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U. S. DEPARTMENT OF AGRICULTURE.

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FARMERS' READING COURSES.

(Abridgment of Bulletin No. 72, Office of Experiment Stations, by L. H. Bailey.)



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U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,

Washington, D. C., December 11, 1899.

SIR: I transmit herewith an abridgment of Prof. L. H. Bailey's article recently published as Bulletin No. 72 of this Office, with the recommendation that it be published as a Farmers' Bulletin. There is much interest among the farmers in this subject at present, and this general article describing the main features of the "farmers' reading courses," now in operation in several States, and suggesting how such courses may be organized, will, I hope, help to extend this useful movement.

Respectfully,

A. C. TRUE,

Director.

Hon. JAMES WILSON,

Secretary of Agriculture.

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FARMERS' READING COURSES.

ORIGIN AND PURPOSE.

Another factor has entered our agricultural educational system. The farmers' reading course has taken its place along with the farmers' institute, the agricultural college, and the experiment station as an important agent in the diffusion of knowledge and the development of enthusiasm among farmers. It is being incorporated in the university extension work of a number of institutions in the Eastern States and as far west as South Dakota. The value of the work and the success it has attained have become so marked that a brief outline of its more salient features has been thought desirable.

The more successful of the farmers' reading courses thus far organized have been set on foot and fostered by the agricultural colleges and experiment stations, and the supervision and direction of the work has been largely in their hands. The work is generally conducted on the Chautauqua plan. The college or station lays out certain courses of agricultural reading on such subjects as "soils and crops," "live stock feeding and breeding," "dairying," "fruit culture," "gardening," "farm economics," "domestic economy," and other like topics; selects sets of books for reading which most clearly set forth the principles underlying these subjects; provides for superintending the work; and makes arrangements for supplying prospective readers with books, examination questions, etc., and to act as a sort of bureau of information. The reading course is designed to bring to the farmer in his own home the opportunity of taking, under college direction, a course of systematic reading on subjects especially pertaining to his work. Not every farmer has been able to avail himself of the advantages of attending a school where the principles of agriculture as known and practiced in the present day by the leading agriculturists of the world are taught. His life is a busy one, and his home reading, though considerable in amount, is generally of a miscellaneous and desultory character. The idea of the reading course is to systematize into a few definite lines this general reading and to make the knowledge thus acquired a permanent mental endowment fund to be used in making farm life more attractive and more profitable.

The method of work is simple. A book on a chosen topic is sent to a reader and he is asked to read carefully a certain subject. Printed questions bearing on this subject are then sent to him and full answers without recourse to the book requested. The object of the questioning is to fix in the mind of the reader the essentials of the subject studied. The putting into writing of one's knowledge of a subject serves to fix still more definitely in the mind the fundamental facts studied, and to recall features which otherwise might be overlooked. No expense is attached except for books and a small enrollment fee, seldom exceeding for the whole course more than \$1 in amount. Sometimes diplomas signed by the college authorities are given upon the completion of a course. A course usually covers about two years' reading. A small amount of reading performed regularly each day and extended over a considerable period of time has been found to give better results than a large amount of reading done in a shorter period. As many courses can be taken as desired. Managers of the courses encourage the formation of reading circles in farming communities, since numbers usually add enthusiasm, and the reading and discussion of the topics in common serve to bring out all the points of the lesson and to maintain interest in the subject.

The general features of these courses are in the main as above described. The details of management are varied. Instead of books being sent out for study, frequently lesson leaflets prepared by the central authorities upon particular topics are sent out. These have the advantage of dealing thoroughly with specific phases of the subjects studied. The temptation to do all the reading in a day is avoided and a constant interest maintained by the frequent receipt of new lessons. The knowledge, too, that each reading lesson is being carefully reviewed has a tendency to make the reading more thorough.

Anyone wishing to take up the work of the reading course has but to apply for membership to the manager of the reading course in his own State, or in another State. Details regarding the courses offered, books required, enrollment fees, etc., will be sent him. Upon subscribing to the rules of the society, he is at once admitted as a member and can begin reading without delay. No entrance examinations are required. Courses are provided for women and technical courses for special students.

The farmers' reading course in its extended and systematic application is of comparatively recent origin. The first widely successful course of the kind in this country was established in connection with the Pennsylvania State College in July, 1892. Since that time other courses, more or less similar in character, have been established in Michigan, New Hampshire, Connecticut, New York, West Virginia, and South Dakota, with a total enrollment of more than 13,000 students.

An account of the historical development and present status of the

reading courses in these States will serve to show the different methods at present employed in conducting these courses and at the same time give some idea of the growing importance of this kind of work. The chronological order in the development of the courses will be followed.

DEVELOPMENT IN THE SEVERAL STATES.

Pennsylvania.—The director of the experiment station, in his report to the president of the college in 1891, suggested a reading course as a means of popularizing station work. In July, 1892, such a course was established. This course is the most famous single venture of its kind.

The course was modeled upon the Chautauqua plan, and was first known as the "Chautauqua Course of Home Reading in Agriculture." The State college provided books and gave the readers examinations whenever the participants were ready to take them. Many of the students found it difficult to read the books understandingly, and a modification of the plan seemed to be desirable.

The next move was to give assistance, through correspondence, to students who found the books to be difficult. The name of the enterprise was changed to the "Chautauqua Course of Home Study in Agriculture." More than 3,000 students were registered in this course. This plan also had its faults: (1) It was impossible to secure suitable text-books; (2) it was found to be a very difficult matter for most students to pursue the study of books by themselves and to sift out the essential from the nonessential parts.

The next movement was to send out printed lessons on particular subjects treated in the books. These lessons were first issued in November, 1897, covering 7 text-books. The lessons were designed to bring the subject-matter of the books up to date, to describe simple experiments to illustrate the subject, to suggest the important or fundamental matters. The experiment was successful, and in the winter of 1898-99 lessons were issued on 16 books and on farm bookkeeping, making seventeen subjects. In 1898 the name of the enterprise became "Correspondence Courses in Agriculture," and this title it now bears.

The lessons are sent to the reader one at a time. Accompanying each lesson is a list of questions to be answered. The replies are sent to the superintendent of the reading course at the college, and another lesson is then mailed to the reader. In this way the superintendent keeps in touch with the student. He can also exercise some control over the student by withholding lessons when the work has not been done satisfactorily.

In 1898-99 the Pennsylvania correspondence courses were five in number: (1) Crop production; (2) live-stock production; (3) horticulture and floriculture; (4) dairying, and (5) domestic economy.

Each course consists of 7 distinct subjects or books, making 35 books in all.

On March 1, 1899, the total enrollment, including the Chautauqua students, was 3,416, of which number 460 have received instruction by means of the lessons. To these more than 1,800 lessons have been sent. Over 1,100 examination papers had been graded during the preceding fifteen months. During the past college year the time of the superintendent and others aiding in the work of the courses was so fully occupied with college work that practically no effort was made to further increase the membership or to extend the usefulness of the correspondence courses. Notwithstanding this, many applications for enrollment are constantly being received, showing that farmers appreciate this method of instruction. There are students in most of the States, and there are some in foreign countries. A large proportion of the students are men of mature years, the ages ranging from 15 to 75, the average of recent enrollments being about 33 years. The course is under the management of George C. Watson, professor of agriculture, State College, Pennsylvania.

Michigan.—The Michigan Farm Home Reading Circle follows the earlier system inaugurated in Pennsylvania. It was started in December, 1892. There are five classes: (1) Soils and crops; (2) live stock; (3) garden and orchard; (4) woman's course, and (5) political science. Any three of these classes constitute a course. The readers are regularly enrolled as members. Enrollment is free for Michigan readers, but \$1 is charged to nonresidents.

When a member has completed the reading of a book, he may send to the secretary for questions, which have been prepared to aid him in making a report to the secretary on that book. If the report is satisfactory, a certificate signed by the president of the college and secretary of the farm home reading circle will be issued, showing that he has completed that book. A certificate is sent upon completion of each book, and also upon the completion of the class. When a member has completed any three of the classes and has sent in a satisfactory report on the same, he is considered to have completed a course, and then will receive a suitable diploma. The reports or examinations, as they may be called, are not necessary unless the reader desires credit for his reading, but they help to fix in the mind the most prominent truths brought out in each book. A large majority of the members take advantage of this feature of sending reports for examination.

The work is confined mostly to Michigan, but there are members in several States and provinces. On March 1, 1899, there were 302 members. This figure does not represent the total number of readers, however, since the course is being taken by many grangers, farmers' clubs, and organizations instituted for the particular purpose of undertaking the reading. In many cases several members of the

family are taking the reading, but only one person may be enrolled as member. For the first three or four years the reading circle met with only indifferent success, but by persistent advertising and careful attention to correspondence it has grown steadily, and is now in a prosperous condition and is doing much good. The circle is in charge of Prof. Clinton D. Smith, Agricultural College, Michigan.

New Hampshire.—In January, 1894, the New Hampshire College of Agriculture and the Mechanic Arts established a nonresident course in Agriculture. The course is designed primarily to meet the needs of those farmers' sons who are unable to leave home to attend college, but who feel the need of the fuller knowledge of their work which the college offers. It has enrolled a considerable number of such students, and also has attracted many young men in cities who intend to become farmers. The course is conducted as a correspondence course, books and bulletins being sent the student, who studies them and returns answers to examination questions.

This nonresident course is free to all, without examination. Students may work for a certificate or not. Those who work for a certificate send answers to examination questions as fast as studies are completed. Those who do not work for a certificate submit a statement that the requisite reading has been carefully done. The work is divided into exercises, and an exercise is estimated at 10 pages of reading matter in book or bulletin. The satisfactory completion of 600 exercises entitles the student to a certificate. Under general conditions it is estimated that the completion of these exercises will require about two years. Each student working for a certificate is required to take given general studies, and then to select at least three special studies. The required general studies are soils, tillage, noxious insects, fungus diseases, meteorology, laws of plant growth, farm and household chemistry, and fertilizers. Special studies are dairying and stock feeding, poultry keeping, orchard fruits, small fruits, commercial horticulture and market gardening, vegetables, floriculture, plant propagation, and forestry. Students not working for a certificate may select any of the above subjects, but it is recommended that they pursue the prescribed lines of general reading in connection with special subjects. The course is in charge of Prof. C. W. Burkett, Durham, N. H.

Connecticut.—The Storrs Agricultural College inaugurated correspondence instruction in October, 1896. The work follows more nearly the correspondence school idea than the reading course. It is definite college extension of the best order. The extension work is a department of Storrs Agricultural College (now called the Connecticut Agricultural College).

A two years' course is given, and the student who completes the course satisfactorily attends the commencement exercises at Storrs and

receives a diploma of graduation. The course comprises two parts, one for men and one for women. The object of the course is to provide home study as nearly as possible like that prosecuted at college. Any resident of Connecticut may enroll, upon the payment of 25 cents and agreement to give three hours a week to the prescribed subjects. Examinations are conducted through correspondence. The ten students who pass the most satisfactory examination on the entire course of study are invited to prepare essays. From these essays the best five are selected to be read by their authors at the commencement exercises of the extension department at Storrs. At the commencement, certificates of diplomas are awarded to all who have completed the course, and persons who are unable to attend receive their diplomas by mail.

The two years' term of study is divided into four periods in each year: October and November, December and January, February and March, April and May. Commencement for extension students occurs during the regular college commencement week.

Each subject in the course is under the special supervision of one of the college staff, and this officer prepares syllabuses and questions covering his subjects and conducts the examinations therein. When any rural organization has a membership of ten pursuing the course the college agrees, so far as practicable, to furnish one or more lectures.

Persons who have completed the regular two years' course may organize into circles of ten or more and apply for further instruction in "subject studies." The college places in the hands of the circle a library of 50 or 100 volumes. By a system of reference cards several courses are outlined, sufficient for a year's reading. One examination paper is forwarded by the department at the end of the year, covering each subject studied. Courses are provided in general agriculture, fruit culture, market gardening, poultry raising, floriculture, botany, agricultural chemistry, veterinary science, foods, sanitation, geology, forestry, English literature, history, and political economy. The first year saw an enrollment of 216 members, and 561 volumes were circulated. The work is growing. In June, 1898, 25 persons received certificates. Two circles of ten or more had completed the course, and to these were sent the first traveling library. The books are kept one year, and they are then sent to the circles which complete the work in the following year. At the present time fully 275 persons are regularly enrolled.

The traveling library idea has been very successful. It is a kind of post-graduate course. The readers often receive more benefit from these libraries than from the two years' preliminary reading. The extension work is in the hands of Prof. A. B. Peebles, Storrs, Connecticut.

New York.—The reading course in New York first took shape at Cornell University in November, 1896, in connection with the university extension work and was at first confined largely to horticulture. Its first object was to crystallize the generally haphazard reading of farmers into a few definite lines. To this end it was suggested that each local farmers' club, grange, horticultural society, or neighborhood gathering take up a prescribed line of thinking and reading for the following winter. Methods of work were outlined. Small, compact clubs were preferred to larger organizations. A definite number of pages of reading was assigned in advance. At the meeting the leader called on a member to read the first paragraph and give his opinion upon it. A general discussion followed. Each paragraph was treated in a similar manner. The soil was the first topic usually taken up. This was followed by the fertilizing of the land and then such special subjects as were of most interest to the community.

Books and bulletins were recommended in (1) soils and tillage; (2) manures and fertilizers; (3) fruits and their cultivation; (4) spraying, insects, diseases; (5) the making of home grounds; and (6) helps for teachers.

The mere recommendation of books and bulletins to be read was hardly worth the while. A reading course will not go of itself. Someone must furnish the steam. At this juncture the details of the work fell to the hands of Mr. John W. Spencer, who is a farmer and not college bred. He saw the problem as farmers see it, and he took up the work with tact and enthusiasm. Of the bulletins recommended, two had been prepared with special reference to use in itinerant schools and reading courses, although they were founded upon experiments made at the experiment station. These are "The Texture of the Soil" and "The Conservation of Moisture" (Nos. 119, 120). These bulletins were sent to farmers who were likely to be interested in a reading course, and correspondence was opened on the subjects which they suggested. As a result of this undertaking, there were 1,500 readers at the close of the reading season, April, 1897.

In the winter of 1897-98 the effort was continued with the same bulletins, and a short essay on the soil was prepared and used as a basis of study and correspondence. Thus arose the Cornell Reading Lesson, which is now the basis of the New York Reading Course. This lesson is a treatise in itself, not a commentary on a book.

At the close of the reading season of 1897-98 the list of actual readers or members had been increased to nearly 5,000. This increase was secured wholly by means of the single topic of physical conditions of soils. In the winter of 1898-99 the same plan was continued, but five successive topics or lessons were used, and in this season the actual enrolled readers were increased to 8,605. Of these persons

8,169 reside in New York State, 411 in other States, and 25 in foreign countries. It is confidently expected that the number will be doubled in the next reading season.

The gist of the New York plan is to give the farmer a short specially prepared lesson, and then to quiz him on it. The motive is to reach the many, not the few. The farmer who can and will read books can take care of himself, but the one who can not or will not needs help, whether he wants it or not. The idea is to get the rank and file to read books by first interesting them in simple, short, and easily digested matter. When the farmer is once interested it needs only good administrative machinery to keep him interested and to lead him on.

The operation of the Cornell plan as now prosecuted comprises: (1) Securing the farmer's name; (2) sending him a lesson, with an inclosure containing questions (called a quiz); (3) the active organization of reading clubs; and (4) the sending of special inspectors and lecturers to these clubs.

There are many ways of securing the farmer's name. The best one has been the paragraphing of the local newspapers. A paragraph calling attention to the reading course has been sent to the country papers of the State. Public-spirited men have been asked to furnish names. Granges, horticultural societies, and other organizations have aided. When the farmer receives the lesson he is informed that a continuance of the favor is conditioned upon his answering the questions. He is not a member of the reading course until he makes a personal application therefor. Every inducement is offered to persuade readers to organize themselves into small clubs, and one of the strongest inducements is the promise of a speaker from the university to those clubs which do the best work. In the past winter three farmers were hired to organize clubs in their respective counties, and the experiment was successful. Small clubs are preferred—those of six to twelve persons, who meet at the homes of the various members. It is the purpose to send an inspector to the clubs once during the winter, to see how they are getting on. The New York course is free and is maintained from a State appropriation for the extension of agricultural knowledge. The course is in charge of Prof. L. H. Bailley, Ithaca, N. Y.

Every effort is made to cause the farmer to get the most out of each lesson. The work can not be done hastily nor loosely. After having had a fair trial, the shiftless reader is cut off. In the winter of 1898-99 five illustrated lessons were issued, as follows: (1) The soil, what it is; (2) tillage and underdrainage, reasons why; (3) fertility of the soil, what it is; (4) how the plant gets its food from the soil, and (5) how the plant gets its food from the air. These lessons attempt to state principles, not directions for practice. At the end of the reading-course season a round-up lesson is published, giving answers to all

quizzes. In the coming winter these lessons will be used again for the recruits, but others will be prepared for the veterans. Books are recommended for special clubs and special readers.

West Virginia.—Late in the fall of 1897 a "home reading course in agriculture" was offered to the farmers of West Virginia. At the close of the first year, June, 1898, 89 students had been enrolled. Although the course has been in operation little more than a year, 132 readers are enrolled, most of whom are doing good and enthusiastic work.

The work in the course is founded upon the reading of books. The course runs in four divisions—crop production, live-stock production, horticulture and floriculture, and rural economy. A regular course consists of any two of the four divisions; or the student may elect any ten books out of the twenty offered. Any student who has completed a subject will, upon notifying the college, receive an examination paper on that subject, to which written answers are to be returned, accompanied with a statement upon honor that the answers are the unaided work of the person sending them. These answers will be graded, and anyone receiving a grade of 75 per cent or more in the studies of any two divisions will receive a suitable certificate signed by the president of the board of regents and the dean of the college. For this certificate a charge of \$1 will be made, which is only sufficient to cover the actual cost of material and engraving.

The course is open to any applicant, without fees. The subjects may be taken up in any order desired by the reader. The work is in charge of Prof. T. C. Atkeson, dean of the College of Agriculture, Morgantown, W. Va.

South Dakota.—South Dakota uses the Pennsylvania system. The work was founded at the beginning of 1899. Five courses are offered, any or all of which may be pursued. Each course, or series, contains five books on related subjects, which are usually so arranged as to develop the subject naturally, leading from simpler to more complex problems. In special cases options are offered in the supplementary list, thus varying the course to meet the special needs of the reader. The superintendent endeavors to arrange such courses to meet special needs.

When beginning a book the student receives from the college a printed lesson of instruction covering certain parts of the work and making prominent the most salient points. Upon the completion of this section the reader fills out answers to questions asked and mails them to the superintendent, who, upon examination, makes needful suggestions or corrects erroneous impressions when necessary. When the work of one section is satisfactorily completed, the instructions for the next section are sent, until the book is completed. The work is in charge of Mr. S. A. Cochrane, Brookings, S. Dak.

REFLECTIONS UPON THE READING COURSES.

Two distinct ideas are represented in the reading courses outlined in the preceding pages. The older, or Chautauqua-Pennsylvania idea, is that of a definite, prescribed, self-limited, technical correspondence curriculum, the completion of which is signalized by a certificate or diploma. The other, or Cornell idea, is that of a flexible, nonlimited, untechnical reading course, in which there is no system of counts, and which does not lead to certificatory honors. The former is intensive: it is adapted to the few. The latter is elementary: it is adapted to the many. Each is incomplete.

The ideal reading-course system is that which joins the two ideas. Its general work is to touch and awaken every farmer, particularly every poor farmer; it searches out the man who has small opportunities. Its special work is to aid the few who are already successful; it accepts the man of fair or large opportunities. If the primary object of a reading course is a mission, the Cornell system would seem to be the better; if the object is technical education, the Pennsylvania or curriculum system is the better. But since the complete reading course is both a missionary and a schoolmaster, it is evident that the two systems should be combined.

A given amount of money will reach more persons in the elementary or Cornell system. If funds are not at hand for the publication of lessons, existing bulletins may be utilized, or the reader may be asked to buy the lesson, and the expense of it would be less than the buying of books. The lessons or the bulletins have more local and personal application than books do. There is, or should be, less of detail in them. But every effort should be made to lead the reader into the larger horizon of book reading. As fast as persons are ready for books, supply the lists and suggest graded courses. For those who go far enough in the reading and study of books a certificate or diploma may be provided, but this diploma should never carry with it an academic degree.

Organization of the readers is a prime requisite. This is the experience of every reading-course movement. The flame of interest is more easily kept burning if there is more than one person to tend the fire. Small circles or clubs are relatively more effective than large ones. Twenty persons is perhaps an outside number for greatest efficiency. If a grange or other society takes the reading course and its members are many, it is well to consider the dividing of the membership into two or more clubs or subcircles. Several small clubs in a community engender emulation. In a small circle every member takes a part in the discussions.

The literature must be distributed promptly at the appointed time. This is particularly important if independent lessons are used, for the

circle depends upon a lesson for new subject-matter at the session. The reading matter should be promised for a definite time, and withheld until that time. The circle may devote as many sessions as it desires to each lesson.

It is of the greatest importance that these reading courses should teach the reasons why—the general or underlying truths, avoiding the discussion of questions of mere practice. The superintendent of a reading course can not know the local and personal conditions which underlie methods of practice, and the greater part of his energies would be dissipated if he attempted to discuss them. But the members of the circles or clubs should be encouraged to make applications for themselves of the principles under discussion. It is far better to elucidate a very few underlying principles and to encourage the application and illustration of them on each farm than to cram the mind with any amount of mere information and advice. We often attempt to teach too much.

A promise of a visit from some person officially connected with the reading course acts as a powerful stimulus. Such visit should be regarded as a premium on efficient work, not as a matter of course. One visit each winter will be sufficient to keep up the interest, particularly if it is made rather late in the winter, when enthusiasm usually begins to lag. The reading course is an excellent supplement to the farmers' institute. The ideal legacy of an institute is a reading course. One or two of the speakers might be delegated to organize such courses, and also to visit and inspect clubs or circles in the neighborhood. The questions which are left over from the institute may form the basis of discussions at the clubs, and the clubs may keep the spark of interest and inquiry alive until the next institute.

Finally, it should be said again that the reading course must be pushed. It will not run itself, unless it runs into the ground. It is not enough to offer the people the privilege. The movement must be kept alive. It must be made attractive and useful. In justice, every farmers' reading course should be run by a person whose head and heart and hands are not full of college or experiment-station work; but, so far, the fact has been just the reverse, and it will be some years yet, no doubt, before the movement reaches that influence and standing which call for specially trained men. The men who have labored with the reading-course movement are doing full work without it. They take it up gladly and hopefully, without remuneration. This spirit is one of the distinguishing marks of the agricultural colleges and experiment stations, and it is one of the most hopeful things in our agricultural status.

**PUBLICATIONS ON AGRICULTURE USED OR RECOMMENDED IN
FARMERS' READING COURSES.**

The following publications are either used in reading courses outlined for the different States in the preceding pages or recommended for reading. They can be obtained through the managers of any of the reading courses or from local book dealers. Following the list of text-books on the different topics are suggested in each instance a number of the Farmers' Bulletins published by this Department. These bulletins treat clearly and concisely a wide range of farm topics. They are distributed free of charge, and in many instances are particularly well adapted for use in farmers' reading courses. For these Farmers' Bulletins application should be made to the Secretary of Agriculture, Washington, D. C.

CROPS, SOILS, AND FERTILIZERS.

Text-books.—How Crops Grow, Johnson; How Crops Feed, Johnson; The Chemistry of Common Life, Johnson; Agriculture, Wallace; Plant Life, Masters; Soils and Crops, Morrow and Hunt; First Principles of Agriculture, Voorhees; Principles of Agriculture, Bailey; Talks Afield, Bailey; Practical Farm Chemistry, Greiner; How the Farm Pays, Henderson and Crozier; Story of the Plants, Allen; Realm of Nature, Mill; Storer's Agriculture (3 vols.); The Great World's Farm, Gaye; Living Plants and Their Properties, Arthur and MacDougal; Potato Culture, Terry; Grasses of North America, Beal; The Silo and Silage, Cook; A Book on Silage, Woll; Manures and Manuring, Aikman; Fertilizers, Gregory; Fertility of the Land, Roberts; Chemicals and Clover, Collingwood; The Soil, King; Tile Drainage, Chamberlain; Land Draining, Miles; Irrigation Farming, Wilcox.

Farmers' Bulletins.—No. 16, Leguminous Plants for Green Manuring and for Feeding; No. 21, Barnyard Manure; No. 25, Peanuts: Culture and Uses; No. 26, Sweet Potatoes: Culture and Uses; No. 27, Flax for Seed and Fiber; No. 28, Weeds: And How to Kill Them; No. 31, Alfalfa, or Lucern; No. 35, Potato Culture; No. 36, Cotton Seed and Its Products; No. 37, Kafir Corn: Characteristics, Culture, and Uses; No. 40, Farm Drainage; No. 43, Sewage Disposal on the Farm and Protection for Drinking Water; No. 44, Commercial Fertilizers: Composition and Use; No. 46, Irrigation in Humid Climates; No. 48, The Manuring of Cotton; No. 50, Sorghum as a Forage Crop; No. 52, The Sugar Beet; No. 54, Some Common Birds in Their Relation to Agriculture; Nos. 56, 65, 69, 73, 78, 79, 84, 87, 92, 97, 103, 105, 107, Experiment-Station Work¹—I—XIII; No. 58, The Soy Bean as a

¹This is a series of brief popular bulletins compiled from the published reports of the agricultural experiment stations and kindred institutions in this and other countries. Each bulletin consists of brief articles on a variety of agricultural topics. Their chief object is to disseminate throughout the country information regarding experiments at the different experiment stations, and thus to acquaint farmers in a general way with the progress of agricultural investigation on its practical side.

Forage Crop; No. 60, Methods of Curing Tobacco; No. 62, Marketing Farm Produce; No. 66, Meadows and Pastures in the Middle Eastern States; No. 75, The Grain Smuts: How They are Caused and How to Prevent Them; No. 77, The Liming of Soils; No. 81, Corn Culture in the South; No. 82, The Culture of Tobacco; No. 83, Tobacco Soils; No. 88, Alkali Lands; No. 89, Cowpeas; No. 90, The Manufacture of Sorghum Sirup; No. 91, Potato Diseases and Their Treatment; No. 95, Good Roads for Farmers; No. 98, Suggestions to Southern Farmers; No. 101, Millets; No. 102, Southern Forage Plants; No. 104, Notes on Frost; No. 110, Rice Culture in the United States.

LIVE STOCK PRODUCTION AND FEEDING.

Text-books.—Horses, Cattle, Sheep, and Swine, Curtis; Stock Breeding, Miles; Feeds and Feeding, Henry; Cattle Breeding, Warfield; Domestic Sheep, Stewart; Cattle Feeding, Stewart; Swine Husbandry, Coburn; Horse Breeding, Sanders; Root Crops for Stock Feeding, Burpee; Manual of Veterinary Hygiene, Smith; Manual of Cattle Feeding, Armsby; Farmer's Veterinary Advisor, Law; Breeds of Live Stock, Sanders; Guide to Successful Poultry Keeping, Sewell and Tilson; Farm News Poultry Book, Purvis; Poultry Culture, Felch; The Business Hen, Collingwood; The Poultry Yard, Burpee; Capons for Profit, Greiner; Natural and Artificial Duck Culture, Rankin; Practical Poultry Keeping, Wright; An Egg Farm, Stoddard.

Farmers' Bulletins.—No. 16, Leguminous Plants for Green Manuring and for Feeding; No. 22, The Feeding of Farm Animals; No. 24, Hog Cholera and Swine Plague; No. 32, Silos and Silage; No. 49, Sheep Feeding; No. 51, Standard Varieties of Chickens; No. 55, The Dairy Herd: Its Formation and Management; No. 59, Bee Keeping; No. 71, Some Essentials in Beef Production; No. 72, Cattle Ranges of the Southwest; No. 86, Thirty Poisonous Plants; No. 100, Hog Raising in the South; No. 106, Breeds of Dairy Cattle.

HORTICULTURE.

Text-books.—How to Grow Squashes, Gregory; Onion Raising, Gregory; Onions for Profit, Greiner; Cabbages and Cauliflower, Gregory; How to Grow Cabbages and Cauliflower, Gregory; Celery for Profit, Greiner; A Kitchen Garden of One Acre; How to Grow Melons for Market; Potatoes for Profit, Van Ornam; My Handkerchief Garden, Barnard; How to Make the Garden Pay, Greiner; Gardening for Profit, Henderson; Success in Market Gardening, Rawson; How to Grow Mushrooms, Falconer; Selection in Seed Growing, Burpee; Vegetable Gardening, Green; Garden Making, Bailey; Greenhouse Construction, Taft; Greenhouse Management,

Taft; Lessons with Plants, Bailey; The Horticulturist's Rule Book, Bailey; The Nursery Book, Bailey; Principles of Fruit Growing, Bailey; Field Notes on Apple Culture, Bailey; American Fruit Culturist, Thomas; Practical Fruit Grower, Maynard; Amateur Fruit Growing, Green; Pear Culture for Profit, Quinn; Quince Culture, Meech; Peach Culture, Fulton; Success with Small Fruits, Roe; A B C of Strawberry Culture, Terry; Grape Culturist, Fuller; Fruit Culture, Strong; American Grape Training, Bailey; Cross Breeding and Hybridizing, Bailey; Principles of Plant Culture, Goff; Plant Breeding, Bailey; Propagation of Plants, Fuller; Ornamental Gardening, Long; Gardening for Pleasure, Henderson; Home Floriculture, Rexford; Practical Floriculture, Henderson; The Rose, Ellwanger; All About Sweet Peas, Hutchins; Pansies, Poppies, and Sweet Peas, Hutchins; Chrysanthemum Culture, Morton; American Carnation Culture, Lamborn; Bulbs and Tuberous-rooted Plants, Allen; The Beautiful Flower Garden, Mathews; Insects and Insecticides, Weed; The Spraying of Plants, Lodeman; Spraying Crops, Weed; Fungi and Fungicides, Weed.

Farmers' Bulletins.—No. 19, Important Insecticides: Directions for their Preparation and Use; No. 30, Grape Diseases on the Pacific Coast; No. 33, Peach Growing for Market; No. 39, Onion Culture; No. 53, How to Grow Mushrooms; No. 61, Asparagus Culture; No. 68, The Black Rot of the Cabbage; No. 70, The Principal Insect Enemies of the Grape; No. 76, Tomato Growing; No. 80, The Peach Twig-borer: An Important Enemy of Stone Fruits; No. 94, The Vegetable Garden; No. 99, Three Insect Enemies of Shade Trees; Nos. 56, 65, 69, 73, 78, 79, 84, 87, 92, 97, 103, 105, 107, Experiment Station Work¹—I—XIII.

DAIRYING.

Text-books.—Milk and Its Products, Wing; Chemistry of Dairying, Snyder; Silos, Ensilage, and Silage, Miles; Dairy Bacteriology, Russell; Milk: Nature and Composition, Aikman; Cheddar Cheese Making, Decker; Testing Milk and Its Products, Woll and Farrington; American Dairying, Gurler; Dairy Science, Woll; Handbook for Farmers and Dairymen, Woll.

Farmers' Bulletins.—No. 16, Leguminous Plants for Green Manuring and for Feeding; No. 22, The Feeding of Farm Animals; No. 29, Souring of Milk, and Other Changes in Milk Products; No. 32, Silos and Silage; No. 42, Facts About Milk; No. 55, The Dairy Herd: Its Formation and Management; No. 57, Butter Making on the Farm; No. 63, Care of Milk on the Farm; No. 74, Milk as Food; No. 106, Breeds of Dairy Cattle.

¹See footnote on p. 16.

POLITICAL SCIENCE AND RURAL ECONOMY.

Text-books.—Elements of Political Economy, Ely; Political Economy, Walker; American Commonwealth, Bryce; Money and the Mechanism of Exchange, Jevons; Small Talks About Business, Rice; Farmer's Tariff Manual, Strange; The Sophisms of Free Trade, Byles; The Sophisms of Protection, Bastiat; Farm Law, Bennett; How to Cooperate, Myrick.

DOMESTIC ECONOMY AND FOODS.

Text-books.—The House Comfortable, Ormsby; Disposal of Household Wastes, Gerhard; Chemistry of Cookery, Williams; Boston Cook Book, Mrs. Lincoln; What to Eat and How to Serve it, Herrick; Household Economics, Campbell; The Way We Did at Cooking School, Reed; The Story of Germ Life, Conn; Home Sanitation, Richards and Talbot; Chemistry of Cooking and Cleaning, Richards and Elliott; Boston Cooking School Book, Farmer; Food Products of the World, Green; House Plans for Everybody, Reed; Practical Sanitary and Economic Cooking, Abel; Home Economics, Parloa; Physical Development and Exercise for Women, Bissel; Hygiene and Physical Culture for Women, Galbraith; A Study of Child Nature, Harrison; Realm of Nature, Mill.

Farmers' Bulletins.—No. 23, Foods: Nutritive Value and Cost; No. 34, Meats: Composition and Cooking; No. 74, Milk as Food; No. 85, Fish as Food; No. 93, Sugar as Food.

FORESTRY.

Text-books.—Forestry Planting, Jarchow; Studies in Forestry, Huston.

Farmers' Bulletin.—No. 67, Forestry for Farmers.

Lists of Farmers' Bulletins, showing additional subjects treated in this series, can be obtained for any farmers' reading circle by application to the Division of Publications, Department of Agriculture, Washington, D. C.

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