479	5
New York [3]	19,087		14,278	3,807		1,002	962,601	2
North Carolina	12,006	9	7,702		4,295		260,211	5
North Dakota	1,801	25	1,396	380			71,592	3
Ohio	34,082		21,317	6,568		6,197	910,155	4
Oklahoma	10,842		7,798	3,044			314,388	4
Oregon	4,543	9	4,534				152,091	3
Pennsylvania	35,758	146	27,061	5,218	3,333		1,047,914	4
Rhode Island	1,546		1,160		386		77,827	2
South Carolina	6,871		5,726	1,145			118,038	6
South Dakota	3,546	11	2,586		845	104	88,644	4
Tennessee	9,291	47	4,937	1,719	2,588		194,497	5
Texas	22,317		16,738			5,579	761,422	4
Utah	1,980	4	1,537		439		56,547	3½
Vermont	1,703		1,703				43,991	4
Virginia	9,895		6,597	3,298			197,899	5
Washington	5,943		4,663	1,280			233,334	3
West Virginia	4,873		2,377		2,496		121,655	4
Wisconsin	7,485	11	2,752	4,183		539	374,252	2
Wyoming	1,296	4	1,024	268			34,243	4
District of Columbia	1,428					1,428	71,409	2
Total	431,636	778	297,968	85,113	23,372	24,405	13,400,180	3.22

Bureau of Public Roads.

[1] These figures do not always agree with those shown on highway income tables because of time of disposition and use of fiscal years.
[2] Tax not effective until Aug. 1.
[3] Tax not effective until May 1.

TABLE 580.—*Quarterly and annual average rate in cents per hour, by geographic divisions, for common labor employed on Federal-aid highway projects, 1922–1929*

Year and quarter ending—	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
	Cents per hour	*Cents per hour*	*Cents per hour*	*Cents per hour*	*Cents per hour*	*Cents per hour*	*Cents per hour*	*Cents per hour*	*Cents per hour*	*Cents per hour*
1922										
March	30	--------	26	30	18	19	24	34	47	28
June	37	33	30	30	21	20	24	36	48	31
September	41	37	33	32	23	21	25	39	50	34
December	43	41	35	32	21	20	23	40	49	34
Average	40	37	33	32	21	20	24	38	49	33
1923										
March	45	41	32	29	19	20	23	38	47	33
June	53	46	40	35	29	23	24	41	52	38
September	53	48	42	37	28	23	25	40	56	40
December	54	48	42	37	29	24	26	43	59	40
Average	53	47	41	36	27	23	25	41	54	39
1924										
March	53	50	41	35	29	23	26	39	51	39
June	51	47	40	35	28	25	26	42	53	39
September	49	42	40	38	28	24	28	41	53	38
December	47	41	40	37	29	24	28	39	53	38
Average	49	43	40	36	28	24	27	40	53	38
1925										
March	46	40	36	39	24	24	28	40	52	37
June	46	43	37	38	29	25	25	45	53	38
September	47	43	37	36	28	25	26	45	52	38
December	46	46	36	37	26	25	28	45	52	38
Average	46	43	37	37	27	25	26	44	52	38
1926										
March	50	45	38	36	28	26	26	43	52	36
June	48	45	38	36	28	25	27	45	53	38
September	48	47	37	36	30	25	27	44	52	39
December	50	48	40	36	30	24	28	42	52	39
Average	49	47	38	36	29	25	27	44	52	38
1927										
March	47	48	40	37	29	24	27	42	52	38
June	50	46	38	38	27	25	31	44	52	40
September	49	47	38	37	28	25	30	46	53	40
December	49	46	40	37	27	25	31	47	54	40
Average	49	47	39	37	28	25	30	45	53	40
1928										
March	52	48	41	38	22	26	27	42	52	38
June	49	43	38	36	26	26	29	46	52	40
September	48	42	38	38	26	25	27	49	53	42
December	51	42	40	39	28	26	30	45	52	41
Average	49	43	39	38	26	26	28	46	52	41
1929										
March	51	45	43	38	22	26	31	43	52	37
June	51	42	39	37	29	26	31	46	53	40
September	51	43	39	37	30	25	31	48	53	40
December	50	42	39	37	27	26	30	49	53	40
Average	51	43	39	37	28	26	31	47	53	39
1930										
March	52	45	39	38	25	26	29	46	53	40
June	49	42	38	37	26	25	30	47	53	40
September	49	42	38	36	25	24	27	47	53	40

Bureau of Public Roads.

TABLE 581.—*Fertilizer and fertilizer materials: Production, sales, and value in the United States, calendar years, 1927–1929*

Item	Quantity 1927	Quantity 1928	Quantity 1929	Value 1927	Value 1928	Value 1929
Agricultural lime and liming materials sold:[1]						
Lime from limestone—	*Short tons*	*Short tons*	*Short tons*	*Dollars*	*Dollars*	*Dollars*
Quicklime	107, 866	110, 533	338, 329	615, 789	639, 615	2, 387, 901
Hydrated	215, 027	223, 377		1, 622, 082	1, 647, 943	
Lime from oyster shells	22, 081	15, 371	----------	175, 234	126, 844	----------
Limestone, pulverized	2, 206, 470	2, 186, 870	----------	3, 360, 704	3, 153, 848	----------
Calcareous marl	52, 962	61, 034	----------	180, 166	200, 704	----------
Total	2, 604, 406	2, 597, 205	----------	5, 953, 975	5, 768, 954	----------
Phosphate rock sold or used:[2]						
Florida—	*Long tons*	*Long tons*	*Long tons*			
Hard rock	131, 254	95, 918	72, 733	525, 016	383, 672	267, 218
Land pebble	2, 506, 166	2, 787, 528	3, 015, 874	8, 121, 146	9, 040, 350	9, 633, 856
Total	2, 637, 420	2, 883, 446	3, 088, 607	8, 646, 162	9, 424, 022	9, 901, 074
Tennessee—						
Brown and blue rock	481, 769	577, 095	633, 939	2, 318, 785	2, 856, 850	3, 097, 104
Other States	[3] 51, 510	[3] 40, 865	[4] 38, 618	[3] 288, 405	[3] 162, 307	[4] 155, 081
Total phosphate rock	3, 170, 699	3, 501, 406	3, 761, 164	11, 253, 352	12, 443, 179	13, 153, 259
Sulphur produced	2, 111, 618	1, 981, 873	2, 362, 389	----------	----------	----------
Sulphur sold[1]	2, 072, 109	2, 082, 924	2, 437, 238	[5] 38, 300, 000	[5] 37, 500, 000	[5] 43, 800, 000
Pyrites produced	215, 786	182, 049	333, 465	804, 006	605, 459	1, 250, 141

Bureau of Agricultural Economics. Compiled from annual reports of the Bureau of Mines. Figures for earlier years appear in previous issues of the Yearbook.

[1] Sold by producers.
[2] Sold or used by producers.
[3] Idaho and Wyoming.
[4] Idaho, Wyoming, and Montana.
[5] Approximate.

TABLE 582.—*Fertilizer and fertilizer materials. Production, consumption, imports, and exports, United States, 1925–1929*

Item	Calendar year 1925	1926	1927	1928	1929[1]
Sulphate of ammonia (equivalent of all forms):	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Production[2]	639, 019	690, 976	717, 460	798, 887	884, 306
Sales[2]	604, 457	682, 967	741, 866	764, 355	----------
Imports for consumption	26, 613	9, 392	19, 211	42, 133	21, 338
Exports	137, 918	202, 860	155, 335	104, 177	162, 133
Nitrate of soda, imports for consumption	1, 245, 693	1, 024, 009	838, 636	1, 156, 860	1, 042, 113
Sulphuric acid:					
Production[3]	1, 979, 292	1, 745, 759	1, 656, 871	2, 126, 860	2, 166, 892
Imports for consumption	18, 191	27, 969	17, 434	13, 164	8, 104
Exports	3, 769	4, 612	3, 756	3, 500	3, 480
Consumption[3]	1, 316, 316	2, 058, 683	2, 137, 129	2, 440, 121	2, 418, 851
Superphosphate:					
Production[3 4]	3, 846, 401	3, 799, 054	[5] 3, 699, 579	4, 472, 341	4, 294, 967
Sales[3 6]	3, 550, 762	3, 536, 552	1, 915, 913	1, 283, 732	1, 380, 565
Potash:					
Production, domestic	51, 565	46, 324	76, 819	104, 129	107, 820
Sales, domestic	52, 823	51, 369	94, 722	105, 208	101, 370
Imports for consumption:					
Kainit	204, 767	203, 702	115, 345	119, 897	85, 042
Manure salts	430, 340	354, 413	311, 357	453, 242	437, 728
Muriate of potash	180, 351	223, 049	183, 475	261, 644	258, 682
Sulphate of potash	77, 226	78, 258	77, 172	96, 833	89, 051
Other potash-bearing substances[7]	29, 002	52, 357	10, 531	12, 076	706
Total imports for consumption	921, 686	911, 779	697, 880	943, 692	871, 209

Bureau of Agricultural Economics. Compiled from annual reports of the Bureau of the Census, Bureau of Foreign and Domestic Commerce, and the Bureau of Mines.

[1] Subject to revision.
[2] By-product of coke ovens: Production from other sources (coal, gas, bone carbonizing, etc.) accounted for less than 5 per cent of the total production for these years.
[3] Fertilizer establishments only.
[4] Bulk superphosphate and superphosphate for mixed fertilizers.
[5] Bulk superphosphate.
[6] Quantity sold as superphosphate or used in manufactured goods sold.
[7] Includes ashes (wood) beet root, other potash-bearing substances (alunite, leucite, etc.) used for fertilizer.

TABLE 583.—*Inorganic nitrogeneous materials: Production and imports, United States, 1901–1929*

Year	Production			Imports								
	By-product ammonia	Air nitrogen (estimated)	Total	Chilean nitrate	Ammonium sulfate	Cyanamide	Calcium nitrate	Ammonium chloride	Ammonium nitrate	Sodium cyanide	Ammonium sulphate-nitrate	Total nitrogen
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
1901	------	------	------	222	12	------	------	------	------	------	------	------
1902	7	------	7	225	11	------	------	------	------	------	------	------
1903	8	------	8	256	9	------	------	------	------	------	------	------
1904	11	------	11	255	11	------	------	------	------	------	------	------
1905	13	------	13	360	5	------	------	------	------	------	------	------
1906	15	------	15	417	15	------	------	------	------	------	------	------
1907	20	------	20	408	28	------	------	------	------	------	------	------
1908	17	------	17	348	32	------	------	------	------	------	------	------
1909	23	------	23	473	43	------	------	------	------	------	------	------
1910	23	------	23	593	92	3	------	------	------	------	------	------
1911	25	------	25	610	96	6	------	------	------	------	------	------
1912	29	------	29	545	60	12	------	------	------	------	------	------
1913	39	------	39	701	65	30	------	------	------	------	------	------
1914	38	------	38	607	83	24	------	------	------	------	------	------
1915	46	------	46	865	36	34	------	------	------	------	------	------
1916	59	------	59	1,365	15	32	------	------	------	------	------	------
1917	67	------	67	1,728	8	53	------	------	------	------	------	------
1918	78	------	78	2,066	3	51	------	------	------	------	------	------
1919	85	(1)	85	456	3	70	------	------	------	------	------	------
1920	104	(1)	104	1,481	2	80	------	------	------	------	------	------
1921	74	(1)	74	413	5	19	------	------	------	------	------	------
1922	97	1	98	608	5	43	------	------	------	------	------	------
1923	123	6	129	999	4	77	10	3	10	------	------	177
1924	117	11	128	1,105	7	85	9	5	2	------	------	191
1925	136	13	149	1,246	27	109	9	5	5	17	------	229
1926	146	14	160	1,024	9	99	15	8	4	14	------	189
1927	152	18	170	839	19	123	20	7	6	16	50	182
1928	170	26	196	1,157	47	152	26	6	7	19	92	255
1929	188	84	272	1,042	21	206	36	5	5	20	18	236

Bureau of Chemistry and Soils. Quantities are net nitrogen contents of commodities named.

[1] Not over 500 tons.

TABLE 584.—*Inorganic nitrogen: Production, imports, exports, and consumption, United States, 1924–1929*

Item	1924	1925	1926	1927	1928	1929
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Production	128	149	160	170	196	272
Imports	191	229	189	182	255	236
Total	319	378	349	352	451	508
Exports	32	32	48	44	36	56
Remaining for consumption	287	346	301	308	415	452
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Percentage domestic production is of total	44.5	43.3	53.0	55.0	47.0	60.5

Bureau of Chemistry and Soils.

TABLE 585.—*Fertilizer: Quantity consumed by States, 1924–1930*

State and division	Year ended—	1924	1925	1926	1927	1928	1929	1930
		Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Maine	Dec. 31	182,000	185,000	147,000	183,750	178,750	171,500	
New Hampshire	June 30	16,000	16,000	14,680	16,875	16,900	16,900	
Vermont		17,000	18,000	18,000	15,663	16,911	14,905	
Massachusetts		61,968	62,656	58,920	71,734	70,458	62,491	
Rhode Island	Mar. 31	8,800	9,000	8,100	10,125	10,100	10,100	
Connecticut	Dec. 31	70,000	70,000	70,000	65,000	72,000	69,000	
New York	do	250,000	253,000	234,000	260,000	260,000	250,000	
New Jersey	Oct. 31	152,827	146,686	135,141	141,635	143,574	141,981	
Pennsylvania	Dec. 31	319,685	328,462	328,904	326,514	339,984	339,900	
North Atlantic		1,078,280	1,088,804	1,014,745	1,091,296	1,108,677	1,076,777	
Ohio	Dec. 31	321,287	321,960	304,480	312,703	320,866	338,662	
Indiana	do	192,417	226,148	228,280	240,498	221,082	250,201	
Illinois	do	17,527	24,582	25,227	26,000	30,509	38,864	
Michigan	do	94,575	109,327	105,014	117,227	124,000	124,000	
Wisconsin	do	15,000	12,500	16,000	22,520	33,041	40,671	
Minnesota	do	8,000	9,000	11,316	11,387	14,211	13,024	
Iowa	do	4,500	6,000	6,021	7,181	10,000	17,000	
Missouri	do	47,121	63,939	56,891	56,100	64,922	58,891	
North Dakota	do	200	225	250	398	450	550	
South Dakota	do	150	150	150	200	220	250	
Nebraska	do	500	500	500	500	600	700	
Kansas	do	4,500	4,138	7,746	7,800	9,162	9,943	
North Central		705,777	778,469	761,875	802,514	829,063	892,756	
Delaware	Dec. 31	36,224	41,006	43,084	41,126	40,817	41,000	
Maryland	do	151,211	165,474	163,285	165,174	173,159	165,443	
Virginia [1]	do	441,895	451,656	435,223	408,158	[2] 336,173	[2] 326,453	[2] 364,427
West Virginia	do	40,000	41,000	43,000	43,500	49,700	49,700	
North Carolina [1]	June 30	1,189,316	1,217,468	1,213,178	1,144,019	1,378,348	1,305,034	1,255,506
South Carolina [1]	do	879,093	866,377	840,955	720,396	817,548	760,085	751,496
Georgia [1]	do	688,783	770,889	760,643	705,053	898,405	870,300	929,622
Florida [1]	May 31	386,521	361,849	355,373	402,842	463,000	449,000	480,000
South Atlantic		3,813,043	3,915,719	3,854,741	3,630,268	4,157,150	3,967,015	
Kentucky	Dec. 31	85,000	93,000	91,500	70,500	90,500	93,000	
Tennessee [1]	May 31	135,270	155,248	135,257	115,973	156,956	148,643	160,558
Alabama [1]	Sept. 30	472,260	580,000	603,444	468,683	[3] 690,267	[3] 671,950	[3] 647,800
Mississippi [1]	do	213,516	257,763	280,890	212,562	[4] 316,893	[4] 335,560	[4] 402,911
Arkansas [1]	do	89,119	122,742	103,931	64,192	[5] 103,880	[5] 117,669	[5] 154,621
Louisiana [1]	Aug. 31	129,288	103,989	116,049	91,090	[5] 133,124	[5] 168,938	[5] 184,095
Oklahoma	June 30	4,000	5,000	5,418	4,263	[6] 8,203	[6] 14,045	
Texas [1]	Aug. 31	126,592	103,416	123,990	79,560	[5] 137,567	[5] 193,576.	[5] 142,744
South Central		1,255,045	1,421,158	1,460,479	1,106,823	1,637,390	1,743,381.	
Montana	Dec. 31			50	90	100	100	
Idaho	June 30	400	400	420	450	500	550	
Wyoming	Dec. 31		100	150	200	300	600	
Colorado	do	250	250	337	607	728	800	
New Mexico	do	1,000	1,200	1,566	1,256	1,400	1,500	
Arizona	do	500	500	500	700	1,000	1,200	
Utah	do	400	500	500	500	500	550	
Nevada	do	30	30	30	30	30	30	
Washington	do	7,000	10,000	12,207	14,244	15,500	17,500	
Oregon	do	7,500	8,000	8,000	9,000	10,000	10,000	
California	do	66,274	85,933	93,845	102,524	121,183	130,477	
Far Western		83,354	106,913	117,605	129,601	151,241	163,307	
United States		6,935,499	7,311,063	7,209,445	6,760,502	7,883,521	7,843,236	

COTTONSEED MEAL USED AS FERTILIZER

North Carolina	June 30	117,626	109,029	150,377	176,476	112,165	99,354	99,354
Mississippi	Sept. 30	49,923	62,090	71,937	[4] 98,562	[4] 51,015	[4] 50,760	[4] 56,700

Bureau of Agricultural Economics. Figures for certain cotton States based on sales of fertilizer tags. Data for other States compiled from reports of the National Fertilizer Association, quoting figures from surveys, private estimates, and State records.

[1] Based on sales of fertilizer tags.
[2] To June 30.
[3] July.
[4] May 31.
[5] June 1.
[6] Calendar year.

TABLE 586.—*Fertilizer used on cotton, 1927–1930*

State	Acreage in cotton							
	July 1				Fertilized			
	1927 [1]	1928	1929	1930	1927	1928	1929	1930
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Missouri	305	355	348	377	15	18	17	26
Virginia	65	81	89	90	62	79	86	86
North Carolina	1,749	1,892	1,916	1,644	1,679	1,873	1,878	1,595
South Carolina	2,454	2,485	2,273	2,211	2,258	2,336	2,091	2,012
Georgia	3,501	3,883	3,818	3,946	3,291	3,728	3,665	3,788
Florida	67	101	96	105	56	87	81	96
Tennessee	985	1,145	1,147	1,252	473	698	688	689
Alabama	3,214	3,643	3,727	3,820	2,828	3,388	3,429	3,514
Mississippi	3,408	4,154	4,229	4,296	1,329	2,035	2,241	2,492
Arkansas	3,142	3,834	3,933	3,985	943	1,534	1,573	1,753
Louisiana	1,585	2,052	2,135	2,125	634	882	1,068	1,105
Oklahoma	4,187	4,420	4,430	4,165	21	44	89	83
Texas	16,850	18,330	18,229	17,536	421	1,100	1,276	1,228
New Mexico	100	123	132	134	1			
Arizona	140	202	227	212				
California	130	223	319	273				
All other	23	23	19	20				
United States	41,905	46,946	47,067	46,191	14,011	17,802	18,182	18,467

State	Fertilizer used							
	Average per acre				Total			
	1927	1928	1929	1930	1927	1928	1929	1930
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Missouri	125	125	140	145	938	1,125	1,190	1,885
Virginia	375	375	390	408	11,625	14,812	16,770	17,544
North Carolina	420	440	438	425	352,590	412,060	411,282	338,938
South Carolina	315	325	330	330	355,635	379,600	345,015	331,980
Georgia	247	260	265	272	406,438	484,640	485,612	515,168
Florida	215	255	240	248	6,020	11,092	9,720	11,904
Tennessee	206	216	218	218	48,719	75,384	74,992	75,101
Alabama	243	262	270	262	343,602	443,828	462,915	460,334
Mississippi	216	220	220	220	143,532	223,850	246,510	274,120
Arkansas	173	187	188	185	81,570	143,429	147,862	162,152
Louisiana	175	185	185	180	55,475	81,585	98,790	99,450
Oklahoma	145	190	180	175	1,522	4,180	8,010	7,262
Texas	185	197	185	175	38,942	108,350	118,030	107,450
New Mexico	165				82			
Arizona								
California								
All other								
United States	264	268	267	260	1,846,690	2,383,935	2,426,698	2,403,238

[1] Acreage in cotton June 25.

TABLE 586.—*Fertilizer used on cotton, 1927–1930*—Continued

State	Value											
	Average price per ton				Total				Average per acre			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
	Dollars	*Dollars*	*Dollars*	*Dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Missouri	35.50	34.40	36.00	32.00	33	39	43	60	2.20	2.17	2.53	2.31
Virginia	24.00	28.30	27.30	27.00	279	419	458	474	4.50	5.30	5.33	5.51
North Carolina	24.00	29.00	28.00	28.00	8,462	11,950	11,516	9,490	5.04	6.38	6.13	5.95
South Carolina	22.00	27.30	26.90	26.00	7,824	10,363	9,281	8,631	3.47	4.44	4.44	4.29
Georgia	23.00	29.70	29.40	29.20	9,348	14,394	14,277	15,043	2.84	3.86	3.90	3.97
Florida	27.50	30.80	30.00	30.30	166	342	292	361	2.96	3.93	3.60	3.76
Tennessee	28.30	33.20	35.70	36.00	1,379	2,503	2,677	2,704	2.92	3.59	3.89	3.92
Alabama	26.00	32.20	31.50	31.50	8,934	14,291	14,582	14,501	3.16	4.22	4.25	4.13
Mississippi	32.30	36.50	38.00	38.00	4,636	8,171	9,367	10,417	3.49	4.02	4.18	4.18
Arkansas	31.50	37.00	37.00	36.60	2,569	5,307	5,471	5,935	2.72	3.46	3.48	3.39
Louisiana	34.00	39.30	39.10	40.00	1,886	3,206	3,863	3,978	2.97	3.63	3.62	3.60
Oklahoma	32.00	32.00	31.20	32.75	49	134	250	238	2.33	3.05	2.81	2.87
Texas	33.20	38.50	37.50	37.00	1,293	4,171	4,426	3,976	3.07	3.79	3.47	3.24
New Mexico	32.50				3				3.00			
Arizona												
California												
All other												
United States	25.38	31.58	31.53	31.54	46,861	75,290	76,503	75,808	3.34	4.23	4.21	4.11

Bureau of Agricultural Economics. Based on returns from crop correspondents.

TABLE 587.—*Nitrogen-fixation plants: Process, number, and capacity, by countries, 1929*

[Capacity in net tons nitrogen per year]

Location	Arc		Cyanamide		Direct synthetic		Total capacity
	Number	Capacity	Number	Capacity	Number	Capacity	
		Short tons		*Short tons*		*Short tons*	*Short tons*
Belgium					5	106,500	106,500
Canada			1	80,000	1	2,500	82,500
Czechoslovakia			1	6,000	2	12,500	18,500
England					2	175,000	175,000
France	2	1,250	8	53,000	18	114,050	168,300
Germany	1	4,500	5	114,000	8	820,000	938,500
Italy			5	21,900	9	58,000	79,900
Japan			10	63,600	5	55,000	118,600
Jugoslavia			2	14,000	1	14,000	28,000
Netherlands					3	77,000	77,000
Norway	2	30,000	1	15,000	2	55,000	100,000
Poland			2	40,000	5	35,000	75,000
Russia					1	7,000	7,000
Roumania			1	5,000			5,000
Spain					3	8,500	8,500
Sweden			2	6,000	1	2,000	8,000
Switzerland			2	5,000	1	7,000	12,000
United States			1	40,000	8	155,600	195,600
Total	5	35,750	41	463,500	74	1,704,650	2,203,900

Bureau of Chemistry and Soils. Circular No. 129; U. S. Dept. Agr., SURVEY OF THE FERTILIZER INDUSTRY, 1931.

TABLE 588.—*Nitrogen: World production of, contained in inorganic nitrogenous materials, 1925–1929*

Product	Quantity produced during year ended May 31—				
	1925	1926	1927	1928	1929
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*
By-product sulphate of ammonia	306, 100	326, 300	361, 000	404, 800	413, 600
Other by-product ammonia	52, 100	52, 500	46, 500	59, 400	56, 100
Cyanamide [1]	126, 500	165, 000	198, 000	224, 400	231, 000
Synthetic sulphate of ammonia [2]	280, 500	318, 160	330, 000	403, 700	533, 500
Nitrate of lime	27, 500	33, 000	89, 100	115, 500	149, 600
Other synthetic nitrogen	72, 700	132, 800	146, 700	259, 600	401, 500
Chilean nitrate of soda	404, 300	439, 400	219, 600	429, 000	539, 000
Total	1, 269, 700	1, 467, 100	1, 390, 900	1, 896, 400	2, 324, 300

Bureau of Chemistry and Soils. British Sulphate of Ammonia Federation (Ltd.), Annual Report.

[1] Excluding cyanamide made in Japan, which is included under synthetic sulphate of ammonia, 1925-1928.
[2] Including cyanamide made in Japan, 1925-1928.

TABLE 589.—*Fertilizer elements (plant food): Consumption of, contained in commercial fertilizers, by countries, 1928*

Country	Nitrogen (N)	Phosphoric acid (P_2O_5)	Potash (K_2O)	Total
	Short tons	*Short tons*	*Short tons*	*Short tons*
Germany	450, 000	566, 000	818, 000	1, 834, 000
United States, with Porto Rico and Hawaii	345, 000	800, 000	343, 000	1, 488, 000
France	160, 000	583, 000	210, 000	953, 000
Japan	190, 000	180, 000	50, 000	420, 000
Italy	62, 000	250, 000	27, 500	339, 500
Netherlands	82, 000	125, 000	115, 000	322, 000
Great Britain and Northern Ireland	49, 000	165, 000	60, 000	274, 000
Spain	75, 000	140, 000	55, 000	270, 000
Poland	52, 000	100, 000	80, 000	232, 000
Belgium	70, 000	40, 000	43, 000	153, 000
Czechoslovakia	32, 000	84, 000	36, 500	152, 500
Australia	4, 000	128, 000	500	132, 500
Denmark	34, 000	40, 000	16, 000	90, 000
Sweden	15, 000	38, 000	30, 000	83, 000
Egypt	41, 000	17, 000		58, 000
Union of South Africa	6, 500	41, 000	3, 000	50, 500
New Zealand	2, 500	41, 000	4, 500	48, 000
Finland	3, 000	31, 000	14, 000	48, 000
Taiwan	32, 000	12, 000	750	44, 750
Algeria	2, 000	30, 000	7, 000	39, 000
Union of Socialist Soviet Republics	10, 000	27, 000		37, 000
Irish Free State	4, 000	30, 000	2, 500	36, 500
Hungary	4, 000	28, 000	1, 500	33, 500
Switzerland	1, 000	26, 000	6, 000	33, 000
Dutch East Indies	32, 000			32, 000
Canada	6, 000	18, 000	7, 000	31, 000
China	30, 000			30, 000
Portugal	2, 500	27, 000		29, 500
Austria	5, 000	18, 000	6, 000	29, 000
Norway	4, 000	14, 000	9, 000	27, 000
Latvia	1, 000	15, 500	4, 000	20, 500
Lithuania	500	15, 000	2, 000	17, 500
Jugoslavia	3, 500	13, 000	1, 000	17, 500
Chosen	17, 000			17, 000
Ceylon	5, 000	6, 000	5, 000	16, 000
Greece	1, 000	6, 000	2, 000	9, 000
Esthonia	500	5, 000	2, 500	8, 000
Philippines	6, 000	500		6, 500
Canary Islands	4, 000			4, 000
India and Burma	4, 000			4, 000
Cuba	3, 500			3, 500
All others	49, 500	76, 000	64, 250	189, 750
Total	1, 901, 000	3, 736, 000	2, 026, 500	7, 663, 500

Bureau of Chemistry and Soils. Circular No. 129, U. S. Dept. Agr., SURVEY OF THE FERTILIZER INDUSTRY. 1931.

TABLE 590.—*Insecticides and fungicides: Average wholesale price per pound, New York, 1919–1930* [1]

Calendar year	Arsenic, white	Calcium arsenate	Lead arsenate		Paris green	Bordeaux mixture		Lime-sulphur solution, per gallon
			Powder	Paste		Powder	Paste	
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1919	9.9		29.9	14.9	35.8	16.5	12.4	19.1
1920	13.8		26.3	13.3	36.2	19.3	13.2	18.8
1921	7.9	19.1	19.4	11.6	27.0	17.2	10.9	16.6
1922	8.9	13.7	14.8	11.1	22.6	16.8	10.8	16.5
1923	14.2	16.4	22.2	15.7	30.4	22.0	16.3	16.5
1924	9.4	10.6	20.9	13.1	28.8	16.3	12.5	16.5
1925	5.1	7.8	15.6	11.0	21.5	13.2	11.0	16.5
1926	3.8	8.0	14.6	11.0	18.4	11.5	11.0	14.7
1927	4.0	7.5	13.8		19.2	11.5	11.0	15.5
1928	4.4	6.8	14.1		27.0	11.3	10.9	15.5
1929	4.5	7.4	13.5		30.9	11.3	10.7	15.2
1930	4.5	8.1	14.5		35.2	13.0	13.0	15.2

Bureau of Agricultural Economics. Compiled from the Oil, Paint, and Drug Reporter.

[1] Average of monthly range.

TABLE 591.—*Insecticides and fungicides: Production, imports for consumption, and domestic exports, 1925–1929*

Item	Calendar year				
	1925	1926	1927	1928	1929
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Arsenic, white:					
Production	30,653,261		35,315,999		
Consumed in the manufacture of—					
Calcium arsenate	[1] 7,702,069	[1] 3,111,782	[2] 7,012,219		
Lead arsenate	[1] 3,932,644	[1] 5,384,193	[2] 5,153,103		
Paris green	2,441,540	2,255,069	4,195,693		
Calcium arsenate:					
Production	19,911,262	5,363,320	18,715,563		
Imports for consumption	1,074	1,057	3,807	1,323	
Exports				1,178,702	3,139,633
Lead arsenate:					
Production	[1] 13,865,482	[1] 16,898,214	[2] 18,728,054		
Imports for consumption	10,467				200
Exports				1,093,673	1,563,982
Paris green, production	[1] 3,544,887	[1] 2,863,691	[2] 5,743,048		
Lime-sulphur solution, production [3]	2,607,064		7,652,779		
Sulphate of copper:					
Production		33,353,264	36,039,487	44,463,000	
Imports for consumption	1,805,095	2,558,584	1,978,726	3,611,844	5,388,743
Exports	6,139,344	4,798,620	6,206,904	8,666,899	6,419,688
Nicotine and nicotine products, exports			2,297,016	2,386,526	2,294,567
Sodium arsenate, imports for consumption	57,867	116,262	90,454	12,403	
Prepared animal dips:					
Imports for consumption [4]	73,477	119,947	102,394	175,055	208,770
Exports					2,252,644

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census and Bureau of Foreign and Domestic Commerce.

[1] Year ended June 30.
[2] Year ended Aug. 31.
[3] Gallons.
[4] Classified as sheep dip.

TABLE 592.—*Number of marketing and purchasing associations, estimated membership, and estimated amount of business, by State and geographic division, 1929–30*

State and geographic division	Cotton and cotton products			Dairy products			Forage			Fruits and vegetable			Grain			Livestock			Nuts		
	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business
	Number	*Number*	*1,000 dollars*	*Number*	*Number*	*1,000 dollars*	*Number*	*Number*	*1,000 dollars*	*Number*	*Number*	*1,000 dollars*	*Number*	*Number*	*1,000 dollars*	*Number*	*Number*	*1,000 dollars*	*Number*	*Number*	*1,000 dollars*
Maine				4	600	440				18	1,300	920									
New Hampshire				2	200	350				1	100	160	1	300	140	1	300	140			
Vermont				35	7,200	11,650				1	100	10									
Massachusetts				12	24,800	39,000				8	600	2,880	1	100	10						
Rhode Island				2	200	750				1	100	10									
Connecticut				4	4,400	12,270				3	100	10									
New England				59	37,400	64,460				32	2,300	3,990	2	400	150	1	300	140			
New York				50	60,900	126,100				59	8,000	6,970	1	100	1,100	2	400	100			
New Jersey										8	2,300	2,270									
Pennsylvania				38	39,500	44,150				14	3,100	4,830	2	500	430	1	200	100			
Middle Atlantic				88	100,400	170,250				81	13,400	14,070	3	600	1,530	3	600	200			
Ohio				33	32,000	26,400				17	2,700	6,950	203	60,700	34,300	73	47,700	20,000			
Indiana				32	13,000	7,160				6	600	240	125	49,500	17,000	105	26,700	18,000			
Illinois				71	18,300	37,460				24	1,600	1,090	440	87,300	97,370	365	76,300	60,000			
Michigan				82	42,900	35,920				62	10,000	5,730	94	36,700	18,960	94	27,600	11,500			
Wisconsin				889	72,300	95,250				22	3,300	4,550	56	19,400	6,100	205	39,800	21,000			
East North Central				1,107	178,500	202,190				131	18,200	18,560	918	253,600	173,730	842	218,100	130,500			
Minnesota				657	112,900	102,260				34	4,800	3,310	317	73,800	46,440	369	72,200	51,500			
Iowa				258	63,700	44,340				4	600	260	379	90,500	81,000	425	73,100	73,000			
Missouri	5	600	300	12	11,600	5,280	1	200	10	66	10,600	2,980	151	41,500	22,100	166	44,600	20,000			
North Dakota				22	3,600	1,200				8	600	550	397	83,000	63,650	70	7,900	4,000			
South Dakota				28	17,300	4,990				2	100	120	252	52,700	43,570	82	11,000	10,000			
Nebraska				26	55,600	6,630				7	2,000	610	346	81,300	78,400	44	7,600	5,500			
Kansas				6	1,800	690				2	100	220	345	64,300	88,000	30	5,300	3,000			
West North Central	5	600	300	1,009	266,500	165,390	1	200	10	123	18,800	8,050	2,187	487,100	423,160	1,186	221,700	167,000			

Delaware	-	-	-	-	-	-	-	-	-	4	200	600	-	-	-	-	-	-	-	-	-
Maryland	-	-	-	3	4,000	9,040	-	-	-	11	2,600	3,420	3	1,200	800	1	200	100	-	-	-
District of Columbia	-	-	-	1	1,100	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Virginia	-	-	-	12	3,600	1,390	-	-	-	13	7,200	9,650	1	100	100	10	2,700	1,950	1	2,500	230
West Virginia	-	-	-	1	100	130	-	-	-	11	700	1,880	-	-	-	23	3,800	360	-	-	-
North Carolina	8	7,900	8,300	8	3,200	890	-	-	-	13	1,300	1,250	1	100	10	1	100	30	-	-	-
South Carolina	3	4,700	6,000	-	-	-	-	-	-	11	1,500	3,180	-	-	-	-	-	-	-	-	-
Georgia	21	12,400	7,400	-	-	-	-	-	-	17	5,700	2,030	-	-	-	4	2,000	230	3	1,400	330
Florida	-	-	-	-	-	-	-	-	-	110	9,700	23,700	-	-	-	1	100	20	-	-	-
South Atlantic	32	25,000	21,700	25	12,000	16,450	-	-	-	190	28,900	45,710	5	1,400	910	40	8,900	2,690	4	3,900	560
Kentucky	-	-	-	6	1,300	100	-	-	-	20	4,500	2,990	2	1,000	90	6	1,000	2,800	-	-	-
Tennessee	4	3,800	1,000	16	4,500	2,020	-	-	-	40	4,700	1,260	2	100	40	8	1,400	450	-	-	-
Alabama	11	21,900	12,000	2	300	40	-	-	-	26	4,600	1,650	-	-	-	7	1,900	290	-	-	-
Mississippi	2	3,200	24,000	1	200	80	-	-	-	16	2,600	1,710	-	-	-	2	400	50	-	-	-
East South Central	17	28,900	37,000	25	6,300	2,240	-	-	-	102	16,400	7,610	4	1,100	130	23	4,700	3,590	-	-	-
Arkansas	7	5,800	2,000	-	-	-	-	-	-	86	9,400	4,160	2	300	1,170	10	1,200	240	-	-	-
Louisiana	3	4,000	3,200	1	100	130	-	-	-	28	6,300	7,340	3	500	4,000	-	-	-	-	-	-
Oklahoma	76	46,000	28,000	8	1,700	870	-	-	-	13	1,500	500	94	22,700	22,500	6	600	100	-	-	-
Texas	52	36,600	15,000	9	2,400	570	3	100	120	42	4,700	5,280	17	4,400	11,000	5	1,100	2,800	3	100	60
West South Central	138	92,400	48,200	18	4,200	1,570	3	100	120	169	21,900	17,280	116	27,900	38,670	21	2,900	3,140	3	100	60
Montana	-	-	-	6	600	630	-	-	-	5	300	140	65	10,000	13,000	16	2,400	1,200	-	-	-
Idaho	-	-	-	11	5,400	4,190	-	-	-	16	1,200	920	11	2,900	4,240	2	100	130	-	-	-
Wyoming	-	-	-	3	400	140	-	-	-	6	700	770	6	1,400	1,000	1	100	90	-	-	-
Colorado	-	-	-	6	800	400	1	100	10	42	9,600	6,730	40	9,300	6,560	8	1,400	680	-	-	-
New Mexico	4	1,000	1,000	3	1,300	330	2	300	640	3	200	120	6	800	550	1	100	10	-	-	-
Arizona	2	1,300	1,100	-	-	-	1	100	100	8	600	1,150	-	-	-	-	-	-	-	-	-
Utah	-	-	-	7	1,500	1,200	-	-	-	17	9,600	540	3	200	150	-	-	-	-	-	-
Nevada	-	-	-	-	-	-	-	-	-	2	100	320	1	1,000	100	-	-	-	-	-	-
Mountain	6	2,300	2,100	36	10,000	6,890	4	500	750	99	22,300	10,690	132	25,600	25,600	28	4,100	2,110	-	-	-
Washington	-	-	-	28	15,000	17,300	-	-	-	70	9,100	25,000	48	7,800	14,520	1	300	20	-	-	-
Oregon	-	-	-	43	12,300	6,920	1	100	20	59	8,100	11,370	15	1,800	1,600	2	600	660	6	1,000	430
California	1	800	700	20	7,400	26,340	2	100	300	328	58,600	157,670	18	2,700	10,000	6	2,800	9,950	31	9,000	13,550
Pacific	1	800	700	91	34,700	50,560	3	200	320	457	75,800	194,040	81	12,300	26,120	9	3,700	10,630	37	10,000	13,980
United States	199	150,000	110,000	2,458	650,000	680,000	11	1,000	1,200	1,384	218,000	320,000	3,448	810,000	690,000	2,153	465,000	320,000	44	14,000	14,600

TABLE 592.—*Number of marketing and purchasing associations, estimated membership, and estimated amount of business, by State and geographic division, 1929–30*—Continued

State and geographic division	Poultry and poultry products			Tobacco			Wool and mohair			Miscellaneous selling			Miscellaneous buying			Total		
	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business	Listed	Estimated membership	Estimated business
	Number	*1,000 dollars*	*1,000 dollars*	*Number*	*1,000 dollars*	*1,000 dollars*	*Number*	*1,000 dollars*	*1,000 dollars*	*Number*	*1,000 dollars*	*1,000 dollars*	*Number*	*1,000 dollars*	*1,000 dollars*	*Number*	*1,000 dollars*	*1,000 dollars*
Maine							1	700	40	1	100	120	27	7,000	2,760	51	9,700	4,280
New Hampshire													10	2,900	2,330	15	3,800	3,120
Vermont										9	800	450	6	3,000	1,420	51	11,100	13,530
Massachusetts	1	100	320	1	100	10	2	100	40	1	100	10	12	29,900	14,250	38	55,800	56,520
Rhode Island	1	100	10										3	200	190	7	600	960
Connecticut	1	200	340										27	2,300	1,780	35	7,000	14,400
New England	3	400	670	1	100	10	3	800	80	11	1,000	580	85	45,300	22,730	197	88,000	92,810
New York	3	300	4,280	1	100	10	25	800	100	9	1,900	840	73	50,000	32,100	223	122,500	171,600
New Jersey	1	100	10							5	3,000	1,400	18	4,000	1,560	32	9,400	5,240
Pennsylvania	1	100	10	4	300	50	19	2,600	800	15	3,300	1,260	81	26,400	5,070	175	76,000	56,700
Middle Atlantic	5	500	4,300	5	400	60	44	3,400	900	29	8,200	3,500	172	80,400	38,730	430	207,900	233,540
Ohio	2	1,200	250				1	6,100	800	13	6,000	8,430	44	16,000	3,920	386	172,400	101,050
Indiana	3	1,000	730	1	4,000	10	2	800	80	12	3,000	2,410	51	12,000	4,360	337	110,600	49,990
Illinois	2	300	260							17	1,900	1,790	51	21,000	6,630	970	206,700	204,600
Michigan	1	200	250				1	100	70	55	13,000	8,730	44	12,000	4,940	433	142,500	86,100
Wisconsin	2	1,400	70	1	4,400	3,000	1	200	70	39	8,500	3,450	115	30,000	14,000	1,330	179,300	147,490
East North Central	10	4,100	1,560	2	8,400	3,010	5	7,200	1,020	136	32,400	24,810	305	91,000	33,850	3,456	811,500	589,230
Minnesota	6	3,200	680				4	3,400	480	14	3,900	1,540	167	56,000	12,000	1,568	330,200	218,210
Iowa	1	400	80				2	5,000	270	9	1,100	1,070	122	33,200	10,500	1,200	267,600	210,520
Missouri	14	13,000	12,750	1	300	10	2	2,000	40	113	25,000	16,870	109	31,000	14,000	640	180,400	94,340
North Dakota							1	2,000	220	9	900	380	28	4,200	1,700	535	102,200	71,700
South Dakota							1	2,000	650	3	1,600	900	41	10,000	2,750	409	94,700	62,980
Nebraska	4	2,000	400				1	100	40	10	2,600	1,710	72	27,000	9,930	510	178,200	103,220
Kansas							1	100	10	8	2,500	1,070	73	15,000	5,260	465	89,100	98,250
West North Central	25	18,600	13,910	1	300	10	12	14,600	1,710	166	37,600	23,540	612	176,400	56,140	5,327	1,242,400	859,220

Delaware																4	200	600
Maryland				1	4,800	3,650	1	100	10	1	100	120	14	6,400	2,370	35	19,400	19,510
District of Columbia																1	1,100	5,000
Virginia	1	100	40							7	2,900	670	33	7,000	4,380	78	26,100	18,410
West Virginia	2	400	170				4	1,800	240	2	200	30	12	3,000	1,950	55	10,000	4,760
North Carolina	4	400	120							12	2,500	2,000	17	5,000	1,120	64	20,500	13,720
South Carolina										3	600	70	1	100	10	18	6,900	9,260
Georgia	7	1,000	130							10	3,600	750	6	1,100	270	68	27,200	11,140
Florida	6	500	390				1	100	10	4	2,900	420	6	700	130	128	14,000	24,670
South Atlantic	20	2,400	850	1	4,800	3,650	6	2,000	260	39	12,800	4,060	89	23,300	10,230	451	125,400	107,070
Kentucky	5	300	30	4	58,000	50	7	900	40	2	100	250	9	2,200	580	61	69,300	6,930
Tennessee	1	200	20	1	3,000	10	8	800	170	20	4,200	1,500	8	5,000	890	108	27,700	7,360
Alabama	4	1,000	510				2	200	150	24	8,200	2,960	7	1,500	3,950	83	39,600	21,550
Mississippi	2	300	30							25	14,700	2,480	5	1,300	200	53	22,700	28,550
East South Central	12	1,800	590	5	61,000	60	17	1,900	360	71	27,200	7,190	29	10,000	5,620	305	159,300	64,390
Arkansas	2	100	10				2	100	10	8	2,200	700	10	1,900	470	127	21,000	8,760
Louisiana	5	300	20							7	1,900	1,000	2	5,000	1,220	49	18,100	16,910
Oklahoma	4	200	60				1	100	10	7	1,700	2,000	17	4,900	2,300	226	79,400	56,340
Texas	15	1,900	730				5	600	270	21	5,400	3,390	28	4,700	1,460	200	62,000	40,680
West South Central	26	2,500	820				8	800	290	43	11,200	7,090	57	16,500	5,450	602	180,500	122,690
Montana	9	2,100	270				13	3,000	1,550	8	800	130	13	1,500	650	135	20,700	17,570
Idaho	4	4,000	1,500				7	900	380	6	2,000	2,260	8	1,900	680	65	18,400	14,300
Wyoming	7	1,400	270				3	500	1,330	4	1,000	1,560	5	1,600	770	35	7,100	5,930
Colorado	10	3,200	1,020				3	300	560	6	700	790	7	1,700	520	123	27,100	17,270
New Mexico	1	100	10							3	300	80	2	600	450	25	4,700	3,190
Arizona	1	100	110							5	700	350	2	200	140	19	3,000	2,950
Utah	1	4,500	5,950				7	700	550	4	800	70	5	900	120	44	18,200	8,580
Nevada	3	300	150				1	100	310				1	100	10	8	1,600	890
Mountain	36	15,700	9,280				34	5,500	4,680	36	6,300	5,240	43	8,500	3,340	454	100,800	70,680
Washington	7	11,000	20,200							7	1,000	430	35	7,000	3,690	196	51,200	81,160
Oregon	6	3,000	3,260				1	3,700	1,200	3	1,700	480	7	1,600	530	143	33,900	26,470
California	7	7,000	23,960				1	100	300	5	600	280	20	10,000	9,690	439	99,100	252,740
Pacific	20	21,000	47,420				2	3,800	1,500	15	3,300	1,190	62	18,600	13,910	778	184,200	360,370
United States	157	67,000	79,400	15	75,000	6,800	131	40,000	10,800	546	140,000	77,200	1,454	470,000	190,000	12000	3,100,000	2,500,000

Federal Farm Board.

TABLE 593.—*Associations marketing dairy products: Number listed and estimated business, 1926, 1928, and 1929*

Year and State	Creameries		Cheese factories		Milk-distributing associations		Milk-bargaining associations		Miscellaneous[1]		Total associations	
	Listed	Estimated business	Listed	Estimated business	Listed	Estimated business	Listed	Estimated business	Listed	Estimated business	Listed	Estimated business
	Number	*1,000 dollars*	*Number*	*1,000 dollars*	*Number*	*1,000 dollars*	*Number*	*1,000 dollars*	*Number*	*1,000 dollars*	*Number*	*1,000 dollars*
1926	1,390	230,000	751	32,000	119	135,000	40	192,000	179	11,000	2,479	600,000
1928	1,400	245,000	740	30,000	114	150,000	47	200,000	199	15,000	2,500	640,000
1929	1,385	264,804	717	27,931	111	138,694	50	229,251	195	19,320	2,458	680,000
Leading States, 1929:												
New York	6	381	25	962	9	93,719	2	30,600	8	438	50	126,100
Minnesota	620	92,995	26	2,000	3	5,626	------	--------	8	1,639	657	102,260
Wisconsin	250	50,894	582	19,808	12	4,072	5	17,404	40	3,072	889	95,250
Iowa	246	41,632	------	-------	3	975	5	1,723	4	10	258	44,340
Pennsylvania	17	1,213	4	141	8	1,382	2	40,832	7	582	38	44,150
Massachusetts	2	1,100	------	-------	8	3,889	1	34,000	1	11	12	39,000
Illinois	9	1,198	23	517	6	4,536	7	30,635	26	574	71	37,460
Michigan	52	9,804	8	560	9	3,859	2	20,338	11	1,359	82	35,920
Ohio	6	2,530	5	80	5	5,917	7	16,000	10	1,873	33	26,400
California	14	20,294	------	-------	3	467	2	5,579	1	-------	20	26,340
All others	163	42,763	44	3,863	45	14,252	17	32,140	79	9,762	348	102,780

Federal Farm Board.

[1] Includes federations, sales agencies, cream stations, warehouse associations, associations renting dairy plants, etc.

TABLE 594.—*Number of active wheat pools, quantity of wheat handled, and percentage which pool wheat was of total wheat,[1] 1921–22 to 1928–29*

Marketing season	Pools reporting	Wheat received by pools	Percentage pool wheat is of total wheat[1]	Marketing season	Pools reporting	Wheat received by pools	Percentage pool wheat is of total wheat[1]
	Number	*Bushels*	*Per cent*		*Number*	*Bushels*	*Per cent*
1921–22	3	11,372,768	2.3	1926–27	9	17,494,726	3.0
1922–23	10	20,293,610	3.5	1927–28	8	12,335,546	1.9
1923–24	11	24,446,621	4.8	1928–29	7	14,879,859	2.2
1924–25	10	27,967,244	4.4	1929–30	8	17,622,957	3.1
1925–26	9	16,823,560	3.5				

[1] Shipped out of country where grown. Yearbook, 1930: 605, Table 11.

TABLE 595.—*Livestock handled, sales, and purchases by terminal market cooperative sales agencies, 1918–1930*

Calendar year	Receipts of livestock [1]					Livestock purchased	
	Associations reporting	Cattle and calves	Hogs	Sheep	Total [2]	Associations reporting	Number
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	
1918	3	30,528	139,483	7,548	189,283	1	252
1919	4	63,876	381,127	23,940	563,383	2	8,504
1920	4	85,313	536,380	29,676	748,255	2	6,550
1921	6	163,361	912,095	103,101	1,310,628	3	42,032
1922	16	736,982	3,414,016	352,861	4,727,056	4	86,350
1923	23	1,409,322	7,732,437	733,552	9,933,445	8	103,928
1924	26	1,893,326	9,239,070	1,202,616	11,382,304	14	242,039
1925	28	1,881,241	7,377,084	1,350,311	10,666,069	18	288,150
1926	27	2,003,014	6,687,296	1,581,882	10,333,307	18	328,016
1927	28	1,678,094	7,149,561	1,598,465	10,426,120	21	280,808
1928	28	1,751,599	8,483,413	1,686,889	11,921,901	18	325,267
1929	28	1,904,066	8,054,184	2,093,136	12,051,386	20	[5] 577,646
1930	30	2,088,411	7,259,731	2,609,604	11,957,746	22	723,422

Calendar year	Total livestock handled		Value of sales [3]	Value of purchases	Value of business handled	
	Associations reporting	Number [2]			Associations reporting	Total [4]
	Number		*Dollars*	*Dollars*	*Number*	*Dollars*
1918	3	189,535	12,384,348	15,901	4	12,400,249
1919	4	571,887	35,178,255	622,335	6	35,800,590
1920	4	754,805	37,419,935	458,824	6	37,878,759
1921	6	1,352,660	35,309,401	894,972	6	36,204,373
1922	16	4,813,406	101,818,588	3,069,638	18	104,888,226
1923	23	10,037,373	191,954,106	4,631,630	23	196,904,508
1924	26	11,624,343	231,372,776	5,222,121	24	236,594,897
1925	28	10,954,219	271,797,282	7,923,372	24	279,720,654
1926	27	10,661,323	278,900,462	8,249,106	24	293,249,470
1927	28	10,793,681	145,202,942	3,036,904	28	274,209,285
1928	28	12,339,000	279,674,261	8,741,163	28	289,152,931
1929	28	[5] 12,755,647	302,894,934	[5] 11,627,701	28	314,522,635
1930	30	12,857,965	263,679,996	10,008,169	30	273,638,165

Federal Farm Board.

[1] Includes some animals sold for yard traders.
[2] Includes animals not segregated by kind.
[3] Includes sales for yard traders.
[4] Includes business not classified as sales or purchases.
[5] Includes 114,757 sheep, valued at $906,040 from producers to feeders.

TABLE 596.—*Farmers' business associations, estimated membership, and estimated business by geographic divisions, leading States and commodity groups, 1915, 1925, and 1930*

Geographic divisions, State, and commodity	Associations			Estimated membership			Estimated business		
	1915	1925	1930	1915	1925	1930	1915	1924–25	1929–30
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
New England	157	259	197	21,054	75,000	88,000	6,974	85,170	92,810
Middle Atlantic	210	522	430	63,971	160,000	207,900	56,096	153,080	233,540
East North Central	973	3,075	3,456	107,331	575,000	811,500	90,114	558,270	589,230
West North Central	2,577	4,825	5,327	254,425	850,000	1,242,400	286,535	836,630	859,220
South Atlantic	329	385	451	37,097	280,000	125,400	10,269	152,325	107,070
East South Central	215	277	305	35,834	295,000	159,300	7,170	117,270	64,390
West South Central	315	454	602	30,793	250,000	180,500	7,684	128,630	122,690
Mountain	232	363	454	34,731	75,000	100,800	20,486	70,950	70,680
Pacific	416	643	778	65,950	140,000	184,200	150,511	297,675	360,370
Total	5,424	10,803	12,000	651,186	2,700,000	3,100,000	635,839	2,400,000	2,500,000
Leading States:									
Minnesota	980	1,383	1,568	90,392	217,400	330,200	58,968	223,980	218,210
Iowa	505	1,094	1,200	59,151	179,800	267,600	106,758	172,710	210,520
Wisconsin	402	1,092	1,330	35,380	120,100	179,300	37,831	113,080	147,490
California	197	350	439	22,375	91,200	99,100	121,789	223,960	252,740
Illinois	263	822	970	31,077	131,000	206,700	32,679	195,210	204,600
North Dakota	313	460	535	22,453	60,300	102,200	47,260	91,280	71,700
Nebraska	282	488	510	29,366	74,100	178,200	15,539	91,930	103,220
Kansas	246	466	465	28,875	82,800	89,100	32,950	99,160	98,250
New York	124	286	223	10,526	100,000	122,500	51,745	103,760	171,600
Missouri	73	537	640	6,737	170,600	180,400	1,243	83,490	94,340
Michigan	127	436	433	21,162	128,300	142,500	10,542	82,200	86,100
Ohio	97	395	386	14,370	115,300	172,400	5,721	107,340	101,050
All other	1,815	2,994	3,301	279,325	1,229,100	1,029,800	112,814	811,900	740,180
Total	5,424	10,803	12,000	651,186	2,700,000	3,100,000	635,839	2,400,000	2,500,000
Commodity group:									
Cotton and cotton products	213	121	199	18,404	300,000	150,000	1,502	150,000	110,000
Dairy products	1,708	2,197	2,458	140,567	460,000	650,000	89,061	535,000	680,000
Forage crops	(1)	16	11	(1)	3,000	1,000	(1)	4,000	1,200
Fruits and vegetables	871	1,237	1,384	109,916	180,000	218,000	201,543	280,000	320,000
Grain	1,637	3,338	3,448	166,828	520,000	810,000	289,689	750,000	690,000
Livestock	96	1,770	2,153	13,438	400,000	465,000	5,624	320,000	320,000
Nuts	(1)	39	44	(1)	20,000	14,000	(1)	16,000	14,600
Poultry and polutry products	(1)	71	157	(1)	50,000	67,000	(1)	40,000	79,400
Tobacco	43	24	15	17,849	300,000	75,000	6,450	90,000	6,800
Wool and mohair	(1)	91	131	(1)	50,000	40,000	(1)	10,000	10,800
Miscellaneous selling	(1)	682	546	(1)	170,000	140,000	(1)	70,000	77,200
Miscellaneous buying	(1)	1,217	1,454	(1)	247,000	470,000	(1)	135,000	190,000
All others	856			184,184			41,970		
Total	5,424	10,803	12,000	651,186	2,700,000	3,100,000	635,839	2,400,000	2,500,000

Federal Farm Board.

[1] Included in all others.

TABLE 597.—*Percentage of the cotton crop delivered to large-scale cooperative associations in specified States by seasons, 1921–22 to 1929–30* [1]

State	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
Alabama	--------	7.0	11.1	8.1	7.9	7.1	6.7	5.1	12.0
Arizona	23.8	21.8	10.2	9.0	13.8	9.6	21.8	43.7	9.2
Arkansas	[2] .8	6.6	6.6	4.0	7.7	3.9	1.2	1.9	2.0
California	--------	--------	--------	--------	--------	--------	8.6	3.3	3.5
Georgia	--------	7.7	12.0	10.6	9.8	5.7	2.0	6.0	9.5
Louisiana	--------	--------	8.1	5.4	5.6	6.7	5.0	3.9	5.1
Mississippi	19.2	17.0	23.4	15.4	15.3	14.9	15.0	20.8	16.8
Missouri	--------	--------	2.9	1.1	4.1	3.0	.6	.8	.4
North Carolina	[3] 2.6	13.6	12.8	14.1	14.6	9.9	5.4	7.1	14.9
Oklahoma	19.0	10.5	18.1	9.4	12.2	11.1	15.8	30.2	28.6
South Carolina	[4] 5.3	[5] 21.7	12.5	12.3	11.0	7.1	3.8	3.9	9.9
Tennessee	--------	--------	6.8	5.2	6.4	3.4	5.8	6.7	2.6
Texas	4.3	2.4	4.2	5.7	5.9	3.5	4.5	2.7	5.0
United States	4.4	7.8	9.2	8.0	9.1	6.7	6.4	8.0	9.7

Federal Farm Board.

[1] Based on total production as reported in U. S. Dept. of Agri. Yearbooks, 1927 and 1928.
[2] Including 6,137 bales of the 1921 crop sold with the 1922 crop.
[3] Including 20,000 bales of the 1921 crop sold with the 1922 crop.
[4] Including 40,000 bales of the 1921 crop sold with the 1922 crop.
[5] Including 25,000 bales of the 1922 crop sold with the 1923 crop.

TABLE 598.—*Cooperative citrus-fruit shipments and cooperative shipments as a percentage of total citrus-fruit production for the United States, 1920–21 to 1928–29*

Marketing season	Total citrus production for United States [1]	Fruit handled, in terms of packed boxes, by—							Cooperative shipments as percentage of total production
		Gulf Coast Citrus Exchange, Silverhill, Ala. [2]	California Fruit Growers' Exchange, Los Angeles, Calif. [3]	Mutual Orange Distributors, Redlands, Calif. [4]	Florida Citrus Exchange, Tampa, Fla. [5]	Rio Grande Valley Citrus Growers' Association, Mercedes, Tex.	Texas Citrus Fruit Growers' Exchange Mission, Tex.	Total	
	1,000 boxes	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Per cent*
1920–21	40,898		19,535,853	2,270,400	3,905,841	--------	--------	25,712,094	62.9
1921–22	31,527	102,453	11,617,311	1,230,144	3,805,942	--------	--------	16,755,850	53.1
1922–23	42,144	238,248	17,857,418	1,952,630	5,205,510	--------	--------	25,253,806	59.9
1923–24	53,109	--------	19,390,596	2,280,748	5,548,241	--------	26,570	27,246,155	51.3
1924–25	44,237	--------	16,144,396	1,491,464	6,375,759	--------	65,690	24,077,309	54.4
1925–26	48,950	--------	20,304,760	2,707,013	4,193,316	4,984	33,640	27,243,713	55.7
1926–27	55,806	--------	22,266,540	3,160,522	4,860,948	18,398	76,655	30,383,063	54.4
1927–28	46,180	--------	19,493,237	2,317,589	3,876,577	40,837	83,278	25,811,518	55.9
1928–29	74,485	--------	29,113,962	[6] 3,015,681	7,280,156	126,161	136,298	39,660,841	53.3
1929–30	--------	--------	20,746,591	2,184,220	5,549,105	88,008	365,035	--------	--------

Federal Farm Board.

[1] U. S. Yearbook of Agriculture, 1930, p. 727, Table 84 and special data.
[2] Federation of 12 local units.
[3] Federation of 22 district exchanges, 200 local units, and several contract shippers.
[4] Federation of 35 local units.
[5] Federation of 80 local units and special shippers.
[6] To end of July.

TABLE 599.—*Almonds, walnuts, and pecans received by specified associations and percentages which receipts were of total production, 1920–21 to 1929–30* [1]

Marketing season	Almonds [2]		Walnuts [3]		Pecans [4]	
	Pounds	*Per cent*	*Pounds*	*Per cent*	*Pounds*	*Per cent*
1920–21	8, 851, 339	80. 5	32, 867, 634	78. 3		
1921–22	8, 731, 104	72. 8	30, 531, 852	78. 3		
1922–23	11, 485, 135	67. 6	40, 111, 800	74. 3	270, 573	
1923–24	13, 896, 405	63. 2	39, 753, 760	79. 5	1, 151, 737	
1924–25	10, 228, 227	63. 9	34, 975, 100	77. 7	295, 312	
1925–26	9, 602, 908	64. 0	48, 160, 170	66. 9	1, 283, 876	3. 4
1926–27	23, 740, 362	74. 2	18, 834, 000	62. 8	2, 303, 720	2. 8
1927–28	14, 772, 655	61. 6	70, 190, 000	68. 8	430, 336	1. 4
1928–29	18, 664, 685	68. 1	42, 101, 000	84. 2	2, 757, 036	4. 6
1929–30	5, 116, 000	98. 4	55, 460, 000	71. 1	720, 138	1. 9

Federal Farm Board.

[1] U. S. Dept. Agr. Yearbook, 1928: Table 165, almonds and walnuts; Table 166, pecans.
[2] California Almond Growers' Exchange, San Francisco, Calif.
[3] California Walnut Growers' Association, Los Angeles, Calif.
[4] Received by National Pecan Growers' Exchange, Albany, Ga.

TABLE 600.—*Eggs, live poultry, and dressed poultry: Receipts and sales by farmers' associations reporting, 1920–1929* [1]

Year	Eggs				Live poultry				Dressed poultry			
	Receipts		Sales		Receipts		Sales		Receipts		Sales	
	Associations reporting	Quantity	Associations reporting	Value	Associations reporting	Quantity	Associations reporting	Value	Associations reporting	Quantity	Associations reporting	Value [2]
	No.	*Cases*	*No.*	*Dollars*	*No.*	*Pounds*	*No.*	*Dollars*	*No.*	*Pounds*	*No.*	*Dollars*
1920	5	736, 257	4	9, 796, 396			1	46, 361				
1921	8	1, 196, 773	6	10, 480, 165	1	737, 361	2	217, 684				
1922	13	1, 297, 621	9	11, 435, 272	3	1, 103, 215	4	303, 783			1	134, 867
1923	19	1, 683, 041	11	13, 803, 058	6	4, 540, 039	5	540, 302	3	994, 254	3	469, 000
1924	42	2, 147, 788	41	21, 303, 487	25	12, 879, 971	25	3, 026, 408	9	3, 552, 428	10	1, 029, 078
1925	51	2, 649, 086	52	28, 180, 032	27	12, 263, 541	30	2, 818, 808	14	12, 163, 075	16	3, 656, 426
1926	48	2, 992, 314	48	28, 858, 919	30	17, 649, 154	33	3, 959, 924	20	20, 484, 622	20	6, 089, 599
1927	29	3, 213, 570	29	25, 948, 274	17	13, 179, 451	20	2, 926, 893	14	7, 316, 708	15	2, 427, 538
1928	53	4, 140, 466	51	39, 564, 224	38	15, 512, 261	39	3, 647, 217	22	10, 528, 107	22	3, 334, 434
1929	63	4, 356, 192	65	46, 094, 022	52	31, 174, 385	53	5, 999, 652	32	27, 168, 925	37	9, 242, 247
1930 [3]	44	6, 073, 010	39	53, 765, 416	34	22, 983, 995	29	3, 079, 821	28	19, 214, 666	29	5, 103, 583

Federal Farm Board.

[1] Total number of associations listed at close of 1929 was 157.
[2] Including live poultry that was killed, dressed, and sold by associations.
[3] Subject to revision.

TABLE 601.—*Dairy products marketed by farmers' business associations, 1929*

State	Creamery Butter			Cheese			Milk powder		
	Associations[1]	Quantity[2]	Percentage of total production	Associations[1]	Quantity[2]	Percentage of total production	Associations	Quantity[2]	Percentage of total production
	Number	*Pounds*	*Per cent*	*Number*	*Pounds*	*Per cent*	*Number*	*Pounds*	*Per cent*
Alabama	1	37, 506	1. 8						
California	15	30, 896, 713	42. 5	1	35, 904	0. 4	4	7, 396, 390	14. 8
Colorado	4	436, 056	2. 0						
Connecticut	1	9, 854	2. 7						
Idaho	7	10, 723, 764	44. 7	3	641, 998	8. 4	1	494, 700	20. 3
Illinois	11	2, 728, 624	3. 9	26	2, 845, 849	23. 1			
Indiana	15	6, 311, 058	10. 1	2	136, 489	1. 3	1	90, 300	2. 2
Iowa	249	93, 124, 228	43. 4				5	1, 006, 334	20. 6
Kansas	1	973, 598	1. 7						
Kentucky	3	105, 850	. 5						
Maine	2	45, 451	17. 8	1	72, 715	97. 0			
Massachusetts	2	18, 606	1. 2						
Michigan	62	21, 929, 288	34. 6	10	3, 345, 802	35. 9	8	3, 082, 868	12. 8
Minnesota	633	190, 203, 029	67. 2	29	7, 593, 708	66. 1	55	13, 596, 301	60. 8
Mississippi	1	144, 599	1. 9						
Missouri	9	8, 035, 509	9. 7	1	40, 276	. 9	2	2, 131, 278	31. 3
Montana	2	381, 576	2. 3						
Nebraska	18	18, 149, 512	18. 7	1	1, 331, 544	40. 2			
New York	18	854, 158	9. 4	27	5, 543, 637	10. 2	3	7, 818, 367	17. 0
North Carolina	4	939, 516	42. 9	2	12, 472	2. 8			
North Dakota	8	991, 085	2. 4						
Ohio	8	3, 393, 902	4. 2	6	308, 265	10. 2	1	138, 723	7. 2
Oklahoma	5	826, 264	3. 2						
Oregon	15	5, 869, 344	26. 2	26	9, 206, 262	70. 9	2	977, 723	39. 9
Pennsylvania	22	1, 868, 643	16. 8	8	1, 221, 871	56. 5			
South Dakota	22	9, 625, 440	23. 8	2	60, 478	17. 4	1	130, 000	11. 2
Tennessee	10	4, 072, 270	22. 7	5	115, 211	4. 7			
Texas	4	1, 713, 812	6. 5	1					
Utah	4	4, 605, 984	41. 6	2			1	1, 162, 940	57. 9
Vermont	29	2, 910, 988	77. 1	3	185, 810	25. 8			
Virginia	6	839, 754	14. 3	1	42, 330	4. 2	2	372, 589	23. 4
Washington	20	13, 306, 838	44. 0	6	2, 717, 452	54. 6	5	9, 298, 222	74. 7
Wisconsin	298	104, 439, 231	67. 0	595	83, 392, 158	27. 3	44	33, 304, 550	64. 3
Wyoming	2	176, 252	7. 6						
United States	1, 511	540, 688, 252	33. 9	758	118, 850, 231	24. 6	135	81, 001, 285	29. 4

Federal Farm Board.

[1] Commodity associations listed plus other associations reporting.
[2] Estimated production.
[3] Subject to revision.

TABLE 602.—*Wool: Consignors, quantity marketed, and sales value for associations reporting, 1920–1929*

Year	Consignors		Wool marketed			Sales value		Average quantity per consignor[1]
	Associations reporting	Total	Associations reporting	Total	Percentage of total production	Associations reporting	Total	
	Number	*Number*	*Number*	*Pounds*	*Per cent*	*Number*	*Dollars*	*Pounds*
1920	12	17, 869	12	6, 104, 042	2. 5	14	2, 054, 478	323. 8
1921	19	21, 470	23	12, 579, 634	5. 4	27	3, 757, 062	523. 5
1922	28	15, 151	40	10, 119, 991	4. 6	38	4, 010, 913	502. 6
1923	33	21, 868	45	18, 024, 306	8. 0	43	8, 660, 932	646. 3
1924	39	21, 347	53	16, 634, 634	7. 1	53	6, 952, 166	616. 4
1925	45	24, 391	52	24, 015, 984	9. 8	52	9, 391, 341	913. 1
1926	48	26, 464	55	25, 026, 935	9. 6	55	7, 590, 854	889. 4
1927	48	12, 854	54	21, 731, 142	7. 7	55	4, 796, 073	1, 017. 2
1928	55	16, 541	62	15, 738, 239	5. 2	55	2, 460, 439	670. 4
1929	46	19, 748	54	[2]29, 784, 977	9. 6	61	9, 456, 267	1, 192. 1

Federal Farm Board.

[1] For associations reporting both number of consignors and quantity of wool received.
[2] Total wool received by associations reporting.

TABLE 603.—*County extension agents: Number employed, United States, 1929 and 1930*

State	County agricultural agents 1929	County agricultural agents 1930	County home demonstration agents 1929	County home demonstration agents 1930	County club agents 1929	County club agents 1930	Total of all agents 1929	Total of all agents 1930
Alabama	86	88	59	57			145	145
Arizona	13	14	7	6			20	20
Arkansas	77	83	66	67			143	150
California	79	85	29	30	1	1	109	116
Colorado	32	33	7	9	5	5	44	47
Connecticut	10	10	8	8	9	12	27	30
Delaware	3	3	3	3	3	3	9	9
Florida	56	55	44	40			100	95
Georgia	108	120	88	88			196	208
Hawaii	6	5	1	4			7	9
Idaho	24	26	7	7	2	2	33	35
Illinois	96	104	28	27	8	3	132	134
Indiana	85	84	9	8	7	8	101	100
Iowa	101	102	19	22	9	8	129	132
Kansas	72	75	27	31	3	5	102	111
Kentucky	96	93	26	26			122	119
Louisiana	78	78	52	40			130	118
Maine	15	15	14	14	5	7	34	36
Maryland	30	31	22	24			52	55
Massachusetts	15	16	17	15	25	27	57	58
Michigan	62	65	10	9	16	16	88	90
Minnesota	66	67	12	14	37	33	115	114
Mississippi	89	90	78	78			167	168
Missouri	61	67	14	18			75	85
Montana	33	38	9	13			42	51
Nebraska	42	45	10	10	6	1	58	56
Nevada	12	12	6	5			18	17
New Hampshire	11	11	9	9	13	14	33	34
New Jersey	24	23	20	22	8	8	52	53
New Mexico	22	20	8	13			30	33
New York	68	76	50	57	32	39	150	172
North Carolina	105	105	60	63			165	168
North Dakota	34	34	6	6			40	40
Ohio	80	90	20	25	8	10	108	125
Oklahoma	90	91	64	61			154	152
Oregon	34	35	5	7	9	8	48	50
Pennsylvania	71	71	33	34			104	105
Rhode Island	3	3	3	2	3	3	9	8
South Carolina	58	65	52	55			110	120
South Dakota	32	32	16	15	5	6	53	53
Tennessee	75	95	42	54			117	149
Texas	193	206	127	141			320	347
Utah	21	20	6	6			27	26
Vermont	12	13	12	12	13	11	37	36
Virginia	94	104	42	52			136	156
Washington	36	36	11	10	6	5	53	51
West Virginia	40	43	21	21	11	4	72	68
Wisconsin	53	57	3	4	10	8	66	69
Wyoming	21	21	10	10			31	31
Total	2,624	2,755	1,292	1,352	254	247	4,170	4,354

Extension Service.

TABLE 604.—*Cooperative extension work: Projects and percentage of agents' and specialists'*[1] *time devoted to each, 1925–1929*

Project	1925	1926	1927	1928	1929
Soils	5.2	5.3	4.8	5.1	5.6
Farm crops	13.1	13.1	12.4	11.5	11.0
Horticulture	6.9	7.3	7.1	7.3	7.0
Forestry	.5	.7	.9	1.0	1.6
Animal husbandry	7.1	7.5	8.2	7.8	7.6
Dairy husbandry	7.0	7.1	7.9	8.7	8.9
Poultry husbandry	8.7	9.0	8.8	8.1	7.2
Rural engineering	3.7	3.6	3.4	3.3	3.1
Rodents and insects	2.0	1.7	1.5	1.3	1.3
Agricultural economics	3.9	4.0	4.1	4.0	4.2
Foods	4.8	4.6	4.6	4.4	5.3
Nutrition	2.3	2.6	2.5	2.6	2.9
Clothing	7.9	7.1	6.8	6.8	6.2
Home management	1.7	1.5	1.5	1.7	2.
House furnishing	1.2	1.8	2.0	2.4	2.6
Home health and sanitation	1.2	1.2	1.2	1.2	1.2
Community activities	6.2	5.9	6.0	5.8	5.9
Miscellaneous	16.6	16.0	16.3	17.0	16.3

Extension Service.

[1] Only field work of specialists as reported by county extension agents is included.

TABLE 605.—*Adult result demonstrations and improved practices adopted, 1925–1929, as reported by all county extension agents*

Project	Adult result demonstrations					Better practices adopted				
	1925	1926	1927	1928	1929	1925	1926	1927	1928	1929
Soils	48,403	47,708	48,754	60,135	81,624	252,041	257,588	279,774	306,491	351,894
Cereals	34,263	38,587	41,712	40,339	42,848	185,596	261,621	309,692	250,913	253,110
Legumes and forage	61,040	64,516	72,539	71,483	76,023	201,033	225,287	241,956	226,171	228,350
Potatoes, cotton, and other special crops	37,065	34,178	35,132	40,655	43,773	182,876	179,639	166,909	205,228	213,872
Horticulture	73,781	80,364	98,841	105,957	127,754	271,231	294,007	344,836	354,516	393,395
Forestry	1,917	2,286	3,358	4,510	4,870	6,574	10,074	15,807	18,902	21,350
Dairy	20,951	17,797	22,571	29,815	32,026	384,148	418,345	429,105	461,888	488,808
Animal husbandry	15,082	16,375	19,793	19,605	20,878	167,462	171,533	198,516	223,554	235,136
Poultry	46,539	43,759	50,102	55,443	62,214	237,817	227,352	259,222	260,648	318,553
Agricultural engineering	21,787	19,091	21,749	24,152	24,427	114,236	120,200	151,478	140,460	172,170
Rodents and insects	25,223	17,469	22,208	19,591	16,350	202,558	265,255	259,321	220,956	177,161
Agricultural economics	-------	-------	-------	-------	-------	430,074	492,176	492,495	526,700	669,892
Foods	118,555	90,827	98,719	128,497	125,803	305,567	325,455	397,517	404,517	450,784
Nutrition	40,849	37,335	43,931	47,027	46,673	162,449	168,029	168,293	211,991	206,243
Clothing	115,695	55,387	81,126	74,644	84,217	348,904	299,221	297,245	320,202	392,414
Home management	44,340	19,823	30,950	33,941	37,467	90,872	74,038	106,677	99,156	126,369
House furnishings	41,793	25,944	33,093	35,052	38,739	96,462	106,789	126,417	141,034	167,028
Home health and sanitation	11,636	17,657	23,421	25,387	27,847	125,856	128,580	164,804	179,687	177,165
Miscellaneous	13,550	15,681	24,186	35,293	36,211	57,631	79,305	108,673	109,083	126,649
Total	772,469	644,784	772,185	851,526	929,744	3,823,387	4,104,494	4,518,737	4,662,097	5,170,343

Extension Service.

TABLE 606.—*4-H club work: Number of clubs, enrollment, projects completed, etc., 1925–1929*

Item	1925	1926	1927	1928	1929
Junior clubs	41,286	41,234	44,188	46,671	52,180
Different boys enrolled	224,633	234,078	249,553	270,534	303,509
Different girls enrolled	340,413	352,078	370,159	393,406	452,587
Total enrollment	565,046	586,156	619,712	663,940	756,096
Different boys completing	133,076	145,202	153,324	175,069	201,910
Different girls completing	196,498	223,103	245,783	272,510	305,577
Total completing	329,574	368,305	399,107	447,579	507,487
Projects started	1,079,604	1,161,024	1,330,239	1,466,584	1,614,149
Projects completed (total) [1]	589,440	673,997	776,029	882,795	995,262
Cereals	24,629	24,107	25,789	26,997	29,197
Legumes and forage	4,549	4,988	5,253	6,137	7,559
Potatoes, cotton, and other special crops	29,854	30,458	25,228	36,475	40,380
Horticulture	62,577	81,494	88,922	112,296	124,459
Forestry	308	730	2,192	2,719	3,852
Dairy	17,142	19,094	23,076	29,468	37,218
Animal husbandry	31,250	37,409	44,341	48,233	54,227
Poultry	52,795	52,730	56,756	56,900	60,020
Agricultural economics	6,841	6,139	4,925	8,361	7,379
Foods	105,856	131,121	142,302	167,058	182,877
Nutrition	39,259	39,071	54,451	62,790	65,652
Clothing	128,970	133,501	146,181	162,291	190,249
Home management	6,477	10,215	13,822	16,309	16,237
House furnishings	22,268	24,834	30,024	36,274	40,999
Home health and sanitation	28,032	40,857	56,352	59,342	77,932
Miscellaneous	28,633	37,249	56,415	51,145	57,025

Extension Service.

[1] Boys' and girls' club members completing.

TABLE 607.—*Freight tonnage originating on railways in the United States, 1923–1929* [1]

Commodity	Calendar year						
	1923	1924	1925	1926	1927	1928	1929
FARM PRODUCTS							
Animals and animal products:	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Animals, live—							
Horses and mules	603	531	544	513	541	577	553
Cattle and calves	9, 400	9, 316	9, 330	9, 241	8, 636	7, 976	7, 310
Sheep and goats	1, 159	1, 215	1, 224	1, 270	1, 296	1, 362	1, 387
Hogs	6, 944	6, 707	5, 502	5, 271	5, 369	5, 871	5, 534
Packing-house products—							
Fresh meats	3, 023	3, 001	2, 904	2, 996	2, 986	2, 935	3, 007
Hides and leather	1, 090	1, 025	1, 026	984	1, 010	914	913
Other packing-house products	2, 397	2, 395	2, 140	2, 023	1, 957	1, 461	1, 414
Total packing-house products	6, 510	6, 421	6, 070	6, 003	5, 953	5, 310	5, 334
Eggs	597	572	591	644	651	635	588
Butter and cheese	571	649	686	725	747	754	793
Poultry	366	376	357	408	407	407	417
Wool	291	294	263	281	356	394	414
Other animals and products	1, 814	1, 668	1, 758	1, 888	2, 054	2, 348	2, 578
Total animals and animal products	28, 255	27, 749	26, 325	26, 244	6, 010	25, 634	24, 908
Vegetable products:							
Cotton	2, 887	3, 261	4, 127	4, 482	4, 182	3, 772	3, 940
Fruits and vegetables	10, 398	10, 868	11, 634	12, 223	12, 029	12, 947	12, 875
Potatoes	4, 698	4, 590	4, 614	4, 339	4, 728	4, 511	4, 425
Grain and grain products—							
Grain—							
Wheat	23, 091	27, 442	21, 548	24, 379	26, 237	26, 950	27, 019
Corn	15, 151	14, 883	12, 680	13, 924	13, 162	17, 045	15, 258
Oats	8, 332	8, 507	8, 450	6, 496	5, 518	5, 888	5, 713
Other grain	4, 739	5, 616	4, 564	4, 014	5, 216	5, 506	4, 477
Grain products—							
Flour and meal	10, 518	10, 330	9, 901	10, 137	10, 027	10, 754	10, 627
Other mill products	10, 002	10, 083	9, 578	9, 768	10, 179	10, 580	10, 820
Total grain and grain products	71, 833	76, 861	66, 721	68, 718	70, 339	76, 723	73, 914
Hay, straw, and alfalfa	5, 965	5, 802	5, 506	5, 028	4, 468	3, 999	3, 697
Sugar, sirup, glucose, and molasses	4, 891	5, 356	5, 700	5, 744	5, 584	5, 604	5, 858
Tobacco	1, 099	1, 069	1, 038	1, 010	1, 053	945	989
Other vegetable products	13, 406	15, 277	17, 118	17, 609	18, 469	16, 686	15, 501
Total vegetable products	115, 177	123, 084	116, 458	119, 153	120, 852	125, 187	121, 199
Canned goods (food products)	3, 435	3, 731	4, 144	4, 070	4, 204	4, 805	5, 029
Total farm products	146, 867	154, 564	146, 927	149, 467	151, 066	155, 626	151, 136
OTHER FREIGHT							
Products of mines	713, 735	638, 520	678, 336	758, 064	713, 731	696, 583	737, 879
Products of forests	115, 618	108, 090	107, 391	104, 859	99, 391	96, 737	94, 855
Manufactures	258, 471	246, 432	274, 001	284, 640	279, 407	300, 043	317, 443
Merchandise, all l. c. l. freight	44, 339	40, 551	40, 587	39, 498	38, 432	36, 954	36, 043
Total tonnage	1, 279, 030	1, 188, 157	1, 247, 242	1, 336, 528	1, 282, 027	1, 285, 943	1, 337, 356

Bureau of Agricultural Economics. Compiled from reports of the Interstate Commerce Commission. Figures for earlier years appear in previous issues of the Yearbook.

[1] Freight tonnage as delivered at original shipping point.

TABLE 608.—*Index numbers of freight rates on livestock, wheat, and cotton, 1913–14 to 1929–30*

Year beginning July	Livestock						
	Cattle				Hogs		
	Western district	Eastern district	Southern district	United States	Western district	Eastern district	United States
1913–14	100	100	100	100	100	100	100
1914–15	100	104	100	100	99	102	100
1915–16	100	108	99	101	99	107	101
1916–17	100	113	98	102	99	116	102
1917–18	101	116	98	103	100	122	104
1918–19	126	158	120	129	124	169	132
1919–20	128	157	120	131	124	169	132
1920–21	166	207	148	170	161	222	172
1921–22	165	211	147	170	160	230	173
1922–23	156	197	137	160	153	218	164
1923–24	155	201	136	160	153	217	164
1924–25	153	199	136	158	151	214	163
1925–26	153	199	136	158	150	214	161
1926–27	153	199	136	158	150	214	161
1927–28	152	201	136	158	150	214	161
1928–29	152	198	136	157	150	206	160
1929–30 [1]	152	195	136	157	150	199	159

Year beginning July	Livestock—Continued				Wheat				Cotton
	Sheep			Total	Spring	Western	Winter	All wheat [2]	
	Western district	Eastern district	United States						
1913–14	100	100	100	100	100	100	100	100	100
1914–15	99	102	99	100	100	100	101	101	100
1915–16	98	105	99	101	101	100	100	100	100
1916–17	98	112	100	102	101	100	101	101	100
1917–18	99	129	103	103	101	100	101	101	103
1918–19	118	167	126	130	127	126	129	128	133
1919–20	119	167	127	131	127	126	128	128	136
1920–21	152	225	164	170	164	154	166	164	172
1921–22	148	226	160	170	160	148	162	160	176
1922–23	137	199	147	160	149	140	152	150	164
1923–24	137	200	147	160	149	140	152	150	164
1924–25	137	200	146	158	149	140	152	150	166
1925–26	135	200	145	157	148	140	152	150	166
1926–27	134	200	144	157	148	140	152	150	166
1927–28	134	200	144	157	148	140	151	149	165
1928–29	135	189	143	156	148	140	149	148	164
1929–30 [1]	135	184	142	155	148	140	149	148	164

Bureau of Agricultural Economics. These relatives are based on the average of the monthly rates in effect during the crop year. Rates in effect in 1913=100. For points of origin and destination, see Yearbook, 1926, pp. 1248–1249.

[1] Based on rates in effect Dec. 31, 1929.

[2] Index for spring, western, and winter wheat weighted respectively 2, 1, and 5. Weight based on average production, 1923–1927.

TABLE 609.—*Coffee, Rio, No. 7: Average wholesale price per pound, New York, by months, 1921–30*

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average [1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	6.7	6.7	6.4	6.0	6.2	6.7	6.5	7.0	7.9	8.1	8.8	9.3	7.2
1922	9.6	9.0	9.6	10.8	11.0	11.0	10.4	10.0	10.2	10.2	10.8	11.1	10.3
1923	11.9	13.0	13.0	11.5	11.6	11.7	10.9	10.7	10.7	11.1	11.0	10.9	11.5
1924	10.9	14.2	15.6	15.3	14.8	14.6	16.5	16.6	17.7	20.7	22.6	22.6	16.8
1925	23.4	22.4	21.2	20.2	18.6	21.6	19.7	20.7	21.2	19.5	18.5	17.1	20.3
1926	18.5	19.1	18.2	18.3	19.8	20.1	19.8	19.2	17.7	16.1	16.3	15.3	18.2
1927	15.3	14.9	15.8	16.2	15.4	14.8	14.2	13.9	13.5	14.7	14.5	14.2	18.5
1928	14.8	15.7	16.8	15.4	15.7	15.7	16.5	17.3	17.3	17.8	18.1	18.1	16.4
1929	18.3	18.4	18.0	17.6	17.1	16.8	16.3	16.1	15.8	13.9	11.6	9.9	15.7
1930	10.3	10.5	10.3	9.9	9.2	9.3	7.6	7.2	7.2	8.9	7.9	7.0	8.7

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics reports. Data for 1890-1920 are available in 1924 Yearbook, p. 832, Table 426.

[1] Derived from the figures upon which the monthly averages are based.

TABLE 610.—*Tea, Formosa, fine: Average wholesale price per pound, New York, by months, 1921–1930*

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average [1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	24.5	24.5	24.5	24.1	22.4	22.0	22.0	22.0	22.3	23.0	28.0	29.0	24.0
1922	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.5	30.5	31.0	31.0	30.2
1923	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
1924	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.3	32.5	32.9	35.0	31.7
1925	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.3	35.0
1926	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.0	35.5
1927	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	32.9	32.5	34.2
1928	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	31.0	31.0	31.0	32.1
1929	32.2	33.0	33.0	33.0	33.0	32.5	31.0	31.0	31.0	31.0	31.0	30.4	31.8
1930	30.0	30.0	30.0	30.0	30.0	30.0	29.2	29.0	22.4	22.3	22.5	22.5	27.2

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics reports. Data for 1890–1920 are available in 1924 Yearbook, p. 834, Table 427.

[1] Derived from the figures upon which the monthly averages are based.

TABLE 611.—*Copra, South-Sea Island: Average price per pound, in bags, f. o. b. New York, by months, 1921–1930*

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	5.8	5.0	4.5	4.6	5.1	5.0	4.6	4.6	5.0	4.7	4.2	4.4	5.0
1922	4.5	4.4	4.9	4.5	4.6	4.6	4.5	4.5	4.4	4.4	4.6	4.8	4.6
1923	5.1	5.2	5.8	6.0	5.5	4.9	4.6	4.6	4.8	5.2	5.2	5.4	5.2
1924	5.6	5.8	5.6	5.3	5.1	5.1	5.2	5.6	5.9	5.9	6.0	6.1	5.6
1925	6.1	6.0	5.9	5.9	5.9	5.9	5.9	6.2	6.2	6.2	6.2	6.2	6.0
1926	6.1	6.1	6.1	6.1	6.0	6.1	6.0	5.6	5.6	5.6	5.2	5.1	5.8
1927	5.0	5.3	5.1	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.3	5.2
1928	5.4	5.5	5.4	5.4	5.4	5.3	5.0	4.9	4.8	4.8	4.9	5.0	5.1
1929	4.8	4.8	4.7	4.6	4.3	4.0	4.4	4.2	4.4	4.5	4.3	4.4	4.4
1930	4.4	4.2	4.0	4.3	4.0	3.8	3.6	3.5	3.3	2.9	3.0	3.1	3.7

Bureau of Agricultural Economics. Compiled from Oil, Paint, and Drug Reporter, 1917–1927; subsequently from Bureau of Labor Statistics Wholesale Price Bulletin.

TABLE 612.—*Coconut oil, Manila: Average price per pound, in tanks, f. o. b. Pacific coast, by months, 1921–1930*

Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	9.69	8.06	7.25	7.62	8.22	8.15	8.25	8.20	8.20	8.12	7.90	7.69	8.11
1922	7.66	7.46	7.62	7.50	7.44	7.00	7.03	6.95	6.70	6.88	7.45	7.80	7.29
1923	8.22	8.20	8.68	9.06	8.54	8.00	7.88	7.76	8.25	8.15	8.33	8.24	8.28
1924	8.40	8.31	8.22	8.01	7.80	7.81	8.31	9.34	8.58	9.19	9.75	10.02	8.64
1925	9.88	9.08	9.17	8.68	8.72	8.98	9.24	9.47	10.29	11.25	11.88	10.75	9.78
1926	10.24	9.67	9.82	9.56	9.56	10.26	9.47	8.78	8.94	8.28	8.09	7.84	9.21
1927	8.06	8.30	8.06	8.06	8.19	8.06	8.12	8.12	8.31	8.75	8.69	8.44	8.26
1928	8.38	8.12	8.25	8.31	8.25	8.06	8.44	7.69	7.69	7.81	7.94	8.12	8.09
1929	7.98	7.89	7.62	7.53	6.87	6.53	6.98	6.63	6.63	6.90	6.81	6.80	7.10
1930	6.78	6.56	6.38	6.32	6.30	6.12	5.96	5.86	5.84	5.03	5.10	5.06	5.94

Bureau of Agricultural Economics. Compiled from weekly quotations in the Oil, Paint, and Drug Reporter. From 1918 through November, 1921, reported as 5 per cent acid.

TABLE 613.—*Raw silk: Production in specified countries, average 1909–1913, 1921–1925, annual 1926–1929*

Country	Average, 1909–1913	Average, 1921–1925	1926	1927	1928	1929
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
WESTERN EUROPE						
Italy	8,524	9,487	8,499	10,201	10,662	10,640
France	992	548	529	650	452	430
Spain	182	177	187	183	174	163
Total	9,698	10,212	9,215	11,034	11,288	11,233
Eastern Europe, Levant, and Central Asia [1]	6,611	1,874	2,359	2,293	2,513	2,976
FAR EAST						
China:						
Exports from Shanghai	12,576	10,456	12,225	13,283	14,154	14,286
Exports from Canton	5,146	6,418	7,055	5,809	6,162	6,272
Japan:						
Exports from Yokohama and Kobe [2]	21,898	46,336	66,193	68,839	74,075	63,371
British India:						
Exports from Bengal and Cashmere	428	121	121	176	132	44
Indo-China:						
Exports from Saigon, Haipong, etc	[3] 32	84	143	132	110	88
Total	40,080	63,415	85,737	88,239	94,632	84,061
Grand total	56,389	75,501	97,311	101,566	108,433	98,270

Bureau of Agricultural Economics. Compiled from Statisque de la Production de la Soie, Silk Merchants Union, Lyon, France.

[1] Includes Hungary, Czechoslovakia, Yugoslavia, Rumania, Bulgaria, Greece, Salonika, Adrianople, Crete, the Caucasus, Turkestan, Central Asia, and Persia.
[2] Previous to 1923 only exports from Yokohama are included.
[3] For years 1911–1913.

TABLE 614.—*Raw silk: Net imports, and price per pound, 1900–1929*

Year ended Dec. 31	Net imports [1]		Average price per pound [2]	Year	Net imports [1]		Average price per pound [2]
	Total	Per capita			Total	Per capita	
	1,000 pounds	*Pound*	*Dollars*		*1,000 pounds*	*Pound*	*Dollars*
1900	9, 554	0. 125	4. 169	1915	36, 958	0. 372	3. 318
1901	13, 539	. 174	3. 513	1916	40, 406	. 401	4. 867
1902	15, 518	. 196	3. 822	1917	42, 971	. 420	5. 494
1903	14, 440	. 178	4. 135	1918	48, 163	. 465	6. 273
1904	20, 643	. 250	3. 642	1919	55, 035	. 524	8. 880
1905	19, 418	. 231	3. 991	1920	38, 798	. 365	8. 277
1906	18, 526	. 216	4. 163	1921	51, 846	. 478	6. 035
1907	17, 556	. 201	5. 060	1922	57, 827	. 526	7. 219
1908	19, 856	. 223	3. 890	1923	61, 511	. 551	8. 228
1909	24, 583	. 271	3. 840	1924	59, 626	. 524	5. 917
1910	25, 150	. 273	3. 524	1925	76, 003	. 659	6. 341
1911	25, 907	. 277	3. 471	1926	76, 870	. 656	5. 937
1912	29, 518	. 310	3. 445	1927	85, 036	. 717	5. 100
1913	33, 996	. 352	3. 640	1928	87, 172	. 728	4. 859
1914	30, 600	. 312	3. 694	1929	96, 848	. 797	[3] 4. 777

Bureau of Agricultural Economics. Compiled from December issues of Monthly summary of Foreign Commerce of United States prior to 1918. Subsequent years are from annual issues of Commerce and Navigation of United States Department of Commerce. Prices are from bulletins of the U. S. Bureau of Labor Statistics.

[1] Net imports are imports minus reexports.
[2] Monthly average of price per pound of Japanese Kansai, No. 1.
[3] Monthly average of price per pound of Japanese Best, No. 1 x, 13–15.

TABLE 615.—*Rayon, yarn: Production, net imports, amount available for consumption and price in the United States, 1911–1929*

Year ended Dec. 31	Production	Net imports [1]	Available for consumption		Average price per pound	
			Total	Per capita	150–A denier [2]	300–A denier [2]
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*Pound*	*Dollars*	*Dollars*
1911	320	823	1, 143	0. 012	----------	----------
1912	1, 120	1, 549	2, 669	. 028	----------	----------
1913	1, 566	2, 298	3, 864	. 040	1. 850	1. 700
1914	2, 445	2, 918	5, 363	. 055	1. 963	1. 813
1915	4, 111	2, 707	6, 818	. 069	2. 125	1. 975
1916	5, 744	860	6, 604	. 066	3. 113	2. 950
1917	6, 697	546	7, 243	. 071	3. 863	3. 650
1918	5, 828	66	5, 894	. 057	4. 396	4. 146
1919	8, 174	1, 147	9, 321	. 089	4. 767	4. 517
1920	10, 240	1, 799	12, 039	. 113	4. 663	4. 413
1921	15, 000	3, 419	18, 419	. 170	2. 671	2. 479
1922	24, 406	2, 993	27, 399	. 249	2. 800	2. 650
1923	36, 477	6, 515	42, 992	. 385	2. 800	2. 650
1924	37, 720	6, 569	44, 289	. 389	2. 113	1. 871
1925	51, 902	12, 363	64, 265	. 557	2. 004	1. 754
1926	63, 648	13, 918	77, 566	. 662	1. 810	1. 603
1927	75, 555	17, 740	73, 295	. 786	1. 489	1. 289
1928	97, 901	15, 113	113, 014	. 943	1. 500	1. 300
1929 [3]	122, 066	20, 318	142, 384	1. 172	1. 246	1. 073

Bureau of Agricultural Economics. Compiled from December issues of Monthly Summary of Foreign Commerce of United States prior to 1918. Subsequent years are from annual issues of Commerce and Navigation of United States Department of Commerce. Production figures are from Yearbook of the Department of Commerce. Prices are from bulletins of the United States Bureau of Labor Statistics.

[1] Net imports are imports minus reexports, years 1911 through 1924; and imports minus exports and reexports, 1925–1929.
[2] The count indicates the number of deniers or one-half decigram units, in weight, of a standard length of 450 meters. Since the standard is based on an arbitrary fixed length and a variable weight, the finer the yarn the smaller the count; 150 denier count, a size commonly used, is fine and 300 denier count is coarse.
[3] Preliminary.

INDEX

O