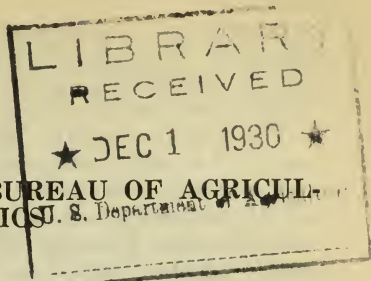


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REPORT OF THE CHIEF OF THE BUREAU OF AGRICULTURAL ECONOMICS

UNITED STATES DEPARTMENT OF AGRICULTURE;  
BUREAU OF AGRICULTURAL ECONOMICS,  
*Washington, D. C., September 26, 1930.*

SIR: I transmit herewith a report of the work of the Bureau of Agricultural Economics for the fiscal year ended June 30, 1930.  
Respectfully,

NILS A. OLSEN,  
*Chief of Bureau.*

Hon. ARTHUR M. HYDE,  
*Secretary of Agriculture.*

With agriculture continuing to face critical economic difficulties, the resources of the bureau during the past year have been put to maximum use in meeting the demands for economic service and information. The regularly issued reports have been supplemented with numerous special inquiries; the economic research has been directed in large measure to emergencies of one kind or another; and the general information and inspection services have been amplified wherever possible.

Agriculture the world over is passing through a critical period. Expanding crop areas, revolutionary changes in production technic and mounting agricultural surpluses have been paralleled by business depression, impairment of markets, and declining prices of agricultural products. Special effort, therefore, has been made to evaluate the tendencies in competition and demand and provide a better basis for essential adjustments in our agriculture. The analysis of price trends has been strengthened and the long-time phases of the agricultural outlook have received increasing attention. Measures have been initiated to focus, by type-of-farming regions, the farm management researches of the bureau upon the organization and operation of farms. And in the studies of land utilization special effort has been made to determine the best use for submarginal agricultural lands.

A constructive forward step in broadening our knowledge of the foreign competition our farmers must face was taken by Congress in the last session in the enactment of the foreign agricultural service act. Under the provisions of this measure a foreign agricultural service division has been created in the bureau and outposts of American agriculture are now being stationed in the important competing and consuming regions of the world to report

currently on developments affecting the foreign outlets for our products. In the development of this service there will be the closest coordination with the foreign offices and activities of the Departments of State and Commerce.

The activities of the bureau are being materially broadened as a result of several additional pieces of legislation enacted during the last session of Congress. Under an act authorizing the Secretary of Agriculture to conduct investigations of cotton ginning an experimental cotton-ginning plant will be built and operated by the Bureau of Public Roads and the Bureau of Agricultural Economics, to study the effect of various ginning methods and practices upon the quality of the lint. The perishable agricultural commodities act, also enacted by the last Congress, provides for the licensing of commission merchants and others engaged in the buying and selling of fresh fruits and vegetables, and aims to prevent unfair and fraudulent practices in the handling of these products. A special organization is being provided to administer this far-reaching piece of legislation.

Tobacco is a major commodity that hitherto has not received the attention that is warranted by its commercial value. To overcome this shortcoming a tobacco section was established in 1929. This section administers the tobacco stocks and standards act, passed during the preceding session of Congress which requires quarterly reports of tobacco stocks by types and groups of grades. A tobacco inspection service has been inaugurated and other services are being developed in this commodity section.

During the last year a new Federal agency, the Federal Farm Board, was created by Congress to assist in solving the economic problems of agriculture. The activities of the Federal Farm Board are primarily in the field of action, but obviously the board must have the necessary facts upon which to base its conclusions and policies. A primary function of this bureau is to collect and interpret economic data. Its energies and resources have been mobilized accordingly during the past year with the view to providing timely and adequate information on emergency and other phases of the agricultural situation.

## DIVISION OF FARM MANAGEMENT AND COSTS

C. L. HOLMES, *in Charge*

Although the work of the Division of Farm Management and Costs is concerned primarily with the economic problems arising from the organization and operation of individual farms, it is necessary also to study agriculture in its broad, collective aspect, its regional development, and the causes and trends of such development. Results of these broad studies make it possible to point out the adjustments that are necessary in order to meet changing economic conditions.

On the individual farm economy side, the division is concerned with the problems of determining the use to which the farmer shall put his resources in terms of cropping programs and livestock systems. It points out the best and most efficient financial and technical organization of agricultural business units and the most efficient methods to be followed in production programs. It is concerned

with studying the efficiency of agricultural production, and the price outlook as it affects the farmer's production program, both from a long-time point of view and from the point of view of year-to-year modification.

#### TYPES OF FARMING

Data from the last three census reports were mapped and analyzed, and a publication entitled "Shifts in Farming in the United States" was issued. A manuscript dealing with the types of farming as determined by the distribution of crops was practically completed. These maps and their analyses portray changes in the agriculture of the different areas and form a basis for further studies of the reasons for the systems of farming now followed in various areas.

With the completion of work in the States of Michigan, Texas, Minnesota, and Nebraska, a detailed analysis of types of farming has been completed in nine States. These detailed studies have furnished a basis for farm-management programs and have been used in interpreting the National Agricultural Outlook Report in terms of local conditions.

A beginning was made in analyzing local and regional conditions with respect to the reasons for the economic advantages of specified crops. An analysis of factors that determine the wheat acreage under various local and regional conditions is under way. This analysis correlates such factors as growing season, soil, topography, and rainfall with the degree of intensity of wheat production in the agriculture of various areas. This necessarily involves consideration of the economic adaptability of other enterprises.

#### FARMERS' RESPONSE TO PRICE CHANGES

A study was inaugurated to determine the nature of the causes of shifts made by farmers in their production programs. An understanding of these causes is necessary in forecasting future supplies and in measuring market prospects for particular commodities. Such an analysis involves a determination of the changes that farmers are likely to make as a result of changes in prices and other factors. Particular attention was given to an analysis of factors affecting the flax acreage, both for the United States and for the four important flax States. A manuscript was prepared analyzing the situation and explaining the various factors that are associated with or that determine variations from time to time in the flax acreage.

#### RANGE-LIVESTOCK PRODUCTION

Studies designed to determine and outline methods of range cattle and sheep production and of ranch organization for each of the important range-livestock producing districts were continued in cooperation with the Bureau of Animal Industry and State agencies. The information collected has been carried back to the ranchman along with outlook material in order that he may conduct his operations to best advantage. Manuscripts were prepared covering research conducted in the Edwards Plateau of Texas, in the Stamford area of Texas, and in North Dakota and South Dakota. Work was continued in Montana and in the North Park and Saratoga Valley districts of Colorado and Wyoming.

In Arizona and New Mexico the study to determine the importance of the various factors affecting range sheep and wool production, range goat and mohair production, and practical modifications that will increase the ranchman's net returns, was continued.

In Montana a study was inaugurated to determine the causes of the wide variations in the number of range sheep and the organization and management of range-sheep production. The main object of this project is to determine the specific forces and conditions that have been shaping the course of the range-sheep enterprise since the World War, with a view of determining probable future developments.

#### FARM POWER

A study of the utilization and cost of power on farms was started in cooperation with the Bureaus of Public Roads and Animal Industry and 10 State agricultural experiment stations in the central Corn Belt and Cotton Belt States.

The usefulness of both mechanical and animal power has greatly increased through the successful development and adoption of general-purpose tractors, and multiple hitches for horses, improvements in motor trucks and in public roads. The information gathered will throw light on many economic, engineering, and horse-husbandry questions, such as the effect of the use of different forms of power on the organization and operation of farms, labor, and equipment, tendency toward use of mechanical power equipment; efficiency of operations on various crops with tractors of different designs and with various sizes of teams, influence of the motor truck on hauling operations, and the effect of various units of animal and mechanical power on timeliness of operation and size of business.

#### THE APPLE INDUSTRY

Statistics showing trends in planting of various varieties in the different apple areas were analyzed further, particular attention being given to localized conditions and changes in both commercial and farm orchards. These facts for the State of New York were published by Cornell University in connection with a State project on orchard management in western New York. It is expected that other States will make similar use of the statistics in connection with their local farm-management problems. A report containing tables and charts and bringing together all available statistics and information on the apple industry was published.

In cooperation with State agencies, a manuscript was completed entitled "Marketing Apples in the Cumberland-Shenandoah Area." This manuscript points out important problems confronting the growers in the marketing of the varieties and grades of apples that are produced in that section. It throws light on the future expectations of production and distribution of the various varieties. A study of the place of orcharding in farming systems in the Cumberland-Shenandoah area was also continued. There the principal objective was to determine what constitutes good orchard management with respect to production and marketing, the economic combinations of other enterprises with the orchard, and the size of business suitable for specified incomes.

### THE EASTERN GRAPE SITUATION

An economic study of the eastern grape industry was continued in cooperation with the agricultural experiment stations of Arkansas, New York, Michigan, and Pennsylvania. This study was undertaken for the purpose of determining what growers could do to enlarge their farm returns. Information was collected on the condition of vineyards, recent plantings, removals, and the care being given to the vines. Various cultural practices were studied and analyzed in relation to the quality of grapes produced, cost, and prices received for the grapes. Results thus far obtained were placed before the farmers of Pennsylvania and New York at meetings held for this purpose.

### THE PECAN INDUSTRY

An economic study of the pecan industry, which was undertaken at the request of the National Pecan Growers' Association, was continued in cooperation with State agricultural colleges and experiment stations. Information was obtained and prepared for publication relative to the practices and costs involved in the development of a pecan orchard to bearing age and in the cost of producing nuts thereafter. This phase of the work has been coordinated with other phases of a study of pecans made in this bureau. The work of the Division of Farm Management and Costs is to determine the reasons for success or failure in the development and management of pecan groves and to show the practicability and necessity of effecting economies in production in view of marketing conditions and production potentialities of the industry.

### BROOMCORN PRODUCTION

As the result of a cooperative project with the Bureau of Plant Industry, the agricultural colleges and experiment stations of the States of Illinois, Oklahoma, and Kansas, the economic and agronomic study of the broomcorn industry was continued. Although the broomcorn industry is of minor importance nationally, the demand for broomcorn has a direct bearing upon the economic welfare of groups of farmers in the above States.

The study was planned to determine the place of broomcorn in the system of farming in each of the important districts under different price conditions and to set forth the most efficient methods of growing and harvesting the crop. A manuscript was prepared for publication as a farmers' bulletin, dealing with the production and handling of broomcorn, and another for publication as a technical bulletin giving the detailed analyses of the results of the study.

### RETURNS TO STRAWBERRY GROWERS

An economic study of the strawberry industry in 20 districts of 11 Southern and Eastern States was continued in cooperation with State agricultural colleges and experiment stations. A mimeographed report was published which showed total production costs and common practices for handling strawberry fields, distribution by important varieties, daily prices to growers by grade and variety, estimated average yields for the different years of the life of the planting, and the place of strawberries in the farming systems of the different districts.

**CITRUS FARMING IN FLORIDA**

A study of the citrus industry in Florida was begun in the early spring of 1930 in cooperation with the University of Florida. Data have been obtained in the Winter Haven section and in Lake and Orange Counties. The main object of this study was to measure the gross and net income from citrus farming and the factors influencing income. Particular attention was given to the incomes and expenditures of absentee owners, and to a study of the relative efficiency of operation for small groves when cared for by the owner and when cared for by a specialized caretaker who cares for several small acreages owned by different individuals. The economic relationship of the citrus industry to the demand and market outlet for the product as related to the natural and economic conditions of the area was given attention.

**DAIRY-FARM MANAGEMENT IN VIRGINIA**

A 3-year study, in cooperation with the Virginia Agricultural Experiment Station, of the factors affecting earnings of dairymen near Richmond, Va., was completed. Conservation of manure, the inclusion of legumes in the cropping system, the development of pastures and soiling crops, and judicious feeding of high-producing cows were found to be the essentials to successful dairying in this limited district. Producers in this district of highly specialized dairy farms have high operating costs; consequently, high average production per cow, together with a uniform supply of marketable milk, is essential to successful dairying. This high standard of production can be attained through the production of crops with high feeding value and the distribution of the freshening of cows so as to secure year-round milk production.

**EARLY-POTATO FARMING**

In cooperation with the Virginia Polytechnic Institute, this bureau inaugurated a study to determine reasons for the unstable volume of early-potato production and extreme fluctuation of prices in relation to the prevailing system of farm organization and management of the section and of the sources and supplies of credit.

Preliminary results of the first year's work indicate that the problem of the territory is largely one of adjusting production to demand and of efficiency of production of the potato crop. No outstanding opportunities appear for substituting other crops to any great extent. The opportunity for expanding poultry, hogs, and dairy beyond local needs seems to be very limited. The study is being continued for the purpose of working out alternative forms of farm organization that will minimize the wide fluctuation in the potato acreage and result in a more efficient and stabilized production.

**COTTON, PEANUT, AND HOG FARMING IN GEORGIA AND ALABAMA**

Cotton, peanuts, and hogs are sources of cash income in a large section of southeastern Alabama and southwestern Georgia. A two years' field study of the economics of production in this section, conducted in cooperation with the Georgia State College of Agri-



culture and the Alabama Experiment Station, was completed, and an analysis of the data is in progress.

This study demonstrated that the 1-plow family farm can maintain only a low standard of living unless the family income is supplemented from some outside occupation or the farm is operated with an intensity of cultivation which is not typical of the section. The analysis also indicates the division of income and expense between the operator and croppers to show the minimum number of plows per farm which can be reasonably expected to yield the operator a satisfactory standard of living. Farm organizations with various combinations of cotton and peanuts (the peanuts being marketed as a cash crop or through hogs) are being outlined, with their normal net income under stated price conditions, and the effect of changing price relationships upon gross and net income.

#### INFLUENCE OF WINTER LEGUMES ON CROP PRODUCTION

In cooperation with the Bureau of Plant Industry a study was made of the use of winter legumes in various systems of farming in the States of Georgia, Alabama, North Carolina, and South Carolina. The benefits derived by farmers from the use of winter legumes are so pronounced and of such an economic importance to southern growers that the project was expanded. The results of the previous year's study indicate that where the crops were plowed down for corn the yield is increased from 5 to 30 bushels per acre in average seasons.

The past year's work has shown that under certain conditions of climate, soil, and fertilization the beneficial results from plowing under winter legumes were reduced to a minimum. Particular attention was given to determining methods of procedure which will bring the best results from the use of winter legumes. Attention was given to the time and manner of sowing and of turning under the legumes, to the inoculation of the seed or soil, the use of fertilizer, the date of planting the following crop, and the time of planting after the legume was plowed under.

#### ORGANIZATION AND MANAGEMENT OF COTTON PLANTATIONS

In cooperation with the Arkansas Agricultural Experiment Station a study was undertaken for the purpose of working out improvements in the organization and management of cotton plantations, with special reference to the utilization of labor and farm power. The study will be confined to cotton plantations of about 500 cultivated acres or more. Data will be collected from the plantation accounts, and these data will be analyzed for the purpose of finding out the advantages and disadvantages of the different forms of labor, equipment, and power units.

#### EUROPEAN CORN BORER

A study to determine the most successful systems of farm organization and management under corn-borer conditions was continued in cooperation with the Indiana Agricultural Experiment Station. A similar study was begun with the Michigan State College of Agriculture in the more heavily infested localities of Michigan. The

continued advance of the borer toward the central Corn Belt makes these studies of particular importance. Changes in crop rotations, livestock combinations, types of equipment, and general farm practices and their effect on soil fertility, control of the corn borer, and farm returns are considered.

Study of the possibility of substituting other crops for corn in the Corn Belt was continued. The importance of corn in the crop and livestock systems found in the Corn Belt and its relatively greater value as a feed or cash crop and in the use of a large amount of profitable labor indicate the extent to which farms should go to retain corn in the rotation. The general relation of the present supply of cash crops, such as wheat, rye, sugar beets, canning crops, and potatoes and the effect which their substitution for a part of the present corn acreage would have on prices have been considered. The possible cost of controlling the borer under different conditions and the extent to which farmers can afford to rely on control measures at increased production costs of corn have been studied and information made available.

#### CORN-HARVESTING METHODS

A study of the methods and costs of harvesting corn was started in cooperation with the Illinois Agricultural Experiment Station to determine the most feasible and economic farm practice both under present conditions and under conditions of possible corn-borer infestation. The relative costs and physical requirements of hand husking, machine picking, cutting for silage both with field and stationary cutter, and cutting for fodder were determined. Records kept on the harvesting operations in the fall of 1929, and other detailed records obtained in previous years were used in the analysis. Husking from the standing stalks accounts for nearly 90 per cent of the corn harvested. Until the last few years machine picking was of little importance. It was found that whereas the average labor in hand picking amounted to about 5.5 hours per acre, only 2.7 hours were used per acre with the 1-row picker and 2.2 hours with the 2-row machines. Field silage cutters are common in the dairy district in northern Illinois. Although the rate of cutting was lower with the field cutter than with the stationary cutter, less labor was used per ton of silage, and the number of men required was considerably lower.

#### LARGE-SCALE FARMING

Because of the continued widespread interest in large-scale farming the bureau has expanded its study of large-scale farms. Approximately 22,000 questionnaires were mailed recently to individuals who, in the opinion of the crop reporters and bankers suggesting them, were operating "large-scale" farms. As a result of this investigation it is hoped that the majority of large-scale farms in the United States may be located and classified according to size and to type of farming; and that the organization, operation, and management of these farms may be analyzed in such a way as to be of benefit to the individuals reporting and to others interested in the subject.

Current studies indicate that some of the present large-scale farming organizations can not be looked upon as permanent. There are

other large-scale farming organizations, however, which are sound, and it is expected that many large-scale farms and farming corporations will be established in the next few years. The present study is designed to determine the conditions and the forms of organization and management under which such ventures are likely to be permanent and successful.

#### SWEETCLOVER IN THE CORN BELT

An economic study of sweetclover on Corn Belt farms, conducted in cooperation with the Bureau of Plant Industry and several Corn Belt States, was completed. Records of utilization practices, cost of seeding, carrying capacity of sweetclover pasture, and increased yield of crops following sweetclover were obtained from more than 200 farms. These data have been summarized and prepared for publication.

The relative cheapness of seed, the ease with which it may be fitted into established cropping systems, and its outstanding value as a pasture and soil-improving crop have made sweetclover the most valuable leguminous crop in the Corn Belt. It was found that the first year's growth may be grazed for about two months in the fall and during this time will carry the equivalent of 1 to 1.5 mature animals to the acre. The second-year crop is usually pastured from about May 1 to August 20, and if grazed to capacity will carry the equivalent of 2 to 3 mature animals to the acre over this period. Data obtained indicate that on land on which long-continued cropping to corn and small grain has reduced yields to a low level a single crop of sweetclover plowed under will frequently increase the yield of the succeeding crop of corn or wheat from 25 to 100 per cent.

#### FARMING IN THE APPALACHIAN HILL LANDS

Studies of farming under adverse conditions found in the Appalachian Plateau country throw considerable light on the inadequacy of the income from farming alone to support the farm family. Figures from 503 farm families show that average incomes from the sale of farm products after farm expenses were paid amounted to \$272; income from outside work of the farmer to \$185; and other miscellaneous income to \$121. Only 69 of the 503 families depended entirely upon the sales of farm products for their family living expenditures and their savings, and 434 of them depended to a greater or less extent upon supplementary incomes. Studies carried on in cooperation with the experiment stations in Kentucky and Ohio thoroughly analyzed farm organizations in several counties and pointed out means of improving the farming operations.

#### WHEAT FARMING IN EASTERN WASHINGTON AND NORTHERN IDAHO

A large area of eastern Washington and northern Idaho represents one of the most important dry-farming wheat sections in the United States. In this section wheat has been grown for a great many years, and recently it has become a serious problem to maintain wheat yields. Such a problem involves a decided change in the system of farming. In cooperation with the Washington Agricultural Experiment Station and the University of Idaho a study

was made primarily designed to determine the enterprises and the types of farming best adapted to the physical and market conditions of the district. The results have been prepared for publication. Systems of farming were developed which appear to be best suited for increasing incomes under conditions prevailing, and plans were set forth which are designed to meet changing conditions. These farming systems involve the more general use of peas and sweet-clover in the crop rotation for the purpose of building up the productivity of the soil. Such a system eliminates a considerable proportion of the summer fallow and appears to offer opportunity for increasing profits through increased yields and through the greater utilization of the land each year.

#### BULK HANDLING VERSUS SACK HANDLING OF GRAIN

In cooperation with the agricultural experiment stations of Washington, Idaho, and Oregon, a study was begun to determine the relative economy of bulking and sacking grain on the farm. Farmers' experiences in shifting from sack to bulk handling are being studied. Particular attention is given to comparative labor and equipment costs in harvesting and handling the grain and to the efficiency of operating under each method.

In changing from sack to bulk handling, the amount, cost, and specifications of field and hauling equipment and of farm storage are vital factors. These are being studied for various sets of conditions relating to size of business, topography of fields, and distance from local market. Widespread interest among farmers in the practicability of making the shift and how to go about it indicates the timeliness of the project.

#### POULTRY FARMING

In cooperation with the Agricultural College of Utah, a study was undertaken of the economic place of poultry in the organization of Utah farms and the factors that affect the returns received by poultry farmers. Poultry and egg production in Utah has had rapid expansion within recent years. The shipments of high-quality eggs to eastern markets increasing to such an extent that Utah is one of the important sources of receipts in the off-season months.

In this study the amount and costs of land, labor, materials, and equipment used in poultry production are ascertained, as well as the egg-laying performances of flocks and the effect of the expansion of the industry upon farm organizations, for the purpose of indicating for different sets of conditions in the State the most successful poultry-farm organizations. The facts as brought out in this study will also be useful in indicating the most profitable methods of management of farms that have poultry as an important enterprise.

A report was completed consisting mainly of charts, maps, and statistical tables dealing with the economic factors affecting the production, marketing, and prices of poultry and eggs in the United States. This report contains comprehensive statistical data regarding the industry, which will be of use to commercial poultrymen and research and extension poultry specialists throughout the United States.

## BETTER SYSTEMS OF FARMING

The project on the development of more profitable farming systems for the Virginia dark-tobacco section was continued in cooperation with the Virginia Extension Service. On the farms on which the recommendations have been made and followed by the farm operator the returns continued well above the returns on other farms where no appreciable change in the system of farming had been made.

In parts of the spring-wheat area the tendency is to reduce wheat acreage. Farming systems are changing gradually to those with less wheat, more feed grains and pasture, and more livestock. In cooperation with the State Experiment Station of North Dakota, farm plans which are the result of carefully made budgets are prepared for the farmers' consideration. The results of each year's operations are compared with the results suggested by the original budgets. In this way data are obtained on profitable farming systems for the area and on the extent to which farmers in this area may make use of economic and technical information.

In southwestern Kansas the acreage of wheat has been increasing rapidly. The widespread use of improved mechanical equipment has lowered the cost of growing wheat, has enlarged the acreage that could be seeded and harvested by one man, and has encouraged the increase of wheat acreage. These developments are requiring adjustments in the farming program. A study undertaken in cooperation with the Kansas State Experiment Station aims to show the most profitable system of farming for the various natural conditions in the district, the economical size of farm unit, the safe degree of specialization in wheat, and conditions under which other crops and livestock will add to farm earnings.

In cooperation with the Oklahoma Agricultural Experiment Station, farm budgets were prepared for representative farms in northwestern Oklahoma. These budgets, which were worked out with the help of individual farmers indicate possibilities of increasing net returns over previous systems. More profitable wheat production was suggested through a more liberal use of alfalfa, sweetclover, cattle, and sheep. The results were presented at farmers' meetings held in the section.

The results of a 2-year study of farm management in Jones County, Miss., in cooperation with the Mississippi Agricultural Experiment Station were prepared for publication. It was shown that in that section successful crop production requires careful soil management and judicious use of fertilizer. The terraced fields are not adapted to the use of large machinery for cotton cultivation. The eradication of the fever tick has improved the opportunity for income from livestock, and the depletion of the timber has made the farmers more dependent on farm production. Plans for the better utilization of the farmers' resources were set forth.

Studies of systems of farming were made also in North Carolina, Tennessee, Minnesota, Wisconsin, Texas, Illinois, and Montana, all in cooperation with State agencies.

## SUMMARIES FROM FARM-BUSINESS STUDIES

This division acts as a coordinating agency in the assembling and compiling of specific results from farm-business studies made by this bureau and by State agricultural experiment stations and colleges. Data from each farm-business study are summarized to show the type of farming, average acreage, capital, expenses, and such forms of income as receipts, farm income, labor income, return to capital, family living from the farm, and operator's earnings for each study. During the year data have been summarized for 17,887 farms in 209 localities in 36 States. These records, added to the 71,515 records for which similar data were published in the Yearbook of Agriculture, 1925, bring the total number close to 90,000.

## FARM RECORDS, ACCOUNTS, AND BUDGETS

Further progress was made in summarizing farm-production data obtained through farm-account studies carried on in cooperation with State college and experiment stations. This material shows the variations in farming practices in different sections of the United States and variations in materials used in producing crops and livestock, and covers studies made in 38 localities in 18 States.

Forms for obtaining daily records showing man labor, horse work, and fertilizer used in crop production and the man labor, horse work, feeds, and other cost factors used in the production of livestock and livestock products were furnished to a number of State colleges and experiment stations where farm-management studies by means of detailed records are being carried on. Data from these studies show practices worked out by successful farmers, the amount of different cost elements used in crop and livestock production under varying conditions, and provide basic information for farm reorganization and farm budgeting. Interest of farmers in farm records is evidenced by numerous inquiries regarding methods of farm book-keeping and farm accounting which will give them information on which farming plans can be based.

## COST OF PRODUCING STAPLE CROPS

Cost-of-production figures for corn, wheat, oats, and cotton, were published as heretofore. The average cost of producing the 1929 corn crop on 4,150 farms was 73 cents per bushel, which was the same as the average figure reported for the 1928 crop. Corn yields reported by these farmers averaged 31 bushels per acre in both years. For wheat, the average 1929 cost reported by 2,898 farmers was \$1.24 per bushel, which also was the same as the average reported for 1928. Average yields reported for both years were 17 bushels per acre. For oats the average 1929 cost reported by 3,081 farmers was 54 cents per bushel, which was 4 cents higher than the average cost reported in 1928. Oat yields on these farms averaged 33 bushels in 1929 and 37 bushels in 1928.

Cotton costs reported by 929 farmers were tabulated by yield groups, since many of the farmers reporting had yields that were much above the average. On 273 of these farms yields varied from 101 to 180 pounds per acre and averaged 147 pounds. For this group the average cost was about 16 cents per pound. On the lower yielding farms, costs were higher, and on the higher yielding farms costs were lower.

The cost figures include charges for labor of the farmer and members of the family and a charge for the use of land on a cash-rental basis.

#### APPLICATION OF OUTLOOK INFORMATION

The study of the use of outlook information in determining short-time and long-time adjustments in farm organizations was continued. Farmers usually alter their farm organizations to some extent in response to changes in price relationships that have prevailed in the past. Efforts were made by this bureau to demonstrate to farmers, in dollars and cents, the profitableness of making shifts in organizations in the light of probable future price relationships, rather than on past conditions. Losses may be minimized and profits increased if probable future prices are considered in planning the farm business, and by means of budgets of actual farm operations, many farmers were shown the increased returns resulting from planning based upon the outlook.

#### FARM RETURNS

Voluntary reporters submitted statements of the financial results of operations on their farms during 1929, which are summarized as follows: The average return of 11,805 owner operators for 1929 was \$1,298 from farms averaging 270 acres and representing an investment of \$15,242 at values current on January 1, 1929. Cash receipts from these farms on an average amounted to \$2,669; cash outlay for current operating expenses amounted to \$1,572, leaving a cash balance for the year amounting to \$1,097, in addition to which there was an increase of \$201 in the inventory value of crops, livestock, machinery, and farm supplies. These farms supplied the farm family with food to the value of \$262 as estimated by those farmers reporting the item.

Average cash receipts, average cash outlay for current operating expenses, and the balance between these were larger than the averages for the same items in any of the previous years (1922-1928) in which farmers from the same general list have reported their returns. The net return for 1929 was slightly less than that for 1928, largely because of lower prices for inventory items at the end of the year than at the beginning. Averages obtained in this inquiry addressed to owner operators, however, are considerably above the averages for farms of all sizes and tenure classes computed from the census of 1925 or estimated from mass statistics of production and prices.

#### ECONOMIC BASIS FOR FERTILIZER EXPERIMENTATION

This division has worked out a method of basing fertilizer experiments on the formula for the law of diminishing returns that makes it possible from a few simple plot experiments to ascertain (1) the quantity of available nitrogen, phosphoric acid, and potash in the soil, (2) the fertilizer analysis that will give the largest return per dollar spent for fertilizer, (3) the quantity of available nitrogen added to the soil by a leguminous crop turned under, and (4) the effect of any course of soil management on the yielding power of the soil.

## FEDERAL-PRISON FARMS

Aid was given the United States Department of Justice in working out certain problems connected with the organization and operation of Federal-prison farms.

For the 1,200-acre penitentiary farm near Atlanta, a survey was made and advice given as to the proper location of new barracks and farm buildings, a revision and amplification of the farm equipment, and proper methods of operation.

Aid given to the 2,500-acre Federal road camp near Petersburg, Va., began with the development of a dietary for an initial 600 men as a basis for determining the crop and livestock-product requirements and the productive livestock needed. The dietary was based on the energy, protein, and mineral requirements recommended by the Bureau of Home Economics for farm workers. The quantities of available vegetables and fruits in variety and the livestock products to furnish such of these dietary requirements as practicable from the farm, were determined for each month of the year. These data, together with average yields for the section, furnished a basis for determining crop varieties and acreages.

Estimates of the work stock and machinery needed for operation and the quantities of seeds and fertilizers needed were made, and directions given for planting and the use of fertilizer.

Assistance was received from the Bureaus of Public Roads, Chemistry and Soils, Plant Industry, Animal Industry, and Dairy Industry on numerous items relating to this work.

## DIVISION OF CROP AND LIVESTOCK ESTIMATES

W. F. CALLANDER, *in Charge*

The outstanding accomplishments of the Division of Crop and Livestock Estimates have been (1) the development and improvement of forecasts and estimates covering more than 20 vegetable crops; (2) the preparation for the Bureau of the Census of average farm prices by counties for 156 crops and livestock products for the 1929 marketing season, and inventory values of 30 livestock items as of April 1, 1930; (3) the completion of tentative estimates of farm income by States for the 5-year period, 1924-1928, inclusive, covering 78 different crops and 14 items of livestock and livestock products; and (4) statistical improvement in the technic of crop forecasting.

Research work on methods of forecasting from sample data has been pushed, particularly in developing accurate methods of forecasting yields per acre. The method used for many years in forecasting yields per acre on the basis of straight-line relationships between condition and final yield in previous years has been largely discarded or modified. Extensive studies to determine the effect of weather on yields have been conducted, and the results obtained will make it possible to estimate yields more accurately.

The technical staff of the division includes 100 men, of whom 12 are in Washington and 88 in the field. All of these men have had training in statistical methods. In addition, schools of instruction have been conducted in Washington each winter, in which several weeks of intensive training in the application of modern statistical methods to crop-forecasting problems has been given.



The State of Georgia was added to the list of States in which the crop-reporting work is carried on in cooperation with State agencies. At the close of the year cooperative agreements were in effect in 37 States; 31 being with State departments or boards of agriculture and 6 with State colleges of agriculture.

In addition to the regular reports on all crops and classes of livestock, many special reports have been made. One of the most important was the report showing capacity of grain elevators and mills in practically all of the important States west of the Mississippi River.

#### FRUIT AND TRUCK-CROP ESTIMATING DEVELOPMENTS

Increased funds became available July 1, 1929, for the improvement of commercial truck and canning crop estimates, covering 20 commodities. Because of their perishable nature, the ordinary short growing and marketing season, and the quick succession with which products from widely scattered areas of commercial production appear in the market, constant field contact with each active area is imperative during its season of production and movement. Four new men were appointed and assigned to specific areas; one to the south Atlantic group of States, from North Carolina to Florida another to the Eastern Shore; one to the important east north central canning area; another to the three Pacific Northwestern States. A large share of the time of another estimator was devoted to the work in Alabama and Mississippi. Additional funds were furnished the State offices in the West North Central States and arrangements made for carrying the important work along. Similarly in Arizona, New Mexico, Utah and Nevada, Colorado, Louisiana, Arkansas, New York, New Jersey, and New England, arrangements were made with the State offices for conducting the necessary work.

Interest in the commercial truck and canning crop production reports has grown tremendously as these crops have expanded in volume and value in the older areas, as well as in new centers of population.

Probably the most significant change in the reporting service, made possible by the additional funds, has been the transition from collective reports on groups of commodities to reports on single commodities, in which are included practically all the current statistical and commentary information assembled on the crops. These refinements have improved the usefulness of the reports and have permitted the more efficient and economic distribution of current data to interested persons. During the year, 540,000 copies of reports were mailed, as compared with 375,000 copies in the previous fiscal year. More effective use of the estimates has been obtained through prompt release to the press, by transmitting timely and interesting crop details by leased wire to field offices of the market-news service, and through the review and analysis of the material for radio presentation.

The most important developments in this work with respect to the canning crops have been the improved methods of compiling and analyzing canners' reports, the reorganization of inquiries, and the addition of new types of information. The accomplishments thus far involve only vegetable crops, but work has been begun on fruits and berries. Limited surveys have been undertaken in the Pacific Northwest, in Michigan, and a few other important areas. The

data compiled from these, with the more comprehensive details that will be available in the 1930 census returns, will provide the basis for additional reports on the fruit crops and their commercial utilization.

#### FARM-PRICE REPORTS

During the year the division collected by counties the average farm prices of 156 crops and livestock products for the 1929 marketing season and inventory values of 30 livestock items as of April 1, 1930, for the use of the Bureau of the Census in evaluating their current enumeration of agricultural production.

The method of procedure used in collecting per unit values for the 1930 agricultural enumeration is briefly summarized below.

Prices were collected monthly by this division during the 1929 marketing season and were averaged, by crop-reporting districts, for 31 of the principal crops and livestock products. These district prices, by months, were weighted by the usual rate of marketing for a given State to obtain a weighted price for the crop year. Prices of early season crops and check data on livestock products sold in 1929 were compiled, by districts, from the division's regular December 1 and January 1 price inquiries, and a special questionnaire sent to all voluntary reporters during the latter part of the year. The same list of correspondents was again circularized on April 1, 1930, for inventory values of livestock according to the age and sex classification as of that date. Prices received by growers for special crops, such as peanuts, dry edible beans, broomcorn, and grain sorghums, were collected, by counties, from lists of commercial growers and dealers.

Prices of fruits and berries in commercial areas of production were obtained through the field offices in 42 different States. The field men also collected prices of 47 miscellaneous crops such as emmer, spelt, hemp, and ginseng.

In recognition of the desirability for individual price estimates for areas smaller than the crop-reporting districts, every effort was made to obtain county prices for agricultural commodities of general importance and especially for crops of localized production.

In addition to the census price project, the regular routine work of preparing monthly reports on prices paid farmers for 45 commodities, quarterly reports on retail prices of 170 articles farmers buy, monthly summaries of wholesale prices of miscellaneous commodities, quarterly reports on wages paid hired farm labor, and crop-year averages of prices for the farm-income study of this bureau was carried on as usual.

#### FARM VALUE, GROSS INCOME, AND CASH INCOME FROM FARM PRODUCTION

Tentative estimates of farm income by States were completed for the 5-year period 1924 to 1928, inclusive. Estimates for 78 crops and for 14 items of livestock and livestock products were included. In general, the estimates were formulated to treat the farmers of each State as one unit. Farm income, according to this method, consists of the income from farm commodities sold from the farm for shipment out of the State or for use in the industries either within or out of the State.

Total farm value of crop production and livestock production, gross income and cash income from crops, from livestock, and from crops and livestock combined; gross value, gross income, and cash income, for the United States, by commodities; and estimates of gross income for 1928 by commodities and by States have been published. Details of the estimates by commodities and by States, together with production, disposition, and price data used, 1924 to 1928, were published in mimeographed form.

#### HISTORICAL REVISION OF CROP ACREAGE AND PRODUCTION, AND ESTIMATES OF LIVESTOCK NUMBERS

Progress was made upon the revision of the historical data on acreage and production of crops and upon estimates of livestock numbers, which is being conducted in cooperation with the Division of Statistical and Historical Research. The compilation of assessors' and other enumerations bearing upon this subject was completed, and data available in the bureau's records were compiled. An analysis of census data, wording of inquiries, and possible effect of time of enumeration was made also. This project has now entered the final phase of the determination of tentative and final estimates of acreage, yield per acre, and production of crops and of numbers of livestock on farms. Tentative estimates for a number of important States were completed and tested by correlation with historical price series.

#### LIVESTOCK ESTIMATES

Distinct progress has been made in working out new methods of obtaining information as to changes in livestock numbers and production which will further improve the accuracy of various livestock estimates.

The most important contribution to the industry was the completion and publication of tentative estimates of livestock production by States for the years 1924 to 1929. These estimates include balance sheets showing by States the items of annual increase and decrease in cattle, hog, and sheep numbers for each of these years; the net quantity of production of each species in pounds of live weight and the value of this production by States; the gross income and the cash income from each species.

Progress has been made in revising the estimates of livestock numbers on farms January 1 from 1867 to 1919, to give a comparable series of numbers over the whole period. Much information covering annual assessments of livestock by States has been obtained. Effort is made to obtain and organize all available information on marketings and slaughter by States and areas and to assemble information as to production methods that will throw light on changes in livestock numbers.

Detailed statistical studies have been made to determine the factors that affect changes in hog production and in seasonal market distribution of hogs for the different States of the Corn Belt and for areas outside the Corn Belt. The object of this work is to furnish a basis for actual numerical estimates of the pig crops by States and for forecasting the market supplies and seasonal distribution of these supplies.

Further improvements in the methods of obtaining sample information showing changes in livestock numbers and production were made. To secure a measure of memory bias and some indication of intentional bias in livestock sample data, records for a large number of farms for consecutive years are secured by matching reports. The indications of changes in numbers on these identical farms give a measure of bias, where historical questions are asked, and are in themselves valuable evidence of changes in total numbers.

A cooperative agreement between the Bureau of the Census and this bureau covering sheep enumeration in the Western States was entered into in order to obtain more complete data on range sheep. The State statisticians of this division were appointed special agents of the census, and as such prepared lists of all sheep owners in their States and will assist the census supervisors in checking these names against enumeration lists and in securing missing reports.

Since the principal value to producers of statistical information as to livestock numbers and supplies is in the indications that these give as to future conditions in the industry, more and more attention is being given to study of methods for interpreting these figures. Such studies will make the outlook reports on livestock increasingly dependable.

#### POULTRY REPORTS

The regular monthly inquiry to crop reporters concerning the numbers of chickens on hand in their own flocks, and number of eggs laid on the first day of each month has been continued, as well as special inquiries on various matters of concern to the poultry industry. Studies carried on during the last two years have resulted in the preparation of tentative estimates covering numbers and value of chickens on farms on January 1, 1920-1930, by grand divisions; numbers and value of chickens on farms January 1, 1925-1930, by States; numbers and value of chickens raised, consumed on farms, and sold, 1924-1929, by States; number and value of eggs produced on farms, used for hatching, consumed on farms and sold, 1924-1929, by States; and other information. The data on poultry and poultry products are not yet on a par with those for other important commodities.

#### MILK AND DAIRY REPORTS

Additional funds became available in July, 1930, for collecting statistics on milk production, and work was started on the development of a program that would best meet the needs of 5,000,000 farmers and of the organizations marketing dairy products. Numerous conferences have been held with producers' organizations, State dairy commissioners, and others interested in dairy statistics.

According to present plans the annual reports will summarize available information as to the number of milk cows on farms, numbers of heifers and heifer calves being saved for milk production, plans of producers in regard to increases or decreases in the size of their herds, and other information needed in connection with outlook reports. The monthly reports will include details regarding the condition of pastures, the quantity of grain being fed to milk cows, the production of milk per cow on the first of each month, the receipts of old dairy cows and dairy calves in stockyards, changes in

the time of freshening, and such other information as is needed currently by producers and producers' organizations for properly adjusting their feeding, breeding, and marketing programs.

Preliminary studies have shown substantial differences of opinion between producers' organizations as to the causes for changes in milk and butter production and a corresponding difference of opinion as to the adjustments that should be made. This division will, therefore, endeavor to obtain such current and basic information as is needed to explain the causes of such changes in production as may hereafter be apparent.

Questions regarding the number of cows milked, total number of milk cows and the daily production of milk, etc. were added to the cards distributed to farmers by rural mail carriers in June, 1930. About 100,000 cards have already been returned. Similar information is being collected monthly from 20,000 crop correspondents, and a new list of dairy reporters is now being established for obtaining a more detailed record of monthly production and deliveries of milk and butterfat, of grain being fed, of calves allowed to suck, and of changes in time of freshening.

Progress has been made in calculating the quantity of milk produced and sold by farmers of each State and in calculating the gross income and cash income which farmers obtain from milk production. Tentative estimates for the five years, 1924 to 1928, inclusive, have been issued, and work on estimates for 1929 will soon be completed. Work on the month-to-month changes in production has been started, and as the task of estimating the quantity of milk and butterfat used in manufactured products, sold for fluid consumption, and utilized on farms progresses, a more accurate check will be had on the estimates of production.

## DIVISION OF COTTON MARKETING

ARTHUR W. PALMER, *in Charge*

The Division of Cotton Marketing is engaged in service and regulatory work, and in research studies, under the authority of the United States cotton futures act of August 11, 1916, as amended; the United States cotton standards act; the act of March 3, 1927, authorizing the Secretary of Agriculture to collect and publish statistics of the grade and staple length of cotton; the act of April 12, 1928, relating to the investigations of new uses of cotton; and the act of April 19, 1930, authorizing the Secretary of Agriculture to erect and operate an experimental ginning plant; and general statutory authority.

### REVISION OF STANDARDS

#### PREPARATION OF LONG-STAPLE COTTON

On May 20, 1929, the Secretary issued a public notice relative to tentative standards for the preparation of long-staple cotton. The tentative preparation types have been widely used by the trade in the United States, as evidenced by the fact that some 655 boxes have been distributed to the public.

## REVISED STANDARDS FOR AMERICAN EGYPTIAN COTTON

The revised standards for American Egyptian cotton which were promulgated on April 10, 1929, effective August 1, 1930, were largely used in merchandising the 1929 crop. Experience has demonstrated that the use of intermediate or half grades in the classification of American Egyptian cotton according to the revised standards would be in the interest of more exact determination of quality and more exact and satisfactory adjustments in the settlement of contracts of purchase and sale. Accordingly on July 3, 1930, the Secretary signed an order providing for the use of intermediate-grade designations.

## ADDITIONAL STAPLE LENGTH DESIGNATIONS

The additional length designations 29/32 and 31/32 which were promulgated during the preceding fiscal year became fully effective on November 16, 1929. These designations were established at the urgent request of various groups in the industry which pointed out that the elimination of millimeter descriptions in interstate and foreign commerce had made it particularly important that provision be made for more exact length descriptions of cotton shorter than 1 inch.

## ENFORCEMENT OF UNITED STATES COTTON FUTURES ACT AND UNITED STATES COTTON STANDARDS ACT

Service and Regulatory Announcements No. 117, containing an account of the proceedings of the International Cotton Standards Conference of 1929 and items relating to the administration of the cotton futures and cotton standards act, was published, and a number of amendments to the regulations were issued.

The fee for classification was reduced from 40 cents to 30 cents per bale for the determination of grade and staple. This action was possible because of the extraordinary increase during the year in the certification work handled by the various boards of cotton examiners.

## CLASSIFICATION OF COTTON UNDER THE UNITED STATES COTTON FUTURES ACT

The United States cotton futures act requires that all cotton intended for delivery on futures contracts entered into in accordance with section 5 shall be classified by officers of the department. Boards of cotton examiners were continued at New York, New Orleans, and Houston-Galveston, and an appeal board of review examiners in Washington, D. C.

Additional boards were established at Norfolk, Charleston, and Savannah in order to take care of the southern deliveries provided for by the New York Cotton Exchange.

The volume of classification work far exceeded that of any preceding year in the history of the administration of this statute. During the year total original certifications numbered 917,869 bales, as compared with 446,181 bales in 1929.

Because of the fact that new original representations of the official standards for length of staple became effective on August 1, 1929, it became necessary to restaple all of the certificated stocks at the various futures contract delivery points as of that date.

Collections during the year amounted to \$350,928.67 and disbursements to \$178,890.74. Of the total collections, \$14,188.18 was for loose cotton and the balance for classification fees. A balance of \$324,588.89 for conducting the work for the fiscal year 1931 was in the Treasury on July 1, 1930.

#### CLASSIFICATION OF COTTON UNDER THE UNITED STATES COTTON STANDARDS ACT

Under the United States cotton standards act any samples of cotton may be submitted to the department for classification, and the various boards of cotton examiners are authorized to perform this service.

Approximately 55,000 bales were classified under this act during the year, and collections amounted to \$22,550.07.

#### LICENSING OF COTTON CLASSERS

The cotton standards act authorizes the Secretary of Agriculture to issue licenses for grading cotton in accordance with the official cotton standards of the United States. During the fiscal year 143 applicants were examined for licenses; 114 licenses were granted, including 59 renewals. The matter of supervising the classification work of licensees has been particularly stressed, and during the active season a specialist gave his entire time to this work.

Licensing work is assuming a greater importance than ever before in view of the fact that a number of cotton cooperative associations have announced that in the future all of their responsible classification work will be handled only by persons who qualify for licenses under the cotton standards act. At the close of the fiscal year a greatly increased interest was in evidence among classers throughout the South, who hoped to pass the practical test and otherwise meet the requirements necessary to secure licenses. The employment of licensed classers by cooperative associations and the trade generally is doing much to encourage a wider use of the official standards wherever trading in American cotton is carried on. Applicants for licenses as classers under the United States warehouse act are required to submit to the same practical test as that for licenses under the cotton standards act.

#### PREPARATION AND DISTRIBUTION OF OFFICIAL COTTON STANDARDS

The grades for American cotton, 42 in number, remained unchanged. Tentative standards for the preparation of long-staple upland cotton of the grades Strict Middling, Middling, and Strict Low Middling have also been established. Standards for length of staple remained unchanged, except that on August 1, 1929, new original representations went into effect.

Practical forms or copies of the official cotton standards are prepared and sold to the public. During the year 4,667 boxes of the standards for grade and color (including 655 boxes of the tentative preparation types) were distributed, compared with 3,892 during the fiscal year 1929. The number of staple types distributed was 9,905 as against 17,195 during the preceding fiscal year. A sum of \$29,141.47 was collected from the sale of practical forms of the stand-

ards. Sales of loose and rejected cotton amounted to 495 bales, for which the sum of \$38,077.25 was received.

Various demonstrations of the standards at summer cotton schools were carried on in cooperation with southern agricultural colleges, but it was necessary to restrict these demonstrations in view of the extraordinary demands upon the boards of cotton examiners in connection with the certification of cotton under the United States cotton futures act.

Demonstrations of the standards in European markets continued. The technical representative of the United States, through contact with different European trade organizations and individuals, continued to give valuable assistance in encouraging the use of the standards for grade and color in accordance with the universal standards agreements as well as the use of the official staple types in foreign countries.

#### FUTURE AND SPOT MARKET INVESTIGATIONS AND COTTON PRICE QUOTATIONS

This project supervises the quotation of commercial differences by the designated spot markets in connection with the settlement for cotton other than Middling delivered on future contracts. It also publishes market information in order that producers, merchants, manufacturers, and others interested in spot cotton may be reliably informed as to the prices of cotton of various grades. Particular attention continued to be directed to quotations for the tenderable grades in the lengths of  $\frac{1}{8}$ -inch and 1-inch staple, which lengths command a premium over  $\frac{7}{8}$ -inch staple when delivered on future contracts. It is felt that through the cooperation of the spot exchanges with the representatives of the bureau, very satisfactory results were attained both as to the quotations for differentials between grades, and staple premiums for  $\frac{1}{8}$ -inch and 1-inch cotton. As a result of the supervision maintained throughout the season almost no adverse comments from either buyers or sellers either with reference to differentials between grades or to the staple premiums were received.

A more general purpose of the project is to obtain accurate price data on cotton and to give them wide publicity in order to meet the urgent demand for market information. Telegraphic reports continued to be received from many domestic cotton centers, and weekly cable reports from large cotton centers abroad. These reports contained current information on the state of demand for various grades and staples of cotton, qualities sought and in supply, grade differences, basis prices, staple premiums, fixations, and other pertinent factors of cotton-marketing information. The data thus assembled were reviewed carefully and consolidated in a weekly report, which was telegraphed to the field offices, where it was distributed by mail and other means so as to reach every section of the Cotton Belt each Monday morning.

In addition to the cotton-market review issued weekly there was prepared at field offices a premium-staple report which covered the prevailing premiums for cotton above  $\frac{7}{8}$  inch including the lengths from  $\frac{1}{16}$  up to  $1\frac{5}{16}$  inches.

Reports showing grade differences, and premium staple quotations for the lengths  $\frac{1}{8}$  and 1 inch as furnished by the quoting markets, were prepared and distributed by the Atlanta office.



Newspapers and periodicals continued to be active in publishing the information assembled, and in this way the service was made available to a very large number of interested growers. The circulation of newspapers and periodicals that carried the various cotton-market news service reports is estimated at about 5,000,000.

#### PREPARATION AND DISTRIBUTION OF STANDARD GRADES FOR AMERICAN COTTON LINTERS

At the request of the industry, demonstrations of the use of the standard grades for linters were held in Washington, D. C., and at a number of points in the field. These demonstrations were attended by approximately 150 persons, many of whom subsequently took an examination to qualify as licensed classifiers. Sixty persons were licensed to classify cotton linters on the basis of the official standards, and their reports show that approximately 250,000 bales of linters, out of the total production of over 1,000,000 bales, were so classified. The demand for the classification of samples, submitted directly to the bureau's board of cotton linters examiners, increased nearly 100 per cent.

The consumers of linters have shown much interest in the tests of the felting qualities of the various grades of linters and in the arrays of the various lengths of fiber embraced in the standard grades that have been made. The studies of the felting properties of linters for mattress purposes have been made use of also by various branches of the Government in the purchase of mattresses.

#### GRADE AND STAPLE ESTIMATES (CROP AND CARRY-OVER)

The Secretary of Agriculture is directed by law to publish estimates of the grade, staple, and tenderability of cotton carried over on August 1 each year, and not less than three such estimates of the current crop.

In addition to the regular reports on the carry-over, and the crop for the United States as a whole, separate reports were prepared on the ginnings for each State, and cooperating gins were furnished with reports at the end of the season based on the samples furnished from their gins. These localized reports were especially valuable to the growers. Special charts showing staple length of cotton produced in definite areas were prepared at the request of agricultural workers in a number of States. Many reports and special articles were prepared on the basis of these estimates and a number of these were published by State and other agencies. Summaries and analyses have been made to show the trends of production of the various grades and staple lengths in different localities.

The last preliminary report of the number of bales ginned of the 1929 crop, based on the number of bales reported by the Bureau of Census March 20, showed 14,515,800 bales of American cotton and 28,800 bales of American-Egyptian cotton. According to this estimate, cotton ginned during the past season was lower in grade and slightly shorter in staple than the cotton ginned for the 1928 crop.

Of the 14,515,800 bales of American upland cotton, 9,179,000 bales, or 63.2 per cent, were white in color and Middling or better in grade. The proportions of other grades follow: Strict Low and Low Middling, 18.5 per cent; below Low Middling 366,600 bales were

reported; Spotted and Yellow Tinged, 11.8 per cent; Light Yellow Stained, Yellow Stained, Gray and Blue Stained, 49,100 bales.

An analysis of figures showed that 10,994,800 bales, or 75.7 per cent, were tenderable on future contracts. Of tenderable cotton, 9,437,100 bales, or 65 per cent of total upland ranged in staple from  $\frac{7}{8}$  inch to  $1\frac{1}{2}$  inches, inclusive, and 1,557,700 bales were over  $1\frac{1}{2}$  inches in staple. Of the 3,521,000 bales which were untenderable, 600,800 bales were deficient in grade, 2,640,900 bales were deficient in staple, and 279,300 bales were untenderable in both grade and staple.

#### COTTON STANDARDS RESEARCH

The fiber and spinning studies include a series of studies having for their object the isolation of the various properties of cotton fibers and their evaluation in terms of spinning behavior and of yarn or fabric properties in the further development of actual standardization. The ginning studies are confined to surveys of ginning equipment and conditions and to fiber analyses.

#### FIBER STUDIES

Considerable progress has been made in the work with respect to the first grade factor; namely, color. Substantial contributions have been made in the development and improvement of both method and apparatus for determining this element of quality of cotton. These methods now find application in the checking of the universal grade standards prepared for distribution. In order to understand the importance of color in raw cotton, color facts are being traced through all the manufacturing processes. Effort is exerted to determine the stability of color in raw cotton and its manufactured products and the nature in which, and extent to which, it may change under given conditions.

Laboratory investigations of staple length and uniformity conducted throughout the year have added to previous knowledge of uniformity of dispersion of lengths of fibers normally occurring in cotton and to some extent the responses in terms of length to varying degrees of temperature and humidity. Apparatus has been developed which facilitates determinations of fiber length and uniformity and increases the accuracy of results.

One of the most important and least known phases of quality in raw cotton is that of so-called character. Microscopic, microchemical, and X-ray diffraction analyses of samples of known and unknown origin are being studied in an effort to obtain information fundamental to an understanding of the natural biological variations in fibers. Special consideration is being given to fiber development, structural components, and morphological features such as fiber width and thickness, cross-sectional area and shape, cell-wall development, and convolutions. Incidentally the results should indicate whether the fiber abnormalities or variations which are so vital to standardization problems represent retarded, arrested, or deteriorational phenomena. Detailed studies are being made on the composition and classification of neps and on the preparation of the ginned lint. Information of this type, supplemented by that from other phases of the program, is expected to serve as a basis of comparison of unknown commercial samples, to further the future es-

establishment of scientific specifications for fiber qualities, to give a physiological explanation of color, and to indicate the degree to which color may serve as an index to other associated fiber characteristics and properties. The information should contribute to knowledge of the changes that take place in the fibers as a result of environmental ginning and manufacturing conditions.

In connection with all of the fiber, spinning, and ginning studies, a careful analysis is being made of cotton-classing methods in an effort to learn the fiber properties considered, especially in appraising length and character; the relative importance attached to each; the nature and extent, if any, to which judgment of one factor may be influenced by sensations produced by another; the variations due to the personal equation; and the influence of the humidity, temperature, light, atmospheric pressure, density of sample, etc., on the judgment of length, color, leaf, preparation, and character. Information of this type is needed in order to facilitate the most accurate, uniform, and consistent cotton classing and application of the standards.

#### SPINNING STUDIES

Spinning, including all of its preliminary processes, constitutes one of the most important methods in cotton technological investigations because it is the sole medium of translation of data obtained from the fiber and ginning studies. Considerable spinning work has been completed, employing standard commercial manufacturing machines, organizations, and settings. A large body of information has been obtained for samples embracing many different qualities and a broad and general background with particular reference to the standards, ginning, harvesting, and breeding has been established.

Incidental results of the spinning work have been the derivation of methods for computing waste and deviation, which resulted in saving in time and effort in working up data; and determination of size of sample.

#### GINNING STUDIES

Cotton ginning, involving both the preliminary process of extracting and cleaning and the major operation of separating the fibers from the seed, constitutes one of the most important factors influencing the quality of American cotton and its standardization. Need for the improvement in cotton ginning has been urged by every branch of the cotton industry in this country and abroad, it being claimed that the preparation of American cotton is not as good as it formerly was. That is, the ginned lint appears on the whole to be rougher, more gin cut, and more neppy than formerly. Efforts to improve quality of ginning have been handicapped by lack of scientific information and by the large number and complexity of the factors in the seed cotton and in the ginning processes. Moreover, a scientific approach to the problems of ginning has been impeded both by lack of methods of measuring the effect upon the ginned fiber of variations in seed cotton and in the ginning processes and by a lack of facilities for varying sufficiently and controlling the conditions of ginning. Recent developments in fiber analyses have in large part removed the first of these obstacles.

Under an act of Congress approved April 19, 1930, plans have been made by the Bureau of Public Roads for the erection of an experimental cotton-ginning plant. The Bureau of Public Roads will have the engineering responsibilities, and this bureau will make analyses of the fibers in an attempt to develop some of the fundamental principles of cotton ginning, cleaning, and extracting and to promote a more exact understanding of the fundamental relationships which exist between the properties and conditions of the seed cotton, the mechanical conditions of ginning, and the resultant quality of the ginned lint.

The results obtained from preliminary ginning tests indicate that the information to be obtained from the laboratory analyses suggested by data pertaining to the more purely engineering and economic phases will furnish a scientific basis for records concerning (1) a more scientific technic of gin operation, (2) improvement in gin machinery and organization, and (3) educational work in the interest of improved gin operation generally.

#### SUMMARY OF STORAGE FACILITIES

A survey was made to determine the extent to which the storage facilities for cotton are adequate to handle the crop. These data will show the location, kind, capacity, compress facilities, storage cost, and concentration privileges for the storage facilities for cotton in the United States. This information is to be supplemented by data showing the extent to which storage facilities west of the Mississippi River have been used during the last two years.

#### SOUTHWESTERN IRRIGATED COTTON QUALITY PROBLEM

During the year 51 test lots of cotton were collected and arrangements made for tests. All data have been secured on each of these lots, such as the alkalinity of the soil on which the cotton was grown, the hardness or imperviousness of the land, whether it was good land, and whether there was sufficient irrigation. Each lot was grown under a different condition, and the date of harvesting was noted in each case.

Data on the movement of irrigated cotton for the season 1927-28 were obtained. In 1927-28 records of merchants showed that they handled 48,801 bales of cotton; 2,000 bales going into domestic consumption and 46,801 bales of cotton into foreign consumption. In 1928-29 these same merchants handled 108,610 bales of cotton; 1,148 bales for domestic, and 107,462 bales for foreign consumption and carry-over. Data on the movement of about one-fifth of the irrigated cotton grown in 1928-29 have been checked thus far. These results show that about 1 per cent of the irrigated cotton grown for the past two years went into domestic consumption, and that about 99 per cent was consumed abroad.

Data have been obtained on the organization which a mill has used in the successful manufacture of irrigated cotton during the last seven years. It was found, among a number of other things, that the roll settings used by this mill were different from those used by mills spinning rain-grown cotton of the same staple length. The commercial-mill tests which are being used to check the production factors are also being used to study the behavior of irrigated cotton as compared with rain-grown cotton under the same organization.

## COTTON PRICE STUDIES—RELATION OF QUALITY TO PRICE

As a basis for determining to what extent the central market demands for cotton of different qualities are accurately reflected in the local markets in the form of price differences paid to individual growers for different grades and staple lengths of cotton, price data for approximately 170,000 individual bales of cotton in 157 local markets representing as near as possible a cross section of the local markets in the country were collected during the season 1928-29, and data for approximately 130,000 individual bales of cotton in 124 local markets were collected during the season of 1929-30.

An analysis of these data showed that the proportion of the premiums paid in the central markets for white grades above Middling which were reflected in the local markets in the form of price differences paid to growers, varied from less than 20 per cent for Strict Good Middling to less than 50 per cent for Strict Middling; and the proportion of the discounts in the central markets for white grades below Middling which were 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 the central markets for cotton with a staple length of thirteen-sixteenths of an inch and under were reflected in the local markets in the form of price differences paid to growers. The proportion of the staple premiums in the central markets which were paid to growers varied 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  $1\frac{1}{8}$  inches.

Spot quotations in central markets are probably more nearly correct now than ever before, but there is need for the development of more systematic and uniform methods of determining spot quotations. To ascertain to what extent the methods used in arriving at these quotations at the present time can be improved, a qualified analyst has been stationed in New Orleans, La., to work with the chairman of the board of cotton examiners, who is responsible for quoting the New Orleans spot market. Results obtained from this work will be issued in the near future.

## COTTON DEMAND, TRENDS, CHANGES, AND CAUSES

Work on this project was started a little over a year ago to meet the need for information relative to world demand for American cotton. The project as now outlined embraces a study of the factors affecting world consumption of American cotton.

Competition between American and foreign cotton has caused considerable concern in this country during the last few years. It is believed to be essential to the best interests of cotton farmers as well as others engaged in the cotton industry of the United States that facts regarding foreign competition be readily available. A complete and comprehensive analysis of this problem is one phase of the research work under this project. Such an analysis includes a study of the trends and changes in the world consumption of each growth of cotton and the various factors such as price, quality, range of substitution, preferences, costs, and other factors which affect the competition of American cotton with other growths.

A study of the world consumption of cotton by growths has been completed, and the results have been prepared for publication. This study reveals a marked expansion in the cotton-manufacturing industry during the 5-year period 1924-25 to 1928-29 when average annual world consumption of cotton reached the highest level on record. Annual consumption during this period was more than 3,500,000 bales greater than during the pre-war period. American cotton constituted 62.4 per cent of total world consumption during the five pre-war years, 60.2 per cent during the five war years, 59.2 per cent during the five years immediately following the war, and 59.7 per cent during the current 5-year period. The United States leads the world in the mill consumption of cotton, consuming on an average more than twice as much as Great Britain, the next largest consumer.

Annual consumption of American cotton during the last four years, 1925-26 to 1928-29, as compared with the pre-war years, 1909-10 to 1912-13 has increased approximately 1,800,000 bales. Annual consumption of American cotton in Great Britain has decreased about 1,400,000 bales, while Japan has increased her consumption of this growth by about 800,000 bales. The continent of Europe has regained its pre-war level of consumption of American cotton. The total net increase in annual world consumption of American cotton during this 20-year period has been about 1,800,000 bales.

Through the assistance of the foreign representatives of the division in Europe considerable progress has been made on the study dealing with the factors that affect the competition of American cotton with cotton of other growths. Apparently, price has been the greatest single factor causing increased foreign consumption of exotic growths as compared with American, during 1929-30. Depressed conditions in the spinning industry have caused spinners to be extremely cautious in buying, and this has been an important influence in turning them to these outside growths. A number of European spinners consider the deterioration in the quality of American cotton, together with the improvement in the quality of a number of the foreign growths, as having a great influence in the shift from American to other growths of cotton.

A knowledge of the staple of cotton grown in each of the foreign countries is considered basic to a study of the competition which each of these growths offer American cotton. To supply this information data relative to the staples of foreign cotton are being assembled.

#### ADAPTATION OF COTTON TO NEW AND EXTENDED USES

This work is helping to sustain the consumption of cotton and is laying a foundation for future increases in its use. Many requests and inquiries are received from cotton manufacturers, bag manufacturers, and others who stand ready to put into production new fabrics.

Cotton bags for consumer packages for potatoes and citrus fruit have been developed in cooperation with the North Carolina State College of Agriculture and Engineering. A unique feature of the potato bag is that it has an open-mesh side where the potatoes may be inspected and a close-mesh side suitable for carrying the brand. This feature gives to the seller valuable means of establishing his

brand in the minds of consumers. Bag manufacturers have announced that they expect to put this fabric into commercial production for handling the late summer and fall crop of potatoes.

A study of ways in which cotton may be used in power laundries has been completed, and a report entitled "Cotton Consumption in Power Laundries of the United States—1928," has been issued. This study showed that approximately 52,000 bales of cotton were consumed by power laundries during 1928 and that the greatest potential field for increasing the use of cotton in power laundries lies in the purchase of supplies such as soap chips and other detergents, in cotton bags, subsequently using these bags for collecting and returning laundry to customers.

The study of cotton-picking sacks, cotton-picking sheets, and tarpaulins in the Cotton Belt has been continued, and a report will soon be issued. Several tests on sheets made from both cotton and burlap are being carried on in cooperation with the experiment station of North Carolina and the Clemson Agricultural Experiment Station. Preliminary data seem to indicate that the cotton sheets, although lighter in weight and less expensive than the burlap sheets, will hold up better, but the data gathered so far are too fragmentary to warrant definite conclusions.

Studies designed to develop an economical and a suitable cotton-patching material for cotton bales is now under way in cooperation with the North Carolina State College of Agriculture and Engineering. Several patterns have been completed, and others are in various stages of development. These will be studied in the laboratory to determine the strength, stretch, etc., and tests will be made at compresses.

#### COTTONSEED STUDIES

A plan for grading cottonseed for crushing purposes has been perfected which makes it possible to base the price paid the grower on the oil and protein content of his product.

The free fatty acid content of the oil in the seed has been found to be so correlated with deterioration in all the products of cottonseed that it could be used as an accurate measure of the amount of deterioration that had taken place in cottonseed at the time of purchase and sale.

At the convention of the National Cottonseed Products Association held in New Orleans, La., May 12-14, 1930, both the method of grading cottonseed and the method of measuring deterioration in cottonseed developed in these investigations were adapted and incorporated in the trading rules of the association. These rules will be used in the purchase of cottonseed beginning with the 1930-31 season.

#### DIVISION OF FRUITS AND VEGETABLES

WELLS A. SHERMAN, *in Charge*

#### MARKET NEWS SERVICE ON FRUITS AND VEGETABLES

The market news service was expanded by opening new branch offices at Cleveland, Detroit, New Orleans, and Seattle. The former field station at Spokane was changed to a permanent market station. At the close of the year, 22 branch offices were in operation. All but one of these offices were connected with the bureau's leased-wire

telegraph system, which connects the various field offices with Washington and serves as a means of rapid dissemination of market news, including arrival and price information, shipment and movement reports, and other information covering both producing sections and terminal markets. In addition to the 22 branch offices, 39 temporary field stations were in operation for varying periods in important producing sections. The leased-wire telegraph service was extended also to four additional State offices, where State officials give the information gathered by the bureau wide publicity for the benefit of producers and others in their sections.

A total of 13,546,954 mimeographed market reports was issued from Washington and the field offices. Although the radio and other means of publicity have been made greater use of each year, the demand for the mimeographed reports continues to increase, and greater dependence is placed upon the bureau each year for market information.

#### CARLOAD-SHIPMENT INFORMATION

Daily shipments of 35 products were reported telegraphically by the carriers, and complete market reports in season were issued on 22 of these. In addition special reports were issued at Pacific coast stations on artichokes, broccoli, cherries, chicory, plums, and prunes and in Florida on citrus fruits.

Daily telegraphic reports on selected perishable products in season were received in Washington from several hundred transportation lines, these reports showing the number of cars originating in each division superintendent's territory. About 65 of these reports are known as "consolidated wires," each covering an important railroad system or major portion of such a system. Approximately 400 individual division superintendents or other reporting officials, chiefly of the smaller transportation lines, sent daily telegrams in season. About 15,000 local freight agents and express agents sent monthly reports by mail, covering a greater number of products than those in the daily telegrams. These reports amplify and also serve as a check upon the daily telegraphic reports. A net total of 1,073,707 carload shipments was reported by the carriers.

In addition to the reports forwarded to the Washington office, the carriers furnished special information daily to the field stations on the movements of certain products. Information with regard to numbers of carloads moving and destinations is very valuable to shippers and helps to guide them in consigning their produce to the market where the supply is lightest and the demand best.

#### UNLOAD REPORTS FROM PRINCIPAL MARKETS

Regular periodical reports of unloads of important fruits and vegetables were received from 66 cities. Representatives of the bureau in 29 markets and railroad agents in 37 other markets furnished the unload reports on 19 of the most important fruits and vegetables.

Much of the unload information has been prepared in condensed form and these tabulations have been mimeographed to supply the increasing demand for such data on the part of growers, shippers,



members of the trade, transportation officials, and schools and colleges. The figures also were used in summaries of shipping seasons in producing sections and in other reviews. The data are of great value because they show the monthly and annual receipts of various products in large consuming centers, as well as the sources of supply. The bureau's representatives in various markets frequently prepared press releases or mimeographed statements for public distribution on the basis of these figures.

#### REVIEWS, SUMMARIES, AND SPECIAL REPORTS

A corps of four or five employees maintained current tabulations of market prices and conditions for all the leading markets and shipping points, prepared special reviews and summaries based largely on these statistics, wrote articles for trade papers and farm journals, and handled a large correspondence on miscellaneous marketing problems.

Many weekly and monthly reviews and summaries have been prepared, as well as special reports upon particular phases of the work. Constant cooperation has been maintained with newspapers, periodicals, and radio stations, and information has been prepared in suitable form for various types of publicity. Short reviews adapted to different sections of the country were furnished weekly to about 20 farm journals and 35 newspapers and press associations.

A summary of the daily information published, together with a review of the marketing season, has been prepared at the closing of each temporary field station. This report is particularly valuable to the farmers in the vicinity of the field station, since it points out the important factors to be considered in planning the following year's planting, harvesting, and marketing operations. During the past year 50,000 copies of 65 different summaries of this type were issued.

#### INSPECTION SERVICE ON FRUITS AND VEGETABLES

The total number of inspections of fruits and vegetables again showed a substantial increase over the preceding years. Shipping-point inspections increased by 14,500 cars over last year and receiving-point inspections by 7,108 cars. The total number of inspections for both services was 288,439 as compared with 266,831 for last year.

#### RECEIVING-POINT INSPECTION

Offices were maintained at 42 of the most important central markets and inspections were made at these and adjacent points. A total of 44,740 carloads of fruits and vegetables was inspected as well as very substantial quantities of various products for the United States Navy and Marine Corps and other governmental agencies.

Agreements have been entered into in a number of cities with railroad companies and other agencies which handle large quantities of fruits and vegetables for the inspection of all of their receipts. In consideration of the large volume of work special rates have been made for the service.

## EXPORT STANDARDS FOR APPLES

The use of the export standards for apples which were promulgated in October, 1928, has been continued in both shipping-point and receiving-point work. With the aid of these standards foreign buyers have been able to secure official information regarding the suitability of lots of apples for export. Certification of apples on the basis of these standards has eliminated much misunderstanding between buyer and seller and provided a basis of trading which established more cordial relations between them. The bulk of this work has been in New York City, but a great many cars were certified at shipping points on the basis of the export standards.

## SHIPPING-POINT INSPECTION

In 25 States there was an increase in shipping-point inspection during the year, and 13 States showed a decline. The net increase over the previous year was 14,500 cars and the total number of cars inspected 243,699. Colorado showed the greatest increase of any State, the increase amounting to approximately 12,000 cars.

Full-time Federal supervising inspectors were maintained during the entire year in Idaho, Washington, Utah and Oregon, while those assigned to Texas, Florida, and Maine devoted most of their time to the shipping-point work in those States. In California and Colorado the supervisors are employed jointly by the State and the department for the entire year. With Louisiana, Indiana, Ohio, and South Carolina, agreements were made providing that the shipping-point supervisor, cooperatively employed, may devote such time as is not required for the supervision of inspection work to extension work in grading and standardization. These arrangements have proven highly satisfactory from the standpoint of service rendered to growers and to this bureau because of the advantage of having a supervisor on the ground through the entire year. This is not possible in most of the States where the supervisor is engaged only on inspection work.

## INSPECTION OF CANNERY TOMATOES

Experimental work in connection with the inspection and grading of cannery tomatoes has been carried on for several years. During the last year this work was conducted as a regular activity of the shipping-point inspection service in Indiana, Colorado, and New York. During the fiscal year 22,738 tons of tomatoes were inspected in Indiana, 5,528 tons in Colorado, and approximately 5,000 tons in the State of New York. All of these tomatoes were graded by licensed inspectors when delivered at the factories. This phase of inspection and grading work is steadily growing and will be extended to additional States next season.

## RESEARCH AND STANDARDIZATION

During the fiscal year standards for 4 additional fruits or vegetables have been issued, and 11 sets of grades have been revised. United States standards for 46 commodities have now been issued by this division. As in some instances 2 or more standards are necessary for 1 commodity because of different types, or different

conditions in various producing areas, a total of 59 standards has been issued. Requests for standards for 15 additional products have been made by commercial interests, and some work has been done in connection with grades for them.

An outstanding development in the standardization work has been the increasing interest shown by canners and producers of products used for canning, in the establishing of standards for canning crops.

Grades for cannery tomatoes were issued in 1926. Approximately 57 canners located in Colorado, Indiana, New York, Pennsylvania, New Jersey, Virginia, Maryland, Delaware, Ohio, and Utah have expressed their intention of contracting with their growers on the basis of these grades for the 1930 crop. Under these contracts each load of tomatoes is inspected when delivered to the canning plant by the grower. To facilitate the uniform interpretation of certain of the United States grades by the inspection service, photographs have been prepared showing various degrees of injury permitted in different grades. Colored photographs and models for certain commodities have been prepared.

Economic study of various industries is a type of work which has continued in popularity during the year. Cooperative organizations and shippers have asked the assistance of this division in ascertaining market requirements and obtaining constructive criticisms of the trade with a view to widening the market outlet for their respective commodities.

The division of fruits and vegetables has cooperated with other divisions of the bureau and with State agencies in economic surveys of a number of important products, including northwestern fresh prunes, potatoes, apples, pecans, grapes, and olives. The results of these surveys have been published by the department and by State agencies, and have been carried to the producers through public addresses and by other means.

The increasing use of the motor truck in transporting fruits and vegetables is changing marketing conditions. Highly perishable fruits are frequently hauled 600 miles or farther to market. Within a radius of 100 miles of many cities a large part of the fruit and vegetable supply is now carried by truck. The redistribution of fruits and vegetables to the trade territory surrounding large cities as well as the incoming supplies from the adjacent areas are handled largely by truck. Statistics of rail shipments of fruits and vegetables have become inadequate for purposes of marketing studies or market-news reports. Studies have been undertaken in widely separated sections to determine the importance of the motor truck in fruit and vegetable marketing; its advantages and disadvantages; and other pertinent information.

Two reports on motor-truck marketing issued during the year related to conditions in southern Indiana and southern Illinois, and in western New York and the Cumberland-Shenandoah section. The reports indicate that exclusive of market-garden and canning supplies, in 1928, 38 per cent of the fruits and vegetables in southern Indiana were shipped by truck. For southern Illinois the corresponding figure was 23 per cent; for western New York, 20 per cent; and for the Cumberland-Shenandoah section, 11 per cent. A similar survey is now being made in southwestern Michigan.

This bureau has cooperated with the New Jersey State Agricultural College, the New Jersey Department of Agriculture, and the New York Food Marketing Research Council in making a study of the motor truck as a carrier of fruits and vegetables to greater New York.

#### STANDARD CONTAINER ACTS

Work under the standard container acts continued to increase. More than 6,000 containers were tested by the bureau, an increase of nearly 50 per cent over the preceding year. The standard container act of 1928 requires the manufacturers to submit container specifications to this bureau for approval. The manufacturers have shown a remarkable willingness to cooperate with the bureau in the work, and the chief problem of the bureau is to handle the large volume of work entailed and at the same time carry on educational work to bring about complete compliance with the law.

#### PRODUCE AGENCY ACT

The number of complaints under the produce agency act continued to increase. Nearly 400 cases were received during the year, 262 cases were personally investigated, and 34 were referred to the Department of Justice for prosecution. Settlement of 114 cases, involving more than \$17,000, was reported to the bureau.

#### PERISHABLE AGRICULTURAL COMMODITIES ACT

On June 10, the President approved the perishable agricultural commodities act, which is intended "to suppress unfair and fraudulent practices in the marketing of perishable agricultural commodities in interstate and foreign commerce." Work was begun on the rules and regulations immediately after the approval of the act. At the close of the year the regulations were still under consideration.

An organization plan for handling this work has been drawn up, and the force that is now administering the produce agency act will be merged with the new organization, and most of the cases under the produce agency act will be handled under the new act, which applies to dealers and brokers as well as commission merchants.

#### LIVESTOCK, MEATS, AND WOOL DIVISION

C. V. WHALIN, *in Charge*

##### DIRECT BUYING OF HOGS

Study of the direct buying of hogs was begun and will be materially expanded during the coming year. Available data relating to prices of hogs, corn, and pork products and hog production and hog marketings were analyzed. The results obtained thus far indicate that marked changes have taken place in the relationships between farm prices in certain States and between these prices and the prices at leading markets. Although the causes for these changes have not been fully determined, indications are that they are associated with shifts in hog production and the growth of direct buying and selling.

The variations in yields of hog products as reported by wholesale slaughterers using different buying methods are being analyzed to ascertain if they would show any advantages or disadvantages in the methods practiced.

Analysis was made of the hog purchases of slaughterers in different sections and using different buying methods to ascertain the monthly and yearly variations in the number and weights of hogs bought. Information of this character is helpful to producers' organizations that seek better market outlets for their hogs.

Existing material on freight rates and the freight-rate structure in Iowa was studied with a view to analyzing the transportation problems in hog marketing. The possible relationship of highway development and motor-truck transportation to changes in the methods of marketing hogs was given attention. The question of proper price differentials for hogs transported varying distances by motor truck in comparison with those transported by rail is one which needs to be given considerable study, since it is of much concern to both producers and slaughterers of hogs in establishing and maintaining satisfactory trade relationships and working out proper buying and selling policies.

A brief field survey of hog-marketing conditions in Iowa was made late in the year with a view to making plans for a comprehensive study of the developments taking place in hog-buying methods and of analyzing the entire direct-buying situation to determine the relative advantages and disadvantages to buyers and sellers of the different marketing methods in use.

#### PRICE AND SITUATION REPORTS

An analysis of the price and supply situation as it relates to hogs has been prepared each month as part of the monthly price report on agricultural products released by the bureau. This report has served to keep producers and distributors informed as to economic developments by indicating trends from month to month in the hog and pork situation.

Seventeen analytical statements on the economic situation as it related to cattle, hogs, and sheep were prepared during the year for radio broadcast over a national chain of stations. These and other statements carrying economic information were mimeographed and given wide distribution by mail and through the press.

The collection and publication of weekly and monthly price data on beef steers by grade and weight was continued. These data have served as a valuable index of the current beef-supply situation and have been very useful in the preparation of outlook and price reports.

The results of a comprehensive study of the beef-cattle industry in the southern Appalachian region were prepared for publication to help cattle producers in the States extending from Pennsylvania to North Carolina, inclusive, as well as to producers of grass cattle in other sections.

Considerable progress was made in a number of other economic-research projects, including a study of the monthly variation in prices of heavy hogs per 100 pounds at Chicago from 1890 to 1929 as compared with variation in receipts; daily percentage distribution of hogs shipped direct to packers, total shipments of hogs, hold-over

of hogs, and trucked-in hog receipts at the Chicago stockyards for 1928 and 1929, with the object of correlating changes in these factors with changes in daily top prices and daily average prices paid for hogs; and daily "drive-in receipts" of livestock at eight of the principal hog markets, with the object of determining the effect of radio market reports and other factors on the supply of hogs received at these markets.

#### GRADE STANDARDIZATION

##### HIDES AND SKINS

Approximately 700 tests were conducted at various tanneries in the Eastern States in an effort to correlate grades of hides and skins with grades of leather. Heavy unbranded cow hides from big packers, light cowhides and heavy unbranded bull hides from small packers, extremely light country hides, and New York City kips were graded before and after tanning. About 2,000 sole-leather backs, bends, and bellies were also graded for further correlation purposes. All of the hides and skins were graded in accordance with the tentative schedules of market classes and grades of hides and skins which were drafted in this division. The practicability of this method of classifying cattle hides according to quality has been demonstrated, but much research work remains to be done on calfskins, horse hides, and sheepskins.

##### LIVESTOCK AND MEATS

Further grading and slaughter tests of hogs and lambs were made to determine more definitely the number of grades and the limitations of each. The tentative standards were modified somewhat, and later they will be presented to the trade for suggestions. Plaster models of three types and six grades of slaughter hogs made in the bureau have been very helpful in illustrating the difference in grades and types of hogs. There has been considerable demand for these models from extension workers.

##### LAMB GRADE STANDARDIZATION SLAUGHTER TESTS

A lamb and mutton slaughter test was conducted in cooperation with the Bureaus of Animal Industry and Home Economics. It was found that grading results of the live lambs and ewes correlated closely with the grading of their carcasses. The live weights of the lambs varied from 77 pounds for the Choice grade to 40 pounds for the Culls. The average dressing yields of the lambs and ewes showed a gradual decrease from Choice to Cull, with a range of 11.1 per cent on lambs and 7 per cent on ewes. The percentage loss in chill room was slightly less for the lower than for the higher grades. The grading committee working on cooked meat found little difference in tenderness and flavor of lean meat of the several grades. This was contrary to expectations, and further studies will be made to verify the results. There was a high correlation between certain characteristics of the live animal and the carcass grades.

## HOG GRADE STANDARDIZATION SLAUGHTER TESTS

A number of hog-slaughter tests were conducted. The live hogs were graded according to the tentative standards already set up by the bureau. Dressing yields, measurements of carcass, and cutting yields of wholesale cuts were obtained. The carcass measurements showed a direct correlation between the grades of live hogs and dressed carcasses. Much other valuable information was obtained.

## QUALITY OF MEAT RESEARCH

The study of the factors that make quality and palatability in meat, conducted in cooperation with the Bureaus of Animal Husbandry and Home Economics and 25 State agricultural experiment stations, was continued with satisfactory results. In connection with this study 680 cattle, 500 lambs, and 764 hogs were graded and scored according to the division's grade standards.

More than 3,000 cattle and about the same number of lambs have been graded during the 5-year period 1925 to 1929. Statistical studies have been made of the various characteristics of the live cattle and their carcasses, and the data are now believed to be of sufficient volume and of such character that results of the work can be summarized for publication.

Results of cattle-grading work conducted in cooperation with the Bureau of Animal Industry and a large number of the State agricultural experiment stations, involving more than 2,000 cattle, showed that width and depth of body, shape of head, and refinement are reliable indices of the grade of the animal as a feeder. However, feeder-cattle grade has not shown a high correlation with rate of gain during the feeding period. In this grading of feeder cattle the factors that indicate the conformation, finish, and quality of the carcass at the end of the feeding period were the primary considerations.

## MARKET NEWS

Branch offices were maintained in 24 cities, and market conditions and prices at 30 of the important markets of the country were reported. State agencies assisted the Federal department in financing the market-news service at a number of points.

Extension of the southern circuit of the bureau's leased wire telegraph system and the establishment of a circuit reaching the Pacific Northwest enabled the bureau to extend the service to Jacksonville, Fla.; Montgomery, Ala.; Jackson, Miss.; Nashville, Tenn.; Seattle and Spokane, Wash.; Corvallis, Oreg.; and Boise, Idaho. At most of these points dissemination was effected largely by means of the radio and press, although at Jacksonville, Nashville, and Spokane arrangements also were made for mail release of incoming market information. Extending the leased-wire facilities to North Portland made it possible to render a more complete, timely, and accurate service by the division's office at that market.

Through extensions of the bureau leased wire and the broadening of contacts with various cooperating agencies, such as State departments of agriculture, the press, radio stations, telegraph and cable

companies, boards of trade, chambers of commerce, ticker services, and organized trade interests, the division's news service was made promptly available in all sections of the United States. The service was improved by giving constant attention to the style, content, and timeliness of the reports released, and by unceasing effort toward obtaining greater uniformity and understanding in the use of standard class and grade terminology. Efforts expended, both in improving the service and in broadening its scope, usefulness, and avenues of dissemination were met by evidence of ever-increasing interest on the part of producers and the trade.

Appropriations for the fiscal year 1931 will permit the expansion of the news service to include price and supply information on hogs sold in Iowa and southern Minnesota direct to packers; and for establishing and conducting a livestock market-news service at Nashville in cooperation with the Tennessee State Department of Agriculture. Much attention has been given to working out plans for these proposed expansions, particularly the service to be conducted in Iowa and southern Minnesota, where current information will be obtained for the first time on hogs sold direct to slaughterers. The need for this additional service is indicated by the fact that Iowa markets between 10,000,000 and 13,000,000 hogs annually, about 64 per cent of which now move direct to packers, and there are seven large interior meat-packing plants in that State and in southern Minnesota which slaughter approximately 5,000,000 hogs annually, most of which are purchased direct.

The meat market reporting service on western dressed meats which has been carried on for several years at Boston, New York, Philadelphia, and Chicago was continued. The service was expanded through the inauguration of daily reports covering market conditions and prices at New York City on locally dressed meats and by the establishment of a semiweekly report covering the San Francisco wholesale meat market. The need for this additional service had long been recognized. Locally dressed meats in New York represent approximately one-half of the total meat supply of that city and vicinity. For this reason both buyers and sellers study the division's reports regularly in planning their operations. Some selling agencies base their quotations to customers on the prices quoted in the reports, and one of the largest slaughtering plants in New York advises that distant buyers purchase meats in large quantities on the basis of the reports. The reports are of interest also to livestock producers in the Middle West, where most of the livestock slaughtered in and near New York City originates.

The San Francisco market is the only wholesale meat market on the Pacific coast which is reported by the division, and local methods of trading in both livestock and meats have made the division's reports of particular importance in bringing about a better understanding of standard classes and grades of dressed meats.

To meet certain demands for market quotations on hogs on a finer segregation of weights and grades than had been previously released, the division arranged to furnish the commercial telegraph companies with quotations on weight ranges of 20 pounds for hogs weighing from 140 to 220 pounds, and ranges of 30 to 40 pounds for hogs weighing more than 220 pounds. This service has proven very use-



ful where there is a marked tendency to buy and sell hogs primarily on a weight basis.

Considerable improvement was made in the market-news service furnished the press associations by revising and amplifying several of the reports and adding several special reviews and summaries. The radio service was expanded and improved in various ways. Approximately 100 radio stations are now broadcasting the division's reports.

Until recently the Buffalo Stockyards Co. had been furnishing its representatives and certain other interests, including a number of radio stations, with reports of the Buffalo livestock market obtained from sources other than the news service of this division. It is now using the division's reports for this purpose and is thus aiding in bringing the bureau's livestock standards to the attention of patrons of the Buffalo market.

The inauguration of mimeographed releases at Cincinnati was an important addition to the market news disseminating facilities of that office, and was made possible through the cooperation of local commercial interests.

Assistance and suggestions on marketing problems, and information relative to various phases of the market situation were given during the year to many producers and members of the trade by all field offices as well as by the Washington office.

Long-distance telephone calls and requests for information by telegraph increased materially. For example, a cooperative wool-marketing organization in one of the Eastern States requested and received special telegraphic reports covering quotations on certain grades of wool on the days that it offered wools at public auction by sealed bids.

Many letters received from producers and others told of specific instances where market information supplied was of material financial benefit. Trade interests at South St. Paul adopted the official Federal grades on calves in their open-market transactions, thereby tending to develop greater uniformity to price quotations and giving the market more stability. The division's representatives at that market assisted materially in acquainting producers with the new arrangement through radio talks, press, and mimeographed releases, and posters illustrating the various grades of live vealers.

Temporarily demoralized market conditions and sharp price reductions for dressed lamb in August, 1929, prompted the transmission of telegrams to State marketing officials in southeastern lamb-producing districts. These messages called attention to the condition of the market and the probable results of continued heavy shipments of lambs. Those acting on this information were undoubtedly saved thousands of dollars by deferring shipments until a later date.

Efforts were made to keep lamb feeders in Colorado and western Nebraska in constant touch with the market during the winter and spring when the need for such information was extremely urgent because of the unusually large lamb supplies. Special reports on the market for fed lambs originating in these areas were prepared at several branch offices and transmitted daily by wire to the Denver office for prompt distribution to producers and feeders.

Arrangements were completed with a number of newspapers to feature complete daily livestock-market reports, including comment

and detailed quotations, and specially prepared reports were written and transmitted regularly to the metropolitan and country press for publication in several hundred newspapers that had not previously utilized the service.

Despite the greater distribution of reports by the press, radio, telegraph, and telephone, the demand for mail reports continues to increase. This is particularly true in the case of special reports and those of a statistical character.

#### MEAT-GRADING PROJECT

The meat-grading service has proven to be very satisfactory in the 15 cities where it is available. Demand from commercial interests has increased as the service has become better known. More than 22,500,000 pounds of meats were graded during the year, approximately one-third of this being for the Veterans' Bureau, the Shipping Board, and other Government buyers. The service has been used extensively by the dining-car departments of several well known railroads that purchase graded and stamped beef for their dining cars regularly.

One other feature of the meat-grading service, which has brought its value prominently to the front, is its use in connection with the sale of pre-cut and ready-packaged, fresh (unfrozen) meats of all classes. This service was inaugurated in April, 1930, by a large food-products corporation with headquarters in New York, which operates eight packing plants in various parts of the country. Developments so far indicate that this method of retailing meats, involving the use of Government grade labels, may become an important factor in the meat trade.

#### BEEF GRADING AND STAMPING

Material increases in the quantities of beef graded and stamped are shown at practically all markets. A total of 48,548,579 pounds of beef was graded and stamped, this being an increase of 16,828,888 pounds over the amount for the previous year. Demand for this service from retailers continues to increase. Many large chain-store organizations operating markets in the eastern half of the country are now selling United States graded and stamped beef in their markets. In some instances full-page advertisements featuring Government graded and stamped beef have been used to bring this beef to the attention of consumers. Various hotel and restaurant supply houses are now handling Government-graded beef regularly. One of them, upon its own initiative, is arranging for an exhibit of Government graded and stamped beef at the annual convention of the association of hotel and restaurant men to be held at Cleveland, Ohio, this fall. The beef grading and stamping service is conducted under a cooperative arrangement involving receipts and disbursement of funds with the National Live Stock and Meat Board.

#### PUREBRED LIVESTOCK PRICE SURVEY

The eighth price survey on purebred livestock, covering sales in 1929, was made and the results summarized in 21 separate reports issued in March and April, 1930. This survey indicated that purebred-livestock prices during 1929 were slightly higher for beef and dairy cattle and slightly lower for hogs and sheep than those in

1928. This information tends to stabilize prices by keeping buyers and sellers informed as to prices and price trends throughout the country. The survey indicates that nearly 90 per cent of all pure-breds sell within a narrow range at prices not excessively higher than those paid for market animals.

#### THE STATISTICAL SECTION

Much of the basic statistical material used in the research work is obtained in connection with the operation of the market-news service. These statistics cover daily livestock prices of 60 classes and grades at 23 markets; daily fresh-meat prices of 43 classes and grades at 4 markets; daily cured-meat prices of 20 classes and grades at 4 markets; weekly wool prices at Boston; weekly, monthly, and yearly averages of prices; actual daily receipts of cattle, calves, hogs, sheep, and horses and mules at 18 markets; monthly gradings of meat by class; grading of Good, Choice, and Prime beef handled in the beef grading and stamping experiment, and many computations and summaries.

#### EDUCATION AND DEMONSTRATION

In keeping with the constantly increasing demand for information on grade standards, consumer preferences, marketing methods, and factors affecting market prices, educational work in these lines was continued. This work is conducted largely by means of demonstrations, exhibits, posters, charts, models, moving pictures, addresses, radio talks, correspondence, and press releases. Special reports dealing with meat grading and beef stamping, standardization, and the supply, demand, and price situation, were prepared for dissemination through the press and over the radio.

One representative, in cooperation with the United States Office of Extension, State extension services, and the Federal Board of Vocational Training, devoted the major part of his time to attending meetings of livestock producers, vocational agricultural teachers, and others interested in livestock marketing, where he gave demonstrations in livestock grading and delivered addresses on consumer preferences, market requirements, and methods of adjusting production to demands so as to bring increased returns to producers. In this work he carried out 29 assignments in 14 States, attended 9 State or district livestock association meetings, and held 84 demonstrations or livestock-improvement meetings which were attended by approximately 124,000 stockmen, bankers, and livestock specialists.

#### WOOL STANDARDIZATION

The use of the Federal wool grades has increased rapidly. Many new sets were issued, and large numbers of old sets were reconditioned and reissued. Sets were issued to producers, dealers, and manufacturers, educational institutions, and to the United States customhouses for use in the administration of the new tariff act.

At the request of the Wool Institute a classification was made of the wool-top production of the United States. More than 300 samples were analyzed and classified in accordance with the official standards. These samples were mounted and are being used as an exhibit by the Wool Institute for the guidance of its membership.

### ROMNEY WOOL STUDIES

At the request of the American Romney Breeders Association, the bureau has undertaken the study of the wool of the Romney sheep. Romney breeders hope, through a careful study of the wool produced by the Romney sheep in this country and possibly in foreign countries, to develop definite standards for their breed. The Romney breeders were given instructions for drawing samples of wool from the fleece and forwarding them to the bureau for study. More than 500 samples have been received, and at the end of the fiscal year these were in the process of classification. When the classification is completed, the individual breeder will be notified of the grades produced by his flock, and a summary will be made of the gradings of all of the samples.

Much educational work has been done among wool growers in order to bring about a better understanding of the wool standards, and to demonstrate the best methods and practices in the handling of wool.

### WOOL SCOURING AND SHRINKAGE INVESTIGATIONS

The wool scouring and wool shrinkage investigations were continued. Large numbers of samples of wool, submitted by agricultural colleges, county agricultural agents, and other extension workers, and by individual wool producers, were tested for shrinkage and yield. The tests in each instance embrace the operations of grading, weighing, conditioning, scouring, drying, reconditioning, reweighing, and calculation of yield and loss. The results of the tests are reported to the senders of the samples. The data collected are being compiled for use in the wool-standardization program and for dissemination to the public.

### WOOL-UTILIZATION STUDY

The division has recently begun investigations relating to wool utilization. In this will be embraced studies of the various uses of wool including those for personal, household, commercial, industrial, scientific, and military purposes; the economic factors affecting the use of wool; the possibilities of expanding the present uses for wool; the effect of substitutes of natural and synthetic origin on the use and consumption of wool; the creation and development of new uses for wool. These studies are correlated with the wool-standardization work.

### WOOL-STOCK REPORT

The quarterly wool-stock report was continued, periodical surveys being made of the stocks of wool, wool tops, and noils held by dealers and warehouses in the United States. The cooperative relations with the Bureau of the Census were maintained, whereby the stocks of wool held by manufacturers as reported by that bureau were combined with dealers stocks, and a joint report in mimeographed form was periodically released.

A service has been inaugurated whereby current economic information on wool and mohair is being released. These releases are issued approximately three times a week and make available pertinent and valuable information to those interested in these commodities.

**MOHAIR STANDARDIZATION**

With the completion of certain phases of the investigational work pertaining to mohair standardization, tentative grades for mohair were formulated, and distribution of practical forms of the grades was begun. More than 100 sets have been issued to dealers, manufacturers, producers and other interested in the work, for the purpose of obtaining comments and criticisms on the grades that can be used in the further development of the standards.

**GRAIN DIVISION**

H. J. BESLEY, *in Charge*

**ENFORCEMENT OF THE UNITED STATES GRAIN STANDARDS ACT**

The work was administered from the Washington office and from general field headquarters at Chicago. The central board of review and the force in charge of inspection efficiency were also located at Chicago. Under the direction of general field headquarters the divisional organization was operated as follows: Pacific coast headquarters, Portland, Oreg.; export division headquarters, New York; southeast division, headquarters, Indianapolis; Great Lakes division, headquarters, Chicago; and southwest division headquarters, Kansas City.

At the close of the year there were 37 district offices, 136 regular inspection points and 20 additional designated points, and 458 licensed inspectors.

**CONFERENCE WITH CANADIAN OFFICIALS**

Pursuant to Senate Resolution 220, which authorized the State Department, the Interstate Commerce Commission, the United States Shipping Board, and the Department of Agriculture to investigate and report on the alleged diversion of traffic in grain and other commodities from United States Atlantic ports through Canadian North Atlantic ports, arrangements were negotiated by the State Department with the Government of Canada for a conference between members of the State Department, the Department of Agriculture, and officials of the Canadian Government at Ottawa, Canada, on February 3, 1930. At this conference Canadian Government officials were requested to permit this department to establish and maintain United States inspectors at Montreal for the purpose of inspecting, grading, and certificating as to grade grain of United States production passing through the port of Montreal in foreign commerce.

**CERTIFICATION OF PRODUCTS FOR EXPORT**

During the year the Dominion of Canada Department of Agriculture issued an order requiring that importations from the United States into Canada of bran, middlings, mill feeds, corn, oats, wheat, rye, buckwheat, and other grains, for use in feeding livestock or susceptible of conversion into feed for livestock be accompanied by a certificate signed by an official of this department reciting the fact that such product had been grown in the United States. This division was charged with the task of making these certifications in order to facilitate the movement of commerce to Canada and to avoid costly delays and demurrage charges. The field offices not

only at border points but also at inland points of origin were called upon to certificate a large number of shipments of this character, with entire satisfaction to the Canadian Government as well as to producers and shippers in the United States.

The Mexican Government placed a quarantine against the importation of wheat from States in which flag smut was present, excluding specifically wheat from Illinois, Missouri, and Kansas. Certificates reciting the fact that wheat intended for shipment to Mexico did not originate in any of the three States mentioned were issued by the Plant Quarantine and Control Administration. That administration, however, was not organized to care for shipments which were loaded into cars in the interior and shipped to the border, and requested this bureau to employ the organization of the Grain Division to furnish information to plant-quarantine inspectors as to the origin of shipments.

#### REGULATORY ACTIVITIES

Administration of service and regulatory work is normally attended with more or less criticism but during the past year criticism has been negligible. This is due, in some measure, to increased inspection efficiency, to the better average quality of the crops, and the consequent small percentage of grain falling into the lower grades; but in larger measure to the better understanding on the part of farmers, country elevator operators, and others in the trade of the standards and the methods by which they are administered. This better understanding is mainly the result of the work of an educational committee in the division, with the assistance of district supervisors and the collaboration of the Extension Service, agricultural colleges, crop-improvement associations, and others.

The enforcement activities of the division fall into two classes: (1) Cases where, as agents of the Food and Drugs Administration, Federal grain supervision offices have undertaken to obtain compliance with provisions of the United States food and drugs act as that law applies to whole grain; and (2) cases under the provisions of the United States grain standards act designed to prevent fraud in grain transactions.

The ordinary practice of many terminal and export grain elevators is to mix and blend like grains of different grades and qualities so that the resultant mixtures will come within the minimum limit of the official standards for the grade No. 2 wheat, or No. 3 corn. According to contracts customary in the grain trade, the grade No. 2 wheat is the usual grade contracted for both in domestic and export transactions. Practically all of the mixing that is done in export elevators is of stocks of grain accumulated by and belonging to patron dealers of the elevator, and is performed at the order of such dealers. The amount of profit in the mixing operation depends on the quantity of low-grade cheap grains that can be added. In general, such mixing is not unlawful, but some dealers add foreign grain, screenings, and musty and distinctly low-quality grain, which practice is deemed unreasonable.

A spirit of cooperation has been noted among the dealers in working with the department to prevent the mixing of material which this office has considered unfit. Supervisors have made arrange-

ments whereby they secure samples of practically every car or larger lot of objectionable substances that arrive in their market. All of the samples are sent to general field headquarters for a decision. When the material is considered unfit for mixing, the fact is telegraphed to the field supervisor, who communicates it immediately to the interested parties and asks the possessor of the material for information as to its intended disposition. Experience has shown that ordinarily trade members who receive such notices willingly comply with them and keep the objectionable material out of human food channels. It was necessary, however, to carry one case to the Federal courts, where decision is now pending.

Each year several hundred carloads have been tagged as "unfit for mixing with sound graded wheat intended for human consumption."

Findings were published by the Secretary of Agriculture on the basis of hearings conducted during the previous year in three cases of violation of the United States grain standards act. Hearings were held in a number of other cases, and as a result penalties were imposed in several cases by grain exchanges of which the offending firms were members. Corrective action was brought about through correspondence or personal contacts in a large number of cases.

The year's records showed continued improvement in inspection efficiency and in intermarket uniformity in grading. This was due to improved supervision coverage of all inspection points and better supervision of intermarket movements. There was a general absence of trade complaints involving important intermarket grain movements. The general conformity to the official interpretations of the standards was greater than during the previous two years.

Intermarket supervision reports covered 154,496 cars of grain which were graded at different markets. This is approximately 9,000 cars more than were reported last year, and 30,000 more than were recorded during any previous fiscal year. Supervision information covering nearly 309,000 inspections is available from these reports and, with water-borne grain coverage, constitutes an effective uniformity and accuracy check on inspections of over 385,000 carloads of grain.

#### EDUCATIONAL ACTIVITIES

The education of country grain dealers, producers, and agricultural students in grain grading has been carried on through grading schools conducted throughout the grain-producing territory. Printed bulletins have been prepared and distributed, and a 2-reel motion picture illustrating grain-grading procedure was produced and used. These bulletins have met with a general demand and have been distributed to all agricultural colleges concerned with grain standardization, to secretaries of grain dealers' and producers' associations, and to other interested persons engaged in crop-improvement work who have requested copies.

Federal grain supervisors gave grain-grading instructions and demonstrations at 197 meetings widely distributed throughout the grain-producing territory, not including the west coast division. Six circular letters to grain inspectors giving general information for the improvement of inspection efficiency have been prepared.

The grain, milling, and agricultural publications have given wide distribution to material furnished them by this bureau.

During the year the board received and reviewed 24,891 official supervision and appeal samples from field offices, and 1,219 board appeals were handled. In 71 per cent of these appeals the supervisor's grade was sustained.

The field offices handled 80,087 appeals from decisions of licensed inspectors. In 56,262 of these cases, or 70.3 per cent, the grade assigned by the inspector was sustained. Approximately \$100,000 was returned to the Federal Treasury from fees collected for this service.

#### GRAIN INVESTIGATIONS

For several years workers in the United States Department of Agriculture have been searching for a fumigant suitable for use in the treatment of stored grain. During the last year a method of using ethylene oxide in combination with carbon dioxide has been developed that appears to be well adapted for the fumigation of grain in elevator bins. There is no fire hazard when the fumigant is properly applied, and the method of application is simple. The fumigant has no harmful effects upon the milling and baking qualities of the grain, leaves no odor, is not expensive, can be handled without danger to the operator, and when properly applied is 100 per cent effective against the grain weevil even at winter temperatures.

The insecticidal value of ethylene oxide-carbon dioxide mixture was developed in the Bureau of Entomology and the Bureau of Chemistry and Soils. This bureau participated in developing satisfactory commercial application of the insecticide to grain in storage in large terminal elevators.

#### MILLING, BAKING, AND CHEMICAL LABORATORY

Concentrated attention was given to the performance of a number of devices recommended as suitable to determine the moisture content of grain in an almost instantaneous manner. One device, the Tag-Heppenstall moisture meter, gave considerable promise under controlled laboratory conditions. By this device a moisture test can be completed in approximately one-half minute. This is to be compared with the time interval of 45 minutes now necessary to make a moisture test by the Brown-Duvel method (recognized as official under the grain standards act). The device is now being tried out on the new crop under various conditions. If it proves satisfactory, it will revolutionize the practice of moisture testing, as it will make possible the moisture testing of all samples of wheat, make possible the reporting of protein on a moisture basis, and be of use in making protein surveys and in combine-harvester studies.

A research project was carried on to determine the milling and baking properties of the five commercial classes of wheat of the 1929-30 crop. This study will make available data which will be useful to the Federal Farm Board. A study was made to determine how well the various numerical grades and standards for hard red winter wheat reflect milling and baking quality. A comparison was made of the relative milling and baking qualities of the spring



wheat grown in the United States and Canada. Over 900 milling and baking tests were made in covering these three lines of investigations.

The facilities of the milling, baking, and chemical laboratory were extended to other bureaus, and hundreds of tests were made of samples of grain for various purposes. Technical Bulletin 197, Milling and Baking Qualities of World Wheats, was prepared for publication.

#### RICE-GRADING SERVICE

The Federal-State rice-grading services conducted in Texas, Louisiana, and California were continued. The grading service in Texas was expanded to include milled and brown rice involved in foreign and domestic shipments and a considerable quantity of such rice was graded under Federal supervision and sold on the basis of Federal-State grade certificates. The standards covering rough rice produced in California were amended to make them more applicable to such rice. Nearly all rough rice produced in California is now being graded under Federal supervision. A number of lots of rough and milled rice were graded for the benefit of other branches of the Government, and lots of milled rice were graded for the War, Navy, and Interior Departments, and other branches of the Government that purchase rice on the basis of the Federal rice standards. One of the principal advantages accruing to rice farmers and other members of the rice industry from an official rice grading service based on Federal standards uniformly applied is that the sales price for rice so graded makes possible a reliable market-news service. Such a market-news service is now in operation in the bureau.

#### ARTIFICIAL DRYING OF GRAIN AT COUNTRY ELEVATOR

Investigations were conducted to determine the practicability of drying damp grain in a commercial grain drier by means of heated air. The tests showed that grain driers are practicable at country elevators located in humid areas where a considerable quantity of damp grain is ordinarily delivered from farms. Drying the grain artificially eliminates labor and permits combining earlier in the season, and after rains and dews. This in turn reduces the time required for harvesting, and prevents losses in standing grain due to hail, high winds, and heavy rains.

These investigations were conducted in cooperation with the Division of Agricultural Engineering, Bureau of Public Roads. The data secured in the investigations were compiled for publication.

#### FARM GRAIN STORAGE

Further studies were made of farm grain storage in cooperation with the Bureau of Public Roads. A report of these studies which discusses the economic advantages of storing grain on the farm and the general types and construction of farm storage plants under various conditions, together with the grain-handling equipment that is essential for the proper handling of bulk grain at a farm storage plant has been prepared for publication.

### RICE-TESTING EQUIPMENT DEVELOPED

Two new rice-testing devices for determining the quality and condition of rice for grading, storing, and milling purposes were developed. A rice-scouring device for removing the bran from rough rice from which the hulls have been removed by means of the Smith shelling device was perfected and adopted for grading purposes. By means of this device it is now possible to determine definitely the amount and extent of any defect, such as heat damage, chalky kernels, etc., that may be present in the rough rice.

A mechanical sieving device for determining the quantity of foreign seeds and of broken kernels in any lot of rough, brown, or milled rice in a definite and uniform manner was designed and perfected, and was adopted for rice testing and grading purposes.

### SEED-RICE SURVEY

Surveys were made in the southern rice-producing States and in California of the seed rice that was being planted and of the seed rice that farmers had intended to plant. Full analyses of the seed samples were made to determine the germination qualities of the rice and the admixtures of weed seeds and red rice in the seed rice. A high percentage of weed seeds and red rice and low percentages of germination were found in a high proportion of the seed lots. This information in detail was submitted to growers and to the banks and agricultural-credit corporations that loan money on seed rice and to the officials of the various rice growers associations, with the result that many lots of the seed rice that were being planted or which the growers had intended to plant were discarded and new lots of high-germination seed free of weed seeds and red rice were secured and planted.

### BULK HANDLING OF GRAIN AND RICE

Investigations concerning the economic advantages of handling grain in bulk were continued on the Pacific coast. Similar investigations were begun in that area with reference to rice. Detailed comparative-cost data for each step or operation of handling grain in bulk and in sacks were secured by the Division of Farm Management. These data show that a material saving is made by harvesting and handling grain and rice in bulk. Assistance was rendered grain and rice farmers and managers of grain and rice storage plants in planning new bulk storages and bulk-handling equipment suitable for the conditions under which each was intended to operate.

### SURVEY OF DOCKAGE IN WHEAT AND FLAX PRODUCED IN THE SPRING-WHEAT AREA

A survey was made of the dockage (separable foreign weed seeds) contained in the wheat and flax as threshed and marketed in the spring-wheat States. The survey showed that the threshed wheat and flax produced in that area contained a large quantity of weed seeds and other foreign materials.

Publicity was given to the data obtained in the survey through the press, radio talks, pamphlets, and posters. It is noticeable that considerable effort is now being made in that area to do more seed cleaning and to remove more of the weed seeds from the threshed grain before it leaves the farm.

## DIVISION OF DAIRY AND POULTRY PRODUCTS

ROY C. POTTS, *in Charge*

## RESEARCH PROJECTS

A study of consumers' habits, preferences, and demands for quality in eggs was undertaken at Boston, New York, Newark, N. J., and Washington, D. C., and in cooperation with the University of Illinois, at Chicago. More than 50 retail stores in these cities sold eggs of the four United States retail grades viz, United States Specials, United States Extras, United States Standards, and United States Trades, in cartons specially labeled to indicate their quality or grade. The volume of eggs of each grade and of private brands sold in these stores was ascertained weekly and compared with the volume of sales of eggs of private brand sold in an equal number of check stores. Personal contact was made with more than 2,000 housewives who bought their eggs in the first group of stores with a view to ascertaining the factors or conditions which influenced their actions in purchasing a particular United States grade or private brand of eggs.

Preliminary indications are that housewives either seek to purchase eggs of the freshest or best quality, or eggs that are low in price. It was apparent that consumers generally do not have definite information on the various qualities of eggs.

The general results indicate that eggs are not well graded for quality in retail channels and that there is much to be done in teaching both the trade and housewives the qualities of eggs of the various United States grades and the use of each grade of eggs for the purpose it is best fitted to serve.

Another egg-marketing study covered an analysis of the price-making forces in the New York egg market. An attempt was made to describe the forces that influence the price of eggs in the New York market, and to analyze the factors that influence egg prices in the spring, in the fall, and from month to month. The preliminary results of this study indicate that general price levels and trends can be forecasted with reasonable accuracy when conditions near normal prevail through the different seasons.

## MARKET-NEWS WORK

The market-news work was expanded on the Pacific coast by the opening of new offices at Portland, Oreg., and Seattle, Wash., in August, 1929. Previously in those cities the local markets for dairy and poultry products were not included in the Government reports, and such information as was available was mailed from the San Francisco office. A distribution office was established at Spokane which, with the offices at Seattle and Portland, now makes it possible to give prompt market-news reports on dairy and poultry products to all the Pacific Northwest States.

Two new weekly reports were instituted at the Pacific coast offices—a weekly report of receipts of eggs at commercial egg-packing plants and a weekly report of butter production on the Pacific coast. These reports furnish information regarding commercial supply close to or at point of production, which is exceedingly valuable.

At the Boston office a weekly report of milk and cream receipts was instituted. This report is similar to the reports issued weekly

at the New York and Philadelphia offices for those markets and shows the State of origin. A weekly report of cream receipts at Chicago by States of origin was instituted by the Chicago office.

The monthly hatchery report was issued again this year beginning in February, with the cooperation of nearly 1,500 commercial hatcheries. This report provides an index of conditions in the baby-chick hatching industry and is one of the most valuable reports issued by the bureau for the poultry industry.

A monthly report of poultry canned by poultry-canning plants was instituted during the year.

#### STANDARDIZATION AND INSPECTION

With the opening of new offices in Portland and Seattle, the grading service on butter, cheese, and eggs was extended to those markets, where it was received with much favor by the trade. The United States grades were accepted by the trade as official for those markets. At Los Angeles a large butter-marketing organization made application for the grading of all the butter received from its member creameries. This is the second Pacific-coast organization to apply for the service on all of its butter supply and to use it as a basis for making payment to its creameries for their butter. In California and Washington this service is rendered in cooperation with the State departments of agriculture of those States.

At practically every market where the butter and egg grading service is rendered there was an increased demand for the service, especially where the privilege of issuing certificates of quality is used. During the year 12 firms applied for and were granted the privilege of issuing certificates of quality on eggs, and 9 firms applied for the privilege on butter. More than 30,000,000 pounds of butter and 50,000 cases of eggs a year are marketed with certificates of quality.

More than 155,000,000 pounds of butter and 382,000 cases of eggs were graded during the year.

In attempting to grade and label or brand American type Cheddar cheese, which is manufactured in various styles or shapes and is coated with paraffin to protect the surface, one of the problems has been to affix to the cheese itself a label or mark of the grade of the cheese. A special machine was developed in the bureau which successfully brands cheese through the use of an electrically heated stamp. The primary purpose of branding cheese with its grade and of approving the use of certificates of quality on or in packages of butter and eggs is to carry through to the consumer the grade of the product. A total of 561,000 pounds of cheese was graded during the year.

During the fall of 1929, the turkey-grading service was extended to shipping points in the Pacific Northwest and in Minnesota and to a larger number of eastern terminal markets, including Pittsburgh, Detroit, and Chicago. A total of more than 8,000,000 pounds of dressed turkeys were graded at both shipping points and terminal markets.

The inspection of poultry at canning plants for condition and wholesomeness was extended during the year to 8 plants in the New York district, 19 plants in the Chicago district, and 2 plants in

California. During the year a total of 25,260,000 pounds of poultry was inspected for condition and wholesomeness. Of this quantity approximately 4.3 per cent was rejected as diseased or otherwise unfit for food. Application was received from a group of 9 poultry-packing plants in Kansas, Nebraska, and Missouri for the grading of their dressed poultry and the labeling of each bird with a private brand and Government grade mark. This service has been established and is the first of its kind in the United States.

### DIVISION OF HAY, FEED, AND SEED

W. A. WHEELER, *in Charge*

Satisfactory progress was made by the seed-verification service. More and more farmers are becoming acquainted with the merits of verified-origin seed, largely because of the attractive tag certificates adopted during the year. The service has passed the experimental stage and is now regarded by many seedsmen as a fixture in the seed trade.

More than 1,700 inspection certificates, covering approximately 36,600,000 pounds of alfalfa and 22,000,000 pounds of red-clover seed, were issued. Clover seed was included in the service, after having been dropped the preceding year. In certain sections there apparently is a greater demand for verification of red clover than of alfalfa; therefore this seed will continue to be verified as to origin during the next fiscal year.

To avoid confusion, all verified-origin dealers were required to use the same kinds of tag certificates, and a second (new) form of tag giving the address of the branch office which issues inspection certificates to the verified-origin seed dealer using this form was adopted so as to afford greater protection to the buyer.

### SEED-REPORTING SERVICE

Reports covering prices, supplies, movement, and other data on 42 different kinds of field seeds were issued, and about 190,000 copies were distributed to growers, country shippers, seedsmen, retailers, banks, associations, newspapers in seed-producing districts, agricultural periodicals, and others.

Seed surveys were made and situation reports issued covering 25 different seed crops. They were based on information obtained from nearly 8,500 country shippers and more than 30,000 growers, supplemented by other facts and data obtained from State agricultural statisticians and by personal observations in the seed producing districts. Foreign information was obtained through contact with foreign correspondents. Reports regarding prospective demand, retail sales, and prices were issued after the data from more than 11,000 retail dealers had been assembled. Information regarding certified seed-potato production was obtained from State agencies. Special reports were issued on vetch, ryegrass, and sunflower seed.

### GRAIN, HAY, AND FEED MARKET NEWS SERVICE

The outstanding development of the year was the extension of the grain and hay market-news service to the Pacific coast and the rounding out of the service into a national organization. Three new

offices were established—one each at Los Angeles, San Francisco, and Portland. These offices are now furnishing more comprehensive reports of the market situation in those areas and have made it possible to effect a much better distribution of the various market reviews to the agricultural interests on the Pacific coast. The work has been favorably received not only by the grain and hay growers but also by trade agencies. Requests for special information have been numerous, but reports indicate that the information being furnished is meeting the needs of the agricultural interests in that area.

The rice market-news service established during the previous year was materially broadened and improved. The cooperation of southern rice mills was obtained in the collection and compilation of more authentic and complete reports on the stocks and movement of rough and cleaned rice. The rice growers' associations and others in Texas, Louisiana, and Arkansas are obtaining regular market reports.

The hay market-news service was reorganized and extended. A special service on alfalfa hay was begun and a market review on alfalfa hay covering the principal alfalfa markets in the central West and on the Pacific coast is being issued weekly. More comprehensive information is being furnished on broomcorn than heretofore, covering the market situation in all of the principal producing areas.

#### REVISION OF UNITED STATES HAY STANDARDS

Extensive studies of the application of the Federal standards to the hay crops of the United States were carried on, and suggestions for changes from the hay trade were considered. Effective November 1, 1929, certain changes were made in the standards for all the principal kinds of hay. The color specification of the No. 1 grade and the special grade of Extra Green was reduced 5 per cent for Timothy and Clover hay and Johnson and Johnson Mixed hay, and 10 per cent for Prairie hay and Grass hay, in order to increase the quantity of hay that would fall into these two grades. The definitions of "hay" and "Sample grade" were changed so as to allow undercured hay to be graded as Sample grade instead of excluding such material from the definition for hay. Changes were made in the special grades for the principal kinds of hay in order to make the grade designations more descriptive of the type of hay to which they apply.

#### STRAW STANDARDIZATION

At the request of the United States Army, work was begun on the preparation of specifications for straw to be used by the Federal Specifications Board in purchasing straw for use in Government departments. It is planned to issue United States grades for straw which can be used not only by the Federal Specifications Board but also at central markets.

#### ALFALFA-MEAL STANDARDIZATION

The field and market surveys on alfalfa meal were continued with special reference to the alfalfa meal produced by artificial hay-drying plants. Contacts were made with the State feed-control officials in order to obtain further information on the factors to be

considered in developing standards for alfalfa meal. A paper entitled "Problems in Alfalfa-Meal Standardization" was presented at the annual meeting of the Association of Feed Control Officials.

#### HAYSTACK MEASUREMENT

The tabulating and summarizing of the haystack measurement data collected in cooperation with 10 of the Western and Great Plains States during the season of 1927 and 1928 was completed. The Division of Farm Management and Costs assisted in this work. Formulas for determining the volume of several types of oblong stacks and a method of determining the volume of round stacks were developed. The average number of cubic feet per ton was determined for various kinds of hay and for different lengths of time in the stack. These figures, since they are based on data for a large number of stacks, can be used with the assurance that they will give fairly accurate results. The results of this study have been submitted for publication, and an article has been prepared for the 1931 Yearbook.

#### CURING SOUTH TEXAS HAY

Much of the hay produced in the prairie-hay section of south Texas is of low quality. Producers and dealers maintain that it is impossible for them to produce hay that has sufficient color for the No. 2 grade. A study was begun for the purpose of determining whether the hay deteriorates in color after it is stored or if the poor color is due to poor curing and late cutting. The samples cut during the early season seem to indicate that this hay has considerable color at that time. Bales are being stored and will be examined again during the winter to determine whether the color was lost in storage.

#### HAY-INSPECTION SERVICE

The hay-inspection service has shown a constant growth. Six new cooperative agreements have been made which extended the work into new territory, particularly in the alfalfa-producing sections in the West. Probably the most important of these is the agreement with the California Department of Agriculture, which provides for definite establishment of Federal-State inspection service in that State. An agreement with the Arizona Farm Bureau Federation now makes Federal inspection available at shipping points in the Salt River Valley, while other agreements provide for service in Utah and Idaho, and additional service in New Mexico. An agreement with the Atlanta Commercial Exchange by which all members of that exchange have all hay received by them at Atlanta inspected by Federal inspectors adds another large receiving market to the service, and a new agreement negotiated with the Oklahoma State Market Commission has resulted in the renewal of the agreement with that State which was discontinued about a year ago.

#### BROOMCORN INSPECTION

Three years' experience in the use of the broomcorn standards recommended by this bureau in 1927 has indicated that although they provide accurate specifications for quality, length, and other

factors affecting the grading of broomcorn, the process of analyzing the statements of the percentage of these factors when trading on that basis is too complicated for business purposes. A study has been made to find some method of summarizing the results of these detailed analyses by which they could be expressed in some general terms which would meet the requirements of the trade and at the same time be simple enough to secure more general adoption than the original standards. As a result, revised standards have been prepared and submitted to producers, dealers, and manufacturers for further consideration. Expressions received from the trade thus far are favorable to this new plan, and it is expected that they will soon be issued as the recommended standards.

#### BEAN STANDARDIZATION

Extensive tests were made on a modified moisture-testing machine, widely used in the bean industry, for the purpose of checking the results obtained with those of the official Brown-Duvel machine. These tests showed that the official machine showed a higher moisture content for a given sample than the modified machine. Data obtained in connection with the bean-inspection service were studied with a view of determining the accuracy with which the United States standards reflect the commercial quality of beans. As a result of these studies the United States standards for beans were revised. The changes made are designed to bring the standards more closely in line with local production problems, marketing methods, and consumers' requirements.

A series of conferences were held with large bean buying and selling organizations. A representative group of canners who use normally 70 per cent of the pea beans produced in the United States, after protesting against the quality of beans delivered under existing trade standards and rules of arbitration, endorsed the United States standards and Federal inspection and recommended their adoption by bean shippers' and jobbers' associations. A resolution embodying these statements was subsequently passed by the National Canners Association.

#### SOYBEAN INSPECTION

At the request of mills, the soybean-inspection service was extended to Atchison, Kans.; Sikeston and St. Louis, Mo.; Chicago, Ill.; and Cincinnati and Toledo, Ohio, necessitating the training and licensing of nine new inspectors. Licensed inspectors were also stationed at Kansas City and Buffalo. Mills in all of the more important soybean markets, except Decatur, Ill., are now buying soybeans on the basis of the United States standards applied by Federally licensed soybean inspectors. In all cases, however, the United States standards are the basis for soybean purchases and growers' contracts.

#### BEAN INSPECTION

The number of inspections of beans made during the year was 2,541, an increase of 70 per cent over that of 1929. The inspection service was established at St. Louis, Chicago, Pittsburgh, and Philadelphia in response to requests from buyers and trade organizations. It is more desirable from the standpoint of shippers that beans be



inspected at original shipping point; consequently, the number of inspections at terminal markets is small. This service was also extended to shipping points in California under a cooperative agreement with the California State Department of Agriculture.

### DIVISION OF WAREHOUSING

H. S. YOHE, *in Charge*

The greatest growth under the warehouse act during the past year was in the licensing of grain warehouses, the licensed storage capacity for grain having increased more than 50 per cent over the preceding year. On July 1 more applications were pending for the licensing of grain warehouses than at any one time in the past. This increased demand for the licensing of grain-storage facilities was due to several factors, the principal ones being the condition of the grain market and a keener appreciation on the part of credit institutions of the Federal warehouse receipt as collateral for loans.

The licensed storage capacity for cotton also reached a new high mark, and indications were that additional warehouses for cotton would be licensed under the act during the coming year. Moreover, an increase in the demand for licenses by wool warehouses was noted, especially in producing sections.

A substantial increase occurred also in the licensed storage space for canned foods. This has been brought about by the credit needs of canners and by a desire of many canners to avail themselves of the grading service afforded under the warehouse act. Buyers of canned vegetables on a large scale have also played a part. In one instance a large chain store entered producing territory during the canning season and made its purchase of canned tomatoes on the basis of the grades for canned vegetables which were prepared under authority of the warehouse act. This company specified that all canned tomatoes purchased must grade in line with those standards. To secure the grading service they directed that all goods should be shipped to Federally licensed warehouses, where they were inspected immediately upon arrival. If they met the grade requirement they were placed in the licensed warehouse. If they did not, they were rejected.

### CANNED-FOODS STANDARDS

Under authority of the warehouse act tentative standards have been prepared for canned peas, tomatoes, corn, string beans, Lima beans, spinach, and beets. First drafts of standards have also been prepared for canned peaches, hominy, carrots, and succotash. Standards for some of these products had been prepared in previous years, but they were perfected during the last year, with the result that they are coming into general use. Many canners are now packing their products on the basis of those standards, and wholesale merchants are buying to a considerable extent on the same basis.

### AMENDMENTS TO REGULATIONS

The regulations for the storing of cottonseed were amended so as to permit the storage of cottonseed having a moisture content not in excess of 12 per cent in warehouses equipped with cooling and conditioning apparatus approved by the department.

The regulations for the storage of nuts were amended and revised, and the storage of pecans, filberts, and English or Persian walnuts was authorized.

The regulations for the storage of cold-pack fruit were amended to permit the storage of berries packed with one-tenth of 1 per cent of benzoate of soda by weight. Berries so packed are not required to be placed in sharp rooms, and they may be carried in storage at higher temperatures than the ordinary cold-pack berry covered in the regulations prior to the amendment.

#### COTTON WEIGHING

Work in the weighing of cotton stored in licensed warehouses, for the purpose of checking the accuracy of weights, was continued. As a result, more care is being exercised by warehousemen and licensed weighers, and complaints regarding the weight of cotton passing through licensed cotton warehouses are decreasing.

#### EXPANSION OF SERVICE

On August 1, 1929, a cooperative agreement was entered into between this department and the Alabama State Department of Agriculture for the administration of both State and Federal acts in the State of Alabama.

On account of the increased demands in the West Plains area, that area was made into two divisions and a new office established at Omaha. A great number of applications for the licensing of grain elevators have been received in the closing two months of the year. A number of elevators of a capacity of a million bushels or more, located in this area, have already been licensed, and further applications are pending.

#### STATISTICAL AND HISTORICAL RESEARCH

O. C. STINE, *in Charge*

The general world-wide financial and business depression has seriously affected the markets for farm products at home and abroad. The average price received by producers, computed for about 30 farm products, dropped from 143 per cent of pre-war prices in August, 1929, to 111 per cent in July, 1930, although the total volume of crops produced was smaller than during the preceding year. The decline in farm prices was due mainly to a decline in the general price level, a reduction in the buying power of consumers, and consequently a world-wide reduction in the demand for farm products. This marked decline in farm prices in the face of smaller supplies for market greatly increased the demands for economic analysis and for appraisals of the outlook for the several important farm products.

Analysis of current conditions and the meeting of emergency current demands for data have occupied a very large part of the time of the staff. The Federal Farm Board early in the season requested data as to the economic situation and outlook for several of the farm products as a basis for determining loan policies. The sharp break in prices in November stimulated many demands for an analysis of the situation with respect to important commodities. Special efforts were made to present the facts about the cotton situ-

ation to farmers in time to be used by them as a basis for determining the acreage that they should plant in the spring. This division participated more fully than ever before in presenting the outlook to producers in many parts of the country. Toward the end of the season a special effort was made to appraise the wheat situation and outlook as a basis for a program of planting for the 1930-31 season. In addition to these special cases, many Members of Congress, executives, and private citizens made urgent requests for facts concerning the tariff and analyses of the probable effects of tariff changes upon the prices of farm products.

The extent and seriousness of the business depression became an important problem early in the season. Some decline in business had been indicated in the outlook report for the 1929-30 season. As the season progressed much attention was given to a study of factors affecting business to obtain a measure of the extent and probable duration of the business depression, and the probable effect of the business depression upon the demand for farm products. This study showed that the business situation has been reflected quite definitely in the general level of wholesale food prices. Since 1920 the combined prices of food products, particularly prices of meats and dairy products, have fluctuated very much like the variations in domestic business as reflected in factory pay rolls. Although variations in supplies are partly responsible for the price movements, the changes in buying power of consumers have exerted a very important influence. The decline in the prices of meats and dairy products, amounting to more than 15 per cent between the spring months of 1929 and the summer of 1930, may be attributed very largely to the decline in the buying power of consumers, inasmuch as the supply situation had not changed materially during this period.

Some preliminary studies have been made of the effect of the business and general price-level depression upon returns to farmers. It was found that farmers received considerably less for their marketings of cattle, hogs, and lambs because of the reversal in the business situation. For example, in April, 1930, producers received from packers approximately \$12,000,000,000 or about 15 per cent less than they probably would have received for the same quantity marketed in the early part of 1929. The late-potato crop of 1929, because of the lower level of food prices and business in general, was marketed for about 10 cents per bushel less than the prices that might have prevailed had there been no decline in the business situation. In the early spring and summer months of 1930 the marketings of the early-potato crop brought 30 to 50 cents per barrel less than farmers would have received under normal business conditions. A preliminary study of cotton indicated that the general financial and business depression had been responsible for reducing the demand for that staple sufficiently to lower the price nearly 2 cents per pound below what it would have been otherwise in the spring of 1930.

The relation of financial and business conditions to farm expenses also received attention. It was found that the prices farmers pay have declined to some extent, but not nearly so much as the prices of farm products. The prices paid for fertilizer appear to be determined by the area to be fertilized as well as the purchasing power of producers. Farm wages have been reduced slightly under the in-

fluence of increased unemployment in cities. The index number of prices farmers pay for commodities purchased has declined from 155 in July, 1929, to about 149 in July, 1930, or 4 per cent. Farm wages declined from 173 to 160, or 8 per cent, in the same period, quite in contrast to the drastic decline in farm-product prices. The ratio of farm-product prices to the prices farmers pay for what they buy declined from 90 to 74 per cent of pre-war prices.

#### POTATO PRICE ANALYSIS

The interstate potato committee has been supplied with current analyses of the potato situation. Statements have been delivered at meetings of bankers, dealers, and growers on the Eastern Shore of Maryland and Virginia and in Florida. These statements covered production, the effect of changes in production, marketings, and business conditions on the seasonal level of prices and probable seasonal trends. An analysis of potato prices has been completed, and the results will be published.

The outstanding facts to be presented in the potato price bulletin deal with (1) changes in the annual level of prices for the country as a whole and for important surplus and deficit areas, (2) seasonal variations in potato prices on the Chicago market, (3) the effect of prices on marketings, and (4) the effect of prices on acreage changes in the following season.

The largest element in the yearly variations in price for the country as a whole was found to be the volume of production. The annual prices in most of the important producing areas are influenced by the national supply, so that once the national supply or the probable national price level is known, the probable prices in these areas are readily indicated. The importance of the national factors as elements in local price appears to be least in the far Western and greatest in the Central States.

Price appears to be a factor in the volume and rate of marketings of a crop already produced. Given an average crop, more will be sold during the entire season when prices are high than when prices are low. The percentages of average crops sold under varying price conditions differ in the important areas. In very low price years only 35 per cent of the Wisconsin crop has been sold, 50 per cent of the Michigan crop, 65 per cent of the Idaho crop, and 75 per cent of the Maine crop, but in years of high prices 60 per cent of the Wisconsin crop has been sold, 70 per cent of the Michigan crop, and 85 per cent of the Maine and Idaho crops.

The total supply of potatoes in any one year is apt to be determined as much by changes in acreage as by changes in yield. For the country as a whole a price level of about \$1 per bushel tends to keep acreage constant from one season to the next. Prices below that level tend toward acreage reduction, whereas higher prices stimulate increase in acreage. Very low prices received for a crop not only result in acreage reductions in the following year but also in the second year following the season of low prices.

#### ORANGE PRICES

A study of orange prices was begun as a joint project with the New York University cooperating through the New York Food Marketing Research Council. The purpose of the study is to analyze (1)

the influence of the supplies of oranges and competing fruits, the grade and size of oranges, and the trend of demand for oranges, on the returns for the crop, and (2) the effect of similar supply and other factors on market returns for short-periods in a particular market. The demand for oranges has increased very rapidly in the United States during the last 10 years. This has made possible the marketing of increasing crops at prices equal to or above those obtained in preceding years. There is indication of a slackening in the rate of increase in demand at the present time. It has been found that the chief factors in the prices of oranges are total supply, the quality of the crop, the average size of the oranges, the concentration of shipments, and the competition of other fruits. The analysis of weekly receipts and prices in New York indicates the outstanding importance of supply, competition of other fruits, and temperature, and the detailed analysis of daily supplies shows clearly the influence of changes in size and quality upon orange prices. It is planned to complete this study and publish results during the coming year.

#### TOBACCO PRICES

Studies of factors affecting the acreage and price of the various types of tobacco were inaugurated. It was found that for the period from 1921 to 1929 approximately 35 per cent of the yearly variations in the price of flue-cured tobacco were associated with variations in supply, 25 per cent with variations in quality, and 14 per cent with the regular growth of demand. An analysis of the prices on different markets indicated regular seasonal variations in the prices of this type of tobacco. On six representative markets in North Carolina during the seasons from 1925-26 to 1928-29 prices, on an average, advanced 28 per cent from September to October, advanced 9 per cent from October to November, declined 15 per cent from November to December, and declined 12 per cent from December to January. The changes appeared to be due largely to the quality of the marketings, a larger proportion of the better grades being sold during the middle of the season. It was found that 88 per cent of the yearly changes in the production of flue-cured tobacco since 1909 was due to variations in acreage and 12 per cent was due to variations in yield per acre; in the case of Burley 78 per cent of the yearly changes in production was due to variations in acreage and 22 per cent to variations in yield per acre; for Kentucky and Tennessee fire-cured tobacco, 96 per cent of the variations in production was due to variations in acreage and 4 per cent to variations in yield per acre.

Studies of the factors affecting the acreage of the different types of tobacco indicated that the prices received by growers the previous year, and the second year previous, as well as the acreage change the previous year are important in determining the acreage planted.

A study of the factors affecting the acreage and prices of cigar tobacco grown in the Connecticut Valley and competing cigar types was undertaken in cooperation with the Connecticut Agricultural Experiment Station. A feature of this study has been the analysis of the records of the Connecticut Valley Cooperative Tobacco Association, in which the prices by grades are used for a 3-year period. The results of the analysis were used in the bureau's price-situation and outlook reports. Four reports were prepared during the marketing season, each summarizing the supply and demand conditions

for the different types of tobacco and indicating changes in the market prospects. Special outlook statements were prepared for flue-cured and Burley tobacco, which were used extensively by State and Federal extension agencies and the Federal Farm Board in efforts to acquaint all growers with the unfavorable market prospects for these types before the crops were planted.

#### RICE PRICES

The project, factors affecting rice prices, was completed during the year and a report prepared. The following prices were analyzed: Fancy Blue Rose at New Orleans, yearly average and monthly prices; rough rice in Louisiana, farm price as of December 1; Fancy California-Japan at San Francisco, yearly average price; Japan variety, middle quality brown at Tokio, yearly average price. Based on these analyses, a forecast was made in November, 1929, of Fancy Blue Rose prices for the months December, January, February, March, and April, with the following results: December, correct; January, 0.6 per cent error; February and March, correct; and April, 1 per cent error. A forecast made in October of rough-rice prices in Louisiana as of December 1 was less than 1 per cent in error. The effect of price on acreage changes in both the southern belt and California was determined. It was found that price alone in neither case was sufficient to explain acreage changes. In California, price, together with an index of water available for irrigation, gave satisfactory results. The results of this study have been presented to rice growers in the South and have received their endorsement.

#### STOCKER AND FEEDER CATTLE

An economic study of stocker and feeder cattle, with special emphasis on the factors affecting price, was begun. The price of Good to Choice feeder cattle 800 pounds up at Kansas City was the price series used in most of the analyses. It was found that the factors affecting prices change in different seasons of the year. Even those prevailing throughout the year vary as to importance. Four separate studies were made, each covering a 3-month period in which similar conditions prevail. The results of these analyses are being prepared for publication. They serve also as a basis for the bureau's forecasts of future prices and conditions in the livestock industry.

A study was made of the variation in live weight of stocker and feeder shipments, and of cattle slaughtered. It was shown that there has been a definite downward trend in the weight of stocker and feeder cattle during postwar years, but that there had been no corresponding trend in weights of cattle slaughtered. The relation between prices of heavy and light slaughter cattle was worked out.

The period of heaviest stocker and feeder shipments is during the fall months, and the heaviest marketing season for fat cattle is during the summer. Since 1921, stocker and feeder shipments from October to December were found to be closely associated with marketings of fat cattle at Chicago from April to August, except during years of low corn prices. The study indicates that if the farm price of corn in April is below 75 cents more cattle are sold for slaughter at Chicago, and the lower the price the greater the slaugh-

ter, when feeder shipments the previous fall are held constant. Corn prices have no noticeable effect if they are above 75 cents per bushel.

A corn-hog ratio for the Corn Belt was constructed, covering the period from 1922 to 1929, for use in relating changes in hog supplies to changes in the corn-hog ratio. This ratio was used in studying the market situation for corn and for hogs, and in forecasting the number of hogs which would be slaughtered during the coming season.

Much statistical and analytical work was done in connection with the various reports on the agricultural situation. Supply-price curves for hogs, cattle, and sheep were constructed for publication in the 1930 Yearbook of Agriculture and for use in the work of forecasting future conditions.

#### TEXTILE PRICES

Research with reference to the prices of textiles has continued. The most important development of the year has been the assembling and analyzing of world wool production and price statistics, by grades, from 1890 to date. The analysis of wool production and prices shows very clearly that there are definite cycles in wool production. Furthermore the study has shown that it is necessary to consider fine wool separately from medium or coarse wools, since the cycles of production and prices of these wools differ. The results of this study will make it possible for producers to understand better the shifts that are taking place and to avoid making changes which in the long run may not prove profitable.

Cotton-research studies undertaken during the year include revision of world-production statistics, classification of foreign growths by staple, developing an index of cotton-production costs, and the collection of data for analyzing foreign demand for cotton. Monthly reports on world wool prospects and world cotton prospects have been issued as well as a quarterly report on the world carpet-wool situation.

#### DAIRY AND POULTRY RESEARCH

This division joined the division of dairy and poultry products and the New Jersey Agricultural Experiment Station in making a study of the production and consumption of dairy products in New Jersey. Six townships, largely rural, and selected districts in metropolitan New Jersey were surveyed. The survey of the rural townships has been completed. In these rural communities it was found that the availability of milk was an outstanding factor in determining the quantity of milk consumed. Income is also an important factor in milk consumption. It was found that per capita consumption of dairy products declined as per capita income decreased. The survey of the consumption of dairy products in metropolitan New Jersey has been completed. This survey obtained data from 2,200 families which will be analyzed to show the effect of income, race, and size and composition of family upon per capita consumption in cities.

In cooperation with the New York Food Marketing Research Council an analysis is being made of the effect of income and other conditions upon the consumption of butter and eggs in New York City.

In cooperation with the Division of Dairy and Poultry Products and the Maryland Agricultural Experiment Station a survey of the consumption of dairy products in Baltimore was begun.

Some progress has been made in analyzing poultry and egg prices. It has been determined that there is a definite regular 3-year cycle in the monthly prices and receipts of both eggs and poultry. A definite relationship has been found between fall poultry receipts and egg receipts the following spring. The study is continuing with the object of making a comprehensive analysis of poultry and egg prices.

#### GRAIN-PRICE ANALYSIS

Statistical researches relative to grain have continued along many lines. Analysis of weather in relation to yields as a basis for making early forecasts of crops in important competing countries has been continued. During the last season forecasts of production in Canada, Argentina, and Australia have been fairly accurate. Each season, however, presents problems peculiar to the season and requires careful analysis of the special features that develop in the course of the season.

At the beginning of the last season a wide spread between cash prices and distant futures in the markets of the United States, and between prices in the Canadian and United States markets brought a demand for interpretation of the situation. A careful study of the factors entering into the situation indicated that congestions at terminal markets resulting from a large carry-over of old wheat and heavy early marketings were a very important factor in depressing cash prices of wheat in the principal markets of the United States.

Observing the effect of congestion at terminal markets upon cash prices, plans were made to watch the situation carefully throughout the 1930-31 marketing season. A survey of storage capacity was made in cooperation with other units of the bureau, and one worker, was assigned to the task of putting together and keeping up to date all information bearing upon the movement of the wheat crop, so that the Farm Board or any other agency interested might make plans to prevent congestion in the terminal markets during the movement of the 1930-31 crop.

#### DIVISION OF FOREIGN AGRICULTURAL SERVICE

ASHER HOBSON, *in Charge*

In order to make estimates of price prospects for American agricultural products the department needs accurate knowledge of the world situation in regard to acreage sown, crop conditions, stocks on hand, numbers and kinds of livestock, and prices, together with an appraisal of present and prospective demands. The prices of a greater portion of the farm commodities grown in this country are affected by conditions abroad, and those definitely on an import or export basis are most sensitive to the impact of foreign economic forces. Of those on an export basis, cotton, grain (principally wheat), tobacco, pork products, apples, and dried fruit are outstanding. The more important items commercially grown in this country, but of which large quantities are also imported, are sugar, wool, flaxseed, and nuts. To these lists should be added dairy products, beef, mutton, and lamb, which do not fall definitely into either the



export or import class but which, during periods of over or under production, must cope with foreign competitors.

Many Governments fail to report statistically upon the agricultural activities of their countries. In some cases the information available is expressed in terms which make it difficult to compare conditions in different countries and in previous periods. Hence, there remains the essential task of supplementing the existing data by observations of trained investigators. This work, together with the interpretation of existing data in terms of prospects for American agriculture, is essential as a basis for sound production and marketing programs in this country.

In order to meet this need, the last Congress enacted legislation designed to expand in a substantial manner the foreign-service activities of the Department of Agriculture. This act is entitled: "An act to promote the agriculture of the United States by expanding in the foreign field the service now rendered by the United States Department of Agriculture in acquiring and diffusing useful information regarding agriculture, and for other purposes." (Public No. 304, 71st Cong.)

For the purpose of putting into effect the provisions of this act, the Division of Foreign Agricultural Service has been established in the Bureau of Agricultural Economics. The activities of this division are designed to provide an adequate world-wide production and market outlook service for American agriculture by collecting more accurate and more extended information upon world conditions of agricultural production, competition, and demand with a view to furnishing a more reliable basis for production adjustments and marketing policies in the United States.

In the dissemination of foreign information the regular informational services of the bureau are used wherever possible. Much of the current information received by cable is forwarded by leased wire to the bureau's market-news offices throughout the country. The weekly publication *Foreign Crops and Markets* is being continued. The former foreign-commodity news releases have been replaced by monthly statistical reviews of world-wide conditions with respect to a number of the principal agricultural products. Other divisions of the bureau cooperate in the foreign-service work.

At the close of the fiscal year the bureau maintained resident representatives in London, Berlin, Shanghai, and Marseilles. Shortly thereafter a resident representative was stationed in Belgrade to cover the Danube Basin. Preparations are under way for maintaining resident agricultural representatives in South America, South Africa, Australia, India, and the Scandinavian countries. In addition to this resident staff located in foreign countries, it is planned to secure the services of a number of specialists who will give their attention to the world situation with respect to specific commodities. For these positions the department intends to employ men who are conversant with the international situation in cereals, cotton, tobacco, wool, fruits, livestock and meats, and dairy products. These men will be assigned to work on specific commodities rather than to territories and are expected to constitute a mobile force working in close touch with the foreign field staff and with the commodity divisions of the Bureau of Agricultural Economics in Washington.

Special attention is being given to coordinating this work with similar activities of the Consular Service of the State Department and with those of the foreign representatives of the Department of Commerce. To this end a liaison committee has been created. This committee consists of one representative each of the Department of State, the Department of Agriculture, the Department of Commerce, and the Federal Farm Board. This committee is in position to facilitate the coordination of effort between the departments concerned and insure more adequate services in the field to be covered.

## DIVISION OF AGRICULTURAL FINANCE

ERIC ENGLUND, *in Charge*

### SHORT-TERM CREDIT

Research in short-term agricultural credit has been concerned chiefly with credit conditions among farmers in the South; the relation of credit advances to potato production in the Eastern Shore of Virginia; and the success of agricultural-credit corporations in financing farmers and facilitating the work of cooperative-marketing associations in the Cotton Belt.

The studies of credit conditions among southern farmers have been conducted in cooperation with State agricultural experiment stations. Two bulletins, *Credit Problems of Cotton Farmers in Butts and Laurens Counties, Ga.*, and *Farm Credit in North Carolina—Its Cost, Risk, and Management*, were published by the agricultural experiment stations of Georgia and North Carolina, respectively. The results of a similar study covering credit problems of farmers in Oklahoma will be published by the Oklahoma Agricultural Experiment Station.

All of these studies show that the use of merchant credit is widespread among southern farmers and that this type of credit is extremely costly. They also indicate clearly that the economic position of many southern farmers must be strengthened considerably before any marked improvement in credit conditions can be effected. Nevertheless there is indication that the limited supply of current funds, which in some areas is partially responsible for the high cost of credit, might be employed more effectively if farmers were to make greater use of existing mortgage-credit facilities. A summary of the results of all southern studies made in recent years is being prepared.

The study in the Eastern Shore of Virginia is being conducted in cooperation with the Division of Farm Management and Costs of this bureau and the Virginia Agricultural Experiment Station. In its larger aspects this study is concerned with the causes of excessive potato production, the effects of price depression, and the possibility of adjusting production more closely to demand. This division is analyzing the possibilities of bringing about better adjustment through credit control.

No conclusive results can be presented now, as the work has not advanced beyond the gathering of basic data. A preliminary survey of data indicates that any control local bankers might be inclined to exercise would be rendered in large measure ineffective by the liberal credit terms offered by dealers and merchants.

In the study of the success of agricultural-credit corporations in financing farmers, the operations of five agricultural-credit corporations which serve as auxiliaries to cooperative-marketing associations have been analyzed. Separate reports on three of these corporations have been prepared, and a consolidated report on all is in state of preparation. This work has been carried on in cooperation with the division of cooperative marketing of the Federal Farm Board.

The results may be summarized as follows: In no case has the 2 per cent spread between the rediscount rates of the Federal intermediate credit banks and the rates which corporations were permitted to charge, sufficed to cover operating expenses and losses and to provide for satisfactory dividends and surplus accumulations. (2) In most cases the corporations have been a source of heavy expense to the parent cooperative-marketing associations. (3) The corporations have been operated at least cost to the parent associations and to borrowing members when they have had relatively small territories, large-sized loans, and borrowers who are good risks. (4) The extreme seasonality of business has been one of the causes for lack of profit to the corporations. (5) The value of the corporations to the associations is problematical. It does not appear that the value of the service of securing additional deliveries of cotton has offset the cost of the corporations to the association. Yet the advantages to members arising from the additional credit facilities provided by the corporations, may be very great, and may, in turn, strengthen the position of the marketing associations. It has not been possible as yet to get an accurate measurement of these services.

#### FARM-MORTGAGE CREDIT

A thorough analysis of the farm-mortgage debt situation has been summarized in a manuscript for publication on farm mortgages in the United States. This study, in addition to presenting estimates of farm-mortgage debt, analyzes the various problems faced by the farmer as a result of the increased volume of mortgage debt. The results show that the frequency of debt on farms in the United States has increased from 34.8 per cent in 1925 to 36 per cent in 1928. The study reveals the further significant fact that 12.2 per cent of all farms mortgaged carry a mortgage debt of over 75 per cent of their value. The difficulty of repaying the farm-mortgage debt under different price levels is discussed, and the most effective methods for eliminating the hazards as to renewals and high interest payments are presented so as to enable the farmer to adjust his financial problems in a more efficient manner.

The results of this study show that there have been important shifts in the relative importance of mortgage-lending agencies. Insurance companies have by far the largest amount of farm-mortgage loans, with 22.9 per cent of the total outstanding loans in 1928. Federal land banks are second in importance with 12.1 per cent of the total, while State and national banks, which until after 1921 were of first rank, now appear in third place among institutions, with 10.8 per cent of all debt. Mortgage bankers have 10.4 per cent, retired farmers 10.6 per cent, and active farmers only 3.6 per cent. These studies have thus revealed a pronounced tendency for the

farmer's long-term financing to shift toward stronger and more specialized agencies, which as a whole offer longer terms and lower interest rates.

The estimate of the farm-mortgage debt contained in the above study represents the completion of the first part of the program for providing current data on the farmer's finances. The data obtained records the movement of capital into agricultural areas and provides the basis for compiling indexes of the rate at which farms are being mortgaged and the rate at which they are being cleared of debt. These series will supplement indexes of bankruptcies and foreclosures already set up.

Construction of indexes of security prices for Federal and joint-stock land-bank bonds has indicated that the difficulties of the joint-stock branch have been reflected in a relative depreciation in Federal land-bank bonds. The increase in the volume of foreclosed lands acquired by the land banks has materially increased the difficulties involved in marketing their bonds at an advantageous price.

The importance of the country bank as an agency in financing the credit requirements of the farmer is generally recognized. It has been difficult, however, to obtain any definite measure of their ability to meet loan requirements of the farmer customer. A general measure of their ability to finance agriculture has been obtained by compilation of an index of demand deposits for member banks of the Federal reserve system located in towns under 15,000 population. This index covers 20 agricultural States, and the composite series is weighted by the proportion of the cash value of their agricultural output. The index represents monthly data computed for the period of 1923 to 1928.

Work was begun on three major projects dealing with the following subjects: Changes in interest rates and their relationship to farm-mortgage financing; the influence of short-term interest rates upon the availability of agricultural credit for production purposes; and the influence of monetary factors on the fluctuations of the wholesale price of farm products.

A valuable step toward economy and efficiency was taken by combining the two annual questionnaires concerning taxes and credit practice. The result has been a marked saving in time, effort, and money. A number of articles have been contributed to scientific journals, and a number of radio talks on farm credit have been given. Much of the material compiled has been utilized in connection with agricultural extension work upon a number of occasions.

#### AGRICULTURAL INSURANCE

A study has been made of the history and present status of livestock insurance in the United States, including an analysis of the various problems involved in providing such insurance protection for the farmer. This bureau has received many requests for information upon this subject, but comprehensive information has been almost entirely lacking. Material obtained through this study is being prepared for publication.

The development of livestock insurance in the United States has been relatively slow as compared with progress in European countries. Prior to 1911 a few commercialized stock-insurance companies

and a score of mutuals, most of them in the Middle Atlantic States, wrote livestock insurance. During the decade 1911-1920 about 30 commercial companies and 25 mutuals entered the field. The majority of these new companies were organized during the years of high livestock prices brought on by the war. However, all but one of the commercial insurance companies writing livestock insurance exclusively, and a number of mutual companies in this group have since dropped out. Most of the remaining mutuals, some of which have been in existence over 50 years, have lost ground during recent years. This is in part explained by the continued low value of horses which in many cases comprise the bulk of the business. Better prices for farm animals, particularly horses, and improved farm incomes would no doubt cause a renewed demand for livestock insurance.

Special attention has been given to the problem of fire losses on the farm and to the prevention and control of farm fires. Some of this work was done in cooperation with a committee on farm fire protection working under the auspices of the National Fire Protective Association. A farmers' bulletin on Fire Safeguards for the Farm was prepared in cooperation with the Bureaus of Chemistry and Soils and Public Roads. This bulletin deals in a simple and popular way with the threefold problem of measures for preventing accidental fires, of simple home equipment for the prompt extinguishment of the fires that are discovered in their incipiency, and of organized rural fire protection.

Additional information has been gathered on farmers' mutual fire and windstorm insurance and on crop insurance, more particularly against hail. A study of employers' liability insurance for farmers was begun.

Addresses on various phases of agricultural insurance were delivered during the year before many of the National and State mutual insurance associations. Several articles dealing with farm insurance problems have been contributed to insurance journals.

#### FARM TAXATION

The results of research in farm taxation, conducted in cooperation with a number of States, were summarized and published in the last year as Technical Bulletin No. 172, Taxation of Farm Property. This bulletin has been well received by farmers, their organizations, and the public generally. Results of other phases of the bureau's investigations in this field have appeared in papers, addresses, and material for the press.

The work of ascertaining the trend of farm taxes in various States and sections of the country has been strengthened. Reports were received from 17,000 farmers giving the value of the property and taxes paid and other information which made it possible to determine changes in taxation. The average tax per acre in 1929 was 7 per cent above 1924 and 150 per cent above the per acre tax in 1913-14.

The relation of taxes to land values was ascertained. It was found that in the country as a whole taxes in 1929 were 1.47 per cent of full value of the real estate, as compared with 1.22 per cent in 1924, and 0.68 per cent before the war. This increase in the true tax rate, i. e., taxes on full valuation of property, is due not only to the increase

in taxes but also to the decline in land values. It is estimated that at the present time taxes paid on farm real estate equal the interest which farmers would pay at 6 per cent on a mortgage indebtedness amounting to one-quarter of the full value of farm real estate.

Although problems of adjustment in farm taxes lie largely within the sphere of the States, since these taxes are levied by State and local authorities under State law, the bureau can render important service to agriculture and to the Nation generally by research in this field. The results not only call attention to the farmers' tax problems, but also help to determine and explain the causes and the economic effects of increasing farm taxes, and thus help to lay a foundation for sound programs of adjustment in State and local taxation.

### DIVISION OF FARM POPULATION AND RURAL LIFE

C. J. GALPIN, *in Charge*

An increasing interest on the part of the public in the group phases of the human factor in farm management has been manifested by more demands upon this bureau for information. For example, public utilities have made inquiries with regard to the group use by farmers of electricity; advertisers have requested information with regard to farmers' standards of living and the purchasing power of farmers; and constant inquiries have been received with regard to movements of population to and from farms, and the economic significance of such movements. There has been an urgent demand also for information on the social aspects of the farmers' cooperative enterprises. The Division of Farm Population has endeavored to furnish authentic information on these questions in so far as such information is available, and to carry on research for the purpose of obtaining dependable data which will bring about a better understanding of the farm problems.

#### FARM POPULATION MOVEMENTS

A survey of the movement of population to and from farms during the calendar year 1929 indicated that the farm population was still declining in absolute numbers through migration to towns and cities. Data are available covering the decrease of farm population over the last 10 years, but it is not yet possible to state whether the bottom of the decline has been reached. A cooperative study of farm migration in selected communities in the State of Washington was completed recently, and the results published by the Washington Agricultural Experiment Station. Similar studies are under way in Iowa, Missouri, Vermont, North Dakota, and Montana. Special articles have been prepared for publication covering trends in farm-population movements.

#### RURAL MERCHANDISING PROBLEMS

A study in Minnesota, in cooperation with the Minnesota Agricultural Experiment Station, on the services of rural trade centers in the distribution of farm supplies indicates inadequacy in present merchandising methods of country and village stores. Slow adjustment of mercantile ways to the changing conditions of modern life appears. Problems arise in connection with volume of sale, mark-up,

grade of goods, advertising (informing the farmer), credit, plant, and equipment. Improvement in rural merchandising seems to call for one or more of the following changes: (1) Retaining existing agencies but strengthening their merchandising practices; (2) retaining local trade agencies but joining them into chain units, either of a proprietary or cooperative nature; (3) concentration of local merchandising functions into fewer units and in larger trade centers; or (4) organization of consumers into cooperative-buying units, either local or federated. This study emphasizes the fact that the spending of the farmer's dollar efficiently is contingent upon the reorganization of the whole rural merchandising system.

A somewhat similar study in New York State, made in cooperation with the Cornell University Agricultural Experiment Station, on village service agencies for New York State as a whole indicates that villages below 500 in population are losing out as trade centers, cultural centers, recreational centers, and social centers for farmers. In urban counties it takes a village of from 1,250 to 1,500 population to maintain the service agencies found in a village of from 1,000 to 1,250 in rural counties because of the trade magnetism of the cities in the urban counties.

A study in Oklahoma, in cooperation with the Oklahoma Agricultural Experiment Station, on the relation of town and country interests in Garfield County indicates that the city of 17,000 population in the county (Enid), on account of good merchandising methods, is competing strongly with the farmer's villages and towns for farmer trade. Apparently, the small trading posts are being subjected to great strain to fit into the farmer's needs.

These three studies in different parts of the United States indicate basic rural social changes going on in the facilities for meeting the farmer's increasing standard of living. The small village is giving place to a more adequate trading center.

#### FARMERS' ATTITUDES TOWARD ORGANIZATIONS

An important study in Ohio, in cooperation with the Ohio State Agricultural Experiment Station and informally with the Ohio State Farm Bureau Federation, on the attitude of farmers in Ohio toward cooperation, is nearing completion. This study illustrates the significance of knowing what farmers are thinking about their organizations, and about the policies of officials. The results of this and other studies indicate a sharp division of opinion as to the policies and functions of organization officials. Certain farmers are highly critical of their organizations on the ground that the administration is carried on by a few men without regard to the opinions or judgments of individual units. The criticism is not that officials decide actions and policies, but that the units are not consulted as to actions and policies. In other words, the farmers themselves have no voice through representation in what goes on at the top. The situation, therefore, is one of basic conflict between two philosophies of business, that of the big business oligarchy and the democratic cooperative ideal. Special articles and addresses have been prepared on social factors in membership relations, membership responsibilities in successful cooperation, and similar subjects.

## INSTITUTE OF METHODS IN RURAL SOCIOLOGICAL RESEARCH

Research workers in the field of rural sociology during the week December 31, 1929–January 4, 1930, gathered at the bureau for a short school of methods in research. Sixty men and women from 36 colleges, universities, and institutes, in 24 States, Canada, and China were present. Research studies on population, standards of family living, and social attitudes were given special attention with respect to scope and methods.

## RURAL COMMUNITY BUILDINGS

A study was completed and a bulletin published on rural buildings for business and social uses. Studies have been made also and articles prepared on rural planning in the interest of farm communities, the country library, farm fire protection, rural community clubs, contacts in a rural community, and other subjects.

## DIVISION OF LAND ECONOMICS

L. C. GRAY, *in Charge*

A great deal of time has been devoted to cooperation with the Bureau of the Census in the preparation of the agricultural schedules to be used in the 1930 census and in helping to plan the program of tabulation and publication in such manner as to be of greatest service to the Department of Agriculture and the State experiment stations.

The bureau was also called upon by the War Department to participate, in cooperation with other bureaus of the department, in a land-appraisal study in the lower Mississippi Valley involving an area of over 4,000,000 acres. This project was undertaken in connection with a flood-relief program.

Special research has been carried on in matters pertaining to farm relief, and the relationship of land and land policies to the agricultural surplus.

Considerable time has been devoted to working out a program of land utilization and classification and to presenting the results of the bureau's work at various gatherings in different parts of the country. Many addresses given by members of the staff have been published in bulletin or book form by universities and various associations.

## LAND RESOURCES AND LAND UTILIZATION

A study entitled "Regional Changes in Farm Animal Production in Relation to Land Utilization" has been completed and the results published. This study covered the effects of the tractor and automobile, and of increasing efficiency in production of meat and milk, upon the need for farm land in the principal agricultural regions. The publication has been used by the extension services in several States in planning programs of work, and by teachers in agricultural colleges.

The Atlas of American Agriculture, which has been issued in sections during the past decade, is now ready for publication in a single volume. This atlas, the responsibility for which has centered



in this division, brings together basic information on climate and soils, grazing land and forest lands, assembled by the Weather Bureau, the Bureau of Chemistry and Soils, and the Bureau of Plant Industry, the Forest Service, and other agencies. This atlas will be a major source of information on the physical basis of American agriculture for a half century or longer.

The Graphic Summary of American Agriculture, which is a compilation of 350 maps and graphs, showing the regional distribution of agriculture in the United States and the geographic shifts in crop and livestock production, in land utilization, land values, taxation, tenure, labor, and farm population that have taken place since the World War, has been prepared for publication. Previous editions of this Graphic Summary have provided many of the illustrations for textbooks on geography and the agricultural sciences, and the publication has been extensively used in agricultural colleges and State universities.

A publication entitled "Land Utilization and the Farm Problem" has been prepared which shows graphically those changes in land utilization and agricultural efficiency, on the one hand, and in diet and population trends, exports and imports, on the other hand, which indicate the urgent need of a new national land policy and of further research as an aid in determining that policy.

#### LOCAL LAND UTILIZATION AND REGIONAL-PLANNING STUDIES

In cooperation with the Vermont Agricultural Experiment Station and the Vermont State Department of Forestry, a study on problems of land utilization in the hill towns of Vermont has been made. Information bearing on the present utilization of land in the 13 towns studied has been utilized by a special committee of the comprehensive survey of rural Vermont in its report on forestry and the wood-using industries.

In addition, it has been possible to work out a preliminary plan for the complete economic and social reorganization of 1 town. Similar data are to be utilized to work out reorganization programs for the entire territory covered by the 13 towns. Since the towns are representative of a much larger territory in Vermont the program should have a very broad application. The social and economic problems of the "hill" towns are acute, and the results of the present study are timely and helpful in the development of a comprehensive program.

A similar project, in cooperation with Pennsylvania Agricultural Experiment Station, was continued. Data for Wyoming County are being published by the Pennsylvania station. The conclusion is reached in this bulletin that there are at least two large districts that are nonagricultural. The utilization of these districts for timber production is recommended. Moreover, in view of the local demand for mine props as well as for larger timber, it would be profitable on most farms to take better care of the farm wood lot. A small number of farms were carefully studied and described to show how the present systems of farm management and land utilization may be improved.

The intensive study of Tioga County, begun in 1928, will be completed during the year 1930. The results of these studies will

probably prove of particular value to the extension forces of the college in formulating programs for promoting the abandonment of districts found unsuited to farming, the development of forests in such districts, and the institutional readjustments made necessary by these changes.

A study has been carried on in eastern Kentucky in cooperation with the State Agricultural Experiment Station, and a manuscript has been completed entitled, "Farm Management and Incomes of Farm Families in Laurel County, Ky." This survey has provided a basis for a revision of the extension program in the area. Another manuscript, *Cost of Living and Population Trends in Laurel County, Ky.*, based on the same study, was also completed. A third manuscript is in preparation, *Problems of Land Utilization in Laurel County, Ky.* This bulletin will include a classification of land from the standpoint of best economic uses, and will consider the effects of such use on the distribution of population.

A survey has been made in West Virginia, in cooperation with the West Virginia Agricultural Experiment Station, and results have been prepared for publication. The study was pointed specifically at the separation of potential farming districts from potential forestry districts.

Plans have been under consideration for an economic and social survey of the southern Appalachians. This project will involve the cooperation of a number of the State experiment stations, and probably two other Federal bureaus. Its object is to develop an economic and social program for agriculture in the area.

#### LAND-SETTLEMENT STUDIES

A survey of the economic aspects of land settlement in the Great Lakes States (Wisconsin, Minnesota, and Michigan) has been completed. An analysis of data obtained in 1920 and again in 1928 for farms in 46 settlements, representing various types of land-settlement projects in the cut-over regions, led to the conclusions that, although settler turnover is due to many causes, a high percentage of turnover in any community is usually associated with intensive colonization practices or excessive promises by the company selling the land.

As a first step in the establishment of a public service on land-settlement questions, an effort was made to gain the cooperation of active land colonization and settlement agencies in all parts of the United States. The nearly complete response of these agencies to requests for information have made it possible to render more efficient service to those seeking information relative to area, location, and type of land for sale, prices asked, terms of purchase, etc.

Official and semiofficial agencies in various parts of the United States which are interested in land-settlement activities either directly or indirectly were visited during the year and State laws and the administration of laws pertaining to land colonization and settlement activities were studied. The purpose of this work is to help public and private agencies lay the groundwork from which settlement expansion may be directed in accordance with sound economic principles.

## LAND APPRAISAL AND LAND VALUES

The third annual nation-wide survey of the farm real-estate situation was completed and published as Circular No. 101, The Farm Real-Estate Situation 1928-29, and the fourth annual survey was begun. The third survey showed that, although land values generally continued the downward trend, the declines during the year ended March 1, 1929, were comparatively slight and in a number of States represented the smallest annual loss recorded since the depression set in. Fewer foreclosures and other forced sales occurred, the rate for all types of "distress" transactions having declined from 22.8 to 19.4 out of each 1,000 of all farms. The survey cautioned, however, that there was no assurance that the bottom had been fully reached in all States; that the distress-sale rate was still high; that the demand for farms was still generally very low; and that little relief from the heavy tax burden on real estate was in sight.

That the bottom had not been fully reached in land values in early 1929 is borne out by the preliminary figures for the year ended March 1, 1930. The average acre value for the entire United States on that date stood 15 per cent above pre-war value, as compared with levels 16 per cent above a year earlier, 17 per cent above in 1928 and 70 per cent above in 1920.

By invitation the farm real-estate situation in the Middle West was presented before the land-management short course of the University of Minnesota. This course was the first of its kind expressly established to discuss the problem of foreclosed lands. An analysis of present farm real-estate conditions and the outlook, especially as to values, was regarded necessary as a basis for deciding (1) whether to "dump" acquired properties or hold them for a price, and what price; (2) how much more money it was worth while to spend on them; (3) what sort of management and maintenance policy should be adopted; and (4) whether loaning should be continued, and in what sections and on what basis.

The bureau was represented on the program of the Illinois bankers and land-appraisers short course. The disturbing experiences of recent years have raised an interest never before shown in valuation problems. This was further emphasized by requests from two State experiment stations for a cooperative program of research in farm real-estate values and valuation.

## THE PUBLIC DOMAIN

Early in his administration President Hoover brought to the attention of the assembled governors of the western States the need of legislation that would properly regulate the use of the remaining unreserved public lands. Later, with the approval of Congress, he appointed a Public Lands Commission, whose duty is to assemble available information and to make a report and recommendations.

Studies of the factors that affect the use of the public domain have been in progress in the Bureau of Agricultural Economics for several years. A special study of Nevada conditions was nearing completion at the time the commission began work. At the request of the commission, colored maps were furnished to it that picture relationships of legal-tenure range claims, existing and possible use, and control of all the lands of Nevada.

These maps show the distribution and uses of private and public lands, as well as the complicated interdependence of lands having longer or shorter seasonal or otherwise restricted uses. Information is furnished on the complicated and competitive nature of claims now made by stockmen to grazing rights on public lands and the privately owned lands with which these public lands are necessarily associated.

#### LAND TENURE

A preliminary study of land tenure in its relationship to the declining agriculture of the old plantation Piedmont of the Southeastern States has been completed. Adjustments are being made slowly by many farmers, but much of the land remains unused, and there is no agency charged with the responsibility of determining the best use of the land and with making plans for the future. A comprehensive plan of work for the future should include participation by the State experiment stations and extension services, as well as by a number of bureaus of the Department of Agriculture.

The widespread interest in large-scale farming led the division to undertake an analysis of the census schedules for all farms of 1,000 acres or more in order to indicate where they are, what type of agriculture prevail on such farms, and what are the general economic characteristics of these farms. The analysis is approaching completion and will be available for publication during the coming year.

Summarization of census statistics of farm tenure in the United States has been continued. Cooperative work has been carried on with the experiment stations in Delaware, Maryland, and Virginia.

#### FARM LABOR

A study on wage payments has been completed which supplements the bureau's periodical reports on average farm wage rates by showing relative and actual amounts of wages paid by farmers to each class of labor during the year and by giving needed data for proper calculation of the bureau's farm wage indices. The data will also be of special value to students of the agricultural labor classes. There are indicated by means of monthly wage payments, the seasons and relative extent of the employment of the principal classes of farm labor, the irregularity of such employment, and the laborer's consequent necessity of supplementing farm work with other paying jobs.

A second study was made with the object of bringing up to date information showing the absolute and proportionate amounts of time spent on farm work by farm operators; by members of their families; by casual, noncasual, and contract-hired laborers; and by croppers. These data supplement the figures of the first study by indicating, from the standpoint of working time and wages, the absolute and relative amounts of employment of each of the principal farm working classes. They indicate not only the working time for hired farm laborers, but also the amounts of work done by members of the farm operators' families.

**TOBACCO SECTION**CHARLES E. GAGE, *in Charge*

The tobacco section was organized just prior to the opening of the fiscal year 1930. Two projects were involved, administration of the tobacco stocks and standards act and the inauguration of inspection service for tobacco, commonly known as the tobacco-grading service. In both projects substantial progress has been made.

**TOBACCO STOCKS AND STANDARDS**

The salient features of the tobacco stocks and standards act are that it requires dealers and manufacturers to report their holdings (1) according to type; (2) according to form, stemmed or unstemmed; (3) according to groups of grades; and (4) according to "new crops" and "old crops." The quarterly reports as formerly made combined certain types and were lacking in the segregation as to grades and time of production. The added detail of the new form had the effect of greatly increasing the burden upon reporters. Necessarily a change of such magnitude had to be approached with caution. By means of hearings held in Washington and attended by representatives of the trade, and by systematic travel and contact with dealers and manufacturers the new form of rendering quarterly stock reports has been successfully inaugurated, and a contribution of important economic value has been made to the statistics on tobacco.

Under the authority of the tobacco stocks and standards act an official classification of types and groups of grades has been promulgated, and systems of grades of certain types heretofore tentatively adopted have been simplified and the way paved for their ultimate promulgation. Plans have been undertaken for establishing a tobacco laboratory for scientific research into the physical properties and characteristics of tobacco.

**TOBACCO-GRADING SERVICE**

The tobacco-grading service was successfully inaugurated on eight widely-scattered auction markets during the marketing season. The service consists of an inspection of farmers' tobacco on the warehouse floor previous to sale and a certification of grade according to Federal standard grades, accompanied by publication of price reports showing average prices at which each grade is selling on the market concerned. The object is to furnish growers with authentic information as to the quality of their tobacco and enable them to judge for themselves whether the price offered is in line with the market. A further object is to teach growers correct sorting of their tobacco as an aid to better prices. During the first season 11,000,000 pounds of tobacco was officially graded, with benefits to the growers in the form of enhanced prices. The project was well supported by the tobacco trade.

Cooperative agreements for tobacco-grading work were effected with five States, Virginia, North Carolina, South Carolina, Kentucky, and Tennessee.

**TOBACCO SORTING AND GRADING COURSE**

In cooperation with the State Agricultural College of North Carolina and assisted by officials of that and near-by States, a short course in tobacco sorting and grading was held in Raleigh in April, 1930. The course lasted five days and was largely attended by farmers, agricultural students, representatives of large tobacco manufacturers, and other members of the tobacco trade.

**COLD-STORAGE STATISTICS**

WILLIAM BROXTON, *in Charge*

Stocks of cream are now being transported over comparatively long distances and are being held in cold storage. Since this commodity has a direct bearing on the butter market, it has been included in the cold-storage report since December 1 of last year.

During the past year a biennial survey of refrigerated-warehouse capacity was undertaken and the results are now available. A complete tabulation will be published, together with data on cold-storage holdings, in a statistical bulletin now in course of preparation. The survey shows that the cold-storage industry has expanded during the last two years by about 9 per cent. In 1927 there were, according to the survey of that year, 1,363 concerns engaged in either public, private, or combined cold-storage warehousing, or meat packing. In 1929 there were 1,400. The expansion in capacity amounted to 60,748,260 cubic feet of warehouse space.

Many requests have been received and complied with, for detailed information on cold-storage stocks. Much of this information is furnished each month. Details of stocks, particularly those of apples and dairy products, eggs, and poultry, are being furnished regularly for a number of the important producing States and a number of distributing cities.

**OPERATION OF CENTER MARKET**

C. H. WALLEIGH, *Superintendent*

The operation of Center Market, Washington, D. C., has been continued.

Since legislation has been enacted providing for the closing of the market, in order that the site may be used in the building program of the Government, repairs and alterations have been held to the minimum. Supervision of the activities are being continued for the purpose of maintaining sanitary conditions and insuring efficient service to the public, until such time as the plant is discontinued.

**ECONOMIC LIBRARY**

MARY G. LACY, *in Charge*

The outstanding features of the past year's work of the library were the continued increase in the demand for its services; the steadily widening use of the periodical, Agricultural Economics Literature, by economists, educators, graduate students, business and commercial agencies, Federal and State Government officials both in the

United States and foreign countries; and the increase in the requests from various agencies for advice and cooperation in organizing economic literature.

Four new bibliographies were added to the bureau's numbered series, and approximately 40 additional lists were prepared in response to special inquiries.

A total of 4,605 books has been added to the library during the year, and a net increase of 68 periodicals. The files of current agricultural-economics information covering both domestic and foreign work have also been enlarged.

The library has cooperated with the Federal Farm Board, with various State and other libraries, with members of university faculties and others in assisting with the organizing of library work, or in arranging for more complete utilization of the economic material available in the library.

### DIVISION OF ECONOMIC INFORMATION

J. CLYDE MARQUIS, *in Charge*

Developments of the past year have served to stimulate greatly the demand for agricultural-economic information of all forms. The widespread growth of interest in economic questions, the problems arising from the price decline of 1929-30, and the advent of the Federal Farm Board have all stimulated interest in economic facts. Farmers, teachers, editors, and others are learning to think in economic terms and are becoming daily better acquainted with the use of such facts. As a result, the facilities of the bureau for the preparation and distribution of such information have been taxed to the utmost.

Every State now has some organized economic work under way that calls for world-wide and nation-wide information. This is a field of education in which local information takes a secondary place. The first need is for a knowledge of world and national markets, prices, production, supplies, etc., because of the fact that local influences are of minor importance. As a result, every new effort in economic education first creates a greater demand for facts from the Federal department.

The calls from general educational institutions, such as public schools, high schools, and business organizations, are growing along with the demand from distinctively agricultural organizations. Our policy has been to serve these groups as well as farmers because agricultural policies are of fundamental importance to all citizens.

Activities of the Federal Farm Board have stimulated the use of our information in some quarters, and the production-adjustment campaigns have laid some very definite burdens upon this bureau. This situation has been met by increased effort without much increase in facilities.

The conduct of the work of the division during the past year has not materially changed in organization but rather has been intensified along particular lines. Decided progress has been made in several lines:

(1) The coordination of publications of the bureau has continued and progress has been made in bringing them to the attention of

agricultural workers everywhere. Several new lists have been prepared for special groups. The head of the division personally visited and addressed extension conferences in seven Northwestern States and two conferences in the South to describe the facilities of the bureau and to outline uses of the material by farmers and extension workers. (2) The radio program of the bureau has steadily grown in scope and volume. (3) Exhibits are in greater demand than ever before, and our facilities for production and handling are inadequate to meet the need. (4) The preparation of special economic articles for newspapers and the farm press has been reorganized and extended. These now reach several million readers weekly.

#### CURRENT PUBLICATIONS

The need for immediate distribution of many types of information from the bureau makes it necessary to use the multigraph, mimeograph, and other speedy forms of preparation to make the information available. The mimeographing facilities of the bureau were increased during the year by the addition of new equipment and personnel to the bureau unit, and the output of this unit has increased from about 500,000 sheets a month to over 1,000,000 sheets.

New equipment for rotaprinting was purchased in cooperation with other bureaus for the department duplicating section, and this greatly increased the output of charts, maps, tables, etc., for immediate distribution.

In addition to a large number of reports which were issued in mimeographed form, 65 preliminary and special reports were issued during the year in editions ranging from a few thousand to as many as 15,000 copies. Altogether, this method of publication covers a volume of material exceeding the printed publications of the bureau. These preliminary reports have been distributed only to interested research and extension workers and others particularly concerned with the information, and are not available for general distribution.

#### PRINTED PUBLICATIONS

The two printed periodicals prepared by the bureau, *Crops and Markets* and the *Agricultural Situation*, have been continued through the year with only slight changes. More and more material is being presented for publication in *Crops and Markets*, and an expansion in the size of this periodical has been planned for.

In the regular bulletin series of the department, 44 publications were issued during the year, and, in addition, over one-half this number was in process of editing and publication at the end of the year. A small increase in printing funds available for the bureau was absorbed chiefly in increases in job printing which is constantly growing in volume because of the extension of the service work of the bureau.

The preparation of manuscripts for printed bulletins has been delayed seriously during the year by the heavy demands for emergency work that were made upon the members of the technical staff of the bureau. The total output of the staff in the form of special reports, articles for press, radio, etc., considerably exceeds that of any previous year, but a smaller proportion of this work has found its way into permanent publication.



## INFORMATION FOR THE PRESS

Use of press releases as the principal means of announcing the results of bureau work has been continued and expanded in some respects during the year. The number of special releases distributed through the department press service has slightly increased in number, but the principal increase in bureau publicity has been through direct contacts with press representatives.

Two of the principal news syndicates have inaugurated a series of market articles during the year based primarily upon information secured from the bureau. Through these contacts, wide distribution is given to the more important work.

Distribution of bureau information by State publicity agencies has also been improved, since a large number of special local releases are now being prepared by extension editors and others from material furnished by the bureau.

The principal change in the bureau's press relations during the year was an addition to the division staff of a writer and assistant to give their entire attention to the preparation of market reviews for the farm press and leading newspapers. Increased interest in economic information has led many newspapers to accept and publish special reviews. These are prepared for various sections such as the East, South, Middle West and far West, and are sent at the latest possible date to reach the weekly publication in time to go to press. Such articles are now being furnished to 86 publications and reach in this manner a total circulation of nearly 10,000,000 readers. Similar reviews are furnished to several radio stations, and some of them are redistributed by mail to newspapers. One particular review, for instance, is sent to seven radio stations and 46 papers.

## RADIO MARKET NEWS

The radio market-news service has been expanded by the opening of contacts through leased-wire offices in Tennessee and Mississippi, and the use of direct messages to a radio station at Raleigh, N. C. The contacts through the New England radio service have been expanded, and effective cooperation is now being had with all of the New England States. The releases of market reports to more than 115 stations has continued through the various branch offices. This service has not been noticeably disturbed by the increase of chain broadcasting.

In chain broadcasting the bureau has continued to contribute a large part of the daily program going from Washington over the national broadcasting chain. Bureau material has also been used in the Middle West chain originating at Chicago. The daily program from Washington is now a recognized feature of national importance, and special programs concerning the outlook, the drouth, and other unusual events, are arranged whenever need arises. This system provides a prompt outlet in emergencies, the value of which can hardly be overestimated.

## EXHIBITS

The bureau exhibit section assisted during the year in the preparation of one international show—The World's Poultry Congress at London. An extensive display was arranged for dressed poultry and

eggs, which received favorable comment. The other large exhibitions of the year were the National Cotton Show, the National Dairy Exposition, International Livestock Exposition, and the Textile Show. Several smaller displays were made for conventions, fairs, etc., which did not come within the scope of the department office of exhibits.

#### EXTENSION PUBLICATIONS

The outlook-chart service continued to expand, and during the year a total of nearly 5,000 wall charts, 30 by 40 inches, was made for the use of the outlook workers of the various States. A series of outlook-chart books was prepared covering seven subjects, and a total of over 80,000 copies were distributed at outlook meetings. Over 1,000 bureau charts were reproduced for distribution by the rotaprint method, these being used chiefly in extension work. In response to a suggestion of the Federal Farm Board, special extension-chart books on cotton, burley tobacco, and flue-cured tobacco were issued for distribution in the South and in the acreage-adjustment campaign. Over 50,000 copies of these publications were used.

A plan of extending the distribution of economic information to the teachers of vocational agriculture in the high schools was put into operation through contacts with a specialist appointed by the Federal Board of Vocational Education. Copies of bureau publications were distributed to agricultural teachers, and their use by these teachers has increased, resulting in a great increase in distribution to them of information on special economic phases.

#### MARKET LEGISLATIVE SERVICE

The marketing legislative service, conducted in cooperation with the National Association of Marketing Officials, has been continued through the year with growing usefulness. Aside from the current information issued through the weekly publication, *Marketing Activities*, a survey of the organization and operation of the State departments of agriculture and markets was made.