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AGRICULTURAL INSTRUCTION IN HIGH SCHOOLS

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AGRICULTURAL INSTRUCTION IN HIGH SCHOOLS.

BRIEF HISTORICAL SKETCH.

One of the earliest proposals in this country to regard agriculture as a subject for higher education is found in a prospectus issued by William Smith, in 1751, designed as a model for colleges.[1] This plan, providing for the chemistry of agriculture, was carried out to some extent at Philadelphia Academy (University of Pennsylvania).

We find husbandry and commerce mentioned in the original prospectus of King's College (Columbia University), dated May 31, 1754, and agriculture and merchandise in the "Laws and Orders" adopted by the governors, June 3, 1755.[2] The chair of botany and agriculture in 1792 was held by Samuel Latham Mitchill, M. D. In describing a summer course in botany, he says:

> An attempt is made by the professor, who is a practical farmer, to elucidate and explain the economy of plants, their affinity to animals, and the organization, excitability, stimuli, life diseases, and death of both classes of beings. The physiology of plants * * * is therefore particularly enlarged upon, as connected with gardening and farming.[3]

One of the best instances of the actual uses of agriculture and other industrial work in an educational way for pupils of elementary and secondary school age is furnished by the schools established at New Harmony, Ind., in 1825, by William Maclure,[4] in connection with the socialistic experiment known as the New Harmony Movement. Maclure placed the schools in charge of Joseph Neef, whom he had brought to Philadelphia in 1806 to introduce Pestalozzi's method of teaching. He provided ample dormitories, books, museums, shops, experimental plots, and other facilities. The experiment was short-lived, suffering from the spirit of religious intolerance on all sides, while the location, so far from the older centers of intellectual life, was largely responsible for the slight impression that the schools made on educational practice.

A pioneer movement in agricultural education and one that lasted much longer than many others, though not much noticed in the literature of agricultural education, was the Oneida Manual Labor Institute, conducted by George Washington Gale from 1827 to 1834,

[1] Discourses on Public Affairs, 2d ed., London, 1762.
[2] Universities and Their Sons, pp. 583, 598.
[3] Mitchill. The Present State of Learning in the College of New York, p. 6.
[4] Monroe, Will S. Pestalozzian Movement in the United States.

whose course included instruction in carpentry and agriculture. This extended effort followed a few years' experience with a number of boys who were taken to a farm near Whitesboro, Oneida County, N. Y., to which Mr. Gale had retired from the ministry on account of ill health. He later established Knox College, at Galesburg, Ill.

A manual labor academy was conducted from 1830 to 1832 at Germantown, Pa., by George Junkin, who became later the first president of Lafayette College.

Sporadic attempts, more or less futile, were made to introduce regular instruction in agriculture as a part of the school curriculum early in the last century, as at Dummer Academy, Newberry, Mass., 1824; Derby, Conn., 1826; Andover Theological Seminary, Mass., 1838; The People's College, Montour Falls, N. Y., 1853; Westfield (Mass.) Academy, 1856; and Powers Institute, Bernardston, Mass., 1857. The opening of Bussey Institute, founded by a bequest made in 1842, was delayed by Harvard College until 1870. That commendable philanthropy, the Farm School, Thompsons Island, Boston, now in its ninety-eighth year, began instruction in agriculture in 1833, and has since continued it. Work of recognized scientific merit was inaugurated at the Sheffield Scientific School, Yale, in 1848, by the establishment of a chair of agricultural chemistry and vegetable and animal physiology.

Most of the agricultural and mechanical colleges were founded as a result of the famous Morrill Act of 1862. Of the few in existence before this date, the Michigan Agricultural College, founded in 1857, is the oldest. The Morrill Act gave to each State for the establishment and maintenance of such schools 30,000 acres of land for each Member of Congress. From this have resulted endowment funds amounting to over $13,000,000, with land worth more than $4,000,000 not yet sold. Later acts of Congress, the Hatch Act, effective in 1887; second Morrill Act, 1890; Adams Act, 1896; and Nelson amendment, 1907, have appropriated sums of regularly increasing amounts which aggregate $80,000 annually for the agricultural colleges and experiment stations of each State. Part of the funds resulting from the last-mentioned legislation "may be used for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts," interpreted to include courses in education as applied to instruction in agriculture, mechanic arts, and household economy.

No less remarkable than the development of the agricultural college has been the rapid growth within the present decade of the agricultural movement in the elementary and secondary schools of the public-school system. Within the limitations indicated in parentheses, instruction in the rudiments of agriculture is required in the elementary schools of Alabama, Arkansas, California, Florida, Georgia, Louisi-

ana, Maine (rural), Mississippi, Missouri (rural), North Carolina, North Dakota (rural), Ohio (rural), Oklahoma, South Carolina (county boards may require it), Texas (in districts with less than 300 children), West Virginia, and Wisconsin (rural). Elementary agriculture has been compulsory in about half of these States for six or seven years. The early legislation found the State educational systems utterly unprepared to undertake the work, because of the lack of teachers with the requisite training. After failing to reach the greatest number, the effort was made to use the machinery of the public high school. During the school year of 1906–7 probably less than 100 public secondary schools, either special or general, gave agricultural instruction by means of even simple experiments. By the following year the number had risen to nearly 250, and in two years was in the neighborhood of 500. In 1910 about 1,800 schools reported to the Bureau of Education that agriculture was taught as a separate study in the high-school department. This includes, however, many schools where officials reported sixth, seventh, and eighth grade agriculture as a high-school study, an error due partly to local usage of the term "high school" when meaning graded school, and partly to the frequent inclusion of the eighth grade in the high school.

Historically, secondary-school agriculture may be said to have developed by a series of overlapping epochs. From 1825 to 1860 there were attempts to introduce the subject into the humanist academies of the period, paralleled by several purely vocational experiments. From 1865 to very recent years the land-grant colleges did much work of purely secondary-school grade. The University of Minnesota in 1898 set off this work into a high-school department, an example very largely followed since. Special secondary schools of agriculture were established by Alabama between 1889 and 1895, though it is true that the instruction in agriculture was subordinated to that in traditional studies. Sixteen agricultural high schools were in operation in the United States by 1907, and others had been authorized. The high-water mark in establishing special schools was reached in the school year 1907-8, during which 15 schools were opened, or more than twice as many as have been established during any one year since. The decline in the establishment of special schools of agriculture, however, has been compensated for by a somewhat different movement, that of granting State aid for the support of departments of agriculture, or of agriculture and home economics, sometimes including manual training, in high schools already in existence. This growth may be measured not only by the number of schools establishing such departments, but also by the dates of legislation. Using the latter standard, we have in 1903 one State enacting laws for this purpose, two in 1908, two in 1909, three in 1910, and four in 1911.

Supplementary legislation has later been enacted by three of these States.

An excellent criterion of progress is the number of schools offering agricultural courses two or more years in length. In the school year 1906–7 probably less than half a dozen public (city and village) high schools offered more than one year of agriculture, and all were supported entirely by local funds. Three years later, in 1909–10, over 30 locally supported high schools were giving two or more years' work, and 45 to 50 others maintained agricultural departments through State aid. In the academic year 1911–12 agricultural courses of two or more years were maintained locally in about 135 public schools, and by State aid in 175 more. This is in addition to the 50 or more separate special schools of agriculture and 34 secondary schools attached to land-grant colleges in 23 States. The above figures do not include schools for negroes or for Indians.

ORGANIZATION OF SECONDARY SCHOOLS IN RELATION TO THE TEACHING OF AGRICULTURE.

From the standpoint of support or maintenance, secondary schools giving instruction in agriculture fall into two groups: (1) Those supported by public funds regardless of how the money is raised, and (2) those supported by private benefactions. From the standpoint of administration, however, the line of cleavage is along rather different lines: (1) General, or nonspecialized, public high schools, with agriculture included among the various other studies taught; and (2) special, or technical agricultural high schools. Many technical agricultural schools are private, but appeal to a general constituency; while many others, both public and private, are for mental and moral delinquents. No technical schools will be considered in this bulletin except those maintained, at least in part, by public funds, and open to all the young people of the community.

The general high school offering instruction in agriculture is of practically every type recognized among public schools. The political units supporting it range from villages and parts of townships to counties. The special schools, on the other hand, are supported almost without exception by the larger political units, the county, the congressional or special district, or the State at large.

The aim of the special schools is avowedly vocational. They possess facilities for carrying on practical farming in its various branches which are surprisingly complete in view of the short time since the inception of the idea. In these schools the most radical departure appears in equipment and curriculum. The least innovation is found where agricultural departments have been grafted on existing institutions, or where these institutions have been "reor-

ganized." This statement, with the appropriate change of phraseology, applies equally to the public school.

There are special schools with but few acres of land, or none at all for practical work, while others possess large tracts for the illustration of diversified methods of farming. Some schools have fair-sized observation tracts, but no room for outdoor laboratory work; if the students do farm work in such schools, much of it may be as day laborers working out their board, thus diminishing the time for school work proper. This is not carried to such an extreme in publicly supported schools as in private or denominational schools.

In the matter of curriculum, at one extreme there may be no cultural elements save a very limited amount of English, and perhaps civics; at the other extreme are schools established ostensibly as "agricultural high schools," or calling themselves by that name, offering the usual Latin-scientific courses, with agriculture running as a parallel course through three or four years. With very few exceptions, this last-named arrangement represents the most extreme position of the general high school, and at this point the characteristics of the two large groups overlap. While this was the case in some of the Alabama district schools but a few years ago, as shown by their catalogues, the situation is now reversed and agriculture is required of all for five semesters, with the option of substituting Latin for it during the last three semesters. This change went into effect September, 1909.

The agricultural colleges of 12 States[1] have organized their work of secondary school grade into special departments. Sometimes these departments are given the designation "school of agriculture," and they are often spoken of generically as high schools. California, Georgia, and Minnesota maintain schools located apart from the agricultural colleges but under their control. Independent of college control, except perhaps in an advisory capacity, secondary agricultural schools are maintained by California, Colorado, Nebraska, New York, North Dakota, Utah, and Vermont, while in Massachusetts and Pennsylvania some aid is given to such schools. The main purpose of these schools is to furnish vocational training, and little is attempted that does not aim at this result. Some training in agriculture or horticulture is given in certain State schools for women, notably in Texas.

In Alabama, Georgia, and Virginia agricultural schools are located according to congressional districts; in Oklahoma the judicial district[2] is the unit of distribution, and in Arkansas the district is one

[1] California, Colorado, Georgia, Idaho, Louisiana, Maine, Minnesota, Montana, Nebraska, North Dakota, Oklahoma, and South Dakota. Eighteen other States have preparatory schools of secondary grade, but they do not come under the term secondary agricultural.

[2] The three counties of the fifth district, forming the "panhandle" of the State, have been organized as a separate agricultural school district.

of four quarters into which the State is divided. A wide divergence exists in the essential character of the work and in the administration of these schools.

According to the printed curriculum, the Alabama district schools give 40 per cent of the time the first year to the common branches, but slightly over 20 per cent of all the recitations during the four years to agriculture, and, including farm work, less than 30 per cent of all the time. The schools are in villages and small cities, which have no other schools above the elementary grades. They have therefore functioned as general public high schools, often giving courses in commercial branches and sometimes in elocution and music. Agriculture is not required in two semesters and may be replaced by Latin in three others. The curriculum is based on an elementary course of seven grades.

A four-year curriculum was adopted by the Georgia district schools for use in 1912–13, presupposing the completion of six elementary school grades. It requires agriculture of the boys and household arts of the girls in every semester. The agriculture will average 21 per cent of the recitation periods during the four years and 40 per cent of all the time, including laboratory, shop, and field-work. This is a smaller proportion than contemplated in the first tentative curriculum, though as put into practice in the different schools that curriculum showed much variation. Approximately one-half of the time of the first year and one-fifth of the second year is devoted to the common branches. No instruction is given in foreign languages. The State authorities favor restricting elocutionary efforts to the work of the English department and that of the literary societies. A teachers' course, with some pedagogical work, was added during the current year.

The curriculum of the Oklahoma district schools is three years in length, with an average of 28 per cent of the recitations and 42 per cent of all the school time devoted to agriculture. The course is based on the completion of the eighth grammar grade, but one-sixth of the first year is given to instruction in the common branches.

The Virginia schools, though popularly called "agricultural schools" and commonly designated as congressional district schools, occupy a somewhat unique position. The State makes special provision for the separate maintenance of a "department of agriculture, domestic science, and manual training," and for a "normal department" in 10 high schools. The law provides for the location of the former in one high school in each congressional district. The result is in each case a high school with regular academic courses of four years ministering to its village or city, maintaining at the same time an agricultural department for the congressional district and a normal training department for no special geographical unit unless prescribed

by the State board of education. Some of the schools have commercial departments and departments of music, art, and elocution.

There is a wide variation in the kind and amount of agriculture taught in the so-called county agricultural school. Most county high schools teaching agriculture have four-year curricula and include a wide range of culture subjects. The seven county agricultural schools of Wisconsin and the one at Menomonie, Mich., have two-year curricula, requiring for entrance the completion of the eighth grade. The cultural elements of the curricula occupy much less time than in those of the other schools mentioned, ranging from 28 per cent to 47 per cent of the total time. The remaining work is purely vocational.

As in district schools, so in county high schools, agriculture may be required of all students or it may be elective, even though the school is legally designated as an agricultural high school. Some have even offered Greek.

Among high schools supported by townships, cities, and smaller municipalities a similar diversity exists. At one extreme stands such a school as the Gardena High School, one of the eight high schools of Los Angeles, with its agricultural curriculum containing an average of 50 per cent of industrial work for four years, or, excluding work in mechanics, 47.5 per cent of agricultural work in the tenth, eleventh, and twelfth grades. From this high mark the percentage falls to the vanishing point. As in the case of the county school, so with the township school, agriculture may be the predominant note or it may be scarcely more than an echo.

If it be desired to classify schools teaching agriculture, it should be done with regard to the kind and amount of agriculture taught and not according to the kind of political unit served. Such a classification is the following:

1. Public secondary schools with an agricultural course of one year or less: (*a*) A course with definite provision for laboratory work by the pupils and demonstrations by the teacher, and (*b*) a course consisting mainly of recitations based on a textbook.

2. Public secondary schools with agricultural courses in two or more years: (*a*) Courses considered as equivalent to any other one full-time study in a given year or less, and (*b*) courses that amount to more than one full-time study each year.

Private secondary schools that function for their communities as public high schools logically belong in one of the two main divisions indicated, especially when receiving grants from the State, which often occurs in New England.

Of the agriculture courses continuing one year or less, about two-thirds are half-year courses and a few are three months' courses. Approximately two-fifths of the courses of a year or less are given 40 minutes a day throughout the week. This makes little or no pro-

vision in school for special laboratory periods. Experiments requiring a longer time must be carried on or finished after school. Courses of a half year or less are usually book work principally. When combined with half a year of botany, the agriculture course often includes much of the plant physiology usually given in botany courses continuing through the year.

Most secondary schools with agriculture in two or more years carry it entirely through each year. Few confine it to part of any year. Many high schools give the same time to agriculture as to any other one subject extending through two or more years, as English, Latin, or mathematics. In addition to agriculture, such related subjects as manual training, mechanical drawing, and natural science often make an aggregate of perhaps half the total time. In certain States, notably California, Michigan, and New Hampshire, a year of some pure science or of a mixed "elementary" science is planned to precede the distinctively agricultural courses of the three later years. The content of these subjects is variously influenced by the agricultural idea; to what degree it is difficult to estimate. Many special schools and a few general high schools give two or more courses in agriculture, parallel to each other and aggregating a total exceeding five periods a week. In such cases the predominance of agriculture in the curriculum is marked.

For convenience we may consider the "special" school as one in which agriculture does so predominate, and in which some of the usual high-school subjects, particularly foreign languages and higher mathematics, are not required or are not even offered. To this tentative definition should be added all the ideas, not conflicting with it, embodied in an official pronouncement by the Association of American Agricultural Colleges and Experiment Stations that an agricultural high school should be distinctively of secondary-school grade, including no grammar grades, that it should require all students to spend at least one-fourth of the entire time on agriculture (or home economics for girls), and that it should make definite provision for practice in farm operations. (See Table 1 on p. 17.) The term "agriculture high school" is largely a matter of definition. It would seem as logical for a high school offering Latin and a four-year commercial course to call itself a commercial high school as for one offering Latin and a four-year agricultural course to call itself an agricultural high school. The confusion arises principally from the failure to distinguish between a high school with definitely organized agricultural and other departments and a special school whose nonvocational subjects occupy a subordinate position and are even then closely related to the student's future citizenship. The one offers general high-school subjects; the other does not. This clear distinction removes from the class of special schools the congressional dis-

trict schools of Alabama, the departmental or composite schools of Virginia, and many of the county schools of Louisiana, Mississippi, and elsewhere.

The strictly local high schools are locally governed, whether they be city, village, township high schools, or a combination or intermediate form. The county schools, whether truly agricultural or general high schools, are also governed by boards chosen by the electors or by local school commissioners. The State agricultural high schools and the district schools, whether special or general in character, are governed by boards appointed usually by the governor of the State.

THE PUBLIC HIGH SCHOOL.

The term "public high school" is of variable meaning. In some localities the school so named receives pupils from the sixth or seventh grades, and its curriculum includes work in arithmetic, geography, history, and English grammar. In some regions a "high" school is simply a graded school, instead of an ungraded school.

Over most of the United States, however, the high school presupposes an eight-grade elementary school, and does not offer instruction in the common branches, except for review purposes in the later years. High schools which are "approved," "commissioned," "accepted," etc., by State universities and State departments of education require four years of work for graduation, usually with a minimum of 15 or 16 recitation periods a week. Further than this it is difficult to generalize. There are variations in the length of periods from 20 to 55 minutes and in the length of the school year from eight to ten months. Many schools requiring four periods daily for 36 weeks have curricula of less than four years.

Attention has been called by Prof. Thorndike to the fact that—

> the most typical, in the sense of the most frequent, secondary school in the United States is a school taught by one teacher. The secondary schools in the country with only one teacher outnumber by a considerable figure all those with five or more teachers. Those with only one or two teachers considerably outnumber all the rest. Those with one, two, or three teachers are ten times as frequent as those with ten or more teachers and five times as frequent as those with from five up to ten teachers.[1]

The data he used showed that over 36 per cent of the high-school pupils of the United States were in schools with three teachers or less.

These smaller schools present one of the most important problems in secondary education. They minister to a constituency essentially rural in composition and interest. They furnish practically all the "higher" training possessed by a large proportion of the rural schoolteachers. As a class the rural high schools have received far less than

[1] Educ. Rev., vol. 33, March, 1907, pp. 245-265.

their share of attention. Falling short of university requirements, they seldom get the advice of the inspectors. Having individually a small purchasing power, their peculiar problems receive little attention from the writers of most classes of textbooks.

Even the measurable facts regarding these schools can not easily be stated in exact terms, as they are, in many respects, the most difficult schools to reach for statistical purposes. The figures relating to a given group of this class are likely to vary considerably from those of another group, though it partly duplicate the membership of the first. So far accurate data have not been collected from a group large enough to furnish an adequate basis for generalizations. From 250 high schools offering agriculture in 1908, information was furnished by 188 schools on part or all of a list of questions asked. Comparable data on several points were furnished by 151 schools. They furnished high-school facilities to a population of over 460,000. They enrolled 12,356 pupils, an average of 82 pupils for each school. Of these, 3,228 were in classes in agriculture, an average of 21 for each school, or 26 per cent of the total enrollment; 5,321 were reported as from farm homes, an average of 35 for each school, or 42 per cent of the total enrollment. The grand totals given below are for all the schools reporting the several items, without regard to whether they reported every item or only part of them. The number of schools reporting each item is indicated by the figures in parentheses.

Grand totals for all the schools reporting any of the above items: Population of districts, 543,950 (181); enrolled in high school, 15,977 (188); enrolled in agriculture, 3,726 (176); from farm homes, 5,666 (164); total schools, 188.[1]

The following year, 1909, 309 of the 500 or more high schools with classes in agriculture reported an enrollment of 54,700 pupils, an average of 177 pupils for each school. Over 9,500 pupils were studying agriculture, an average of 31 for each school, or 17 per cent of the total enrollment.[2] It is evident from the larger average enrollment of the school and the smaller percentage in the classes in agriculture that the general character of the schools reporting had changed somewhat. In the second case more reports were received from city schools, with larger enrollments and with agriculture offered as an elective, and in consequence with fewer pupils taking it.

The 1,800 schools reporting to the Bureau of Education in 1910 gave a total of 37,000 pupils studying agriculture, an average of about 20 pupils for each school.

According to the most reliable information the total number of secondary schools teaching agriculture, with their geographical distribution, is found in the following table:

[1] Robison, C. H., Agricultural Instruction in High Schools of the United States, p. 32.
[2] An. Rep. Office of Exp. Stations, 1909, p. 309.

TABLE 1.—*Geographical distribution of secondary schools teaching agriculture.*

Schools.	North Atlantic States.	South Atlantic States.	South Central States.	North Central States.	Western States.	Total.
With two or more years of agriculture:						
(a) General or nonspecial	26	36	42	170	20	294
(b) Special agricultural[1]	10	16	14	14	12	66
Total	36	52	56	184	32	360
Whole number (approximately) teaching agriculture in 1911-12	175	125	175	1,650	75	2,200

[1] Excluding all schools with general high-school courses.

TABLE 2.—*Occurrence of one-year agricultural courses in the high-school curriculum.*

Year of high school.	Number of schools in 1911.	Per cent.	Number of schools in 1907.	Per cent.
First	491	59	49	34
Second	178	21	31	21
Third	83	10	15	10
Fourth	25	3	10	7
Any year	34	4	7	5
First or second	19	2.3	18	12
Second or third	1	.1	4	3
Third or fourth	(1)	(1)	7	5
First or fourth				
First, second, or third	(1)	(1)	4	3
Second, third, or fourth				
Total	831	.....	145	.....

[1] None reported.

Reference to Table 2 shows that the position in the curriculum of courses of one year or less has changed very little in four years. The principal difference is the greater degree of definiteness of position. Some of the reports were not sufficiently intelligible to be classified. In current practice, it is seen, agriculture is so placed in the curriculum as to receive little benefit from any of the sciences except those usually given in the first year—physical geography, physiology, and sometimes botany.

TABLE 3.—*Reported introduction of agriculture into high schools, by years.*

Agriculture introduced.	Number of schools.	Agriculture introduced.	Number of schools.	Agriculture introduced.	Number of schools.
Before 1895	4	In 1900	15	In 1906	70
In 1895	2	1901	2	1907	88
1896	2	1902	3	1908	163
1897	2	1903	9	1909	212
1898	2	1904	23	1910	194
1899	0	1905	52	1911	198

Answering the request for information concerning land, many schools report acreage that should be ample for instruction purposes, but it seems often to be the "campus" that has been given and not land devoted to the use of the class in agriculture. The phrase

"could be used" often indicates that it is not used. Of 133 schools reporting 1,288 acres, 46 have over 5 acres, and 9 have over 25 acres. One is the academy and high school at New Salem, Mass., with a 100-acre farm; Monroe, Utah, has 40 acres. The Kimball County High School, at Kimball, Nebr., has 5 of its 45 acres under cultivation. The E. W. Grove County High School, at Paris, Tenn., has 34 acres of tillable land and 17 acres in timber. The nine district schools of Alabama have about 645 acres in all.

Without stating the exact amount of land used for agriculture, other schools reported the following items: School gardens, 34; school grounds, 4; city lots, 4; all or part of a city block, 9; total, 51.

TEXTBOOKS.

The less special preparation a teacher has, the more truly the character of the work done is likely to be represented by the text used. By keeping in mind the preparation of the teachers indicated in the next section, one who is conversant with the texts mentioned in Table 4 may gauge somewhat approximately the grade of the agriculture now taught.

TABLE 4.—*Textbooks used.*

Author and title.	Schools using.
Bailey: Principles of Agriculture	47
Bessey, Bruner, and Swezey: New Elementary Agriculture	23
Burkett, Stevens, and Hill: Agriculture for Beginners	69
Duggar: Agriculture in Southern Schools	42
Ferguson and Lewis: Elementary Principles of Agriculture	16
Goff and Mayne: First Principles of Agriculture	124
Hatch and Haselwood: Elementary Agriculture and Practical Arithmetic	16
Hilgard and Osterhout: Agriculture for Schools of the Pacific Slope	11
James: Agriculture	28
Jackson and Daugherty: Agriculture through Laboratory and School Garden	21
Welborn: Elements of Agriculture	29
Warren: Elements of Agriculture	290
Wilkinson: Practical Agriculture	88
Agricultural bulletins	4
Several texts [1]	103
No text used	12

SPECIAL SECONDARY SCHOOLS OF AGRICULTURE.

STATE AGRICULTURAL SCHOOLS.

Reference has been already made at some length to special or technical schools of agriculture of secondary school grade, supported wholly or in part by the State. To give a detailed account of the various curricula, finances, student activities, and attendance, or

[1] In some cases "several" were said to be used. In other cases, three or more of the above were named with no indication that any one was used as the basis of the work; these are classed as several. Where only two were named, each was credited separately.

to attempt to describe their equipment, would require space at least equal to the present bulletin. It may not be amiss, however, briefly to mention the salient points regarding the authorization, support, and control of these special schools, particularly those forming definite State systems.

In their most complete development, the special agricultural schools have as the most prominent feature of organization a threefold division of the industrial work, namely, agriculture, manual training, and home economics, with academic studies forming a subsidiary part of the school curriculum. The academic studies are designed to prevent the education of the student from proceeding along too narrow lines and to remedy the deficiencies in general culture usually only too obvious.

The State high schools, as they have come to be termed, do not minister to particular districts or parts of the State, except as limited by transportation facilities. For the most part they must be provided for by the current appropriations of the legislature. They do not have the local governing boards provided for district and county schools.

State high schools conducted as branches of State agricultural colleges are located at Davis, Cal., and at Crookston and Morris, Minn. The school at Davis was established in 1908, that at Crookston in 1906, and that at Morris in 1910. The last two rank with the State high school on the agricultural college campus, near St. Paul, but offer courses modified to suit local needs.

State agricultural high schools are maintained independently of the agricultural colleges in California, Colorado, New York, and Vermont.

The California Polytechnic School, at San Luis Obispo, was authorized by the legislature in 1901 and opened in 1903. It is governed by a board of seven trustees, of which the governor and superintendent of public instruction are ex officio members. Of the five agricultural schools established or authorized in New York, two were established as departments of colleges, one at Canton in 1906 and one at Alfred in 1908. A separate school was established at Morrisville in 1908, another was authorized for Cobleskill in 1911, and in 1912 a third for some point on Long Island not yet determined. The State normal school at Randolph, Vt., became a State agricultural high school in 1911. It is controlled by a board of five trustees, composed of three practical agriculturists, together with the governor and commissioner of agriculture. The College of Industrial Arts at Denton, Tex., which is the State college for women, established in 1901, offers a number of agricultural courses of a grade similar to those in the other schools mentioned. It is governed by a board of seven trustees.

Secondary courses in agriculture are given in the State schools of forestry maintained by North Dakota at Bottineau and Pennsylvania at Mont Alto.

The National Farm School, operated through private benefactions, at Doylestown, Pa., receives aid from the State. The Smith Agricultural School, at Northampton, Mass., has an endowment for the support of its agricultural work, but receives State aid for mechanic arts.

DISTRICT AGRICULTURAL SCHOOLS.

Arkansas.—Arkansas was divided by its legislature during the year 1909 into four agricultural school districts with from 17 to 20 counties in each. The school in each district is controlled by a board of five trustees "who shall be intelligent farmers," appointed by the governor for a term of 10 years. They may fix the rules of admission so as to equalize the attendance among the counties. They may limit the number to suit the capacity of the school, but may not charge tuition. Students must be 15 years of age. An initial appropriation of $40,000 was made for each of the four schools, to supplement donations from the local communities. The law required that "after the first buildings are erected and ready for temporary use," all work connected with the care and operation of buildings, farm, stock, etc., shall be performed by the students. The location of these schools is as follows: Jonesboro, in the northeastern part of the State, for the first district; Russellville, in the northwestern part, for the second district; Magnolia, in the southwestern part, for the third district; and Monticello, in the southeastern part, for the fourth district.

Oklahoma.—The Oklahoma schools of agriculture are under the general management of a "State commission of agricultural and industrial education," consisting of the State superintendent of public instruction, the president of the State board of agriculture, and the president of the Oklahoma Agricultural and Mechanical College. The State board of agriculture exercises a general oversight of these schools, while their work is under the direction of a dean of the department of district agricultural schools attached to the college. A condition of the location of the schools is that they "shall be provided with not less than 80 acres of land without cost to the State and deeded in perpetuity to the State." All white citizens over 15 years of age are entitled to admission without entrance examinations or fees. As a consequence of this statutory provision the schools maintain sixth, seventh, and eighth grade classes. The work of the secondary grade extends over three years, and offers nothing besides the purely industrial courses and related science, except mathematics, English, civics, and history. No pupil is admitted to the lower grades who has similar privileges in his home district. Students over 16 years of age may take certain special courses.

Some of these schools also maintain "short courses" of two weeks for farmers and their wives. These courses include instruction and demonstration in domestic economy, canning, preserving, and cooking, for women, and various agricultural subjects for men. The schools were authorized in 1908. The school for the second district, at Tishomingo, opened the same autumn; that for the first district, at Warner, early in 1909; and late in 1909 schools were established for the other districts, located as follows: Third district, Broken Arrow; fourth district, Lawton; and fifth district, Helena. In 1910 the three counties of the fifth district, composing the "panhandle," were made into a special agricultural school district, with a school located at Goodwell. Starting with initial appropriations of $20,000 for buildings and equipment, the five district schools have received annually increasing appropriations, now almost as large as the original sum voted. The school at Goodwell is in a much smaller district and receives less financial aid.

Georgia.—The bill providing for the establishment of the 11 district agricultural schools of Georgia, passed in 1906, provides that "they shall be branches of the State college of agriculture, a department of the University of Georgia," and that "the general board of trustees of the university shall exercise such supervision as in their judgment may be necessary to secure unity of plan and efficiency in said schools."

The local boards of trustees consist of one member from each county of the respective congressional districts, appointed by the governor for a term of six years. The schools receive the receipts from the fertilizer, oil, and other inspection fees over and above the expense of such inspections, supplemented by appropriations from the State treasury sufficient to bring the amount for each school up to $10,000. The congressional district schools of Georgia act in concert in many ways. Joint meetings are held by the various district boards of trustees or their representatives and the principals or other representatives of the faculties to consider matters calling for some uniformity of action.

The board of trustees of the university has from time to time adopted resolutions regarding the work of the schools. The substance of some of these is as follows: The minimum age of entrance shall be 14 years for boys and 13 for girls; the course of study shall be limited to 4 years of 40 weeks each, requiring for entrance the completion of the first six grades of the elementary school; the courses shall also be as nearly uniform as possible for all the district schools.

The schools are located by districts as follows: First, Statesboro; second, Tifton; third, Americus; fourth, Carrolton; fifth, Monroe; sixth, Barnesville; seventh, Powder Springs; eighth, Madison; ninth,

Clarksville; tenth, Granite Hill; eleventh, Douglas. A new curriculum has been worked out and recommended for use in all these schools for 1912–13. As it is the most recent plan proposed for any State system of special schools, it is given here in condensed form. No attempt is made to distinguish between recitation and laboratory periods.

Curriculum of Georgia congressional district agricultural schools.

(Numerals indicate number of 40-minute periods a week.)

FIRST YEAR.

All students.	*Boys.*	*Girls.*
English 6	Agriculture:	Home economics:
U. S. History 4	General 3	Sewing, textiles, and basketry
Arithmetic 2	Rural school 1	(2d term) 3
Geography 4	Poultry 2	
Penmanship ..... ½	Laboratory 3	
Freehand drawing (1st term) .. 3	Woodwork (2d term) 3	

SECOND YEAR.

English 6	Agriculture:	Home economics:
General history 3	Stock, breeds 3	Cooking 6
Arithmetic 2	Stock judging 1	Foods and household hygiene .. 2
Algebra 3	Dairying 2	Sewing 3
Biology and sanitation 4	Farm crops 3	
	Forge work 2	

THIRD YEAR.

English 5	Agriculture:	Home economics:
English history 3	Feeding 4½	Dressmaking 3
Algebra, plane geometry 5	Horticulture, with laboratory work 4½	Household management and nursing 2
Physics 6	Mechanical drawing 3	Millinery, 6 months 3
Teachers' course ..... [1]3		Cooking 3

FOURTH YEAR.

English 5	Agriculture:	Home economics:
Civics 3	Soils 3	Cooking, 6 months 6
Plane geometry 3	Fertilizers 3	Household arts and decoration 6 months 6
Chemistry 6	Farm management 2	Dietetics 2
Teachers' course ..... [2]2	Landscaping 1	

Alabama.—The Alabama congressional district schools, as already mentioned, in regard to curriculum and relations toward the local communities are more properly classed as general high schools with agricultural departments. As they have commonly been placed in the special school class, and as they resemble the district agricultural schools in their control and support, these points of their organization are here noted.

The "board of control" for each school consists of the governor, the superintendent of education, the commissioner of agriculture, one secretary-treasurer for all the schools, a resident member, and one other member selected from the district. The amount of State support has risen from $2,500, given each of the two schools originally established in 1889, to $4,500 at the present time. Each school has an experimental farm in its vicinity in charge of a trained agriculturist.

[1] May be substituted for English history.
[2] May be substituted for landscaping or for some domestic science.

In three of the schools the experiment station and the instruction in agriculture are in charge of the principal. The law requires that $750 of the State appropriation shall be expended on the experiment station. The district schools of Alabama have been greatly benefited by a standardization made possible by the association of presidents and agriculturists of the nine district schools organized in 1907. One result of their labors is the course of study which went into operation in the fall of 1909. The locations of the schools and the dates of their authorization by the legislature are as follows: First district, Jackson, 1895; second, Evergreen, 1893; third, Abbeville, 1889; fourth, Sylacauga, 1895; fifth, Wetumpka, 1895; sixth, Hamilton, 1895; seventh, Albertville, 1893; eighth, Athens, 1889; ninth, Blountsville, 1895.

COUNTY AGRICULTURAL SCHOOLS.

Legislation was enacted in Minnesota in 1905 permitting counties to appropriate as much as $20,000 in any one year. No schools have been established under its provisions, and the more recent legislation granting State aid for departments of agriculture in public high schools seems to have provided for the needs that would have otherwise called into being the county type of school. County agricultural schools, purely vocational in their work, have been established in Michigan and Wisconsin. In both States the curriculum is two years in length. As the completion of the eighth grade is required for entrance, except into the winter short courses, the students on graduation are, in a general way, on a par with graduates from the Georgia district schools.

In Michigan, county agricultural schools may be established by single counties, or by two or more counties jointly. The appropriations must be made by the county supervisors. They also elect the four members of a county school board, who, with the county school commissioner, have charge of the operation of the school. Where two or more counties unite to maintain such a school, each county furnishes two members of the agricultural school board, of which the school commissioner of the county in which the school is located is also a member. On determining to establish such a school by a two-thirds vote of its members, the county supervisors must submit the proposition to the voters before issuing bonds or contracting any indebtedness. The first school established under the provisions of this act of 1907 was the one at Menominee, begun the next year. It is across the river from Marinette, Wis., where a county agricultural school is located, which was opened the year of this legislation. The second school, established under the Michigan law, was the Dunbar school of agriculture, located at Sault Ste. Marie.

The notable experiment in secondary agricultural education begun by Wisconsin resulted from the report and recommendations of the

State superintendent, L. D. Harvey, to the legislature of 1901. Two schools were authorized by the law of 1901; this number was increased to four in 1903, and to eight in 1907. Each school is controlled by a board of three members and is under the general supervision of the State superintendent, who "with the advice of the dean of the college of agriculture of the State university shall prescribe the courses of study to be pursued and determine the qualifications required of the teachers employed in such schools." Two-thirds of the annual cost of maintenance of each school is paid out of the State treasury, with the maximum limit at $4,000. That the counties themselves do not pursue a niggardly policy is evidenced from the annual statements, which show that they not only provide their full share, $2,000, but often several hundred more each year. Villages are also authorized to issue bonds to bear part of the expense of county schools, not to exceed one-fifth of the cost of the school. The locations of the schools and dates of establishment are given by counties: Dunn County, at Menominee, 1902; Marathon County, at Wausau, 1902; Marinette County, at Marinette, 1903; Winnebago County, at Winnebago, 1903; La Crosse County, at Onalaska, 1909; Milwaukee County, at Milwaukee, 1911; Racine County, at Racine, 1912.

County schools in other States, designated as agricultural high schools, either by law or by custom, give also general high-school work and are not trade schools in the same sense as the schools of Michigan and Wisconsin. Though they can not appropriately be discussed in this section, the laws relating to State aid for the agricultural work in these schools are included in the section on legislation relating to public high schools.

HIGH-SCHOOL TEACHERS OF AGRICULTURE.

The calculations of this section include no data from the special county or district agricultural schools which do not also offer general high-school work, such as academic, general scientific, commercial, or teachers' training courses.

Of the 898 high-school teachers of agriculture reported to the Bureau of Education, 300 are general high-school assistants, usually science teachers, while 88 might be styled specialists. This term is used here somewhat arbitrarily to designate teachers of any class who have spent at least a full year as students in an agricultural college or have graduated from a special school of agriculture. The number includes teachers with a single class in agriculture, as well as heads of well-organized departments, the kind of preparation, not academic rank, being the controlling factor in the classification.

In addition to the 88 thus listed as specialists, 38 with the same minimum of qualifications are principals or superintendents, making in all 126 shown in the reports as having at least this amount of preparation. In many cases fully organized departments of agriculture are under teachers with college science training, or with practical experience, or both.

The States most largely represented in the reports are Missouri, Nebraska, Ohio, and Wisconsin, with 379 of the 898 teachers. These States may be taken as fully typical of conditions generally. Of the 379, 253 are principals or superintendents, distributed as follows:

Missouri.....44 out of 75, or 60 per cent;
Nebraska.....76 out of 114, or 66 per cent;
Ohio.....90 out of 111, or 81 per cent;
Wisconsin.....43 out of 79, or 54 per cent.

Of the 898 teachers, 540 mentioned some academic training in general or agricultural training in particular; 72 others claimed no special preparation; and 286 did not comment on preparation though furnishing other information, such as the official position of the instructor.

As to the agriculture studied by the instructor, 194 reported having studied it in college, some of them in college summer school; 79 reported normal school agriculture; while 9 had agricultural work in secondary schools; 46 had studied agriculture in summer school, though some did not specify whether under college or normal school auspices; and 51 mentioned normal school "work," without indicating whether it included any agriculture. Of the secondary schools mentioned above, two were district agricultural schools, three were high schools (one of them with only a half-year course), and one was an industrial school. Six not already counted reported "correspondence courses."

College graduation was reported by 231 teachers, normal school graduation by 82, and normal school "work" by 51, as already noted.

Farm life or practical farm experience was given as a qualification by 187, and home study by 67, some giving this with farm life. A large number of those reporting either or both of these two qualifications made no mention of any academic training, while practically none of the college graduates, agricultural or otherwise, mentioned farm life.

Table 5 gives the percentages of the above listed items in a form comparable with the tabulated answers to a very detailed question on preparation furnished by 182 teachers in 1908.

TABLE 5.—*Comparison of 1911 data on preparation of teachers with 1908 data on the same.*

Number of teachers in 1911—	Teachers	Percentage (of 856 teachers).	Percentage in 1908 (of 182 teachers).
Reporting on all academic work	540	60.0	78.5
Claiming no preparation for agriculture	72	8.3	6.5
Making no comment on preparation	286	31.7	15.0
Employed in 862 schools	898		
Reporting college agricultural training	[1] 194		
Reporting normal-school agricultural training	79		
Reporting summer-school agricultural training	46		
Reporting other secondary-school agricultural training	9		
Reporting some training in theoretical agriculture	328	38.6	23.6
Reporting practical farm experience	187	21.0	42.0
Reporting college science without college agricultural work	95	10.5	22.5
Reported as college graduates	231	25.7	44.5
Reported as normal-school graduates	82	9.0	27.0
Reporting normal-school work	51	5.6	1.6

[1] This includes the 126 having one or more years of agriculture.

SALARIES OF TEACHERS OF AGRICULTURE.

IN SECONDARY SCHOOLS.

"Lack of teachers" has been the cry ever since the introduction of special agricultural courses into the high schools began. When the textbook was supplemented by simple school-room experiments, a short summer course was sufficient to piece out the general training of the science teacher or the practical farm experience of the principal or superintendent. With the extension of the work through several years of the high school, and with the introduction of more elaborate field and judging operations, such meager training is inadequate.

The demand for teachers with the necessary technical skill, not to mention teaching ability, has drained the available supply. It is not surprising, therefore, to find a widespread desire on the part of school boards and administrators for definite information concerning the cost of the services of competent instructors, as well as the cost of supplies and equipment.

The Bureau of Education has gathered from 125 teachers of secondary-school agriculture some information concerning salaries received, theoretical training and teaching experience, and disposition of time in school. A special inquiry was sent early in 1912 to a selected list of 175 teachers, chosen partly because of the known character of their work and partly on account of information indicating special preparation or fitness.

A number of factors must be taken into account in considering this information, chief among them being the kind and amount of preparation and the character of the school. Since the purpose of the special inquiry was to make possible a study of the demand and

the reward for special training, a comparison is made on that basis. Another basis of comparison is the effect of agricultural preparation on the salaries paid. Of the 23 reporting no difference in salary on account of ability to teach agriculture, 12 reported training in college agriculture, while 11 reported no such training. Two of the former and six of the latter were principals. Of 92 reporting increased earning capacity because of ability to teach agriculture, 78 had spent at least one year in agricultural work at an agricultural college, most of them being graduates. In many cases a year at an agricultural college followed graduation from a general science or engineering course.

The kind of school is a marked factor. One series of figures shows a pronounced difference between the salaries paid in high schools which offered general courses and those with only the special agricultural work. This is true without regard to the factor of preparation.

A few of the more striking and important facts may be summed up as follows:

1. There has been a great increase during the past four years, not only in the number of secondary schools offering courses in agriculture, but in the number offering agriculture for two or more years.

2. A large majority of the latter schools employ men trained in the subject in agricultural colleges; whereas four years ago very few high schools had teachers with any more special preparation than that afforded by attending one or two sessions of a summer school. If the teacher in charge of a well-organized agricultural department has not attended an agricultural college for one or more years, he has usually supplemented a good scientific preparation in college with summer-school work in agriculture.

3. The most usual salary paid teachers with college agricultural training is $1,200, and the average of all is about that figure.

4. Half the men teaching high-school agriculture, taught it for the first time during the school year 1911–12. Most of these were graduated from agricultural colleges in 1910 or 1911.

5. The teachers without the training in college agriculture average as large a salary when they are high-school principals as the others; otherwise the average is much lower.

6. The length of teaching experience of all kinds, in the case of the men with college agriculture, is 3½ years, as compared with 8 years for those with other training, though the former receive higher salaries.

7. The average yearly increase in the salaries of teachers with college agriculture has been $158, as compared with $110 for the other group, due in part to their ability to obtain good-paying principalships although having little experience in teaching. The former begin teaching agriculture at a salary $50 higher than the latter.

8. Three-fourths of the teachers estimate that they are better paid on account of teaching agriculture, as follows: In general high schools about $300 extra a year, in special agricultural schools about $550 a year more than they could otherwise earn.

9. Of the teachers referred to in paragraph 8, those without training in college agriculture receive as extra salary about two-thirds the amount reported by the specially trained teacher.

10. Teachers in special agricultural schools receive salaries about one-fourth larger than those of teachers in secondary schools with general high-school studies.

In presenting the facts concerning the salaries paid to teachers of agriculture in high schools it is helpful to make use of more than one measure, namely, the average, the median, and the mode.[1] These will all be about the same when the salaries grade off rather evenly from some central figure in both directions. In the present case, however, an unusual report occasionally disturbs the symmetry of the distribution. For instance, the salaries of the 125 teachers here discussed average $1,215. Only four receive over $2,000. But one of these receives in addition to his salary of $1,800 a living for a family of seven, which demands an allowance of at least $1,000, making a total of $2,800, not to mention an extra salary as adviser to a commercial enterprise. Although the average is brought up to $1,215 by this and a few other high salaries, it appears that the number of teachers who receive under $1,200 is greater than the number who receive more than that. The salary, $1,181, above and below which there is an equal number of cases, is the median. Since 34 teachers are receiving $1,200, we may consider this figure as the mode, but at the same time practically two-thirds of the teachers receive salaries scattered generally over the interval from $900 to $1,500. Figure 1 illustrates this point. The distribution in the diagram shows what seems at first glance a peculiar feature, viz, the very low drops at the $1,100 and $1,300 levels. This really has no significance, however, other than that these are not popular salaries. For a nine-months school year $900 represents $100 a month, while $1,200 represents $100 a month for a 12-month year with four to six weeks for vacation. This condition applies to those schools with well-organized departments of agriculture with a demonstration farm or experiment station, and to the special or technical schools of secondary grade, such as those in Wisconsin, Oklahoma, and elsewhere.

A comparison of the salaries paid to members of the group here considered with those paid to high-school men at large gives the following figures: The median is only $900 for men teachers generally, instead of $1,181. The most usual salary for men the country over

[1] Most frequent.

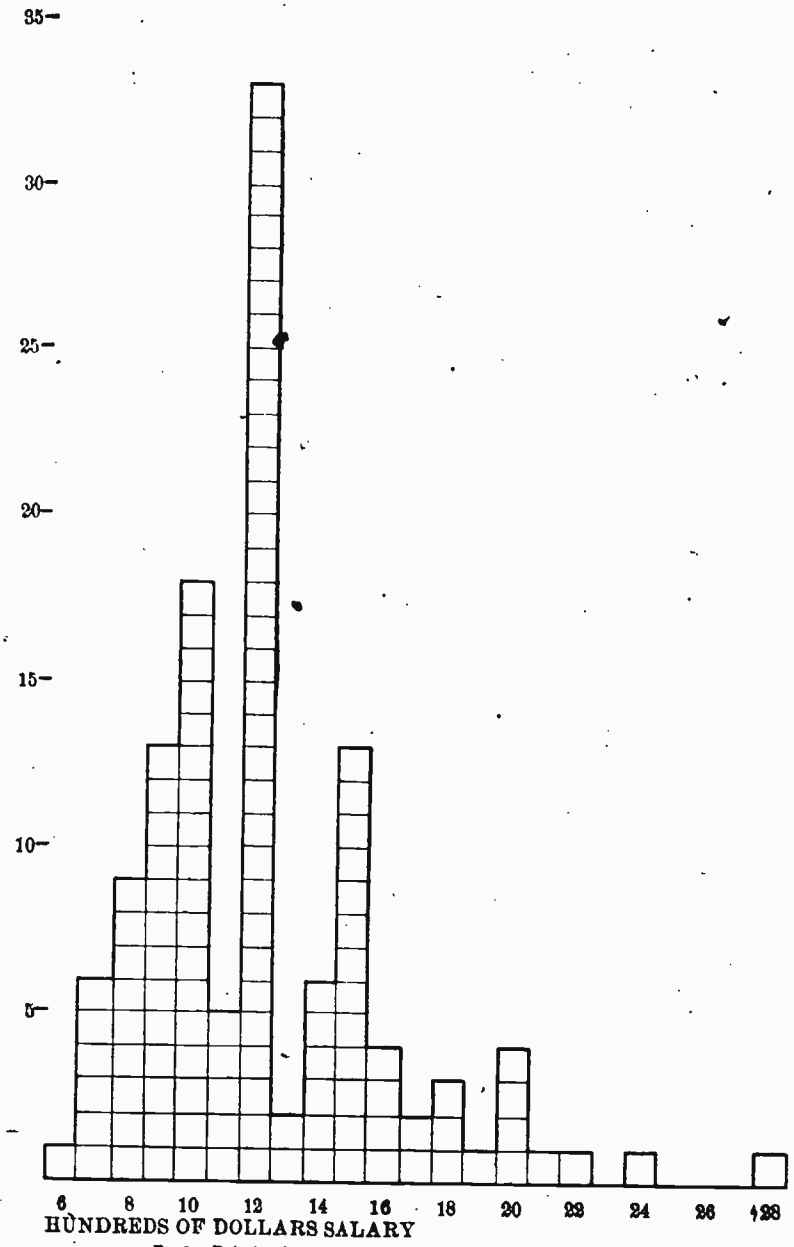

FIG 1.—Relative frequencies of salaries of all teachers reporting.

is $700,[1] instead of $1,200 for these agriculture teachers. Two-thirds of the men in high schools at large are paid between $500 and $1,100, as against $900 and $1,500 for the agricultural group; while the middle third receive between $600 and a little over $800, as against $1,050 and $1,300.

The apparent effect of special agricultural training upon the salary received is graphically shown in figure 2, in which the distribution of teachers without special training is superimposed upon that of the specially trained teachers. The respective averages and medians are shown in Table 6. The element of length of service will be considered later.

TABLE 6.—*Salaries of secondary-school teachers of agriculture with and without special training in the subject.*

Teachers.	Number.	Average salary.	Median salary.
All teachers reporting salaries	125	$1,215	$1,181
Teachers with special college training in agriculture	101	1,220	1,183
Teachers with only general college science [1]	24	1,191	1,179

[1] Of the 24 teachers with the general college science training, 11 were principals (including one with a salary of $2,400), with salaries averaging $1,268. The 13 who were not principals averaged $1,125.

In the various distribution tables and charts relating to salaries the intervals have the fifties as their limits, because approximately three-fourths of all the cases are even hundreds, which thus fall at the center of the intervals or groups instead of coming to one side.

The following tables epitomize the number of reports according to the different classifications mentioned.

TABLE 7.—*Difference in salary due to agricultural training.*

Teachers reporting extra compensation because of college agricultural training	78
Teachers reporting extra compensation for other agricultural training	14
Teachers reporting no extra compensation for college agricultural training	12
Teachers reporting no extra compensation for other agricultural training	11
Not reporting on difference in salary due to training	10
Total	125

TABLE 8.—*Teachers reporting extra compensation for agricultural training classified according to schools.*

Teachers in high schools having agricultural course only:	
With college agricultural training	12
With other training	2
Teachers in high schools having general courses:	
With college agricultural training	66
With other agricultural training	12
Total	92

[1] The Teaching Staff of Secondary Schools in the United States: By E. L. Thorndike, U. S. Bu. of Educ. Bull. No. 4, 1909, pp. 22-23

Table 9 shows in a comparative way the difference between the salaries paid to teachers of agriculture who have had more or less training in college courses in agriculture and the salaries of teachers who have pursued general science courses, perhaps supplemented by

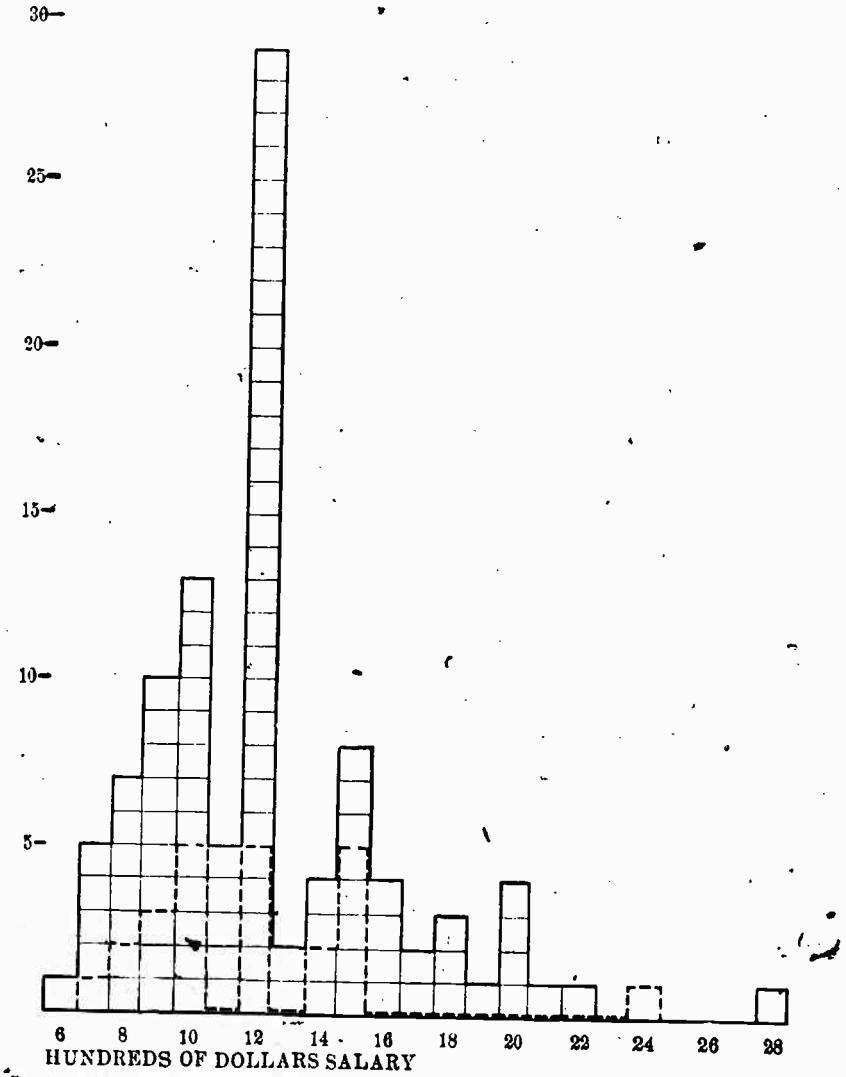

FIG. 2.—Relative frequencies of same salaries shown in figure 1, but showing salaries of teachers with college agricultural training (solid line) and with other training (dotted line).

short courses in a summer school or by farm experience. The difference amounts to $22 in the medians and $190 in the averages. It will be noted that the lowest salaries are those reported by teachers who thought they would receive practically the same salary if not

teaching agriculture. Three-fourths of these had not pursued agricultural work in college, and probably were receiving salaries currently paid science teachers. The great difference between average and median in the last instance is due to the presence of one $2,400 man, although none of the other 20 receive over $1,500.

TABLE 9.—*Tendencies in the salaries of reports listed in Table 8.*

Teachers.	Number.	Average salary.	Median salary.
All teachers reporting present salaries	125	$1,215	$1,181
All reporting extra compensation for teaching agriculture	92	1,230	1,180
Agriculturally trained teachers reporting extra compensation	78	1,251	1,185
Teachers trained otherwise and reporting extra compensation	14	1,110	1,050
Teachers reporting no difference in salary [1]	23	1,094	975
Agriculturally trained teachers not reporting difference in salary [2]	10	1,301	1,533

[1] Nine of these were principals, averaging $1,203, and only two of them had training in college agriculture.
[2] One of the ten is a principal.

DIFFERENCE IN SALARIES PAID ON ACCOUNT OF TEACHING AGRICULTURE.

As indicated in Tables 10 and 11, 92 teachers have estimated by varying amounts the difference made in their salaries by reason of ability to teach agriculture. Of the 10 teachers not furnishing any such estimate, a few state that they could not hold their present positions if unable to teach the subject. About a third of the estimates were between two limits, as "from $20 to $30 a month," or "between $200 and $300 a year." For tabulation the mean between the limits given has been used. The average difference in the 92 cases, based on the mean differences, is $359, as against an average difference of $314 based on the least differences. Table 11 gives the estimated extra amounts per annum and per month, and also the per cent by which the salaries would be lessened but for this extra compensation. These estimates are based on the prevailing salaries paid in the same or neighboring communities, as given in the reports.

TABLE 10.—*Distribution of differences in compensation for ability to teach agriculture as estimated by 78 teachers in all schools with special training.*

Extra compensation per annum because of agricultural training.	Teachers so reporting.	Extra compensation per month because of agricultural training.	Teachers so reporting.	Without the extra compensation, salary would be less by—	Teachers so reporting.
				Per cent.	
$50- $149	11	$0-$10	9	0-10	7
150- 249	13	11- 20	10	11-20	14
250- 349	14	21- 30	13	21-30	20
350- 449	13	31- 40	14	31-40	20
450- 549	12	41- 50	13	41-50	15
550- 649	5	51- 60	8	51-60	2
650- 749	2	61- 70	4		—
750- 849	5	71- 80	1		78
850- 949	1	81- 90	4		
950-1,049	1	91-100	1		
Over-1,050	1	Over-100	1		
	78		78		

[1] One case of $1,600 difference.

TABLE 11.—*Comparison of averages and medians of groups reporting differences in salary due to teaching agriculture.*

According to training.	Extra compensation.		Without the extra compensation, salary would be less by—
	Per annum.	Per month.	
			Per cent.
Average of 78 specially trained teachers in secondary schools	[1] $385	$38	31
Medians of the same 78 teachers	358	34	29
Average of all 92 teachers reporting differences	370	36	29
Medians of the same 92 teachers	325	32	27
Averages of 14 teachers with only general training	211	24	19
Medians of the same 14 teachers	200	22	16

[1] The difference in the case of the one highest salary alone brings up this average from $369.

The progress of agricultural instruction is well illustrated by a comparison of the tendencies just given with those computed from the data furnished by a number of teachers in 1908. At that time agriculture was taught in perhaps less than 250 schools. Replies to requests for information were received from 182 of these teachers, most of whom had very little training for teaching agriculture except general science and practical experience. That is the kind of ability in many cases which school boards in 1908 seemed to value to the extent shown in Table 14. As the openings for men of agricultural training have increased, the demands of the school boards have increased; the teachers reporting in 1912 average much higher in the quality of special preparation. Data from 41 agriculturists of more or less special training and teaching in public high schools and other public secondary schools in 1909 showed an average salary of $1,189, with a strong mode at $1,000. This list included most of the special teachers of secondary-school agriculture in 1909 outside of the high-school departments of agricultural colleges. About three-fifths of the number were principals.

SALARIES AND CLASSIFICATION OF SCHOOLS.

When we take from the 125 schools considered the 16 special agricultural schools in which no general high-school courses are offered, but the agricultural course is the only one given, we have left the general high schools with a distribution of salaries as shown in figure 3. Of these 109 salaries, 22 are salaries of men who have not had the special training amounting to as much as a year of agricultural-college work. The relative frequencies of the 22 salaries and of the 87 salaries of the agricultural-college trained teachers in the general public high schools are shown by the dotted and continuous lines, respectively, in figure 4. The remarks made concerning the $1,100, $1,200, and $1,300 groups of figure 1 apply also to

figure 3. The relation between the salaries of the specially trained and the alternate group may also be seen from a comparison of the averages and medians, shown in Tables 12 and 13. The salaries indicated by the dotted lines of figure 3 are not included in the 109 salaries covered by the solid line.

TABLE 12.—*Salaries of secondary-school teachers of agriculture grouped according to the kind of school.*

Teachers.	Number.	Average salary.	Median salary.
Teachers in general high schools	109	$1,174	$1,168
Teachers in special agricultural schools	16	1,488	1,450
Teachers in general high schools who have received special training in agriculture	87	1,175	1,170
Teachers in general high schools who have not received special training in agriculture	22	1,176	1,050

In Table 13 is a statement of the salaries of the teachers grouped according to the kind of school and according to the kind of preparation possessed by the teachers in the general high schools. All but two teachers in the special schools received their training in agricultural colleges. For easy comparison the table presents the tendencies of all teachers of each group parallel with those receiving extra compensation by reason of their being agricultural teachers. A few extreme salaries, indicated in the figures, pull the averages somewhat above the medians. This is pronounced in the last group of all the teachers and in most groups of those receiving the extra compensation.

TABLE 13.—*Agricultural teachers' salaries grouped according to kind of school.*

Teachers.	All teachers of class indicated.			Teachers receiving extra compensation for teaching agriculture.		
	Number.	Average salary.	Median salary.	Number.	Average salary.	Median salary.
Teachers in general high schools	109	$1,174	$1,168	78	$1,251	$1,167
Teachers in special agricultural schools	16	1,488	1,450	14	1,506	1,450
High-school teachers with special training	87	1,175	1,170	66	1,275	1,173
High-school teachers with other training	22	1,170	1,050	12	1,123	1,017

It might appear at first glance that high-school teachers with general science preparation were on a par with those prepared in the agricultural colleges, but 10 of the 22 are principals averaging $1,222, while the remaining 12 average $1,123. The difference may justly be ascribed to their executive duties.

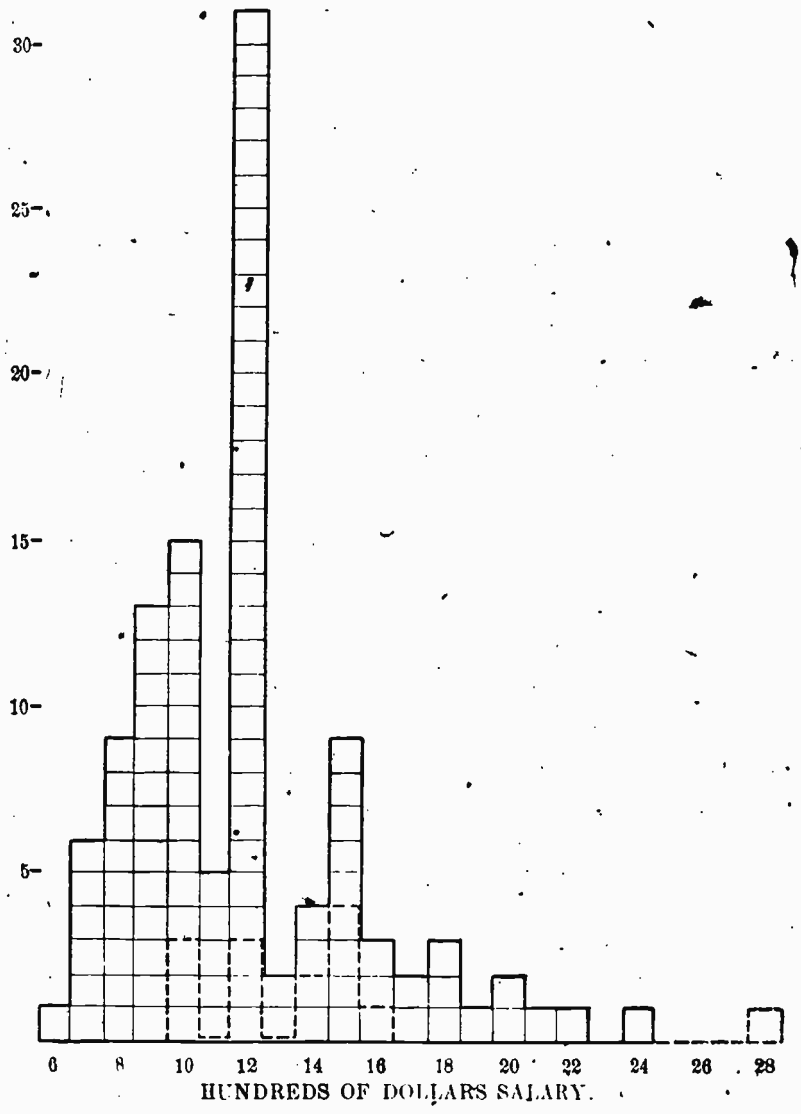

FIG. 3.—Relative frequencies of salaries of teachers in general high schools (solid line) and in special schools (dotted line).

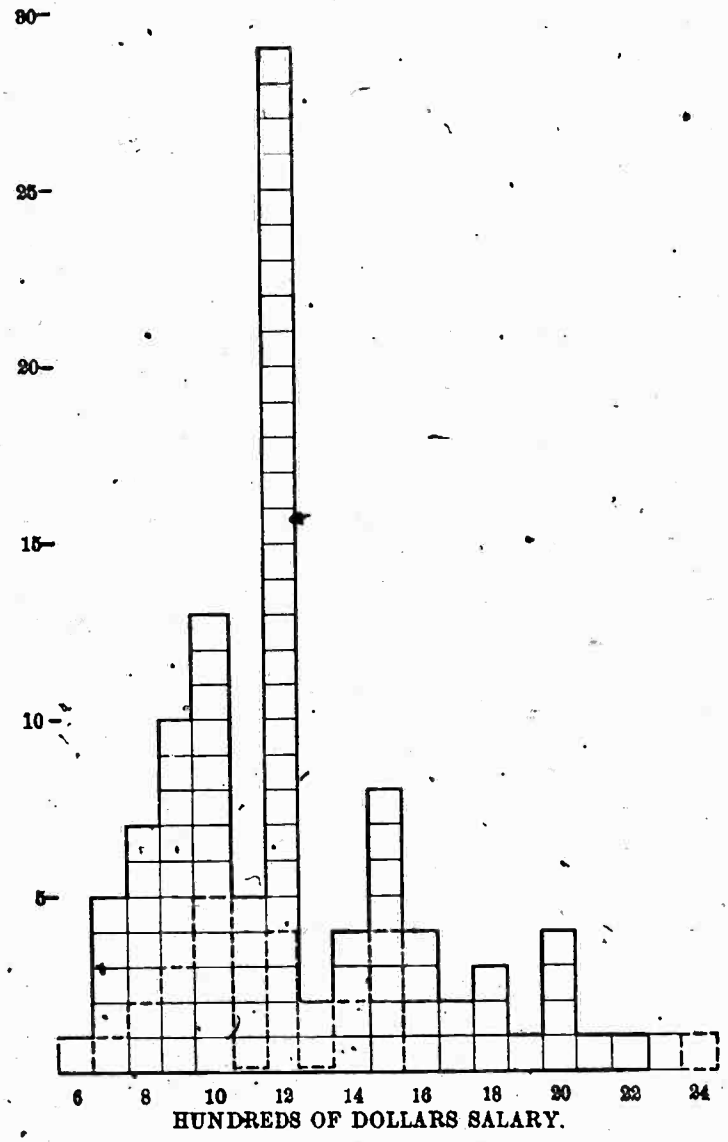

FIG. 4.—Relative frequencies of salaries of teachers in general high schools with agricultural-college training (solid line) and without (dotted line).

TABLE 14.—*Salaries of teachers paid more in 1908 because of ability to teach agriculture in the high school.*

Yearly salary.	Teachers so reporting.	Extra compensation per month because of agricultural training.	Teachers so reporting.	Salary without the extra compensation would be less by—	Teachers so reporting.
				Per cent.	
$401–$500	1	$0–$10	4	11–20	8
501– 600	2	11– 20	4	21–30	1
601– 700	3	21– 30	2	31–40	4
701– 800	4	31– 40	1	Over 40	[1] 1
801– 900	3	41– 50	1		
Over 900	[1] 2	51– 60	1		
		81– 90	[1] 1		
	[2] 15		14		14

[1] $1,600 was paid for one year to an agriculturist with teaching experience to organize a county high school with agriculture as the prominent feature; but his successors have received probably less than half that amount.

[2] The average yearly salary of the first 14 teachers was $779.20; the average monthly extra salary, $25; and the average loss without the extra compensation would be 22 per cent.

TABLE 15.—*Comparison of medians of groups in 1912 reporting differences in salary due to teaching agriculture, classified according to character of the school, as in Table 10.*

Teachers.	Number.	Extra compensation.		Salary without the extra compensation would be less by—
		Per annum.	Per month.	
				Per cent.
Teachers in general high schools	78	$300	$29	27
Teachers in special high schools	14	550	53	40
Teachers in both classes of schools	92	325	30	27
Teachers in general high schools—				
With special training	66	304	31	28
With no special training	12	200	22.5	16

In some ways the tendencies shown in Table 15 are more comparable with those of 1908, shown in Table 14, than are the tendencies of Tables 12 and 13 with their large number of teachers in special agricultural schools. It should be remembered, however, that only one of the teachers listed in Table 14 had studied in an agricultural college.

Of those reporting in 1912, the opinion was expressed by 23 teachers, 8 of them principals, that they would receive no less if not teaching agriculture, i. e., that the ability to teach it did not add to their earning capacity except as occasionally they would not be teaching at all. The salary of one of the principals was $2,400. Those of the remaining 12 were normally distributed and averaged $1,048 a year. Six of the teachers received $80 a month or less. The average and median of the 23 were $1,094 and $975, respectively.

In answer to the question, Does the board engage an agriculturist as principal because that is the only way it can pay a sufficient salary to get an agricultural teacher? an affirmative reply was given by 13 and a negative reply by an equal number.

SALARIES AND EXPERIENCE IN TEACHING.

One-half of the teachers of agriculture have taught the subject for one year or less, two-thirds for two years or less, and seven-eighths for three years or less. Teachers trained in the agricultural colleges have not had the experience of those not so trained. These facts are clearly shown in Table 16. The average length of experience in teaching agriculture is two and two and one-half years for each of the two groups, respectively.

TABLE 16.—*Number of years agriculture has been taught by 125 instructors.*

	Less than 1 year.	1 year.	2 years.	3 years.	4 years.	5 years.	6 years.	7 years.	8 years.	9 years.	10 years.	Total
By teachers from agricultural colleges	3	49	16	20	5	4	2	1	....	.....	1	101
By teachers with other training	1	9	8	2	1	2	.....	1	.....	.....	.....	24
Total	4	58	24	22	6	6	2	2	....	.....	1	125

The teachers trained in the agricultural colleges average only about 3.5 years of experience in all kinds of school work, as against a little over 8 years for the teachers with other training. The median for the former is but 1.7 years, in contrast with 8.2 for the teacher not trained in the agricultural college. This latter median is the same as that for men teachers generally in public secondary schools, reported in Thorndike's study on the teaching staff of secondary schools in the United States, already mentioned. One-seventh of the first group and one-third of the latter group have taught 10 years or more. The agricultural college graduate with the longest experience, about 28 years, receives less than the average salary. The frequencies of these cases is shown in figures 5 and 6.

It thus appears that long teaching experience, even when coupled with good college science training, does not command salaries equal to those paid for technical training. Whatever advantage experience now carries with it will be overcome largely by the pedagogical training now being introduced in the agricultural colleges.

Omitting the 62 who had not completed their first year of teaching agriculture in a high school when they filled the reports for the Bureau of Education, all the remaining 63, except 12 (10 of the agricultural college group and 2 of the other group), report increases in salaries since beginning to teach the subject. The present year obviously must be excluded from the computations. The reports show an

average increase of $361, $413 for the agricultural college group and $221 for the other group. This does not take account, however, of the length of service. The increase in salary according to years of

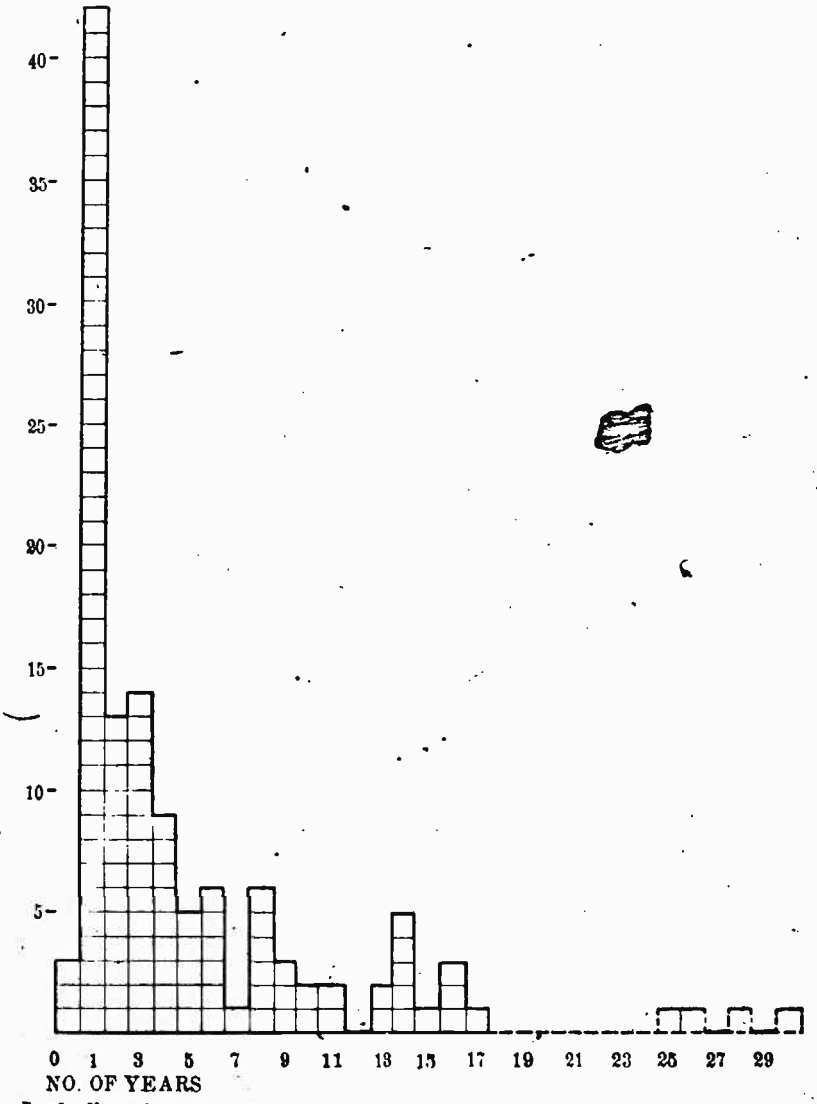

FIG. 5.—Years of experience of teachers of agriculture in any kind of teaching (experience of last four cases is approximate).

service amounts to $147, or $158 a year for the agricultural college group and $110 for the college science group. In fairness it should be stated that one-half of these teachers have advanced at the rate of $100 or less each year. Of the 10 reporting increases averaging

$300 or over, 5 are principals of general high schools and 2 of special schools. The reports indicate that many of the principalships

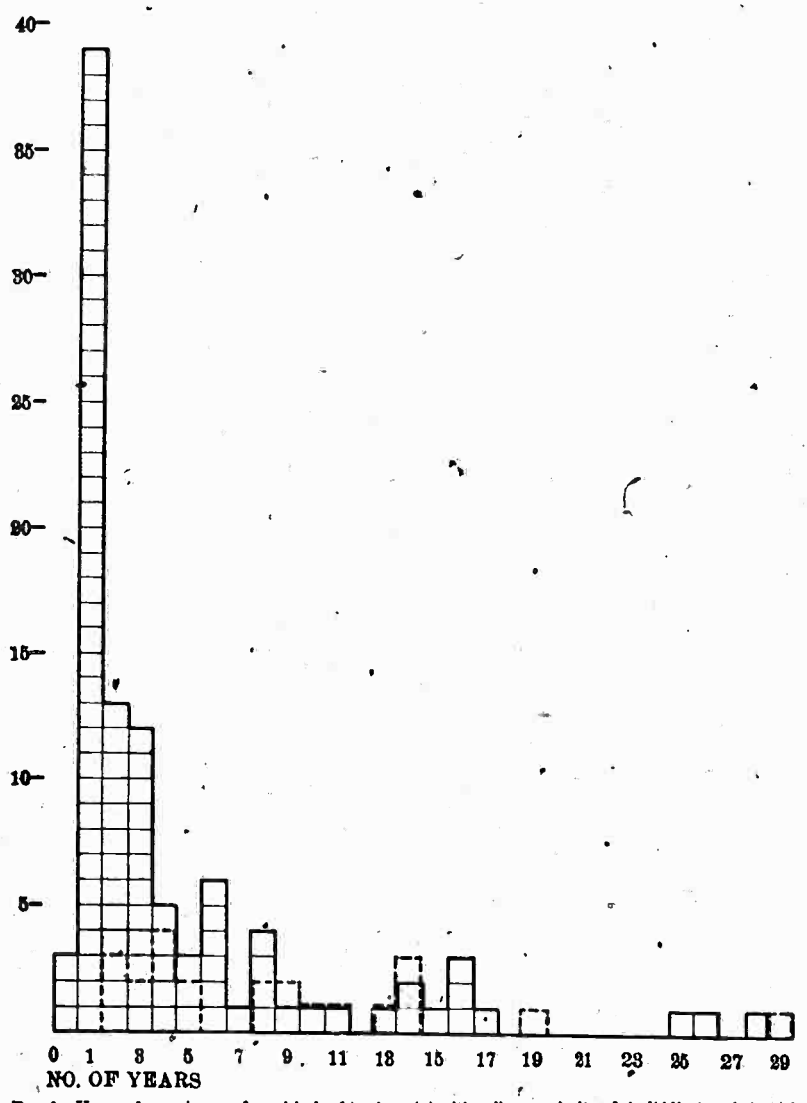

FIG. 6.—Years of experience, of any kind, of teachers (a) with college agricultural (solid line) and (b) with other training (dotted line).

held by these teachers came to them by reason of their ability to teach agriculture, and in some cases such ability is a prerequisite to election to the principalship.

DISPOSITION OF THE TIME OF THE SELECTED GROUP OF TEACHERS.

The extent to which these teachers of agriculture are "agricultural teachers" may be indicated roughly by the number of school periods they spend in teaching the subject. A better index is the proportion of their time in school given to the work; some teachers report as low as five periods a week devoted to class instruction in agriculture, although they teach no other branches, but give a great deal of time to supervising outdoor work, to conducting short courses, to delivering evening lectures, and to other lines of endeavor among the adults of the farming community. The demonstration farms attached to public high schools as well as to special schools call for considerable attention outside of school hours. In an Oklahoma district school the instructor is also the superintendent of the school farm and inspector of the demonstration farms in three counties.

The principal of the Imperial Valley Union High School, at Imperial, Cal., states that the agriculture instructor in the afternoons spends the time with the farmers in the district, helping them in every way he can. The instructor in the Hector (Minn.) public schools writes in part:

> I teach no other subjects except agriculture in the high school, normal department, and eighth grade. Three or four afternoons per week are spent in the country surveying and planning drainage systems and in the work of the school farm and demonstration farms. Six rural districts are associated with the high school, and during the fall and winter six evening meetings were held at each of the six rural schools for the benefit of the farmers.

But seven hours of instruction in all were reported for this school.

The instructor at Willmar, Minn., credited with an average of 4.5 hours a week in agriculture and with no time credited to other subjects, reports that he held 46 evening meetings in rural schoolhouses and 22 other meetings, in addition to his visits to farmers, corn and milk tests, and the management of the 10-acre experiment tract.

For the purposes of this discussion a school period is regarded as an exercise of 40 to 45 minutes. One-half of the teachers spend in teaching each week a total of from 20 to 30 periods. Three-fourths of the teachers devote to teaching agriculture each week from 5 to 15 periods. One-fifth of the instructors teach nothing but agriculture, and another two-fifths spend 10 periods a week or less teaching other subjects.

THE AGRICULTURAL COLLEGE AS A SOURCE OF SUPPLY, WITH STATISTICS ON SALARIES COMMANDED BY RECENT GRADUATES.

Passing from the secondary school demand, and its valuation of such service as mentioned, let us now turn to the available supply of persons receiving the most desirable preparation and see what their talents command in other markets.

Table 17 shows what salaries the men just out of agricultural colleges receive when they are engaged by the colleges themselves, by the experiment stations, and for similar work by State or Federal departments. The secondary schools must not only compete with the financial inducements mentioned but also with the greater desirability, to the average college man, of college and research work over public-school teaching. It must be remembered, too, that many of these graduates are without any teaching experience.

TABLE 17.—*Distribution of salaries of graduates from agricultural colleges in 1907, 1908, 1909, 1910, and 1911.*

Salaries.[1]	Year of graduation.					Total.
	1907	1908	1909	1910	1911	
$400– $449	0	0	1	0	0	1
450– 549	1	2	0	2	1	6
550– 649	6	9	3	2	7	27
650– 749	16	13	14	1	9	53
750– 849	15	18	15	13	15	76
850– 949	13	7	17	19	26	82
950–1,049	16	18	20	30	32	116
1,050–1,149	1	1	0	3	6	11
1,150–1,249	13	16	16	13	27	85
1,250–1,349	0	0	0	1	1	2
1,350–1,449	4	2	5	3	1	15
1,450–1,549	3	2	1	7	6	19
1,550–1,649	1	0	0	0	2	3
1,650–1,749	1	1	0	0	0	2
1,750–1,849	0	0	1	1	0	2
Total	90	89	93	95	133	500

[1] The limits of the groups are placed at the fifties instead of at the hundreds, as seven-ninths of the salaries are even hundreds and thus lie at the center of each group instead of at one extreme as would otherwise be the case, making the groups lopsided.

Table 17 is based on data reported to the Office of Experiment Stations. It does not include all graduates of agricultural colleges, and possibly some of those included did not graduate from the purely agricultural course. The number of degrees conferred by the land-grant colleges upon men pursuing the agricultural courses in 1911 is thus given in the report of the United States Commissioner of Education for that year: Undergraduate men, 851; graduate men, 78; total, 929. The number included above for 1911 is only 14 per cent of this total. However, the persons included form, probably, a large proportion of the teachers and investigators.

It will be seen from Table 18 that the salaries run rather evenly for three years and then show a decided rise during the years 1910 and 1911. This may be due to the suddenly increased demand for the output of the agricultural colleges made by the high schools in those years. The number of secondary schools able to pay good salaries has been greatly increased since 1910 by the State aid granted by Minnesota, the establishment of the district schools of Georgia and Oklahoma, and the inauguration of extensive departments of agriculture in the high schools of California, Louisiana, Virginia, and

elsewhere. Of the many high-school teachers of agriculture making special reports to this bureau, 6 were graduated from land-grant colleges in 1909 after pursuing agricultural courses, 6 in 1910, and 20 in 1911.

The general tendency of the salaries of the graduates listed in Table 17 is shown by years in Table 18. In order that the worth of the average may be indicated, this table shows the average deviation

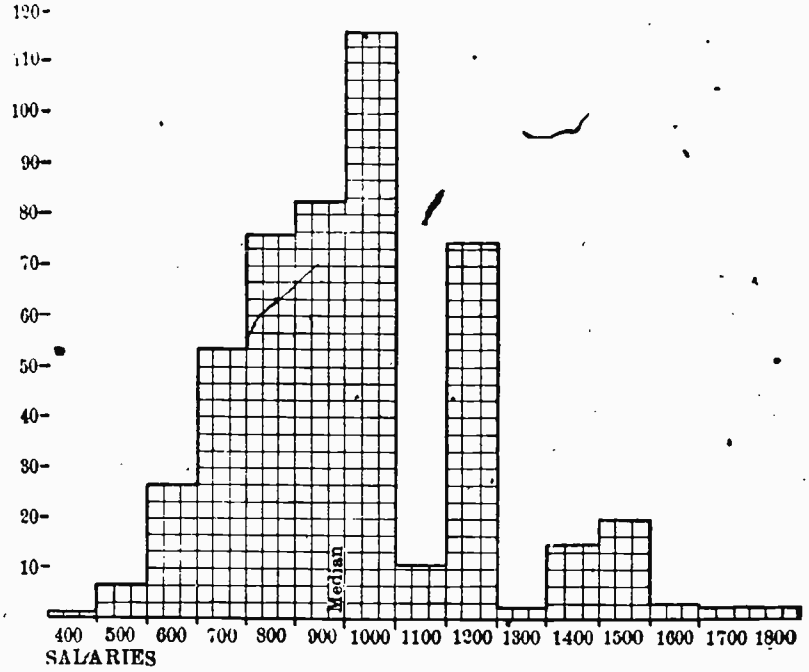

FIG. 7.—Salaries paid agricultural college graduates from 1907 to 1911, inclusive, who have reported their first year's earnings in any occupation (except where they farm on their own account). Each space on the horizontal scale represents an interval of $100, the intervals running from fifties to fifties, so that the even hundreds may fall in the center of each group. The points on the vertical scale represent the number of cases, by tens.

and the median for each year. The "average deviation" is an average of the amounts by which each individual salary deviates from the general average.

TABLE 18.—*Salaries of agricultural-college graduates from 1907 to 1911, inclusive.*

	1907	1908	1909	1910	1911
Average of salaries	$947.50	$921.50	$935.53	$1,017.47	$994.68
Average of deviations	192.00	200.00	190.00	109.00	168.00
Median of salaries	950.00	920.00	950.00	985.00	976.00

It should be mentioned that these "graduates" are not all students receiving the bachelor's degree, but include several "doctors" of veterinary medicine, besides a number of doctors of philosophy and

masters, 29 in all for the first three years. The higher degrees are not indicated in the lists for 1910 and 1911. The presence of 29 men taking higher degrees in the groups receiving the high salaries will, of course, leave a lower average for the men receiving the bachelor's degree. These 29 men received on an average $1,180 each, with a strong mode at $1,200. The 243 men with the bachelor's degree during the same three years averaged $909.13; the two receiving $1,700 and the one receiving $1,800 brought the average up from $899.

One-half of all the cases for the five years lie approximately between $775 and $1,150; four-fifths lie between $675 and $1,250. This shows that the salaries are not closely "bunched," a fact also indicated by the fairly large average deviation and by the distribution of the individual cases in Table 18. While the position of the upper "quartile" has remained fairly stationary, the lower one has shown a rise that should be encouraging to the agricultural workers.

TABLE 19.—*Positions obtained by 500 graduates from agricultural colleges in 1907, 1908, 1909, 1910, and 1911.*

	1907	1908	1909	1910	1911	Total.
Professorships, full	1	1		1	1	4
Professorships, adjunct, associate, or assistant	4	6	4	6	3	23
Places as college instructor	20	15	17	12	30	105
Places as college instructor and experiment-station assistant	(1)	(1)	(1)	5	6	
Places as college assistant	44	51	56	15	20	220
Places as college assistant and experiment-station assistant				18	16	
On experiment station staff or as assistant	[2] 6	[2] 10	[2] 4	20	27	[2] 67
In Federal service	5	3	6	4	4	22
In State service	6			3	4	13
As principal of agricultural high school		1	1		1	3
As instructor of agriculture in high school				5	7	12
As instructor of agriculture in special school					4	4
As instructor of science in high school				2	3	5
As instructor of agriculture in other than secondary schools		1	1			2
In commercial work	1	1	3	4	7	16
Unclassified	3		1			4
Total	90	89	93	95	133	500

[1] Several probably classified as "instructor."
[2] Several probably classified as "assistant" without qualification.

Anyone at all conversant with the pittances paid the graduates of classical and literary college courses can readily see that much greater opportunities are open to the graduate of the agricultural college.

The following items indicate that the "plums" do not all go to the men taking higher degrees, and the possession of these degrees does not necessarily assure the best paying or most desirable positions; but the figures do show the handicap on public schools desiring even the bachelor graduates of agricultural colleges.

(1) The three best paying positions, $1,700 in 1907, $1,680 in 1908, and $1,800 in 1909, went to men holding only the bachelor's degree.

(2) Of the 14 elected to professorships, either full, adjunct, or assistant, but 1 was a doctor of philosophy, 1 a master of arts, 1 a master of science, and 2 were doctors of veterinary medicine, a degree

which does not necessarily presuppose the bachelor's degree. These positions pay from $1,100 to $1,600, averaging $1,380. The doctors of philosophy did not fare much better than the others. The 4 received, respectively, $1,000, $1,200, $1,200, and $1,600, while the 5 doctors of veterinary medicine received $1,000, $1,000, $1,200, $1,400, and $1,500. The 18 holders of master's degrees averaged $1,205, ranging from $900 to $1,500.

The 8 men entering the service of the United States Government in 1907, 1908, and 1909 averaged $1,230, ranging from $840 to $1,400. The average for the 9 entering the service in 1910 and 1911 dropped to $1,125, making the average for the 17 men listed as entering during the five years $1,174.

PROVISIONS FOR THE HIGHER TRAINING OF TEACHERS OF AGRICULTURE.

The significant phases of the movement for the training of high-school teachers, approximately in order of chronological development, are:

(*a*) Provisions for training in the regular college courses.
(*b*) Courses in summer schools.
(*c*) Professorships of agricultural education, with its later development of supervision and aid through extension work.
(*d*) Summer conferences.

Normal schools graduating their students in four years beyond the eighth grade, or in one or two years after the high school, have been the chief dependence in many States for the supply of teachers. Those normal schools with a minimum of six years' work after the elementary grades, and especially the normal schools lately reorganized as "teachers' colleges," have in many instances instituted courses in school agriculture as thorough as corresponding courses for teachers given by agricultural colleges and the university schools of education. Many advances have been made by the agricultural colleges themselves, in the way of meeting the new demands for agricultural instruction, since Dean Bailey's report of four years ago.[1] The nine colleges then offering such work as a part of the regular course may be classified as follows:

(*a*) *Colleges offering normal courses for students of secondary school grade.*

North Carolina College of Agriculture and Mechanic Arts.—One-year course, including one-half unit of methods of teaching agriculture; for rural teachers.

North Dakota Agricultural College.—Three-year course, including one unit of education.

[1] Bailey, L. H., Bulletin Bureau of Education, 1908, No. 1: On the Training of Persons to Teach Agriculture in the Public Schools.

(b) Colleges offering special groups of studies to students of college grade.

Connecticut Agricultural College.—A two-year normal course made up partly of regular agricultural studies, intended especially to train for teaching nature study. No work in pedagogy.

New York (Cornell University).—A two-year course intended especially for teachers of nature study and elementary agriculture. No work in pedagogy.

University of Maine.—A four-year course with no work in pedagogy.

(c) Colleges offering special electives in content and methods of teaching agriculture.

University of Illinois.—A course each in principles and methods of high-school agriculture, elementary agriculture, and farmers institute management.

University of Missouri (Teachers' College of the university).—A course especially for rural-school teachers and a course for high-school teachers, of one unit each.

(d) Colleges of agriculture with departments of education.

Massachusetts Agricultural College.—Courses in psychology, history of vocational education, methods in agricultural education, and special problems in agricultural education.

State College of Washington.—Courses in education for prospective teachers.

There are now much better facilities and much more effective organization for preparing instructors for high-school agriculture in at least 37 of the land-grant institutions. This is due in large part to the provisions of the so-called "Nelson amendment" to the agricultural appropriation bill, approved March 4, 1907, providing that a portion of the funds appropriated thereby, amounting now to $25,000 annually, may be used by the land-grant colleges for the special preparation of instructors for teaching the elements of agriculture and mechanic arts.

The plan followed by the various land-grant institutions is shown in the following table, which was prepared by A. C. Monahan, of the Bureau of Education, and published in Part II of the eleventh yearbook of the National Society for the Study of Education.

TABLE 20.—*State agricultural colleges offering special opportunities for preparing teachers of secondary-school agriculture (indicated by ×).*

Institutions.	Agricultural students may elect courses in general education.	Education students may elect courses in agriculture.	Special elective courses offered in agricultural pedagogy.	Prescribed four-year course offered for teachers of agriculture.	Special one-year course for college graduates preparing to teach agriculture.
Alabama Polytechnic Institute, Auburn, Ala.			×		
University of Arkansas, Fayetteville, Ark.	×				
University of California, Berkeley, Cal.	×	×	×		
Colorado Agricultural College, Fort Collins, Colo.	×				
University of Florida, Gainesville, Fla.				×	
Georgia State College of Agriculture, Athens, Ga.	×				
University of Idaho, Moscow, Idaho	×				
University of Illinois, Urbana, Ill.	×		×	×	
Purdue University, La Fayette, Ind.	×				
Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa.	×		×	×	

TABLE 20.—*State agricultural colleges offering special opportunities for preparing teachers of secondary-school agriculture*—Continued.

Institutions.	Agricultural students may elect courses in general education.	Education students may elect courses in agriculture.	Special elective courses offered in agricultural pedagogy.	Prescribed four-year course offered for teachers of agriculture.	Special one-year course for college graduates preparing to teach agriculture.
Kansas State Agricultural College, Manhattan, Kans.	×	×			×
State University, Lexington, Ky.					
Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La.		×			
University of Maine, Orono, Me.	×			×	×
Massachusetts Agricultural College, Amherst, Mass.	×		×		
Michigan Agricultural College, East Lansing, Mich.	×		×		×
University of Minnesota, Minneapolis, Minn.	×		×		
Mississippi Agricultural and Mechanical College, Agricultural College, Miss.			×	×	
University of Missouri, Columbia, Mo.	×		×		
University of Nebraska, Lincoln, Nebr.	×		×		
University of Nevada, Reno, Nev.	×				
Rutgers College, New Brunswick, N. J.	×				
New Mexico College of Agriculture and Mechanic Arts, Agricultural College, N. Mex.	×				
Cornell University, Ithaca, N. Y.	×			[1] ×	
North Dakota Agricultural College, Agricultural College, N. Dak.	×	×		×	
Ohio State University, Columbus, Ohio.		×	×		
Oklahoma Agricultural and Mechanical College, Stillwater, Okla.	×				
Oregon Agricultural College, Corvallis, Oreg.	×		×		
Pennsylvania State College, State College, Pa.	×				
Rhode Island State College, Kingston, R. I.				×	
South Dakota College of Agriculture and Mechanic Arts, Brookings, S. Dak.	×				
University of Tennessee, Knoxville, Tenn.	×			×	
University of Vermont, and State Agricultural College, Burlington, Vt.				×	
State College of Washington, Pullman, Wash.	×		×		
West Virginia University, Morgantown, W. Va.	×		×		
University of Wisconsin, Madison, Wis.	×	×	×		
University of Wyoming, Laramie, Wyo.	×				

[1] Two-year course in nature study and agriculture.

To the student of education, probably the most significant development in this field has been the spread of the idea, within the last two years, of establishing professorships of education in agricultural colleges, or professorships of agriculture in colleges of education.

The connection between the subject matter of agriculture and the public school is made, as suggested, in two ways: First, by a combination of technical courses in agriculture and education; secondly, by courses in agricultural subject matter, organized with special reference to the needs of public-school teachers, and including as much incidental pedagogy as the fitness or inclination of the instructor may permit.

In universities having technical courses in both agriculture and education the question is one chiefly of administration. The several agricultural colleges have begun to solve the problem of

creating departments to present some of the fundamental work in education. The departmental instruction has, so far, generally been given by men trained in the history and philosophy of education and with more or less experience in school administration. More often than not their special training in agriculture or natural science has been slight.

The second plan is now followed less generally than formerly in several institutions which are effecting a closer union between the technical courses in agriculture and education, and is now used rather to supplement that combination. Good instances of this change are furnished by the State universities of Illinois, Missouri, and Wisconsin. All of these, as well as the Massachusetts Agricultural College, offer courses usually designated as "agricultural education," consisting of agriculture applied to education, rather than education applied to agriculture.

It will be seen, then, that the term "agricultural education" is used in widely different senses; in some cases meaning principles of education when taught in a college of agriculture, and in other cases meaning principles of agriculture when taught in a college of education. These two kinds of work should be differentiated by being called, respectively, "principles of education" and "public school agriculture," or their equivalents. There is also room for an intermediate treatment with a broader outlook than either, which might be called "philosophy of agricultural education" with its complement "methods of agricultural education," and which more properly belongs to such a synthetic treatment than to work of college grade usually passing by that name.

The great change that has come about in the situation may be easily illustrated by the following comparison. In answer to a request in 1908 for names of agricultural college graduates who had gone into high-school teaching, responses were received from 35 colleges, many of them to the effect that none was known. Replies from most of the 42 whose addresses were obtained showed that only 4 were then teaching and that not more than 3 or 4 others had taught. Inquiries in the fall of 1911 elicited from 19 land-grant colleges estimates of the number of agricultural graduates teaching in secondary schools, aggregating 275. Three colleges knew of none, 3 had no data, and 4 did not attempt to answer the question. Twelve schools reported a total of 493 students in "teachers' agricultural courses" during the previous academic year. Three reported none, and 3 more were just starting that line of work. Six institutions reported 180 agricultural students in departments of education. At the teachers' training school, open for six months at the University of Minnesota farm school, 214 were registered.

In addition to the above indications of the success attending the efforts of the colleges to meet the demand for high-school teachers,

effective aid is rendered in many States through the close personal supervision of the professor of agricultural education, conferences held with the teachers in service, and through the extension department of the college. One development of this idea, worked out in considerable detail, is found at Ontario Agricultural College, where Prof. McCready, a teaching professor of botany in the department of nature study of Macdonald Institute, has also been appointed director of elementary agricultural education and inspector of agricultural classes in high schools by the department of education of the Province. The Oklahoma plan differs from that just described in providing two nonteaching members of the college faculty, one a professor of agriculture for schools, i. e., the common schools, as provided for in the constitution, and the other a dean of district agricultural schools. Their official relations to the public schools are, in some respects, comparable to those of the supervisor of agricultural education in the New York Education Department, of the supervisors of agriculture for the four districts of Ohio, and of the agent of agricultural education for the Massachusetts Board of Education. The work of these officials is more definitely related to agriculture than that of the various State and university high-school inspectors and directors of agricultural extension work in the colleges.

While the courses provided in the regular college curriculum must be expected finally to furnish the substantial foundation for the teacher's preparation, an important movement from the standpoint of immediate results has been the development of the college summer-school courses in agriculture, a movement so new that Dean Bailey gives but a passing mention to one institution of college rank offering such work. The efficiency of most of the high-school courses in agriculture of one year or less will doubtless depend for some years upon such help as the summer schools are able to give science teachers, high-school principals, and village superintendents.

The efficiency of these summer courses is probably increasing more rapidly than their enrollment. This was practically at a standstill in 1908 and 1909 in 17 institutions in the United States and 2 in Canada most prominent in this work, being about 1,135 each summer. But 15 colleges in the United States and 1 in Canada registered 1,341 in 1910, while 18 in the United States and 1 in Canada enrolled 1,520 in 1911. The increase is due to the large enrollments in the more recent work in Iowa, Kansas, West Virginia, Cornell University, and the notable increases at California, Illinois, Ohio, Virginia, and Wisconsin over the registration of the earlier years.

The sessions have lasted from two to nine weeks, most of them extending five or six weeks each. The number of distinct courses along agricultural and nature-study lines offered in each school varies in number from 1 to 19, and they are often only one-half or one-third

the length of the entire session. In 1908 but three summer schools offered courses restricted to high-school teachers. The following summer six schools offered courses in secondary-school agriculture. At least 500 students have taken the advanced courses during each of the past two summers in eight or nine schools.

Another movement of great promise is the idea of the "conference on agricultural education" held in connection with the summer schools. This is a sort of specialized but elaborated teachers' institute of State-wide proportions, and is calculated to focus attention on large professional problems too broad to fit into the classroom discussions of special courses.

The "conference" is a feature of recent origin in the colleges giving agricultural instruction. It has taken a form, so far, rather distinctive for each institution adopting it. The central topic may be agriculture as a science, as a subject of instruction, or as related to community life.

Successful conferences were held in the spring of 1910 and of 1911 under the auspices of the University of Illinois. These were largely attended by county superintendents, school directors, normal-school instructors, and others interested in the welfare of agricultural workers and in the home problems of farm life. One result of the conferences was the working out of a course of instruction in agricultural nature-study for the eight grades.

The conferences held since 1908 during the summer sessions of the Massachusetts Agricultural College addressed themselves formally to the science of agriculture and its relation to the work of the school, especially of secondary grade. In 1911 much emphasis was given to religious and social work among rural communities.

Ohio State University conducted a "country church conference" July 25–28, 1911. Agricultural topics were presented at the morning sessions, and economic, social, and religious questions were discussed in the afternoon and evening meetings.

In connection with the summer school, the University of Virginia has celebrated a "rural life week" each year since 1908, in which the discussions have centered around the improvement of the condition of agricultural workers.

RELATION OF AGRICULTURE TO THE OTHER SCIENCES.

By far the larger part of elementary agriculture, as judged by the amount of space given in textbooks and syllabi prepared by the school authorities, is made up of the plant phases of the subject. Crops and soils, forage crops and feeds, the garden and the orchard are the topics that are generally considered. Undoubtedly, most of these lend themselves more easily to field observation and laboratory

study than such topics as breeds of animals, farm buildings, or good roads. The scientific principles underlying these dominant topics are largely the underlying botanical principles of plant structure, plant nutrition, variation of seedlings, and inheritance of characteristics. The line of pure science taught in the colleges that comes into closest relation with public-school agriculture is botany, probably much more so than its close competitor, chemistry.[1]

It is a fact of great significance that a number of high schools have thrown out the subject of botany altogether and have substituted agriculture, on the ground that neither the students nor patrons saw any need for teaching botany, but did recognize the value of scientific agriculture, especially when they saw results. They discarded a book using the name "botany" only to substitute for it a book on "agriculture" which treated of the structure of the flower, the method of pollination, the effect of cross-pollination, of different strains of corn, with plans for field work to be done by the pupils at home on "corn breeding."

There can be no doubt that this spreading tendency noticeable in small high schools is a protest against the formalism into which botany, in company with physics, has fallen. The scientists have only themselves to blame for the widespread substitution of a body of knowledge, poorly digested as yet, for a wholesome and scholarly kind of science work, because the influence of the leaders has been, till recently, so largely for the "pure science" side of botany and so little for the kind that touches the life of the pupil and the interests of the community.

The exponents of the "new physics," the "new botany," etc., maintain that these subjects should come closer to the outside interests of the pupils and patrons of the school, and that consequently the science now in the curriculum can and should be so taught as to satisfy all demands for agricultural instruction that may legitimately be made upon the average public high school.

If the regular sciences are to meet the demands made upon them, the science teachers of small high schools must have more help than the present texts give them or their university courses furnish. It may be too much to expect that private enterprise will furnish rural editions of chemistry, physics, or zoology. The later agricultural texts partly perform this function for botany, with something of other matters thrown in. Even though technical agriculture be introduced into the upper years of the high school instead of the "elementary agriculture," now the vogue in the lower grades, the various

[1] An interesting analysis of five much-used high-school agriculture textbooks, by Prof. O. W. Caldwell, of the University of Chicago, is given in the Proc. of the Eleventh Meeting Cent. Assoc. Science and Math. Teachers, held Dec. 1, 1911. He shows that one devoted 68 per cent of its space to botany, the others gave to botany and zoology together 80, 62, 66, and 65 per cent, respectively. He seems to include under "applied" botany and zoology much that agriculturists would claim to be as much agricultural as botanical or zoological, a distinction which after all depends on the viewpoint and the use made of the material.

sciences should so lend themselves to agricultural treatment as to free the technical subject of the third or fourth years from enough pure science topics to permit earnest consideration of the serious problem at hand. The movement that has started in various parts of the country in very tentative fashion to work out an "elementary science" course [1] has taken on a unique form in California, where the State university has planned a first-year high-school course, receiving a year's entrance credit, which shall include a variety of agricultural general topics of nature and science. One-half to two-thirds of the work is of direct interest to rural communities, whether pertaining to plants, engineering, soil formation, or meteorology. No doubt it is the facility with which agriculture has lent itself to this elementary science idea that has made it so popular as a first-year subject, where it manifestly could not become very technical. Given in the first year, it must of necessity be largely cultural in its effect. It furnishes the opportunity for an introduction to the simplest chemical phenomena—combustion, solution, neutralization of acids in soil, the nature of nitrogen, of the meaning of the term protein, salts, and numerous other terms that any farmer must be slightly acquainted with in order to read intelligently his farm journal or the Government bulletins, and which he may never hear of as a boy if they are left buried in a formal third or fourth year study.

The combinations of studies so prevalent in small high schools are suggestive of the trend toward the use of a body of fairly simple facts and phenomena to fulfill such a function as just mentioned. Where once physical geography was expected to do this, it is now combined with a half year of agriculture. Unfortunately there is little evidence that the physical geography is modified at all by the relationship. At other times the popular combination is botany (flower study) in fall and spring, with agriculture (with laboratory work) in the winter. Undoubtedly the most efficient arrangement will result from a breaking up of the rather divergent lines of agriculture studies, so that plant work, such as the study of field, orchard, and garden crops, may be intimately taught with the principles of botany, when feeds and fertilizers will be integral parts of chemistry, when the cream separator will be the starting point of centrifugal action instead of the end. This grouping will possibly grow more frequent as the "introductory science" comes more and more to be presented in the seventh and eighth grades of consolidated or village schools. Likewise the arrangement, not infrequently used, of this general course in agriculture in the fourth year, may also prove to be a temporary expedient, lasting only until the different sciences and their immediately related agricultural topics are welded together and rescued from pedagogical chaos. At such time we may see the general high schools presenting,

[1] Post, C. B. What shall the first-year high-school science be? Proc. Nat. Educ. Assoc., 1909, p. 809.

with fairly competent teachers, courses in science in appropriate years so strongly "agriculturized" that they might bear indiscriminately the names of the present sciences, or the terms agronomy, horticulture, farm mechanics, etc. With this state of teaching the present first-year agriculture would be largely relegated to the grades, as agriculture, nature-study, or elementary science, according to the taste of the teacher. The more serious technical courses, requiring expensive equipment, where real plant and animal breeding and crop rotations may be studied under observation, may be taken in special schools not so far from the farmer, in time or place, but that he may see the results and profit by them himself and send his ambitious and reliable boy there for intensive study.

One of the questions perplexing the small high school is, How can we relate the teaching of our science to agricultural education? The question is largely bound up in the large proposition of making agricultural instruction "incidental" or "correlated" strongly with the other sciences *versus* the proposition of teaching it in an entirely separate manner. The ideal would involve a combination, but in schools teaching agriculture separately, many presenting the subject in but one year, there is a woeful lack of any such tendency. So far as can be discovered, the sciences are taught just as abstractly, in most cases, whether agriculture is in the school or not. Or where an attempt at "correlation" is made, it is not correlation but repetition, which may have all the value of a review but none of the charm of new study or new viewpoint.

RELATION OF AGRICULTURE IN THE HIGH SCHOOL TO THAT IN THE ELEMENTARY SCHOOLS.

It is a significant fact that the States requiring that agriculture be taught in the rural schools have shown the slowest voluntary development of this subject in the high schools. In several States teachers must pass an examination in agriculture for first and second grade certificates. Unfortunately the subject was made mandatory in some States before the teachers were at all prepared to teach the subject. A serious difficulty is the lack of differentiation between agricultural instruction of high-school grade and that of elementary grade. Some summer schools ostensibly train for high-school work, some for normal training schools, others purport to train only for the grades. But so far as can be determined, there is in most of these classes no distinction in the grade of material used or complexity of subject matter to correspond with the difference in the pupils who are finally to receive this instruction. A few exceptions are noted under the section on "Provisions for the higher training of teachers." The method and subject matter of agricultural instruction should be

made more definite. The frequent objections to the textbooks used by high schools indicate that this faulty standardization is recognized in many quarters.

There is yet no agreement as to the age at which agricultural instruction should begin in a formal manner. The laws of several States require it to be taught in the seventh and eighth grades. The rural common schools, as a rule, use the same texts that the high schools use when carrying on the course for one year or less. If we accept Dewey's definition of education as "a working over of experiences," we must grant that children three or four years apart in age have very different stores of experience, and need different treatment as well as texts. Prof. Bailey and others seem to be against agriculture as a study by itself and apart from nature study until the high school is reached. Prof. Stevens, formerly of North Carolina, in the course of nature study planned for that State, provides for textbook work in agriculture in the fifth grade, to be preceded and followed by work in nature study. The general trend in the South and West seems to be toward specialization in the upper grades.

Leaders in the National Society for the Promotion of Industrial Education suggest the desirability of introducing a differentiation at the age of 12, and important steps have been taken toward that end in the industrial education of rural communities. The administrative and legal machinery for it is in much better shape than the methods for carrying it on. Reports on the grades which pupils must have completed in order to enter the special schools show that the special agricultural and semiagricultural schools of the South are settling upon an elementary course of six or seven grades; that the special schools of the North desire completion of the eighth grade, but often make exceptions; that the special schools of Oklahoma require the completion of the eighth grade, but provide a preparatory course with elementary agriculture in each of its three years. Added to this is the fact that most of the States which maintain these schools require agriculture to be taught in the last of the elementary grades, the seventh or the eighth, as the case may be. These various plans actually operate to bring the children into the prevocational work anywhere from 12 to 16 years of age, according to the opportunities for completing each year's work, which is admittedly meager in many rural sections because of the home demands in the spring. So it would seem that the only conditions necessary to make vocational work, or a near approach to it, a vigorous actuality in rural education are money and prepared teachers.[1] The present lack of these seems appalling, but the progress made compares favorably with the progress in vocational training in cities.

[1] About 35 per cent of the 1,000 high schools reporting on agriculture to this bureau claim their work to be "vocational," notwithstanding the lack of preparation on the part of most of the teachers and the absence of even meager equipment in most of the schools.

DIFFICULTIES OF INSTRUCTION.

The most immediate problems have to do with the facilities at the command of the superintendent or principal. The responses to the question, What are your chief difficulties? were numerous and varied. Although expressed in many ways, they may be roughly grouped under six general headings, as shown below:

TABLE 21.—*Difficulties reported by schools in teaching agriculture.*

	Schools.
Lack of equipment and facilities	69
Lack of time or suitable season for the work	61
Lack of suitable teacher	8
Lack of moral support in various forms	17
Lack of suitable textbook	9
Difficulties of organization or methods	21
Total number	185
Number of schools reporting difficulties	151
Schools reporting no difficulties	13
Total number of schools reporting	164

Of the 164 reports, 119 were from high shools and 45 were from training classes; 38 high schools failed to answer the question on this subject. Of the last, however, 28 reported that the attitude of the pupils or patrons, or both, was favorable and often enthusiastic.

Some of the variations in the lack of facilities reported were lack of apparatus, of laboratory space, of opportunities for practice, of material, of fields for observation, of grounds for gardens and experimental work, of heat in the building at night, and of a reference library. Some complained of the shortness of the growing season before the end of the term, others of the lack of time for field trips. A very small number lamented their own lack of training, although many, no doubt, were conscious of their deficiencies in this respect. Two stated that the teachers were city girls.

THE TIME PROBLEM.

Superintendents complain of the lack of suitable teachers, and of the unsympathetic attitude of the science teachers, which is serious enough. Such teachers could help greatly in solving the time problem.

When asking for a statement of difficulties, no clue was given concerning what might be expected; many respondents characterized their text as "thin," "kindergarten," or the equivalent. The printed page available was evidently not meat but milk for the young mind beginning to realize its own power. Judicious use of Government bulletins, which may be obtained free, would serve as an effective supplement.

Some of the administrative difficulties mentioned were peculiar to the subject; as, determination of its place in the curriculum; laboratory work hard to organize; no definite outline to work from; having city children in the school. These difficulties will disappear as theory and practice are better understood. Such troubles as lack of practical work, difficulty in getting the pupils to do experiments, to observe, to apply the work, and to see that it is real; all these are in a degree dependent on the teacher rather than on the subject, and are difficulties which the same teachers would find with almost any science study.

THE EQUIPMENT PROBLEM.

The complaint of insufficient apparatus for the short elementary course, at least, has less ground than a similar complaint would have for almost any other science, for in no other studies do home-found appliances come so nearly equaling bought apparatus as in agriculture. Tin cans, perforated and unperforated, paint buckets, soup plates, alcohol lamps made of ink bottles, are serviceable. In fact, tin cans do better for many experiments than crockery. Lamp chimneys cost little, family scales and spring balances are inexpensive, though chemical thermometers involve greater outlay. With the exception of a Babcock milk tester, four or five dollars should provide all the apparatus needed in a small high school in addition to what can be made. This would be sufficient for most of the indoor experiments the younger high-school pupils can understand, or for most of those demanded in the usual half-year study. Much of this apparatus should be in the equipment for physics or chemistry, if the school presumes to teach those subjects at all.[1] In the schools visited there was too much evidence of money invested in showy but almost useless air pumps and static electrical machines, while the school suffered from a dearth of simple material or of duplicates of common apparatus necessary to carry on individual laboratory work.

THE TEACHER PROBLEM.

Few high schools of villages and of the poorer townships can hope to get a teacher trained in agriculture as easily as they now get teachers trained in Latin or mathematics, because the present supply is so much smaller than the number of small schools already teaching the subject; the competition for the men available is too keen on the part of institutions able to pay much larger salaries. Reference to the section on salaries (p. 44) indicates how large a proportion of the graduates of the agricultural colleges is absorbed by the colleges themselves, the experiment station, and the State and Federal Governments. Commercial lines have attracted a number. A large per cent of these

[1] A number of reports and bulletins containing lists of apparatus suitable for agricultural courses in high schools of various standards are listed in different bibliographies.

graduates are secured by the special State and county schools and State-aided city schools. This competition by the secondary schools will probably absorb practically all the output of the colleges who have the advantage of teaching experience or pedagogical training. As the salary necessary to secure the desirable men equals or exceeds that paid the principal of the smaller high schools, the only way for such schools to have agriculture taught by a teacher fitted to do so is to elect principals competent to handle this work.

THE TEXTBOOK PROBLEM.

With the appearance of new books which are sufficiently advanced for use in the high schools, the textbook difficulty is solving itself. Books written for the elementary schools are being relegated to use in the grades for which they were intended. In this category may properly be included a large proportion of those reported in Table 4 as the texts used in schools reporting. The past three years have seen the growth of an encouraging crop of texts intended for use in high schools, some for the lower grades, some for the higher, and some for specific subdivisions of agriculture rather than for the general field. Up to this time not more than one or two in use by the high schools could be considered to be of secondary-school grade.

THE METHODS PROBLEM.

Agriculture is taught probably as well as other sciences in the same schools. So much have the sciences been regarded as instruments of disciplinary education that the absence of concrete applications has not seemed to many to be a marked defect. The pedagogy of agricultural instruction must take account of the essentially utilitarian aspect of this study. The philosophy underlying the methods of instruction is not consistent with the conception of education that to be cultural is to be useless; nor does agriculture in the schools depend for its justification on any supposed disciplinary values. Not that it does not possess as much value in this direction as other studies, but agriculture as a study may justly claim to have a content of its own that is worth while. It does not need the prop of a disciplinary conception of education. But if the administrator's idea is to teach only the art or trade of farming, his methods, while involving the idea of doing, will probably be those of purely imitative doing, and not calculated to cultivate initiative, to give opportunities for forming and correcting judgments, nor for acquiring a scientific habit of thought. Viewed as an instrument of education, agriculture should do all these things as truly as any other science.

THE ATTITUDE OF STUDENTS AND PATRONS.

Much of the success of instruction depends on the attitude of the pupils and the encouragement given to the work by parents. On the

other hand, the degree of interest shown reflects in no small degree the quality of the teaching. Opinions were asked regarding the attitude of the students and patrons, and the answers are here given. They are classified rather arbitrarily according to the degree of interest indicated, with the most frequently recurring phrases indicated

TABLE 22.—*Attitude of pupils and patrons.*

Per cent of schools reporting—	Per cent.
Pupils "enthusiastic," "very much interested," "very favorable," or study "very popular"	24
Pupils "like it," "pleased with it," "take kindly to it," or attitude "good," "favorable," "pleasing"	57
Attitude "fairly good," "tolerant," pupils "show no marked interest"	7
"Indifferent," "backward," "no interest"	3
"Unfavorable," or pupils "dislike it"	1
"Can not judge," or "study too new"	1
Not reporting	1

A few of the extreme expressions may be of interest: "Pupils enjoy the work beyond all my expectations"; "heart and soul in the work"; "like it, the only trouble is that there is not enough." Concerning the attitude of patrons: "Would not do without it"; "watch the work closely"; "regard the work as practical"; "parents read the textbook." One superintendent said that his class could not get the books because the farmers bought them as soon as they arrived in town, and that the bookseller had to order the books three times. In two or three cases the pupils were reported as interested, while the patrons were neutral or hostile.

In nearly every case reporting a dislike for the subject, the returns also showed that the work included neither classroom experiments, demonstrations, nor practical home work. Others reported "no demand for it," "prejudice against book farming," and one, that it was hard to make the work seem practical to the patrons. Many of these cases, it would seem, could have been managed by not labeling the study so conspicuously as something never before taught, and by incorporating instead the material in subjects already on a safe footing. In one school the work was introduced under the heading of geology, to meet the objections of an influential citizen. He has since given several hundred dollars for agriculture, and it is taught in all four years of the high school. In contrast with the cases of indifference just noted is the school whose superintendent states that out of 20 graduates from the grades 4 would not have entered the high school but for the respect their parents entertained for the unpretentious course in agriculture. Another school placed animal husbandry in the first year, an unusual place, because that work appealed

to the parents as so eminently practical that they were willing to have the boys continue in school in order to get that kind of work. Two city boys graduating from a school where the subject was regarded "with doubt" chose to enter the State agricultural college. The pupils in a New York high school are "indifferent because the work is too closely allied to their home life; they want something new, and seek to avoid farm life." On the other hand, the pupils of a Nebraska school "like it because most of them are rural pupils." The former school reports no experimental work, while the latter school does. In another school "it is hard to get the pupils interested at first because most of them think they know all about it."

The fact must not be overlooked that enthusiasm on the part of the teacher may be reflected not only in the attitude of his pupils, but sometimes in his notion of their feelings, and thus give rise to a roseate but unjustified answer. However, most answers that would fall under the above criticism are perhaps counterbalanced by the reports of teachers not in sympathy with a study they must teach against their will. A former superintendent in a small Indiana village wrote that he had not been in sympathy with the movement. His conception of education was that "life was more than meat and the body more than raiment. But the demand for instruction in agriculture was so insistent, so sincere, and so dignified and reasonable, that it could not be ignored." So he planned to put a course into operation, but himself "abandoned the field of general school work for the more congenial field of history and psychology."

RELATION OF SCHOOL WORK TO INDUSTRIAL ACTIVITIES.

If it be true, as educators of note maintain, that the work of the school should be related as nearly as possible to the outside life, it must be especially true of any industrial phase of the school life. It is incumbent on the agriculture taught in the high school to be particularly relevant to the principal activities of the immediate neighborhood, and to give an insight into the importance, if not the methods, of agricultural interests in other parts of our Nation. Agriculture in the broad sense includes a variety of activities. More of these are represented in some localities than in others. Some are much more widespread than others. An effort was made in this investigation to learn the important local industries that "fit in" well with the agriculture of the school and that are interesting to the pupils. While a detailed classification would include more than 30 headings, the answers may be roughly grouped under the 7 given below. Those from the high schools are kept separate from those of the normal training classes, as in the last table. The communities reporting represent a random selection.

TABLE 23.—*Principal industries reported by 191 communities supporting agricultural courses.*[1]

	Per cent reporting.[1]
General farming and farm crops	53
Special farming and farm crops	8
Horticulture and gardening	17
Animal husbandry, including dairying	49
Manufactured milk products	7
Manufactures allied to agriculture	7
Industries not allied to agriculture	3
Reporting "no local industries"	5

One of the most important of the teaching problems concerns the relative degree of difficulty of the various topics usually present to high-school pupils. Correspondents were asked to name the agricultural topics giving them the most concern. Although the number of responses on this point is small, the distribution is probably typical. The following replies represent 55 high schools. The topics reported most difficult to teach fall under the headings—soil work, animal husbandry, plants and crops, in addition to those reported by four schools, viz, insects, pests, "all tests."

TABLE 24. *Topics in agriculture most difficult to teach; number of schools so reporting.*

	Schools.
Soils	17
Soils and rocks	2
Analysis	3
Chemistry	8
Drainage	1
Fertility	4
Nitrification	1
Physics	3
Fertilizers	2
Fertilizers, artificial	1
Tests	1
Total	43

	Schools.
Feeds and feeding	14
Feeds, analysis	1
Animal husbandry	1
Dairying	1
Live stock	1
Stock raising	1
Total	19

	Schools.
Field crops	2
Horticulture	1
Orchards	1
Plant breeding	2
Propagation and improvement	1
Budding and grafting	1
Plant diseases	2
Chemistry of plants	1
Total	11

The total of items reported was 74; the number of schools reporting them, 52; and the number of schools reporting none, 4. One report stated that all the topics were easy; another that all were of equal difficulty; and a third that all were too easy in the text. Eight of the schools reporting difficulties teach the subject in the third year, and four in the fourth year.

Many no doubt failed to report because no one topic stood out prominently as being particularly more difficult than the others. The concentration of the replies on two points—soils and feeds—may mean (1) that these two subjects are not treated in the texts with the same clearness as the others; (2) that they are inherently more difficult than other topics; or (3) that they are, in many respects, too difficult for the pupils in the lower years of the high school. Probably all three factors are concerned. Attention has been called at some

[1] Some schools reported more than one item, so that the total amounts to more than 100 per cent.

length[1] to the uneven and otherwise unsatisfactory treatment of "soils" in books of high-school grade. Justification of the second suggestion is found in the fact that both topics draw heavily on physics and chemistry, studies usually deferred until the third and fourth years, and in the fact that the large proportion of difficulties on this point did not appear in the reports from schools teaching agriculture in the last two years of the course.

The fact has not been sufficiently recognized that the topics in agriculture, and the treatment of those topics, must be as carefully graded as the subject matter in any other branch of knowledge. One principal stated, wisely it would seem, that he attempted to handle but three lines, and found them not too difficult for his pupils. A proper organization of courses will eliminate certain topics from the work of the first years, or treat them in a more elementary way. Where the simpler treatment of soils, for instance, is given in the last grade of the elementary school, it is manifestly unwise to repeat the work, even in a more "advanced" manner, until the student has gained the scientific background for advanced work. If a school can include the subject of agriculture formally in but one year, these more difficult topics might much better be deferred for treatment in connection with the sciences of the upper years. We may yet see high-school texts, or series of texts, written in "parts," not treating with completeness the various departments of agriculture, but containing work appropriate to different grades, as the seventh, eighth, tenth, and twelfth; or eighth, ninth, and twelfth. One of the encouraging signs is that men without intentionally writing formal texts are rendering invaluable aid by issuing, in small compass, guides for practical work in several restricted fields of agricultural instruction.

STATE AID TO AGRICULTURE IN THE PUBLIC SCHOOLS.

Appropriations made by the State legislatures for agriculture are sometimes voted in a lump sum for all the schools of the State of certain classes, and sometimes in definite amounts for each school. The degree of latitude given to the school authorities in administering the appropriations and in prescribing restrictions and the minimum conditions varies greatly. The administration usually devolves on the State departments of public instruction, sometimes acting through a supervisor, as in Louisiana, Massachusetts, New Jersey, New York, and Wisconsin, and sometimes through the high-school inspector, as in Minnesota. Briefly summarized, the provisions for State aid are as follows:

Alabama.—Annual aid of $7,500 is granted to one school in each of the nine congressional districts; $750 must be expended on experiment station work by each school.

[1] Some Textbooks for Secondary-school Agriculture. Nature-Study Review, Vol. III, pp. 180-188.

Iowa.—$500 is granted each high school with teachers' training classes for instruction in agriculture and home economics, provided that no county shall receive more than $800.

Kansas.—$25,000 per year has been appropriated for 1912 and 1913, to give $250 for agriculture to each approved high school with normal training class. Minimum requirement: 10 pupils in the class. These schools already received $500 each from the State.

Louisiana.—$25,000 was appropriated for 1911 and for 1912, to give from $1,200 to $1,500 to each of not over 20 high schools for agricultural departments. Minimum requirement: 5 acres, $280 to $430 worth of apparatus and implements on prescribed lists, specified live stock and barns, and a local appropriation of $250 for the department.

Maine.—The State pays two-thirds of the total expenditure for agricultural instruction in any public school up to $500. Minimum requirement: 12 pupils in the class. Two-thirds of the cost, up to $2,000, of special industrial school or department in the school system of any town may be drawn from the State treasury.

Maryland.—$400 is given to any high school toward the salary of a special teacher of agriculture giving at least two-fifths of his time to the school, or $150 to each of four schools employing the same teacher. Minimum time requirement: 2 recitation periods of 40 minutes and 1 laboratory period of 80 minutes per week.

Massachusetts.—Two-thirds of the agriculture instructor's salary will be paid by the State to high schools maintaining agricultural departments, approved by the State board of education.

Michigan.—The State pays two-thirds of the amount expended for maintenance of accredited county agricultural high schools, the appropriation for any one school not to exceed $4,000 for any one year, provided that not more than two schools be placed on the accredited list.

Minnesota.—$2,500 is given each year to each of 30 high schools to maintain departments of agriculture, manual training, and home economics, but they may not benefit by any other laws providing State aid for manual training in high schools. Each is required to have 5 acres of land. To each of 50 other schools $1,000 is given annually for the same purpose, on condition that they offer short courses of three months in winter.

Mississippi.—$1,500 annually is given each county organizing county schools under the provisions of the act authorizing counties to establish county high schools, one each for white and colored youth. Agriculture must be taught. Two counties may unite to maintain these two schools. The electors may rescind the action of the county board in establishing either one or both of the schools. Each school must have 20 acres of land, suitable buildings, including a dormitory accommodating 40 persons. The county boards may (and do) introduce such other studies into the curriculum as they see fit. Subjects generally given in public high schools are included.

New Jersey.—The State duplicates local expenditures for industrial education in amounts from $250 to $7,000. The State superintendent ruled that agricultural instruction comes within the intent of this act, but no attempt has been made to take advantage of the ruling.

New York.—$500 is granted to any high school with one full-time teacher of agriculture, manual training, and home economics, and $200 for each additional teacher. A minimum of 25 pupils in a course of 38 weeks is required.

North Dakota.—$2,500 will be available in 1913 for agricultural departments in each of five high schools, which then forfeit the present general State aid of $600 to $800.

Texas.—$50,000 has been appropriated to duplicate local expenditure between the limits of $500 and $1,500 for agriculture; and between the limits of $500 to $1,000 each for manual training and home economics, in four-year and three-year high schools (above sixth grade); between the limits of $500 and $1,000 for agriculture alone in

two-year high schools. Three acres of land are required. Maximum aid: $2,000 for any one school; aid is given for only one year.

Virginia.—For 1912 the appropriation is $30,000 for instruction in agriculture, manual training, and home economics, in ten high schools, one in each congressional district; $25,000 for buildings and equipment for the same, $10,000 for extension work in the same schools.

Wisconsin.—$250 has been voted for each special department of agriculture, manual training, and home economics in high schools, or $350 if the departmental instruction is carried through the next three grades below the high school. Maximum aid to any one school, $1,050.

Agriculture is prescribed by law in some States and authorized or permitted in others without specific appropriation of State funds for it. It is prescribed in the following States for the schools named: Idaho, in all rural high schools; Nebraska, in the ninth and tenth grades of county high schools; Maine, "natural sciences in their application to agriculture"; Pennsylvania, in all township high schools.

Agriculture is made a part of the curricula by the State boards of education or departments of public instruction, as follows: Alabama, in approved county high schools; Utah, in accredited high schools receiving State aid; Virginia, as a part of the science specified for high schools receiving State aid.

Agriculture is authorized by law in various States, as follows: Kentucky, in county high schools; Maryland, in county high shools; Michigan, in township rural high schools; Texas, in high schools; Vermont, "industrial science" in high schools.

SOME TYPICAL HIGH SCHOOLS TEACHING AGRICULTURE.

FARRAGUT SCHOOL.[1]

CONCORD, TENN.

The criticism is often made that high schools do not meet the needs of a large majority of the pupils who attend them; that they are not in harmony with the life of the communities in which they are located. Such criticism certainly does not apply to the Farragut School. Several years ago this school was reorganized with a view to making it a part of the life of the people it serves. Six years ago the building was destroyed by fire, but it was immediately replaced by the people of the community at a cost of about $12,000. A complete water system has since been incorporated, which cost a little less than $3,000, making the initial cost of the school property, including 12 acres of land, about $17,000.

The school stands in the open country, about 1½ miles from Concord, Tenn., a village of about 300 inhabitants. The school building is a two-story brick structure, with basement. The high school occupies the second floor and has a laboratory on the first floor. The other rooms on the first floor are occupied by the elementary

[1] The material for this description of the Farragut School was furnished by Mr. Adams Phillips, principal of the school.

school. One-half of the basement contains the home-economics room, a lunch room, and a toilet room for the girls; in the other half are found the manual training room and the boys' lunch room and toilet room.

The building was made as attractive as possible and at the same time thoroughly practical. The water system, which adds very much both to the convenience and sanitary conditions, was secured in the following manner: The water from a large spring about 1,200 feet distant is pumped into two large tanks in the attic of the building by a No. 40 double-acting rifle ram, with a capacity of 3,600 gallons per day. The ram is driven by creek water, but delivers only spring water to the tanks. From the tanks the water is conveyed to all parts of the building, to the principal's home, and to the barn. Drinking fountains are located in the halls and lunch rooms, and wash bowls and sinks in the laboratories. Shower baths are installed in both the boys' and the girls' toilet rooms. The waste water from the showers, sinks, and fountains is carried by a tile sewer directly to the creek. The sewer pipe leading from the closets empties into a four-compartment septic tank, which is 15 feet long, 9 feet wide, and 7 feet deep. The tank overflows clear and odorless into the creek.

Six acres are devoted to buildings, playgrounds, etc. The other 6 acres are used for demonstration purposes and for growing feed for the stock. One man is employed the year round as janitor and farm laborer. A four-year rotation of crops is used, and fertilizer demonstrations are in progress. Other land is devoted to general farm crops, so grouped as to get two crops per year. One crop is harvested, the other being turned under to improve the soil, which was very poor when the school took charge of it. The crops now grown are wheat, corn, oats, vetch, rye, alfalfa, and soy beans. The value of soy beans has been so clearly demonstrated that, where there was none three years ago, farmers are now sowing from 5 to 40 acres each.

Another prominent feature of the agricultural course is that of seed selection and seed testing. A flock of Plymouth Rock chickens is maintained and used in teaching animal husbandry. In the course in domestic economy the girls give as much study to the feeding of man as the boys in agriculture give to the feeding of live stock.

An interesting feature of the school work is the moonlight social, which is held the last Friday night before each full moon. This is an effort to help solve the social problem of the rural community. The program varies from meeting to meeting, but always there is a talk on a subject of general interest pertaining to some phase of farm life. There is always plenty of music, and after the regular program, which lasts about one hour, the evening is given over to social converse. These meetings are well attended. The big meeting of the year is on Commencement Day, with an all-day program, including a basket dinner. In the forenoon the graduating class read their

essays and receive their diplomas. After dinner opportunity is offered to study the demonstrations and general farm work. The commencement address is given at 2 o'clock and there is a baseball game at 3.30. At 8 o'clock a two-hour drama is given by the high-school students.

There are three 4-year courses of study offered: The Latin course; the English course; and the agriculture, manual training, and home economics course. Ninety per cent of the pupils are taking the agriculture, manual training, and home economics course. Largely as a result of the practical work offered in the course of study and the change in the attitude of farmers toward agricultural education, the attendance has almost tripled within the past four years.

Manual training, agriculture, and home economics course.

FIRST YEAR.

First term.	Hours per week.	Second term.	Hours per week.
Mathematics—High-school arithmetic	5	Mathematics—High-school algebra	5
English—(a) Grammar	4	English—(a) Grammar	3
(b) Composition	1	(b) Literature	2
Agriculture, manual training, or home economics	5	(c) Composition	1
Science—Botany	5	Agriculture, manual training, or home economics	5
Exercises—(a) Drawing	2	Science—Zoology	5
(b) Vocal music	2	Exercises—(a) Drawing	2
(c) Writing	1	(b) Vocal music	2
Spelling	5	(c) Writing	1
		Spelling	5

SECOND YEAR.

Mathematics—High-school algebra	5	Mathematics—High-school algebra	5
English—(a) Rhetoric	2	English—(a) Rhetoric	2
(b) Literature	2	(b) Literature	2
(c) Composition	1	(c) Composition	1
Agriculture, manual training, or home economics	5	Agriculture, manual training, or home economics	5
Science—Physiology	5	Science—Physical geography	5
Exercises—(a) Drawing	2	Exercises—(a) Drawing	2
(b) Vocal music	2	(b) Vocal music	2
(c) Writing	1	(c) Writing	1
Spelling	5	Spelling	5

THIRD YEAR.

Mathematics—Plane geometry	5	Mathematics—Plane geometry	5
English—(a) Rhetoric	2	English—(a) Rhetoric	2
(b) Literature	2	(b) Literature	2
(c) Composition	1	(c) Composition	1
General history or German	5	General history or German	5
Science—Physics	5	Science—(a) Physics or agriculture	3
Exercises—(a) Drawing	3	(b) State geology	2
(b) Vocal music	2	Exercises—(a) Drawing	3
Spelling	5	(b) Vocal music	2
		Spelling	5

FOURTH YEAR.

Mathematics—Solid geometry	5	Mathematics—Plane geometry and surveying	5
English—(a) Literature	4	English—(a) Literature	4
(b) Composition	1	(b) Composition	1
History—American or German	5	History—(a) American or German	3
Science—Chemistry	5	(b) Civil government	2
Exercises—(a) Drawing	3	Science—Chemistry or agriculture	5
(b) Vocal music	2	Exercises—(a) Drawing	3
Spelling	5	(b) Vocal music	2
		Spelling	5

English and science course.

FIRST YEAR.

First term.	Hours per week.	Second term.	Hours per week.
Mathematics—High-school arithmetic	5	Mathematics—High-school algebra	5
English—(a) Grammar	4	English—(a) Grammar	2
(b) Composition	1	(b) Literature	2
Science—Physical geography	5	(c) Composition	1
History—English	5	Science—Physiology	5
Exercises—(a) Drawing	2	History—English	5
(b) Vocal music	2	Exercises—(a) Drawing	2
(c) Writing	1	(b) Vocal music	2
Spelling	5	(c) Writing	1
		Spelling	5

SECOND YEAR.

Mathematics—High-school algebra	5	Mathematics—High-school algebra	5
English—(a) Rhetoric	4	English—(a) Rhetoric	2
(b) Composition	1	(b) Literature	2
Science—(a) Biology	3	(c) Composition	1
(b) Agriculture or home economics	2	Science—(a) Biology	2
History—Ancient	5	(b) Agriculture or home economics	3
Exercises—(a) Drawing	2	History—Ancient	5
(b) Vocal music	2	Exercises—(a) Drawing	2
(c) Writing	1	(b) Vocal music	2
Spelling	5	(c) Writing	1
		Spelling	5

THIRD YEAR.

Mathematics—Plane geometry	5	Mathematics—Plane geometry	5
English—(a) Rhetoric	3	English—(a) Rhetoric	2
(b) Literature	2	(b) Literature	3
Science—Physics	5	Science—(a) Physics	3
History—Mediæval and modern	5	(b) State geology	2
Exercises—(a) Drawing	3	History—Mediæval and modern	5
(b) Vocal music	2	Exercises—(a) Drawing	3
Spelling	5	(b) Vocal music	2
		Spelling	5

FOURTH YEAR.

Mathematics—Solid geometry	5	Mathematics—Algebra reviewed	5
English—(a) Literature	4	English—(a) Literature	4
(b) Composition	1	(b) Composition	1
Science—Chemistry	5	Science—Chemistry	5
History—American	5	History—(a) American	2
Exercises—(a) Drawing	3	(b) Civil government	3
(b) Vocal music	2	Exercises—(a) Drawing	3
Spelling	5	(b) Vocal music	2
		Spelling	5

Latin course.

FIRST YEAR.

First term.	Hours per week.	Second term.	Hours per week.
Mathematics—Higher arithmetic	5	Mathematics—High-school algebra	5
English—(a) Grammar	4	English—(a) Grammar	2
(b) Composition	1	(b) Literature	1
Language—Beginner's Latin	5	(c) Composition	2
History—English	5	Language—Beginner's Latin	5
Exercises—(a) Drawing	2	History—English	5
(b) Vocal music	2	Exercises—(a) Drawing	2
(c) Writing	1	(b) Vocal music	2
Spelling	5	(c) Writing	1
		Spelling	5

Latin course—Continued.

SECOND YEAR.

First term.	Hours per week.	Second term.	Hours per week.
Mathematics—High-school algebra	5	Mathematics—High-school algebra	5
English—(a) Rhetoric	2	English—(a) Rhetoric	2
(b) Literature	2	(b) Literature	2
(c) Composition	1	(c) Composition	1
Latin—Cæsar	5	Latin—Cæsar	5
Science—(a) Biology	3	Science—(a) Biology	2
(b) Agriculture or home economics	2	(b) Agriculture or home economics	3
Exercises—(a) Drawing	2	Exercises—(a) Drawing	2
(b) Vocal music	2	(b) Vocal music	2
(c) Writing	1	(c) Writing	1
Spelling	5	Spelling	5

THIRD YEAR.

Mathematics—Plane geometry	5	Mathematics—Plane geometry	5
English—(a) Rhetoric	2	English—(a) Rhetoric	2
(b) Literature	2	(b) Literature	2
(c) Composition	1	(c) Composition	1
Latin—Cicero	5	Latin—Cicero	5
Foreign language	5	Foreign language, continued	5
Exercises—(a) Drawing	3	Exercises—(a) Drawing	3
(b) Vocal music	2	(b) Vocal music	2
Spelling	5	Spelling	5

FOURTH YEAR.

Science—Physics	5	Science—(a) Physics	3
English—(a) Literature	4	(b) State geology	2
(b) Composition	1	English—(a) Literature	4
Latin—Virgil	5	(b) Composition	1
Foreign language, continued	5	Latin—Virgil	5
Exercises—(a) Drawing	3	Foreign language, continued	5
(b) Vocal music	2	Exercises—(a) Drawing	3
Spelling	5	(b) Vocal music	2
		Spelling	5

HOPKINS ACADEMY.[1]

HADLEY, MASS.

Private academies formerly existed in New England in considerable numbers. Their principal purpose was the preparation of pupils to enter college, and they performed well their self-assumed task. From the seed sown by these sturdy pioneers have grown the public high schools of to-day. Most of the academies have been superseded by public high schools, or have been subjected to such complete reorganization as to be scarcely recognizable. In some instances, however, there has been a broadening of the course of study to meet the new conditions. Hopkins Academy, at Hadley, Mass., is an example of the transformation of a strictly college preparatory school of the old type to a modern type of secondary school. Its course includes vocational as well as cultural training, and at the same time

[1] Much of the material concerning the work of this school was furnished by Mr. Franklin E. Heald, principal of the academy, and Mr. R. W. Stimson, special agent for agricultural education, Massachusetts State Board of Education.

furnishes an illustration of a new plan for agricultural work in secondary schools. Following is a brief statement of this transformation and the conditions which lead up to it.

In 1908 the trustees of Hopkins Academy, realizing that the traditional curriculum failed to meet the needs of the community, invited a commission of three experts to study the situation and advise them as to what modifications, if any, should be made in the course of study offered at the academy. The academy trustees are the custodians of the Hopkins fund, but for a number of years have been accustomed to make an appropriation to the local school committee, who conducted the academy as the public school of the town of Hadley.

The commission chosen consisted of Mr. William Orr, then principal of the Central High School, Springfield, and now deputy commissioner of education of the State of Massachusetts; Prof. H. W. Tyler, of Amherst; and Mr. Rufus W. Stimson, then principal of Smith's Agricultural School, Northampton, now special agent for agricultural education in the State of Massachusetts.

In anticipation of the report of the commission, the school committee had begun to strengthen the practical part of the science work; a new principal, Mr. Franklin E. Heald, was engaged on account of his qualifications for practical work and administration in this line. The scope of changes covered modifications of the traditional academic course on the one hand, and developments along the lines of agriculture, domestic economy, and physical training on the other.

The aims of the course in general science, as set forth by the principal, were as follows:

(1) To give to each pupil a knowledge of the fundamental principles of science which apply most directly to modern everyday life.

(2) To give that knowledge which is assumed by the scientific allusions of modern literature.

(3) To adapt material to the community, and to give many problems and experiments for home work which may interest the parents, often reacting in favor of the school.

(4) To give to each pupil the basis upon which to decide whether to elect a scientific course at the school.

(5) To provide for the classical student who may get little or no science before his sophomore year in college.

(6) To differentiate and correlate material of the nature study of the grades.

(7) To introduce something practical into a school year, which has formerly appeared to many parents and pupils to be barren of real usefulness.

(8) To cover all these points more broadly than a single science could do it.

The methods and material for above course—

(1) Secure rational groupings.

(2) Begin with what the pupil knows.

(3) Correlate with other subjects, and request other teachers to correlate.

(4) Subordinate sequence of outline to important current events.

(5) Encourage discussion of home questions.

(6) Create enthusiasm, but avoid spectacular work.

(7) Draw on all sciences. Approach old facts in a new way.

(8) Cover the ground by groups of material rather than by groups of sciences.

The material to meet this demand was at first put into the regular science courses, but when classes in agriculture were organized the plan correlating the subjects was worked out, and this is a most important feature of the science work at present.

The school was an old-type preparatory school, the original Hopkins gift being dated 1657, and its charter would not permit changing to a strictly vocational school without giving up the endowment; besides, the number of college preparatory pupils was large enough to justify keeping up this type of instruction.

The commission reported in favor of continuing the college preparatory work, and suggested a course of study. It also favored vocational training, within the limits of the funds of the academy for providing this type of education. Realizing that the funds were rather modest for meeting the exacting demands for vocational training, the commission modestly termed the practical course which it recommended a "non-Latin course."

The findings of the commission were printed, submitted to the trustees and to the town, and were adopted by vote. About 5 acres of land with a large two-story dwelling and other buildings were purchased. The dwelling was remodeled into a very convenient high-school building, with a large assembly hall, recitation rooms, and laboratories, and a workshop in the basement. The large barn was transformed into a gymnasium. Special instructors, working part time, were engaged for the training of pupils in woodworking, domestic science, physical training, and agriculture. An important part of the recommendation of agricultural training related to home and school cooperation.

In September, 1909, following the recommendation of the commission, a plan was inaugurated for conducting courses in agriculture. It was reasoned that the graduate students or strong seniors of Massachusetts Agricultural College might profitably teach two afternoons each week, for ten weeks in fall and ten weeks in spring. This provided the maximum instruction at the minimum cost, and, in the absence of income, gave reasonable satisfaction. One

graduate student, who was very capable and enthusiastic, put in much extra time and secured extra results. The most obvious defect of this plan may be stated as follows: The instructor's major interest, as well as the larger part of his time and work, is elsewhere. He is often needed between visits. Experiments are neglected or go wrong in his absence. Being inexperienced, he is inclined to put a disproportionate amount of time on his "hobbies." But the chief objection is the limited time which can be given to the work.

During the summer of 1911 Mr. E. J. Burke, a graduate of Massachusetts Agricultural College, was engaged to spend his entire time at the school. He was expected to remove several of the limitations of the previous plan; to be available every day; to continue the courses throughout the year; to instruct each day in the week; and to develop the home project work more fully. After four months of this arrangement the school received State approval, that is to say, under the new law which had recently passed, the plan and work of the school were decided to be in compliance with the requirements of the law providing for State aid, namely:

> Agricultural departments will be entitled to State aid when and so long as they are approved by the State board of education as to—
>
> "Organization, control, location, equipment, courses of study, qualifications of teachers, methods of instruction, conditions of admission, employment of pupils, and expenditures of money."

Under the new plan there is maintained an agricultural department in the high school, and the instructor gives all of his time to the work in agriculture. He is on duty during the entire summer, in charge of the home project work, and has his vacation during the winter months. During his absence such work as must be carried on is in charge of the principal. The instructor is expected to spend a part of his vacation in professional improvement, either in attendance at an agricultural college or in making investigations into practical or commercial methods of farming. The State pays two-thirds of his salary.

Course of study prepared by the State board of education.

OPTIONAL STUDIES.[1]

First year.	Second year.	Third year.	Fourth year.
English and another approved subject from the regular high-school course.	English and another approved subject from the regular high-school course.	English and a science from the regular high-school course.	English, or history and civics, and a science from the regular high-school course.

[1] The agricultural student, if he so desires, may spend half his time at school in regular high-school classes in these subjects.

Studies required in 4-year agricultural course.[1]

SCHOOL YEARS ENDING 1912, 1914, 1916, AND OTHER EVEN YEARS.

First and second year students. (One-half school time.)	Third and fourth year students. (One-half school time.)
Agricultural science and projects applied to a given community: Kitchen gardening: Vegetables, small fruits. Ornamental planting: Shrubbery, flowering plants, lawns. Farm shop work: Making and repairing for home and school use, hotbeds, cold frames, etc.	Agricultural science and projects applied to a given community: Farm animals: Types, breeding, management. Farm buildings: Sanitation and conveniences, plans, construction, upkeep. Farm crops for keeping the animals, rotations, balancing, cultivation, etc. Farm machines and implements, their use and repair.

[1] A student may take agriculture for but one year, and even for a single month or week.

SCHOOL YEARS ENDING 1913, 1915, 1917, AND OTHER ODD YEARS.

First and second year students. (One-half school time.)	Third and fourth year students. (One-half school time.)
Agricultural science and projects applied to the community: Small animals: Poultry, sheep, swine, bees—types, breeding, management, rations, etc. Buildings and equipment for small animals—plans, cost, etc. Home-grown crops for small animals—kinds, quantities, seeds, soils, place in farm crop, rotation, fertilizing, tillage, harvesting, storage. Farm shopwork and other construction.	Agricultural science and projects applied to a given community: Fruit growing: Orcharding and small fruits not before dealt with, propagation, cultivation, packing, etc. Market gardening: Markets, soils, seeds, fertilizers, tillage. Buildings and appliances, plans, devices, implements, and machines—cost, use, and upkeep. Farm shopwork and other construction.

A project is defined as (1) something to be done on a farm, (2) under specified conditions and for a specified valuable result, and (3) requiring a thoroughgoing training, e. g., caring for the kitchen garden; keeping a pen of poultry; raising a specified crop of potatoes; caring for a cow, etc.

EQUIPMENT FOR TEACHING AGRICULTURE.

I. Ample room for recitation purpose. Office desk for the instructor. Sufficient shelves for all books, bulletins, and periodicals. Large table for reference reading. Excellent light, heat, blackboards, bulletin boards, etc.

II. A good supply of text and reference books is now on hand, and the number is being increased as fast as possible. The general school library of over 1,000 volumes is available.

Agricultural periodicals are taken by individuals and a few of the most useful are on the reference table each month.

III. The two laboratories of the school are used for the classes in agriculture and the schedule is arranged to give ample opportunity for each class.

The Babcock testing machine is included in the laboratory apparatus and is available for all pupils for testing home dairies. A spraying equipment sufficient for the orchard and garden is provided.

IV. A well-lighted shop in the basement is equipped with benches and tools. This space is also used for some coarser experiments not suited to a chemical laboratory.

V. The school grounds comprise over 5 acres of land and any of this needed is at the disposal of the department of agriculture. There are about a dozen mature apple trees on the grounds and many shade and ornamental trees.

A small barn in rather poor repair is now used for storage, but the trustees have decided to remodel it for forge and woodwork.

A modern cottage has been built upon the school grounds for the high-school principal.

VI. A swarm of bees has been given to the school by a Hadley farmer. A new hive and some bee tools have been purchased by the school. A 50-egg incubator, given by the Park & Pollard Co., has been in use two seasons.

The garden tools include only hand tools, as spades, shovels, hoes, rakes, etc., but it is intended to add some tools each year.

The gymnasium provides a suitable space for indoor exhibits of corn, fruits, vegetables, etc.

Cold frames and hotbeds have been constructed and it is considered feasible to have a small glass-roofed ell on the south of the main building. This will be done as soon as funds can be spared for that purpose.

Estimate of expenses for agriculture (not teaching), 1911–12.

Additional textbooks	$30	
Reference texts	20	
New implements	15	
Fitting of land, manure, etc	30	
Seeds and plants	5	
		$100
Lumber	25	
Repair, which is chargeable to agriculture	15	
		40
Total		140

The amount needed for texts, reference books, and periodicals may vary, but the above is a fair estimate for the purpose for the current year.

Fifteen boys are taking the course in agriculture. Practically every one utilizes all of his out-of-school hours for farm labor. Of the senior division, two boys manage farms, one is a partner with his father, one has managed a hired orchard on a commercial basis, and others are allotted almost any portion of the farm that they can manage. These boys acquire skill in doing things and receive instruction in theory at the same time.

Adjoining the school grounds is an old orchard that has been neglected for years. This has been leased by the school for a period of five years, and the students in agriculture have undertaken the process of renovation. They expect to make it a demonstration orchard and to derive a considerable fund for the use of the department, while at

the same time it furnishes a practice orchard for pruning, spraying, harvesting, etc. After receiving instruction and practice at the school grounds, several hundred apple trees were pruned and sprayed by these boys, for which they received 20 to 25 cents per hour. One boy pruned and sprayed during the season 125 trees.

Special projects for home development have grown, with the full cooperation of the parents. Included in the home work of the present season are studies of dairy problems, poultry, orchard work, seed testing, potato and corn crops, market-garden crops, and others.

The results of the transformation of this institution are thus stated by Mr. Heald, the principal:

> Our case may be unique in that we have added very practical courses on very definite lines to an old-line preparatory school without weakening it and without giving the impression that farming courses are for those who are not bright enough for college. Furthermore, the idea has been an evolution, and each step has been proved, which augurs well for its permanence. The academic departments have been strengthened during these years, so that the school has the full-certificate privilege and no protest has been made.
>
> The enrollment of the school has doubled in four years, and the present senior class graduates 87.5 per cent of its entrants.

The following table shows both the yearly increase in enrollment and the increase in the percentage of pupils entering high school who complete the course. This increase in enrollment and attendance is explained only by the introduction of practical work into the high-school course.

	1908 [1]	1908	1909	1910	1911	1912
Total enrollment	29	41	50	53	55	58
Per cent of entering class graduated	[2] 44.8	34.0	59.0	54.0	79.0	87.5

[1] At time of lowest enrollment, in January. [2] Average, 1897 to 1907.

MANASSAS AGRICULTURAL HIGH SCHOOL.

MANASSAS, VA.

The Manassas Agricultural High School was opened in September, 1908. It is one of the ten district agricultural schools of Virginia.

The establishment of the school was not due to local effort, for the surrounding farmers had evinced neither interest in the school nor any desire for it. In fact, many of the near-by farmers knew nothing of the plan until the school was opened.

A modern-type brick building, two stories high, with basement, was erected near the old high school. Both buildings are used by the school. About 12 acres are included in the lawn, play-grounds, demonstration plots, and gardens. Four acres of the land are devoted to demonstration work. A variety test of soy beans is being

conducted this year, also a complete fertilizer test with grass. A small portion of land is devoted to the growing of tomatoes for the tomato-canning contest. A small building has been erected near the main building for carpentry and repair work. Water pumped by a gasoline engine into a large storage tank outside the building furnishes the supply for the laboratories and sanitary closets.

At the opening of the new school Mr. H. F. Button, a graduate of Cornell University, was selected as director. From the first his idea has been to organize rural life around the school as a center. He believes that the classroom work—the work during school hours—is only a part of the real work of the school; that the true function of the agricultural school is to reach the homes of the community both through the pupils and by direct contact. The extension feature of his work has, therefore, developed rapidly and along several lines. While the school is an agricultural high school, and all pupils are required to take agriculture, the academic work has not been sacrificed in the development of the industrial features. It maintains its standard as a high school.

Course of study.

First year.		Second year.		Third year.		Fourth year.	
	Hours.		*Hours.*		*Hours.*		*Hours.*
English	5	English	5	English	5	English	5
Algebra	5	Algebra	5	Algebra	5	Solid geometry (optional)	
Latin	5	Geometry		Geometry		Plane trigonometry (optional)	
Agriculture (boys)	5	Cæsar	5	Cicero	5	Virgil	
Domestic science (girls)	5	Agriculture	5	German	5	German	5
Manual training	5	Domestic science	5	Agriculture or Latin	5	Agriculture or Latin	5
American history	5	Drawing		Botany	5	Chemistry (optional)	5
						English and American history	5

The school is preparing to offer this fall a two-year normal course to take the place of the last two years of the general course. This is designed not only to fit teachers for the general work of the rural school, but also to give them special preparation in agriculture and domestic science. A teacher's training course covering one year's work has been successfully conducted, and this new course is an enlargement of the former plan. The following is the story of the development of the extension work as told by Mr. Button:[1]

DEVELOPMENT OF EXTENSION WORK.

In theory the agricultural courses should attract country boys to the high school; in fact, it is doing so at a rapidly increasing rate; but I have, like others, found myself face to face with the fact that only a distressingly small proportion of the boys do attend high school, and that those boys are not, as a rule, farmers' sons and prospective farmers. This being the case, how can the school fulfill its mission?

[1] Excerpts from "Short courses and extension work for agricultural high schools in the South." The eleventh yearbook of the National Society for the Study of Education.

My first thought was to do as the agricultural colleges did under similar circumstances, i. e., establish short winter courses for the sons of farmers. Notwithstanding my lack of room and equipment, I tried the plan and found it successful. There are within reach of any agricultural high school 100 young men who can and should take advantage of such a course, lasting 6 to 8 weeks and devoted to the subjects of greatest local interest. There are, however, in the smaller schools, such obstacles in lack of room, lack of equipment, and lack of teaching force as to make a full realization of the plan impracticable. Such a course would require the time of one person the greater part of the school year to interview the students and arrange lectures and laboratory sections. Accordingly, as the work of teaching agriculture to the regular high-school classes has increased by the growth of the school and the increasing popularity of the subject, I have been, for the time, forced to give up this interesting and valuable part of the school's work.

Farmers' institutes have been my most successful line of extension work. When I came to Manassas in 1908 I found no live organization of farmers with whom I could cooperate. I called a meeting of the farmers and after a pleasant session at which they were addressed by the late Dr. Seaman A. Knapp, I proposed that we form a permanent organization. The idea was adopted and a most successful series of meetings resulted. During the three years since the organization of the farmers' institutes of northern Virginia we have held 22 meetings, including a four-day traveling school of agriculture under the direction of the Virginia Agricultural College, a field demonstration in spraying, and three corn shows. These meetings are held in the courthouse on the third Friday of each month from November to April, inclusive. The average attendance for all meetings has been about 75 farmers, besides townspeople and school children.

Recognizing that unless the farmers are behind a school of agriculture it can not be successful, I have endeavored to make this association the connecting link between the school and community. I believe that to these institutes more than to any other one factor I owe the success which I have had in making the agricultural school an integral part of the rural life of the district.

As the winter days were cold, and the roads long and muddy, it occurred to me to utilize the class in domestic science by letting them serve a lunch to the farmers and their wives. This was done with the greatest success. The girls enjoy cooking and serving the meal, and the visitors enjoy the hot, tasty, nutritious food which is served to them at the actual cost of the materials. The lunch has become a regular feature of the institutes and has, in no small degree, contributed to their success. At first these lunches were served at tables, but with the increasing numbers, the plan of a buffet lunch was tried with great success. The farmers get their well-filled plates and stand or sit in small groups eating and visiting in the most informal manner.

Valuable as the information given by the speakers has been, the social intercourse is even more valuable. This is a country of big farms and bad roads, resulting in more than the usual degree of rural isolation. This isolation has been intensified by the frequent changes in the ownership of farms since 1870, until, as a natural result, there is but little of the community spirit. I can say without boasting that the school has done more to break up this isolation and develop a community feeling in three years than all other forces had done in a decade.

This year I am attempting to break down still further the barriers which distance and bad roads have interposed between the farmers by a series of meetings for farmers' wives. At these meetings they can become acquainted with each other, discuss problems of mutual interest, and listen to lectures on household problems by experts. In the forenoon both the farmers and their wives will meet in a session of general interest, while after the lunch the men and women will meet in separate sections, each with its own speaker. Excellent speakers have been engaged and there is every reason to expect that this department will prove to be as popular and useful as the

other. Thus I am attempting to make the agricultural school the social and intellectual center of the newly aroused community life. The farmers' institute serves a double purpose, for it gives to the farmers what is best and newest in agricultural science and brings to the school the hearty support of those to whom it must look for its best pupils.

Nearly every phase of our local agriculture, such as corn growing, dairying, spraying, and feeding, are taken up in the course of the year by an expert. Opportunity is also afforded for questions and discussions, which often prove more valuable than the lecture itself. Not all the time is given to scientists, but at each meeting some successful farmer is asked to give his method, while the man of science gives the reason and principle. The agricultural classes attend the institutes and write reports of the lectures which serve as material for both English and agriculture. Some of the best English work of the school has been done on these agricultural topics.

Another successful line of work has been in the rural schools. As 75 per cent of the school children and practically all of the next generation of farmers attend the one-room rural schools, I have endeavored to reach them by such methods as would quickly interest them and were at the same time within the reach of my very limited resources. My efforts to improve rural schools are along two lines, the schools themselves and the future teachers who are now in the normal training class.

As all farmers keep cows and raise corn, I chose milk testing and seed-corn selection as the best topics for my work in the rural schools. I borrowed a Babcock milk tester from the Dairy Division of the United States Department of Agriculture, and with it and a small exhibit of choice seed corn I visit a country school each week. If the lesson is to be on milk testing, the pupils bring samples of milk and with these I instruct both pupils and teacher in the operation of the test. Some of the parents are present, giving me an opportunity to interest them in the work of the agricultural high school. I leave the machine at the school for a week so that all the pupils may become familiar with it and able to test the richness of the milk from each of their cows. The pupils then write me letters telling of their results. The following is a sample:

BUCKLAND, VA., *November 9, 1911.*

DEAR SIR: We have been testing milk every other day this week. We have tested 6 samples of milk. We first put in the milk and then the acid, then turned for 5 minutes; then we took it out and filled it up to the neck of the bottle and turned it for 2 minutes; then took it out and filled it up till all the butter fat was up in the neck of the bottle; then turned for 1 minute more. The cows we tested were 1 of Dr. Brown's, 2 of Grahm's, 1 of Hall's, and ours.

I am 9 years old.

WILL T. SWEENEY,
Buckland School, Va.

I have dozens of such letters, and they show that the children know far more about the composition of milk than most of the parents. I have found this lesson the very best to introduce the subject of agriculture. It is interesting, almost spectacular, with the strong acid, the mysteriously hot bottles, the whirling wheels, and finally the clear yellow fat that tells that "old Blossom's" milk is twice as rich as that of "Spot." Still more important is the knowledge that it conveys to the parent as to the relative value of each cow. It is the beginning of the exact knowledge that makes for better farming.

This country-school work needs doing, and if honestly done will bring support to the school and carry light to those who most need the help. Let no one who values comfort undertake this form of extension work, for there are long rides through deep mud, hurried starts, late returns, and cold rains as the usual accompaniments of the trips. I have found without exception that the teachers are glad to have me come and will cooperate with me in every possible way. The patrons, when not apathetic, are well pleased to have agriculture introduced in the school. Among the more thoughtful I find a widespread sentiment that their occupation has been slighted and

neglected in the schools, and a full appreciation of any effort to improve conditions. There is urgent need for a wider and more sweeping regeneration of the rural school before the country child shall come to his rights, but if we wait for that time to come, many years may be lost.

In the agricultural high school I test some 200 samples of milk and cream a year, the cream shippers in particular finding it a means to avoid being cheated on the one hand and getting into trouble with the milk inspector on the other. If one of these men buys a cow, he tests her milk, that he may get a good one; if he sells a cow, he tests her milk in order that he may sell a poor one. We have a cow-testing association of about a dozen enterprising dairymen who have stopped guessing about their cows. As the business of dairying grows, this activity of the school will further increase.

An excellent barrel spray pump furnishes means for another line of extension work. This pump is loaned out to people who wish to try spraying but have no suitable machinery. Spraying materials, such as concentrated lime sulphur, arsenate of lead, and caustic-potash soap are furnished at cost. Some of the more advanced students go out and do small jobs of spraying, thus acquiring a proficiency that the limited equipment of the school can not supply, and at the same time getting people started at spraying who have never before attempted it. Last spring we used in this way more than a barrel of the concentrated lime sulphur, with arsenates in proportion. This year two barrels have been ordered and a still larger amount of work will be done. This is not a fruit-raising section, and spraying is still an unusual practice, yet last year a dozen new barrel sprays came into the community as a result of our spraying propaganda. In many cases I have gone out to the orchards, set up the spray pump, and instructed the owner in the adjustment of the nozzles.

In the village I am constantly called upon to prescribe for the ailments of flowers, trees, and shrubs, and to destroy scales, plant lice, caterpillars, and miscellaneous "bugs." Outside of the village I am more and more frequently called on for expert advice on alfalfa, drainage, locations for orchards, sick cows, sick trees, and the like. Sometimes I can help and sometimes not, but the significant fact remains that there is a growing tendency on the part of the farmers to recognize the school as theirs, to be called on for all kinds of aid.

This year my extension work has been greatly facilitated by a fine stereopticon with a steel tank of compressed acetylene gas. After giving a lesson to a rural school I stay and give an evening illustrated lecture on some such topic as corn or dairy cattle. These evening meetings are always well attended and enable me to meet large numbers of people whom I can reach in no other way.

There are two excellent newspapers in the county, both of which have been liberal in their space and helped in their editorial columns. There is seldom a week when I do not have an article in one or both of these papers on some topic of timely interest. I review the lectures of farmers' institutes for those who were not there; I review scientific publications or give advice on the care of a crop or the control of some insect. These and other subjects furnish a means of taking the benefits of the school out to the people on the farms who most need the aid and who are least able to secure it by regular instruction in the school.

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