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## AGRICULTURAL EDUCATION IN SECONDARY SCHOOLS

PAPERS READ AT THE SECOND ANNUAL MEET-  
ING OF THE AMERICAN ASSOCIATION FOR THE  
ADVANCEMENT OF AGRICULTURAL TEACHING  
COLUMBUS, OHIO, NOVEMBER 14, 1911



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## LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,  
BUREAU OF EDUCATION,

*Washington, February 2, 1912.*

SIR: Education in and through agriculture is attracting the attention and interest of teachers in schools of all grades and of many people, both in country and in city. Only within recent years have agriculture and allied subjects come to be an important part of the courses of study in elementary and secondary schools and in normal schools whose purpose and function it is to prepare teachers for these lower schools. For this reason there is still much uncertainty as to what and how much of these subjects should be taught, how the matter selected should be arranged, what methods of teaching should be used, and what should be the organization and support of the schools doing this work. Hence, any contribution toward the answer of these questions is welcomed by teachers, school officers, legislators, and people who have children to educate and who contribute to the support of the schools.

The manuscript herewith submitted consists of papers read before the American Association for the Advancement of Agricultural Teaching at its second annual meeting, Columbus, Ohio, November, 1911. This association is composed of persons engaged in agricultural education in American colleges, normal schools, high schools, elementary schools, and special schools of agriculture. Its membership includes able men and women in all parts of the United States who have acquaintance with the present usage and the needs of such education in all sections. These papers constitute a valuable contribution to the solution of several problems of agricultural education, especially in the secondary schools, and I therefore recommend that they be published as a bulletin of the Bureau of Education.

Very respectfully,

P. P. CLAXTON,  
*Commissioner.*

The SECRETARY OF THE INTERIOR,

## AGRICULTURAL EDUCATION IN SECONDARY SCHOOLS.

PAPERS READ AT THE SECOND ANNUAL MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, COLUMBUS, OHIO, NOVEMBER 14, 1911.

### I. ESSENTIALS IN A STATE SYSTEM OF AGRICULTURAL EDUCATION.

By F. W. HOWE.

*Specialist in Agriculture, State Department of Education, Albany, N. Y.*

The lapse of 54 years since the founding of the first American agricultural college should have given time enough for the formulation of some definite, integrated scheme of agricultural education that could merit and enlist the intelligent support of the American people. It has taken the larger fraction of that period, however, to establish the work of the agricultural colleges in general public estimation, and some, even among the leaders, have been satisfied with this measure of accomplishment, and have been inclined to regard it as the consummation of the development of an ideal system of agricultural education.

Certain of them, however, saw far beyond this—for example, read President James's recent tribute to the far-seeing statesmanship of Prof. J. B. Turner—yet some of the lesser folk, of the common people, have been the ones to encourage and develop the demand for something broader than was first contemplated. As with the older institutions of traditional type, the seed planted by the colleges of agriculture has fruited in the far-spread sentiment that education for efficiency is the right of all the people. And the recognized dependence of the national welfare upon agricultural prosperity has reinforced the demand that special educational provision shall be made for instruction in agriculture.

So we have seen numerous significant, if not scientific, attempts to bring this to pass. In certain States we have seen the teaching of agriculture required by law in all the public schools, even before any teaching standards had been erected or any requirement made that teachers should be examined in the subject. We have seen special schools of agriculture spring full fledged from the fiat of

legislatures, without regard to the relation of these establishments to the colleges or to the general public schools. We have seen private schools and State normal schools offering agricultural courses in the same independent fashion. We have seen congressional district, and judicial district, and indeterminate district schemes of distribution of such schools. We have seen abandoned county courthouses and old academy buildings take on a new life as the home of these promising new schools; and we have seen all sorts and degrees of State-aided schemes brought forward for their support.

We may consider these sporadic developments unpedagogical, irrational, or even as symptoms of sheer political pull or demagogic ambition; but we must admit that their ultimate success depends upon the fact that the people of the several States have set their minds on having an agricultural education that shall be really democratic, in the sense that it is open to every boy and girl who wants it, regardless of the distance of his home from the State agricultural college. Just as the agricultural colleges have fought their hardest battle to overcome the inertia and ignorance of farmers themselves, in like manner those who are interested in the real education of these farmers' children may have to resist and overcome influences that would now restrict the opportunities of education. The very excellence of the teaching of the agricultural colleges has developed the demand for more of this type of instruction than can be given effectively in centralized institutions. The colleges may yet "head up" this movement for broader educational opportunity, but they can not "head off" the movement. And if this trend has not yet shaped itself definitely within the lines of a pedagogic and rational system, at least the development has gone far enough to supply the factors entering into the outline of such a system.

If these observations have served a useful purpose in introducing my theme, I may be justified now in plunging into it at once, and my first proposition is this:

*The State scheme of education in agriculture should be definitely and intimately related to the State's general system of education.*

It may seem easy now to assent to that proposition, but it was only five years ago that the writer found occasion to say in a published article that the usual agricultural college stood as far apart from the recognized system of public education as do the private colleges or the State reform schools.

If, however, we are now agreed that instruction in agriculture is a legitimate and commendable concern of general public education, certain corollaries which naturally follow from the fundamental proposition deserve special statement, as follows:

1. The State agricultural college should be recognized as an important and necessary part of the general educational mechanism of the State.
2. Preparation for entrance upon the courses offered in the agricultural college should be a recognized function of the public high school.
3. The high-school courses in agriculture should present a broadly cultural as well as specifically vocational character.
4. These courses should be projected upon a definite plan of State aid and State supervision.
5. General but none the less distinctive teaching of agriculture in the seventh and eighth grades should precede and prepare for these courses.

Space will permit but the briefest comment as to the significance and validity of the foregoing statements, considered in the direct order.

(1) If the State agricultural college is not an organic part of the State university—and some of the oldest and best of them did not so originate—at least it should be recognized that the best work of these schools is of tertiary rather than merely of secondary grade and that it stands on equal footing with the engineering, scientific, or other professional departments of a well-balanced university system.

It is worth while to call attention to the fact that the original concept of the land-grant college was that of an industrial university. The isolated colleges of this type that have developed harmonious departments of literature, science, arts, history, economics, and language, as well as engineering, forestry, home economics, and agriculture, are still within the scope of the first intention. Though generally so called, these institutions are not exclusively colleges of agriculture, a point that universities as well as the common people do well to remember.

(2) If it is, then, rational and commendable for the public high schools to offer courses preparatory to colleges of law, medicine, science, education, and the liberal arts, it is obviously of equal sanity of thought and procedure that they should also provide courses that lead to the practical arts, either in a higher school or in real vocational life. The obligation to do this is the more urgent in view of the relatively small number of high-school graduates who enter the more learned callings.

(3) But if the high school is to make such offerings as a part of its general educative function, it must bring them into some articulate relation with the material of teaching common to all the other courses. Stated differently, it is a violation of sound pedagogic



principles to "segregate" agricultural students in studies that ought to be pursued in common with other students.

The high-school student can no longer master all the subjects embraced in the modern curriculum; and even the weakest high school should not oblige or expect each of its students to cover the subjects studied by every other student in order to graduate. Furthermore, the agricultural student needs association and coeducation with future citizens who are to devote themselves to other occupations than farming. This assures the safest condition for developing sound ideals of civic responsibilities and of personal culture. In truth, the education that most of us must get for vocation holds in itself the surest, most nearly permanent cultural possibilities. Culture is the spring whose current turns the mill of daily life, while at the same time preserving the beauty of the landscape which life surveys through its windows and into which it walks at eventide.

(4) But a high-school course in agriculture that is both broadly cultural and vocationally adequate can not be properly sustained "in the present state of the art" without assistance from the State as a whole. Efficient teachers of agriculture cost more than efficient teachers of Latin or algebra, even though not as yet so well trained in the theory of teaching their specialty. The new subjects, slow in coming to their proper place in the modern curriculum, must now have unusual assistance in promptly developing their important functions. And the sufficient justification for special State aid in money and supervision lies in the fact that the productive skill and habit developed in the agricultural courses accrue to the advantage of the whole State in a much more direct and traceable way than is shown by the training for any of the older professions.

As to the best way through which financial aid may come to the schools and as to the best proportion of general to technical or vocational studies in the course, local conditions and opinions will vary. So far as any generalization, based upon the actual practice in respect to these points, can yet be made, it would appear that the more eastern States in this country show a tendency to exact a larger proportion of the student's time for technical studies, while conferring a relatively smaller amount of financial aid from the State treasury. There appears also to be a tendency in the Middle Western States to limit the number of schools enjoying this benefit much more definitely than in the Eastern States. Thus, upon the first point mentioned, the report of the recent Illinois Educational Commission recommends that only one-fourth of the course be given to agriculture or other vocational subjects. Missouri and Nebraska and probably a number of other Western States require the teaching of agriculture with State aid through only one or two years of the high-school course.

In contrast with these, New York requires five-twelfths of the time to be devoted to vocational work through four years, and Massachusetts requires practically two-thirds of the time. The latter State also insists that one-fourth of the time given to agriculture shall be devoted to practical work done at the home under direction of the special teacher. No Massachusetts high school can receive State aid and approval for its agricultural course except by carrying out this requirement, which may be regarded as a limiting factor in determining the number of schools that will elect to take advantage of it, for it is intended that "when conflict is unavoidable, or when continuous application for a number of days to his productive farming projects becomes necessary, all else must yield to the student's agricultural instruction, no matter what the cost for the time being to his other studies."

Considering now the second point of comparison between eastern and western schools, Minnesota definitely limits the number of schools receiving State aid under the Putnam law to 10 additions to the list in any biennium. Under this provision 30 schools now receive State aid to a maximum of \$2,500 annually under the Putnam act, and 55 schools receive \$1,000 each under the Benson-Lee act. A somewhat similar limitation prevails in Louisiana and Virginia, which are neither Western nor Eastern States in the usual implication of those terms. North Dakota limits State aid, amounting to a maximum of \$2,500 annually, to five high schools the first year, and to five additional schools in any subsequent period of two years.

Turning again to the Eastern States, New York offers but \$500 annually to schools employing one vocational teacher of "agriculture, mechanic arts, and home making," although this proposition is wide open to every high school in the State that can enlist 25 approved students in the course. Massachusetts makes no limitation upon the number of schools, except by the curricular provisions previously noted, and by fixing the amount of its total appropriation for vocational instruction at \$10,000, a sum which is available for paying two-thirds of the salaries of instructors in agricultural departments of high schools. Maine gives State aid in the proportion of two-thirds of the local expenditures for teaching agriculture, though the absolute amount paid must not exceed \$500 annually to any school.

This hasty survey would thus seem to justify the statement that in the Eastern States generally, where agriculture is not commonly considered so dominant an industrial interest as in the West, the proportion of school time exacted for the study of agriculture is greater than in the Western States, while the amount of State aid offered is notably less; and further, that in the Eastern States there is no definite numerical limitation of the number of schools entitled to State aid, while this limitation appears to be typical of the western plan.



Possibly this rather unexpected conclusion from the comparison made would break down under closer analysis; but it would seem at least to provoke further investigation as to the historic, educational, social, and economic factors involved in an explanation of the two situations compared.

(5) In further comment upon the suggestion that high-school courses should be preceded by agricultural teaching in the lower grades, it may be said that this proposition is now generally conceded. My own point is that this teaching ought to be recognized as an essential step in the practical development of a standard system of agricultural education. It has been practically admitted for a number of years now that the up-to-date high school, at least in the more rural sections, ought to give a one-year general course in textbook agriculture for the sake of its cultural and informational value, if for no other reasons.

So much surely ought to be done; but no high school that means to live up to its full duty in teaching agriculture from the vocational viewpoint can spare the time in a four-year course for a mere general or academic study of agriculture. The logical place for such a course is in the seventh and eighth grades, when the pupil is naturally eager to take up a new textbook on a new theme, enlivened perhaps by occasional demonstrations and observation trips to real farms, and where the generalized, descriptive study of the business of agriculture and its relations to other great world industries will constitute an apperceptual background for the more specialized instruction that awaits him in the high-school course.

To defer this general but elemental study of agriculture to the later years of the course contravenes every consideration of true pedagogy, and contributes much to the lamentable tendency of pupils to "eliminate" themselves from the public school before they have had a fair chance to appreciate the meaning of real high-school work. Much might be said, also, upon the value of this elementary study of agriculture, considered as a preparation for high-school science study.

The development of my theme has thus far pertained chiefly to the general public high schools as the educational unit that needs to be considered next after the agricultural college in the fashioning of a State system of agricultural education. There remain for brief attention certain *scholia*, more or less important, that belong to other phases of the subject. These may now be stated.

(a) *To make agricultural teaching effective, there must be special provision for the adequate training of teachers.*

Possibly this is a matter of less consequence in relation to college instruction, where it may be assumed that persistent students will gain information in spite of the poor methods of presentation that are all too common, but it has imperative importance in the high-

school field and lower. I have no time or disposition to argue this. There are no "born" teachers of agriculture, or any other subject, who need not to be born again through the spirit of true, conscious insight and understanding of the laws of teaching. If it were not so, then we have foolishly spent millions of money in the support of normal-school instruction in the Nation. But not even a referendum vote to abolish all normal schools could invalidate the fact of the need of special training for the art of teaching. Agricultural instruction of any grade can not afford to ignore the requirements which that fact imposes. There was need of the organization of the American Association for the Advancement of Agricultural Teaching.

The State normal schools themselves, to which we naturally look for this training, are beginning to offer it. The quality of the training will improve with larger experience and with adequate technical information in the science and business of agriculture. The agricultural colleges constitute another source from which this instruction should be expected, though they have been slow, if not reluctant, to provide it. The special secondary schools of agriculture that have been established in many States should also do much to prepare experienced public-school teachers to give instruction in the new subject. The general public high school that offers both agricultural and teachers' training courses can likewise do much to better the instruction in lower schools, especially in the rural districts.

The remark which seems important in this connection is that no one State educational institution can supply the training needed to meet pressing demands of the present and the future, and no single institution should attempt to arrogate to itself such a prerogative. The land-grant colleges have no monopoly of the instrumentalities of agricultural education. It is easily conceivable that in many States the wholesome rivalry of an independent institution of collegiate rank that took some pains to secure teachers who should know teaching as well as agriculture, and whose work must depend for support upon its intrinsic excellence rather than upon fixed appropriations from the State treasury—it is possible, I say, that the presence and influence of such a school might be a distinct blessing to the work of certain State institutions. The time is at hand when we should expect large endowments from private sources to complement the service of State and national establishments for promoting education in agriculture, just as we have seen the general education system of State and Nation preceded, and then followed, by private foundations for educational purposes. The disposition to put all responsibility for educational betterment upon the resources of the public treasury is no certain evidence of popular appreciation of educational requirements. The real advances in all national development come from special or individual initiative.

(b) *To improve general agricultural teaching in the State there ought to be a State association of all agricultural teachers and supervisors.*

This State association would bring to its members the conceded advantages of like cooperation in other lines of teaching. The educational powers that be often manifest a tendency to discourage the formation of new organizations. It is, however, distinctly a matter for the beneficiaries to settle for themselves.

(c) *A State organ of publicity and professional improvement is a proper outgrowth of such an organization.*

It should serve as a clearing house of information and suggestion for all grades of agricultural teaching without advertising the special merits of any particular school or person.

(d) *Partly outside the immediate local functions of the several schools, but intimately and logically connected with them, is the field of certain lines of so-called extension instruction.*

These need not be now specified, but it is pertinent to say that here again the field does not belong to any one institution or agency. The local high school may offer such extension work in a series of winter monthly meetings for farmers or otherwise carry on this instruction, perhaps even more effectively than it could be done by a remote institution. Of course the local school should utilize to the utmost any assistance it can secure from general agencies for agricultural betterment—the State farmers' institute service, the State grange, the State departments or boards of agriculture and of education, the faculty of the State college of agriculture and of other teaching institutions, and the staff of the experiment station—but it should pre-eminently develop the interest and abilities of the farmers of its own community. The real success of agricultural teaching within and without the school building will be measured by the extent to which the instruction is adapted to local conditions and possibilities and gets itself realized in the essential betterment of practice on the home farm.

(e) *In addition to furnishing these intimate and personal forms of extension instruction, an ideal system of agricultural education will also provide some systematic type of correspondence teaching in agriculture.*

This is a field of possibility that is yet by no means fully worked, and its special virtue consists in the emphasis which it places on the conception of education as a lifelong process, never completed at any age. It is a form of service that can be particularly helpful to the experienced teacher who knows as yet but little scientific agriculture and to the agricultural graduate who knows as yet but little of the science and the art of teaching.

(f) *To give unity of purpose in the interaction of all these agencies for agricultural education, there ought to be an annual State conference.*

This conference should bring together perhaps not the actual teachers, who ought to have their own special meetings, but the leaders of the State who form public opinion in developing the trunk lines of State progress. Possibly there should be a permanent State commission on agricultural education that should serve to represent and harmonize the various interests concerned in the agricultural and educational development of the State's resources. The influence of some such agency is probably the only efficient safeguard against ill-considered legislative action on these matters.

(g) In this essay to set forth the outlines of a State system of agricultural education, I should include a final proposition: *Additional Federal aid should still be given to the several States in promoting the efficiency of agricultural education.*

Neither education nor agriculture have exhausted their rightful claims upon the fostering care of the General Government. Legislation looking to these ends, frequently proposed in recent years but still deferred, is yet needed to perfect the development of a measurably complete system of agricultural education. So long as public money is still not wanting for the pageantry of war on land and sea the advocates of real national progress will be justified in continuing to press these claims to final recognition.

In the meantime, as well as afterwards, a great advantage would come to the teaching of agriculture through all grades and forms of instruction if the department of agricultural education in the Experiment Station Record could be expanded into, or be supplemented by, a national organ of representation for the important interests involved. Excellent as it is, the clearing-house function of the Office of Experiment Stations in relation to agricultural education is not adequate to the magnitude and dignity of the development which this interest has already attained. If the influence of this organization and of others of like interest be unable to bring about the establishment of such additional means of public discussion and representation, through appropriate legislation and requisite appropriations, then, as a nation-wide association of agricultural educators; we shall face the duty of devising and conducting such an organ directly through our own effort. There should be support enough to assure success to such an effort.

## II. THE NEED FOR RELIABLE SCIENTIFIC DATA REGARDING SOCIAL AND ECONOMIC CONDITIONS IN RURAL COMMUNITIES.

By E. C. HIGBIE,

*Superintendent School of Agriculture, Morris, Miss.*

The objects of this association are to promote and to increase the efficiency of agricultural teaching. The value of agricultural instruction is now seriously questioned only by those who need it most. Some ignorant, slipshod farmers, together with a small self-confident, successful contingent, are practically the only ones who see no place for the new work. President Butterfield generalizes the rural problem thus: "To maintain upon our land a class of people whose status in our society fairly represents American ideals, industrial, political, social, and ethical." Any one in touch with conditions at first hand realizes that the attainment of this purpose is a task of the greatest magnitude.

In the solution of the rural problem the first need is a clear understanding of rural conditions. This comes only after the intelligent consideration of details. My thesis is that we do not have the reliable data at hand to know fully how to proceed. If the problem were uniform the work would be easier; but every State, every county, and almost every locality has its own peculiar manifestations.

This diversity of the problem is accompanied by an equal if not greater diversity of opinion. Recently I sent out a questionnaire to try to discover just what leaders in my section of the State were thinking. I was after opinion and I got it. It is true that there was some agreement, but in certain phases the differences equaled the number answering. This is an age of opinion, sometimes sympathetic and rational, often not. It is characteristic of the day that a large per cent of the people whom we meet will talk fluently and knowingly upon rural life with a strong assurance that they could give solutions for all of its problems.

These circumstances emphasize the need of reliable scientific data, for which there are at present two or three sources. As far as it goes, the census is helpful for beginnings and for general conclusions. The report of the Country Life Commission has served a splendid purpose in directing the attention of people, in a large way, to the problem, but it is interesting to note that their recommendation of a careful survey has gone the way of many of their other conclusions. A third source of information lies in the large number of articles that have appeared in newspapers, magazines, and reports during the last four years. Most of these are general and sometimes sensational in character, but often one finds discussions and descriptions of real value.



## THE NEED FOR SCIENTIFIC METHOD.

What strikes one most is that all the information which we have is long-distance and general. We have been superficial, opinionated, and unscientific long enough. Now we need facts. We have about passed through the period of publicity. Politicians, newspapers, and magazines have performed their function of calling attention to the problem. In order to make the best progress, we are in need of a new spirit in investigation. The high schools have done a real service to education in resisting uniformity. In Minnesota they are absolutely free to-day to develop courses in line with the needs of the communities, and this does not apply simply to occupational differences, but also to differing phases of work in the same occupation. One agricultural community may need a considerably different kind of instruction from its neighboring community. To determine the kind of course, to know what and how to teach, local data are necessary.

The schools in all their activities are to be the real forces for solving rural problems. Those responsible for their development must know rural conditions, and cold, wet, hard facts must be the basis upon which to build.

If the farmer is hard to investigate—and we shouldn't respect him if he were not—he is often still harder to convince; but he is vulnerable when in the face of data that are correct and to the point. The hard facts of life make him suspicious of general statements—so many times his own experience flatly contradicts the generalization. I am indebted to Prof. Andrew Boss for the following statement, which so well illustrates what I am trying to say:

Since 1902 the Minnesota Experiment Station has performed a valuable service in securing data on the cost of producing farm crops in Minnesota. The method followed has been to employ route statisticians who are stationed in the representative agricultural districts and who visit the farms daily, getting a complete record of the equipment, labor, products, and methods of operations, and the disposition of the crops. Reports are made to the central office where the data are brought together in comparative form, in this way giving a fairly good representation of conditions which apply to the whole State.

The results of the investigations bring out clearly the fact that accurate information on the economic or business side of farming is badly needed. Bad practices are followed for the simple reason that the farmer can not determine which are the paying enterprises. Minnesota Bulletin No. 117 gives the cost of producing various cereal crops and discusses different phases of the farm business. Comparison of the cost-tables included shows the impossibility of making a satisfactory profit from producing low-valued crops on high-priced land, and emphasizes the importance of not only highly intensified production, but of economy in the operation of the farm.

In a study of the cost of milk production (Minnesota Bulletin No. 124), it is found that Minnesota farmers made a very small profit, if any, on their cows. To pay for the cost of feed, labor in caring for them, and interest on the investment, a cow must give



5,000 pounds or more of milk a year, and produce at least 225 to 240 pounds of butter fat. Better cows give higher profits and will replace the poorer ones, as soon as the farmers know the facts in the case. While the general practice of farmers is probably nearly correct, it is impossible to determine the profitable enterprises or methods of farming without the exact data and an analysis of the farmer's business, and the data secured through the investigations of the experiment stations are being largely used in many places as basic facts in determining farm profits.

#### SOME QUESTIONS FOR THE LOCAL SURVEY.

To suggest what may or should be done by men in charge of public schools let me outline a possible case. A school happens to be located in an uninteresting, commonplace part of the State. Influences are stirring which demand a redirected course. All at once a new and heavy task is placed upon the man in charge. He has read, perhaps, much that has been written about the new agriculture and its possibilities, but the best thing for him to do is to go out and get acquainted with his field. He should undertake to find out answers to the following questions:

1. How many students has he who have come direct from the farm?
2. What per cent of his graduates came direct from the farm?
3. How many have returned to the farm?
4. What effect has this upon rural leadership?
5. How many of the rural teachers in his area were trained in his school?
6. What are they teaching?
7. How much education do average farm boys and girls get?
8. Wherein does it lack in training them for their particular work?
9. What kind of homes do they live in?
10. How many hours a day and days in a year do they work at farm labor?
11. What particular advantages and disadvantages do they have?
12. What are their neighborhood pastimes?
13. Do they put thought into their labor, or is it largely routine?
14. What proportion of the farmers are tenants?
15. How many are carrying mortgages? Why?
16. What is the average size of farms?
17. What method of farming is most in evidence?
18. What kinds of books do farmers keep?
19. Are they fairly paid for their work?

I am suggesting such a survey in order to get the leaders in real touch with the problem. He will be a dullard indeed who can not see a big field opening up which will be its own cause for redirected energies.

In the case just outlined I have suggested a detailed survey to be carried out by the local superintendent of schools. Now I want to suggest a larger field with the county as the area considered.

A definite plan should be laid out with the idea of learning all the main facts. As one gets into the investigation, various lines will suggest themselves. Maps and charts should be made showing graphically drainage, cultivated areas, grain products, live stock, creameries, schoolhouses, churches, etc. One of the first studies should involve the efficiency of the school system and its relation to the problem. This should be followed with social and economic investigations. A survey of farm buildings, together with sanitary conditions in house, dairy, wells, etc., should be included. Farming methods, marketing facilities, roads, labor, organizations, should receive attention. An important phase that needs serious consideration is whether the farmer is really making a fair wage. Long hours, child labor, home products, lack of account keeping, horse labor, all complicate this particular investigation.

It will be objected that such studies will not be of sufficient value for their trouble and expense. I believe that actual touch with the problem will give a new impetus to the workers that will result in much more effective organization and adaptation to the needs. A large portion of the data can be obtained through county officers, physicians, bankers, and others in touch with the county. Still more can be obtained by visitation and inquiry. A series of afternoon and evening meetings in the schoolhouses will be mutually helpful.

I am not certain that such surveys will be carried on very extensively, but I am certain that they would be very valuable and that the agencies doing the work would begin to see the solution to some of the problems now confronting us. If we are going to be leaders in rural betterment, we have got to be in real touch with the actual work, and the prosecution of such surveys would certainly acquaint us with the field. As I see it, the whole matter merely reduces the problem to scientific, accurate statement, which means, of course, a long step toward the solution.

Briefly to summarize my proposition, if we are to get at the heart of the problem and develop effective instruction, we must realize its diversity, we must have close-range data, we must gain a sympathetic acquaintance with the men and conditions of the farm.

### III. THE PROPER EQUIPMENT OF AN AGRICULTURAL HIGH SCHOOL.

By D. O. BARTO,

*Instructor in Secondary School Agriculture, University of Illinois, Urbana.*

The agricultural studies of such a high school as I understand we are to consider under this topic may be classified under these divisions:

1. A study of the soil.
2. A study of the plant and field-crop production.
3. A study of garden and orchard crops.
4. Studies in the breeding, feeding, and care of domestic animals.
5. A study of the principles and methods of dairying.
6. A study of farm mechanics.
7. A study of landscape architecture.

Possibly few, if any, high schools will feel at the outset that they can compass this whole field of agricultural work, but there is nothing named in this list of divisions that is not of vital importance to the business of farming. Indeed, the list of subjects that might properly be included in the agricultural training of the boy who is to be a farmer is far from complete.

Since wise management of the soil is fundamental to every form of successful agriculture, I would place special emphasis on the work of this division of the course to the end that those who till the soil shall understand its physical and (to some extent) its chemical composition, and shall know how and why soils differ from each other, as well as the way in which these soils are classified and named. They should be taught the important characteristics of these soils and the best methods of handling them to secure the most satisfactory results in growing crops.

This leads up to the immensely interesting and important studies of moisture relations of the soil and the means of controlling them; aeration of the soil, how it is secured and why it is necessary; and soil temperature, and what the farmer may do to influence this important factor in crop production.

The study of soils furnishes work in the laboratory and in the field, and the school equipment should make suitable provision for both. In schools having good laboratories for physics and chemistry it may be possible to utilize one or both of these rooms—though a separate room is much better—and some of the apparatus used in teaching physics and chemistry need not be duplicated, perhaps, for

the soil work. In this laboratory there should be a supply of running water and gas for each student's desk. One compound microscope and analytical balance, or more, according to the size of the class, ought to be provided, besides the hand magnifiers for each student and scales of the Harvard trip or similar pattern. Apparatus for collecting samples of soils, an oven for drying these soils, tubes for making various determinations with regard to soil moisture, Bunsen burners, crucibles, stands, beakers, tubing, and soil thermometers should be included.

#### A SCHOOL MUSEUM.

For the study of plants and crops in division 2 of the suggested classification, the laboratory should contain an abundance of carefully selected and prepared specimens of farm crops, especially of those crops grown in that community, and of the weeds that are most common and troublesome. As far as possible these specimens should show the whole plant, roots and tops, with matured blossoms or seeds. Sheaves of the different cereals and grasses may be gathered by the pupils. These will not only serve as material for class study, but they will make very attractive and appropriate wall decorations for the agricultural classroom. A hill of potatoes with the tubers attached to the stems and showing the root system of the plant, all placed in a large glass vessel and immersed in some preservative solution like formalin, is an object of great interest and instructive value to students. The gathering and saving for observation and study of specimen plants of unusual merit and of those that are in any way abnormal is a practice which should be encouraged among students of agriculture and which will do much to develop keenness of observation and thoughtfulness.

Of course this laboratory should be well stocked with specimens of seeds of farm crops of all classes and varieties that are or might be grown in that district. The specimens should be carefully labeled. Convenient and practical appliances for seed testing are an important part of this outfit.

Samples of the various commercial fertilizers on the market should be kept with a statement of the chemical analysis of each. There should also be ample provision for growing crops both indoors and outside, in various kinds of soils and conditions of culture. I believe that every high school teaching agriculture should have a glass house properly heated, where plants may be grown and studied during that portion of the year when the climate will not permit the work to be carried on outside. Such a house, which is not necessarily very expensive, is really indispensable to thorough work in this division of an agricultural course. Where there is no glass house, considerable work in growing plants may often be done in the windows of the schoolroom.

## THE EQUIPMENT FOR OUTDOOR WORK.

A very necessary part of the equipment of an agricultural school is land. How much is desirable for school work is another question. I think a serious mistake is frequently made by schools in attempting to handle so much land that this part of the work becomes a burden. I believe that small plats worked with care and accuracy are of much more educational value than larger areas where part of the work is done by some one not connected with the school. So far as I know the most satisfactory school work in this division of agricultural study that has been done is at the Ontario Agricultural College, Guelph, Canada, under the direction of Prof. Lavitz, where the plats are one square rod in area and the work is done mainly by the students.

Under division 3 of the outlined classification the work can be done in the main with the same equipment as that already discussed. In addition to this there should be a small spraying apparatus—the one-barrel size is effective and not costly—and arrangements for mixing the different spraying mixtures. Also material and equipment should be provided for pruning, budding, and grafting, and for potting, layering, and setting of smaller plants.

Every school should have grounds where as many kinds of fruits, large and small, as experience has shown can be safely grown in that section, can be raised. Every home ought to have a good garden. Few do have. This is an important field for the agricultural school to develop. Hotbeds and cold frames are not expensive or difficult to make or manage. They should have a place on every farm. Unlike some of the other work, their use comes while the schools are in session.

## INSTRUCTION IN ANIMAL HUSBANDRY THROUGH POULTRY RAISING.

The equipment for work in animal husbandry will probably seem to many schools somewhat more difficult to provide. In the study of the larger domestic animals pictures, charts, models, and manikins can be used to excellent advantage. Farm animals can usually be borrowed from farmers near the school. But in addition to this there should be some personal handling and care in breeding and feeding. This can hardly be done unless the school owns the animals. I think that poultry is the most available and suitable of animals for this purpose and that its use possesses so many valuable features that poultry will probably soon become standard school equipment for instruction in animal studies.

These are sufficient reasons why the public schools should concern themselves with this branch of agriculture. Poultry is kept in practically every home in the country and smaller towns and in very many homes in large cities. Poultry keeping is growing in popularity



everywhere. It appeals to young and old alike, to people of wealth as well as to those with little or no means. Its products are coming more and more into demand as a result of the greater attention paid by the public to the questions of pure food and the cost of living. Added to these circumstances the considerations that an equipment for handling and teaching poultry culture does not require a large investment of money and need not occupy much land; that it is not dependent upon climatic or seasonal conditions as are most other kinds of agricultural work; and that it may be made self-supporting or even a source of profit if properly managed. All these are further reasons why poultry deserves consideration as an educational asset.

Furthermore, the principles of animal breeding and of feeding apply equally to horses, cattle, sheep, swine, and to poultry, while the rapidity with which poultry multiplies and the shortness of time required for its development make it specially well suited for courses in animal studies. I would make one or more pens of well-bred chickens a part of the outfit of an agricultural school.

Every farm home should know how to handle and care for milk and its products. The school should be equipped with a milk tester, separator, and churn. If I were teaching in a high school I would try to rent or borrow one or more cows, care for them on or near the school grounds, and teach by actually *doing*. I know this entails any amount of work. I know it means a complete revolution in many respects of present customs and traditions of the public school, but these changes must come, and here and there have come, to meet the changed conditions.

The necessity for modern machinery and mechanical constructions on the farm to-day is so fully recognized, and the amount of money invested for these is so great that no argument should be needed to support a claim for including some provision for instruction in farm mechanics. Even a careful study of the catalogues of manufacturers of farm implements, to the end that the students may become acquainted with the appliances now used in working good farms would be time well spent. In many instances I am confident that manufacturers, or local agents, would gladly lend a school machinery for study, just as it is now lent to agricultural colleges. I would have some equipment for teaching farm drainage, sewer construction, ventilation of buildings, and farm sanitation. I would have models of farm buildings, fences, feeding racks, and things of that sort, together with equipment for giving instruction in cement construction. A few years ago one of the students at the University of Illinois was asked what he got out of his course in landscape architecture and replied, "I have learned not to hang the clothes line in the front door yard." This much, at least, the high school can teach. Pictures of attractive homes, schools, and other public buildings, with study and discussion



of the features in their setting which add to or detract from their beauty, are easily obtained and may be made quite effective. An acquaintance with the trees, shrubs, vines, and other decorative plants that can be safely used for planting in the latitude of the school may be acquired from a few specimens on the school grounds and in the vicinity.

I have said nothing thus far about the library of works on agriculture and of reference books and publications that should always be a vital part of the school equipment and always in active use. Nor have I mentioned what I consider the most important and helpful part of the whole equipment—an interested, hearty, and enthusiastic support of and participation in all this agricultural work by the patrons of the school. The experience and judgment of these residents should be of the highest value in directing and giving weight to the instruction, and their participation in the work of the school should result in a welding of interests and sympathies between home and school which would be the richest and strongest asset in the whole equipment of the agricultural secondary school.

Is there a question, Who is to get this equipment for the schools? and how? I think that rests mainly with the man behind the desk.

#### DISCUSSION.

After Prof. Barto's paper on the subject "Proper equipment for teaching agriculture in secondary schools" had been presented, Prof. D. J. Crosby, of Washington, D. C., opened the discussion as follows:

PROF. CROSBY.—Fortunately I have not prepared a paper on this subject. If I had I should probably go over a good deal of the ground that Mr. Barto has covered in his very excellent discussion of the equipment for teaching agriculture. He has covered the ground excellently for the public high-school equipment, and has covered it in considerable detail.

I hope, however, that Prof. Barto will pardon me if I drop a word of warning here and there and make one or two suggestions from notes that I took while he was talking. One of the words of warning is with reference to the making and using of collections of farm crops, seeds, and other materials that are brought together by teachers of agriculture in the public high schools, without sufficient provision for taking care of them for future use. It is a very easy matter to get together a lot of hay and grain and seeds and soils and other things like that, but if you were to go into a room where these collections have been brought together, and see them jumbled together in an indiscriminate mass, as I have seen them a number of times, without anybody knowing where anything is, and without anybody being able to use what is there, you would be convinced with me, I believe, that it is better not to have quite so many collections and have them in

better shape. So I think it is well to emphasize the importance of following such methods of mounting and labeling collections as Montgomery has worked out in Nebraska and others have worked out elsewhere, requiring the use of flasks, bottles, cans, lantern-slide mounts, Riker mounts, and various other devices for mounting and preserving seeds, grains, insects, and other specimens, so that they will not be destroyed and will always be convenient for use.

The use of land is a question, I think, that puzzles more teachers of agriculture than any other one problem confronting them, and I fully agree with Prof. Barto that there is danger of having too much land—entirely too much land. I recently saw some land put to pretty good use, at one of the high schools in Los Angeles, Cal—the Gardena Agricultural High School. Los Angeles has seven or eight high schools, each one of which gives three or four courses and specializes in one of them. At the Gardena High School, for example, the pupil can get four years of Latin, three years of Spanish, three of German, three of French, and all the general scholastic courses, but the agricultural course is the one emphasized. The other high schools of Los Angeles are also teaching agriculture, but without putting the emphasis on the subject that the Gardena school does.

The Gardena Agricultural High School has a farm of 14 acres—a pretty large farm for a city high school. Two and one-half acres of this land is in trial gardens, used as their name indicates, to try out all sorts of semitropical and tropical vegetables and fruits, just far enough to bring them to maturity and see whether they will do well in that vicinity. To a certain extent it is an experiment station for this school and for this region. Many of the things they are growing there the boys have never seen before. It is an education for them. There is also a trial vineyard where they are trying out various grape vines, to ascertain which are the best in quality and which the most profitable. They also have a trial orchard for tree fruits, and plots of alfalfa.

I believe that all of the land used for school purposes should be put upon a trial basis, an educational basis. I do not believe, for example, that we want to have individual gardens merely for the sake of raising plants; we need to inject the experimental idea into it, or the contest idea, perhaps, to see which boy can raise the most and the best succession of garden vegetables for the table, running throughout the year. Put it on a contest basis, so that the boy who comes from working in the garden all his life will not feel that he is being forced out upon the land to do things that he knows perfectly well how to do, and without any reason being given for it. If he is engaged in some contest or some experimental work he will take a hoe and do all the weeding and thinning that is required, without any feeling of revolt

or opposition, but if he is sent out in the garden merely to weed peas or onions or to thin beets he will find some fault.

One very necessary bit of farm equipment, it seems to me, is a small nursery of seedlings for educational work—for budding, for grafting, for transplanting, and work like that—and I think that the experimental work for the nursery ought to start right from the putting of the apple seeds, or whatever are raised, into the plats, and extend from that point on to the finished tree ready for transplanting, for grafting, or putting into the orchard.

In the animal-husbandry work of public high schools I believe we shall have to depend for the majority of our equipment upon the farms in the vicinity of the school, and make trips to them to study typical animals, typical herds, typical flocks, and up-to-date equipment. It is possible, as Prof. Barto has pointed out, to have some poultry, principally to carry on some experiments for children, and to explain and demonstrate the use of incubators, brooders, and all that, but we have not yet developed a resident corps of teachers who are at the school all the year around, and we shall have to look out for the time in summer when there is no school, and make some provision for taking care of our equipment during that time.

In connection with our animal-husbandry trips, I think we should not neglect to visit the butcher shop for the information that the butcher can give us concerning the different cuts of meat and their prices; nor should we omit the creamery, the dairy barn, and other like places. If any of you were present this morning in the association which was discussing farm management, you will recall that it is considered a very essential part of their work to get out and see what the successful farmer is actually doing.

Along with whatever other equipment we may have for our work in animal husbandry, we should not forget the score cards, the record forms, the calipers, and tapes for measuring cattle, and the other necessary things that go along with a complete outfit for the information and education of the boys.

I was glad that Prof. Barto mentioned the matter of farm mechanics and I would include in farm mechanics not only the study of farm machinery, but this thing that is variously called manual training, mechanic arts, etc., in most of the schools that are teaching agriculture. I think we are in urgent need of some good pioneer who will devise a workable system of farm mechanics for the carpenter shop and the forge shop in agricultural schools.

I have recently visited one teacher of manual training in a so-called agricultural school, and said, "What are you doing for the boys who are going back on the farm, those that are taking the agricultural course?" He said, "We have some work for them on power machinery, gasoline engines, etc.," and then added "I want to show you,"

and he took me to a show room where there was a case containing all the different kinds of joints that he could possibly devise. Pointing to the case, he said, "It took us six months to go over that series of exercises." He then pointed with pride to a collection of patterns representing the ordinary output of a foundry. I asked, "How many of your boys are going to have foundries on their farms?" His reply was, "Well, it is interesting for them to know how these things are done." We waste entirely too much time in our agricultural schools on things that simply "interest the boys."

Let us compare such work with the farm mechanics' work in the manual training department of the Gardena Agricultural High School. In the seventh and eighth grades their work does not differ very much from the ordinary training work in the village or city schools, but in the high school it is real farm mechanics; it is constructive work. The necessary shopwork consists largely in making models of fences, gates, barn frames, and other things that are used on the farm, but they do as little of that work as possible. There is always plenty to do around the school that is of a practical and substantial character and along the lines of construction work. For example, they put up potting sheds at the greenhouse, and two lath houses to shade the citrus seedlings; they make concrete tile and put in their irrigating system; they put up fences, and in fact did anything and everything connected with the work on the farm. When I was there they were constructing a house for a gas plant connected with the school, and the school board that has charge of this school had made an appropriation for a barn to shelter their horses and store their forage. This barn is not to be put up by contract, but the board will furnish whatever carpenters are needed, two or three or four carpenters—one carpenter to each squad of four or five boys, so that these boys who are taking the agricultural courses will actually put up a farm barn under expert supervision. Now, we shall not be able to put up buildings all of the time in connection with public high schools, but I think we can give much more attention than we have been giving heretofore to making the manual training work the kind of work that will at least illustrate and demonstrate the principles that the boys will put into operation when they do go out upon the farm to engage in their life work. To such boys this kind of work is of greater practical value than foundry or machine shop work, and it is just as educational.

#### IV. THE SMITH'S AGRICULTURAL SCHOOL AND AGRICULTURAL EDUCATION IN MASSACHUSETTS.

By R. W. STIMMON,

*Agent for Agricultural Education, State Board of Education, Boston, Mass.*

The Smith's Agricultural School, at Northampton, has 100 acres of land. In 1908-9 it was the only vocational agricultural school in the State; so that some of the boys who wanted secondary training in agriculture had to come from a distance and live away from home. Even now, we have the problem there of making practical the instruction of the boys who come from a distance and who have to be initiated into the mysteries of the school.

Among those mysteries is the problem—the insoluble problem—I fear—of trying to make an agricultural school show a profit. I do not know that I can better illustrate educational experience in this regard than by referring to the experience of Booker T. Washington, who says that a great industrial school, like Tuskegee, or any school that tries to be thoroughly practical, is always getting up to a level where it can show a profit, but never getting above it. The moment a boy can show a profit from his acquired skill, it is your duty to let him go. The mean is always somewhere down below the level of profit.

I am unaware of any institution which has been able to show a financial profit in connection with its total educational activity, and I have very little hope that such a profit will be shown very soon. If you do show a profit, you do it by an independent labor staff, as at the Smith's school. Here the independent labor staff carries out the processes taught by the school; and from time to time, when the instruction of the boys from a distance requires it, we put those boys into the places of the regular staff. They are given the real thing, but they are given it only from time to time. We do not depend upon them entirely for the work of the school.

Moreover, we insist that the students clear out in the summer time, that they go out on farms, that they go back to their own farms to work, or to other good farms where they shall be under absolutely economic conditions. In agriculture, just as in machine-shop work, you need to put the boy into the economic bath; you need to plunge him into it up to his eyes, and keep him there long enough for him to gain the benefit to be derived from actual economic experience. You need to put him in "all over," and the sooner you get him in "all over" the better. You need to see to it that during his schooling



the boy shall be engaged in real farming long enough and earnestly enough to develop those real powers of discrimination which ought to be exercised in determining on graduation whether or not he should go out to be a farmer. If he can not get up at 4 o'clock in the morning on the farm that requires it; if he can not stand dairying; if he can not stand the kind of work required for success in the sort of farming he thought he would like to follow, then he ought not to be a farmer. He is starting out in the wrong direction, and the quicker he finds this out, the better it will be for him. The best thing you can do for him is to put him right up against the real thing, and then let him determine whether he has made the proper selection of a calling. In this way, if farming is not what he is fit for, he can change before it is too late. We try to put the boys up against the real thing at the school itself, so far as its equipment and work will permit.

Fortunately, most of our boys have lived near enough to enable them to live and work at home during the school year, and part of the others have been secured jobs on farms near by, with the privilege of attending the school. The work of the school has been organized and conducted primarily for the benefit of such boys. Of course, we used our common sense and did not duplicate equipment that was right at hand, for the Smith's Agricultural School is within about 6 miles by trolley of the State Agricultural College. The school had a herd of cows. I advised the trustees to sell that herd, and we sold it, because I did not want our instructors nor our boys to be thinking one single minute about school cows. I wanted them to think about cows, and their profitable management on going farms. Those boys who live at home and come to school in the morning and go back at night we have worked on their own cows.

We men had organized the Connecticut Valley Breeders' Association, and had determined at the outset that we would never have a discussion without a demonstration of the thing we were talking about. For example, we decided to discuss the choice of a male calf for the improvement of a dairy herd, and we decided to have bull calves for our demonstration that came from families whose producing qualities were well known—families whose records had been kept. It turned out that the only place we could hold a demonstration with such calves was at the Massachusetts Agricultural College. We went there and held our meeting. In the midst of a demonstration of a perfect Guernsey bull calf, whose dam and dam's sister were beside him, both high record cows, and whose sire was known to be from high-producing families, a young farmer said in an undertone: "He ought to be a good one; the State owns him, and the State feeds him." Everywhere there is a tendency to discount college-owned or school-owned live stock and operations. If excellent, most farmers are likely to feel that a "barrel of money" from some easy source has



produced the result, that such a result is beyond the reach of the man who must depend upon his own farming for a living.

Our boys are given such benefits as are derivable in a practical school from judging and scoring State-owned live stock, but we take the boys to the State college for this part of their training. Our major effort is to deal with animals and operations which are parts of the equipment and work of actual going-farm-enterprises. To this end we are going to have our boys build a model dairy barn and bring in for a test period one cow from each farm—the home farm of the boys. The dairy school for boys from a distance will then be run during three months of the winter. We are going to agree with the fathers of the boys as to a proper return for the use of the animals thus furnished for the three months' period. We will share with them the profits; or, for that matter, the bargain would be a good one if they were given all the profits. Under this plan every cow tested will be part and parcel of an economic farming proposition; she will represent some farmer's money and some farmer's judgment. If she is found to be returning a profit, well and good; if she is not returning a profit, the best possible service that can be rendered the owner is to let him know that she is a losing proposition.

Our boys put out 500 apple trees on a permanent, semipermanent, and filler plan this last spring; they dehorned, pruned, grafted, and sprayed old apple trees; they put out 3,000 forest trees of four different varieties; some of them have built poultry houses, and the others are working on their poultry houses now. They have fitted up a model horse stable. In short, in everything we do we try to create permanent improvements and to practice profitable methods. In all phases of our vocational education in Massachusetts, we are emphasizing the fundamental importance of "productive work."

Give a boy a stake to work for that will stimulate him to accomplish what you desire him to accomplish. Some of our boys need to be earning something. They need to be pulling their own weight in the family boat. Home farm work—not everything any year, but something every year, directed by the school—we believe to be the best means to this end. I do not myself have very much confidence in work on little school plats for boys over 14 years old. I do not believe we have a right to call a boy back from a home farm to work on a small school plat during the summer. If we have work at the school, let us have not a plat but an acre, and raise a crop worth marketing. Let us conduct our operations in such a way as to teach the boy the benefit of applying the best methods under extensive field conditions, by showing him a good profit produced by his faithful and carefully directed efforts.

I know there is a difference of opinion here. There are many things we can learn from demonstration plats; in their proper place

they are essential, particularly with reference to methods or crops that are purely experimental and should be tried out first in a small way. But it seems to me that in this secondary school work we should direct our attention mainly, not to experimental work, but to demonstrating what have proved to be "dead sure things" somewhere under farming conditions like those in our vicinity.

The results of our observations have led us to put forward this method for the development of our agricultural school movement throughout the State. "Wherever there is a community or a group of towns wanting our assistance in the building up and maintaining of such a school, we say: "We will advise you as to buildings, equipment, and land; and the State will pay half of the expense of maintaining the school if you keep it up and run it in accordance with methods which we can approve." We have adopted the plan of what we call "approval in advance." At the end of a given year we go over the plans and if we find any mistakes, we correct them before we make our arrangements for the next year. If we can "approve in advance" we will help to support the work.

But the thing we are pinning our faith to, gentlemen, is the man—the man out among the farmers and among the farmers' boys, in what we call vocational agricultural departments. We, working with the local authorities, pick a man, put him in a high school and require him to give all of his time to agriculture and nothing else. We surround him with an advisory committee of five of the best local farmers. We tell him to take a three months' vacation, not in the summer but in the winter—January, February, and March.

Why do we give him so much vacation? In some States you require him to devote 11 months of the year to the work. Well, we want a permanently progressive teaching staff in our State in charge of our agricultural work, and a man can not always be lifting himself by his own boot straps. If he has a liberal vacation at that time of the year, he can go to any one of the various agricultural colleges and take a special course at a time when the professors are at home. He can thus renew his energy and his knowledge. He can bring himself up to date. He can get freshened up and come back in the spring full of vigor, animation, and enthusiasm for the work of the ensuing year.

Another thing: We are now working for the 1912' crop in all our agricultural school work in the State of Massachusetts. Not general and deferred values, but values local, individual, and immediate are our aim. Now, we may talk peanuts in the South, or citrous fruits in California, or sugar beets in Michigan, or cotton in Mississippi, or sugar cane in Louisiana, or tobacco in Kentucky. It will all be interesting, very interesting; and somewhere along the line we ought to talk of these things because of their broadening influence. Such

study gives dignity and horizon to the calling. But after all we must get right down to this boy's farm and that boy's farm, deal with conditions as each boy in the school knows them, to exist on his own farm. If we dealt largely with school grains and school crops, if we dealt with silos and fertilizers, if we dealt with breeds and breeding or feeds and feeding, if we dealt with general principles only, we might almost as well be dealing with peanuts, and citrous fruit, tobacco, cotton, and sugar cane. We must get our general principles clearly into the minds of the boys. But we must show them; after they have mastered these general principles, that we can apply our teaching through our practical and progressive instructors to the particular conditions as they exist on the individual home farms of the boys themselves.

Two men got on my train the other day at Hornell, N. Y. They had rifles and they had ammunition. Their real sport would begin when they began to get their eyes on the birds. If you want a meal of game and do not get your eye on the bird, you go hungry. The bird we are getting our eye on is not birds in general, but the particular bird. After generalizing, finally, if we succeed in our work, we must get down to the particular bird, to John's farm, on which, in 1912, he wants to grow an acre of corn and get from that acre of corn his school clothes and as much more of profit as he can make that acre produce.

I must not talk very much longer. In closing, let me only add that there is one other great merit in this high-school agricultural department proposition, and that is its flexibility. If you can not do anything noteworthy at a given school, or if you get the wrong man, or if people lose courage, and you have to withdraw your effort in one locality, you have no buildings to rot down, you have no equipment to rust out. You can simply transfer your efforts and State aid somewhere else, still hoping to come back at a later day with a better man and woo your maiden once more.

## V. THE UNPREPARED TEACHER OF AGRICULTURE IN HIGH SCHOOLS AND COLLEGES OF EDUCATION.

By A. V. STORM,

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This question is not one of my own choosing, but has been assigned me; nor would I have selected it had it been left to my choice. However, I am willing to discuss it because it leads to the consideration of questions that are pertinent at this time. At the outset I wish to say that I do not wish to be circumscribed too closely by the wording of the topic, limiting as it does the charge of unpreparedness to teachers of agriculture in secondary schools and colleges of education. While it is highly appropriate that we should give special attention to the proper preparation of those who are to teach agriculture in secondary schools and colleges of education, let us not lose sight of the great amount of unpreparedness on the part of many of their collaborators, especially in the colleges and universities, nor of the other fact that the unprepared in agriculture are found in other educational positions than those of high schools and colleges of education.

There are perhaps two reasons why we see so clearly this unpreparedness in the teaching of agriculture in high schools and colleges of education, while we have so long been blind to a similar unpreparedness in the teaching of other college subjects. The first is the newness of agriculture as a subject in the public school curriculum; being new and hence more or less of an interloper among the already numerous full-grown and respectable members of the educational social circle, it is scrutinized with the greatest circumspection to be quite sure that it is entitled to recognition; and, as in many of our social groups of to-day, the one seeking admission must show far better credentials to get in than many of those already in must show in order to stay there. However, this is not a misfortune, for the more carefully the friends of agricultural education guard its fitness for entrance into the curriculum, the more signal will be its achievements and the more helpful its career.

The second reason why we challenge the unpreparedness of these teachers of agriculture and raise no voice against that of certain other teachers is because of a difference in the standards of preparedness. There are university and college professors holding positions of influence who, from their moral and personal habits,

are unfit to stand before young men and women. I know of no greater unfitness than this. I do not know what your position may be; but as for me, no man can possibly know enough about the subject matter to compensate for his lack of moral worth if he is to stand before my boy or girl. Other men and women there are who are so weak in the pedagogy of their work that they remain in faculties decade after decade to the contempt and loss of students until the scythe of Father Time or the purse of Father Carnegie relieves the situation. Other men and women there are whose personality makes it impossible for them to succeed, and yet, like those just mentioned, they are saddled upon suffering students and then tied in the saddle, there to remain until the pale horse and his rider shall spirit them away. Why are these persons chosen to teach and retained so long in their positions? Because they know the subject matter to be taught. And from what point of view? From that of the teacher? No; from that of the student, which is a vastly different thing. The greatest incubus upon college teaching of to-day is selecting for teaching positions and retaining therein those who have only a student's knowledge of subject matter, and who are without the other essential qualifications of a successful teacher. Why is this so? Three significant reasons appear: First, lack on the part of those who select faculties of a proper appreciation of the value of other qualifications in a teacher. Second, because it is so easy to apply the student's scholarship standard. Third, because of inadequate facilities for preparing and testing out those who are to teach. Further attention will be given to these topics a little later.

#### A STANDARD OF VALUES FOR THE AGRICULTURAL TEACHER.

As I understand the purport of this topic, the criticism is directed against teachers of agriculture in high schools and colleges of education not because of their moral unpreparedness, their professional unpreparedness, nor their natural unpreparedness; but for their lack of the knowledge of the subject matter to be taught. That we may have a sound basis for discussion, let us establish some standards. What are the fundamental characteristics that should mark every teacher? First, moral character; second, fitness to teach; third, general education; fourth, special education; fifth, professional education; sixth, practice.

Moral character and aptness to teach we will not discuss, realizing that they are equally essential to the rural teacher, the high-school teacher, and the college professor, whether his work be in Greek, medicine, animal husbandry, or pedagogy.

In addition to these two, what shall be the standard preparation of our teachers of agriculture? It should contain the same elements whether he is to teach agriculture in a country school, a high school,



a normal school, or a college, and would only differ in the proportionate amount of each and the special adaptation to the particular kind of school.

That we may have a type and still be specific, let us consider the proper preparation of one who is to teach agriculture in a high school, representing as it does the most urgent demand now being made upon institutions that are preparing agricultural teachers.

Besides (1) moral fitness and (2) natural fitness we have (3) general education. A very valuable and almost indispensable element in general education is that which is entirely separated from schooling, i. e., the education that comes from environment. For one who is to teach agriculture successfully in a community where general farming is practiced, not to have spent a goodly portion of his youth upon the farm is a handicap that it is well-nigh impossible to overcome. To this experience should be added a thorough training in the common branches. Not such, however, as he is now receiving; the common branches need a general purification and redirection that shall better adapt them to the needs of the elementary pupil. They need certain algebraic processes applied to them—subtraction, addition, and substitution, of which the most difficult to apply is subtraction. After this elementary education in which the arithmetic, reading, language, spelling, geography, etc., are better adapted to the past experience and future need of the child, he should receive a strong high-school course of four years with the work distributed about as follows: Mathematics, two and one-half years; English, three years; history and civics, two years; science, three and one-half years; foreign language, two years; electives, three years.

Though we may differ somewhat in the distribution of this high-school work, we shall probably agree very well up to this point; but now the question arises whether the pupil shall take his advanced work in a normal school or in an agricultural college. The organization of educational plants varies so much in different States that it is difficult to make an arbitrary decision that will seem to all persons to be just; but after much investigation and consideration, I am confident that the consensus on the part of those best prepared to judge is that it is the purpose of the normal school to prepare teachers for the elementary schools and that teachers for schools above those of elementary grade should be prepared in colleges and universities. Applying this to our situation, we must conclude:

First, that normal schools should give to all teachers some preparation in nature study and elementary agriculture.

Second, that agricultural colleges should prepare teachers of agriculture for all institutions above the elementary schools, including the normal school itself.



What preparation shall our prospective high-school agricultural teacher have in the college of agriculture?

His preparation should be in four different lines: First, general; second, technical; third, professional; fourth, practice.

• His general preparation will be of two kinds. The first includes such subjects as English, public speaking, economics, commonly thought of as cultural subjects (though that nomenclature has about lost its significance), and the so-called practical subjects of mathematics and the sciences which constitute the foundation for his special work in agriculture. I wish to emphasize the need of efficient preparation in English, public speaking, and economics as a most practical preparation for the extension work which every high-school teacher of agriculture should do among his constituents.

The courses in science should be strong enough to constitute a good foundation for the student's special agricultural preparation and should be sufficient to enable him to conduct the work in any of the high-school sciences, such as botany, chemistry, zoology, physiology, and physics. The value of having the teacher of agriculture in charge of the science work in a high school is twofold; it enables many schools to have agriculture well taught, which otherwise could not do so, and at the same time the high-school sciences under these circumstances will be better taught than they are at present. It is far better to have the high-school sciences taught by the agriculture teacher than to have the plan more common at present of having agriculture taught by the science teacher.

The technical preparation of this high-school agriculture teacher should include the fundamental courses in all of the departments of the agricultural college or division. His specialty should be agriculture; not some one phase of agriculture. Any emphasis he places on one subject more than upon another should be guided by these principles: First, the greatest need of his constituents; second, the adaptability to school-teaching conditions; third, fundamental and underlying character of the subject matter.

Perhaps I may again say with safety, that so far, we may not expect serious disagreement; but now we come to a point where we may find some radical differences of opinion. If we are to judge by a practice still quite common, there are those who believe that teachers are born, and hence, need no making; who, while they believe in all other kinds of culture, do not believe in teaching culture; who think that a knowledge of the underlying principles and the best prevailing practices in any department of human activity is necessary to mark success in that activity except in the intricate, profound, and vital processes of teaching. But the most thoughtful do not take this view. They believe that one who is to teach should prepare himself for that important duty by adding, to his knowl-

edge of the subject matter to be taught, a knowledge of the mind to be taught, and of the principles and processes to be used in teaching. Of what shall this preparation consist?

The professional preparation of a teacher of agriculture in a high school, or other institution above the elementary school, should be approximately as follows:

Psychology, with a special reference to adolescence, five or six hours;

History of education, including especially the history of secondary and industrial education, four hours;

Principles of education, five or six hours;

Principles of general method and the method of the recitation, two hours;

Special methods of high-school subjects, especially methods applied to the sciences and the industrial subjects, two hours;

School management, especially as applied to high schools and colleges, two hours.

In addition to the professional preparation just outlined, there should be the equivalent of from two to four hours' practice work in the teaching of agriculture and general science subjects. This work should preferably be given during the senior year. Lesson plans, criticisms, and similar details of practice teaching should accompany this work. One prepared in this manner is ready to teach agriculture in any grade of school or college, unless it be in some of the more technical advanced courses in the agricultural colleges, for which he would need additional work in that particular subject.

Having established in some measure a set of standards, let us next ask how nearly we are approaching these standards at present. It is well known to all present that a very small percentage of those teaching agriculture have had any even approximately adequate preparation for that work. The demand has come upon us too suddenly for us to have a sufficient supply of properly prepared teachers. Our own institution at Ames cannot supply one-tenth of the demand, and other institutions are probably equally embarrassed.

This, then, is the situation: We have definite standards and no men who have attained to them. We also have a large and insistent demand for teachers, and must furnish somebody. What shall we do? Shall we use all our efforts to prevent the teaching of agriculture in schools until we can prepare the teachers? No, for three reasons:

One, we shall never have teachers, except for this demand; two, more good will come from having it taught fairly well than not at all; three, we can't stop it if we try.

So we must take the other alternative, which is:

First, set all the machinery promptly into motion for the thorough preparation of teachers; second, do everything possible to improve the teachers already teaching; third, furnish the schools with the best teachers we can in the meanwhile.

Let us treat these in reverse order: Whom shall we recommend now? I believe, of those available, we should select our candidates in the following order:

First, those with natural ability, farm experience, and agricultural preparation, even though they have no professional preparation or teaching experience.

Second, those with natural ability, agricultural preparation, professional preparation, and teaching experience.

Third, those with natural ability, farm experience, good science preparation, and teaching experience.

Fourth, those with natural ability, farm experience, good science preparation, and no teaching experience.

What can we do to improve those already teaching? A few will discontinue teaching to prepare themselves fully. The summer school, the teachers' normal institute or association, and the correspondence course must do the rest. While the summer school has appeared not to increase very rapidly in the recent past, yet I believe it is destined to do a great work in the preparation of teachers for work in agriculture, especially for those who have the other essential qualifications, including preparation in college science. As for this last class, summer schools of sufficient length and offering work of a college grade will enable them to prepare to teach agriculture successfully in a high school.

The teachers' institute can furnish a point of view, some enthusiasm, some information, methods of work and devices, but can not give that thorough knowledge necessary to the proper teaching of agriculture above the elementary school. The correspondence course is more far-reaching as to numbers. It will be of inestimable value to elementary teachers, especially those of the rural schools, and of great value also to present science teachers who are trying to teach without special agricultural preparation, yet it is only a temporary expedient so far as the preparation of any but elementary teachers is concerned.

What shall we do for the thorough preparation of our teacher of the future? Where shall he get his agriculture? Where his professional preparation? Where his practice? Again, different conditions in different States may make different plans seem most advisable. The needs to organize the work that the student in his four years' college course may combine three into possibly four things, already enumerated—general education, agriculture, professional work in psychology and education, and, if possible, practice teaching.

Where shall these be given? Universities having a college or department of education, a college of agriculture, and a secondary school of practice may easily meet these demands by a reciprocal relation among these departments. Colleges or universities having departments of education but no agriculture can meet the need by establishing departments of agriculture, though to have these efficient would require a greater outlay than most colleges of this class would care to make. Colleges of agriculture unassociated with a college or department of education can solve the problem by creating a department of education, as many of them are now doing. In case a Commonwealth has its normal school and university separate from its agricultural college, it will be much wiser to create a department of education in the agricultural college than a department of agriculture in the normal school or college of education, if for no other reason than the great difference in the cost of establishing and maintaining the duplicate agricultural plant.

If departments of education are established in colleges or divisions of agriculture, what shall be the character of the work offered therein, and what the preparation of the instructional force? In my own opinion the principles, processes, and facts of agriculture should be taught in the regular agricultural college classes. The department of education should have all of the work relating to the profession of teaching, including the organization of these principles, processes, and facts of agriculture into working systems suitable for use in the schoolroom, and should also have charge of the practice work of students. If this is true, it determines very largely the qualifications of the instructional force in the department of education in such a college.

The instructor must be educated to and experienced in the science and art of teaching. If, in addition to this, he could have equally good preparation in the science and art of agriculture, the preparation would be ideal. But as such men are not now available, the only rational thing for the present is to confine the agriculturist to his agricultural task and the educationist to his educational one. As to the normal school, it is vital that the agricultural work therein be taught by a man strongly and thoroughly prepared in agriculture. With the amount of emphasis placed upon methods in all the other work, the normal-school students need most the virile presentation of agriculture from the practical and scientific points of view. This is to be obtained only by a thorough course in an agricultural college.

It is even a more serious, because a more far-reaching, misfortune to have agriculture taught in a normal school by a nonagriculturally trained teacher than it is to have the same subject so taught in a high school.

I have in no measure given these topics complete treatment. I have endeavored simply to analyze the situation and bring the salient points into clear relief without elaborating upon them either in the form of discussion or argument, thus making it possible to spend more time in discussing such phases as appeal most to those present. I trust the statements in this paper are sufficiently pertinent and positive to make discussion possible.



## VI. WHAT IS BEING DONE TO PREPARE TEACHERS OF SECONDARY AGRICULTURE.

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At present the United States contains more than one hundred special agricultural schools of secondary grade. These schools are located in 17 different States, which support them in whole or in part. In 1910, agriculture was taught as a separate subject in more or less complete courses to more than 37,000 pupils in 1,800 public and 140 private high schools. The figures are taken from the reports submitted by these schools to the Bureau of Education. The number of schools giving instruction in agriculture indicates in some measure the demand for instructors qualified to teach this subject. In larger measure the figures indicate the *need* for such teachers.

It is true that much of the instruction given in these schools is very elementary and is of informational rather than of vocational character. It is true also that in the majority of them the courses are very brief. Better courses of a more practical nature, extending over a greater length of time, and covering the subject in a more thorough manner, would be given if competent instructors with the proper training could be found. Fully as many high schools are now giving four-year courses as are special agricultural schools, and the courses given by them are as vocational in their character as the courses given by the majority of the special schools. In California, for instance, 12 high schools have agricultural departments in charge of special agricultural teachers. All these schools are supplied with land for instructional purposes, varying from 3 to 27 acres in extent; all have available laboratories, and several have greenhouses. Michigan has 11 high schools with four-year courses in agriculture, each taught by a graduate of the Michigan Agricultural College. Massachusetts, New York, Iowa, Ohio, Minnesota, Tennessee, and Vermont, each have several such schools. One or more may be found in almost every State in the Union.

Of the special agricultural schools and the 2,000 public and private high schools teaching agriculture, only a very few besides the institutions giving four-year courses in this subject have instructors with a college or normal school training in scientific agriculture, while a large percentage of the active teachers with this training have had no training in psychology or pedagogy. Probably no one factor has had

greater influence in retarding the introduction of substantial courses in agriculture in all those high schools whose pupils are drawn in large numbers from farming districts than the shortage of properly qualified teachers. The demand for such teachers is indicated by the numerous inquiries received by the Bureau of Education for information concerning where men may be found qualified to teach agriculture in elementary and secondary schools. In a recent letter to the bureau President B. I. Wheeler, of the University of California, writes: "The demand for male teachers in the elementary schools of California is unprecedented. There has come at one and the same time a general desire for well-equipped teachers of science and the additional demand for men particularly equipped in agriculture." President J. A. Widtsoe, of the Agricultural College of Utah, says: "Up to the present a large majority of the graduates of this institution have gone out as teachers of agriculture, home economics, mechanic arts, and related subjects." President J. H. Worst, of North Dakota College of Agriculture, writes: "The demand for these teachers is far and away beyond our ability to supply. This, for the reason that the high schools generally of Minnesota and many in North Dakota are incorporating fairly strong courses in agriculture in the high schools."

It will be several years before the supply of men available as instructors in agriculture will be sufficient to meet the demand. Although the salaries paid are from 50 to 100 per cent higher than are those for instructors in other subjects in secondary schools, the State colleges of agriculture are finding difficulty in persuading men to qualify specially for teaching, because even these salaries are not equal to those paid the graduates of these institutions in the agricultural industries.

It is important, however, that properly trained men be obtained. Agriculture as a high-school science has not yet been developed into good pedagogical form and until it is so developed a higher grade, better trained teacher is needed for the agricultural subjects than for any other subject in the high-school curriculum.

#### WHAT THE TEACHER OF AGRICULTURE SHOULD KNOW.

Men for this work need a liberal education in the general culture subjects, together with special training: First, in the physical and natural sciences, particularly in their relations to the science and art of agriculture; second, in technical and practical agriculture and farm practice; third, in rural sociology and agricultural economics; fourth, in general psychology and pedagogy; fifth, in special agricultural pedagogy, including the history of agricultural and industrial education, the place and purpose of agriculture in the high school, the function of the agricultural high school, special methods of teach-

ing agriculture, and other similar aspects of agricultural teachings. The opportunity for such preparation is offered by several of the State colleges of agriculture.

In each State and in Hawaii and Porto Rico there is one college of agriculture and mechanic arts, established under the provisions of the act of Congress of July 2, 1862. The law is commonly known as the land-grant act, because by it there was granted to each State public land equal to 30,000 acres for each Senator and Representative in Congress. The moneys derived from the sale of this land have formed perpetual endowment funds, the income being used for the support of the institutions. Further aid was provided the land-grant colleges by the acts of Congress of August 30, 1890, and March 4, 1907; so that now each State receives from the Federal Government, excluding the income resulting from the act of 1862, an annual appropriation of \$50,000 in addition to the money paid for agricultural experiment stations. In 17 Southern States separate institutions for negroes have been established, and the Federal appropriation is divided between the colleges for white students and those institutions.

While the agricultural work of the land-grant colleges until 1907 was along technical lines almost exclusively, many of their graduates have become special teachers of agriculture in secondary schools, with no other training than their technical agricultural courses and the other subjects in their general college course. More recently has come the demand for men trained specially for teaching, and it was largely in response to this demand that in the act passed in 1907 for the benefit of the State colleges of agriculture and mechanic arts Congress included the proviso that part of the money "may be used for the special preparation of instructors of the elements of agriculture." This measure is known as the Nelson amendment, as it is contained in an amendment to the appropriation bill for the Department of Agriculture. Under its provisions each State is now receiving for the benefit of its college of agriculture and mechanic arts the sum of \$25,000, all or part of which may be used for the special preparation of teachers of the elements of agriculture. This \$25,000 is included in the \$50,000 mentioned above. It is held by the Bureau of Education, in whose hands the administration of the Federal funds for these institutions is placed, that this language authorizes the expenditure of these funds for providing special courses in agricultural pedagogy, but not in general pedagogy.

As a result of the measure, 36 of the 50 agricultural colleges, not including the separate institutions for the colored race, at present offer some opportunities to their students to fit themselves as special teachers of agriculture for secondary school work. Twelve institutions offer only certain courses in general education elective to students in agriculture, 14 offer courses in general education and special

courses in agricultural education, 1 offers courses in agricultural education only, 7 that have departments of education allow students in these departments to elect courses in agriculture, 9 offer prescribed four-year courses for teachers, and 3 offer special one-year courses to persons preparing to teach agriculture who have already had the equivalent of the general college education. Several others will accept properly qualified persons as special students. So far the colleges have failed to attract many persons to these courses in special preparation for teaching. According to the reports required by Federal law to be made annually by the presidents of the land-grant colleges to the Bureau of Education, in the year ended June 30, 1911, 140 students were enrolled in four-year courses in preparation for teaching agriculture, 7 in two-year courses, and 116 in one-year courses.

#### SOME TYPICAL TEACHERS' TRAINING COURSES IN AGRICULTURE.

Description of the special features of the pedagogical training for teachers of agriculture in all of the land-grant colleges can not be given here. However, enough are included to illustrate the character of the courses offered. The institutions selected are from widely distributed parts of the country and include examples of several different methods of arrangement of this special work. The courses and arrangement of the work in the other institutions are similar to ones described here. A statement prepared by the writer, regarding the work of each land-grant college in the preparation of teachers, is given in the chapter on agricultural education in the Report of the Commissioner of Education for 1911.

The University of California recommends for the State teachers' certificates as special teachers of agriculture only students who have completed in their college course 12 semester hours of work in education and at least 27 hours in agriculture and agricultural education. The term semester hour is used here and in following statements to mean one hour per week for one semester or half year; a four semester-hour course therefore is the equivalent of four recitations a week for a semester. Seven distinct courses in agricultural education are offered, only two of which are arranged especially for students preparing for high-school work. "Agriculture in secondary schools" is a two-hour course which treats of the aims, organization, and methods of agriculture as a high-school subject; "The practice of teaching agriculture" is a graduate course which includes lectures, readings, and conferences, together with school observation and practice of teaching. A course in the history of agriculture and two courses in farm management, including some work in rural economy, are given in the agricultural college. These are recommended especially for students preparing for teaching. The 12 hours in education include

the history of education, the principles of secondary education, either educational methods or school management, and the practice of teaching. The last is a graduate course taken in connection with the course in the practice of teaching agriculture.

The University of Illinois, while allowing agricultural students to elect courses in the department of education, offers also a four-year prescribed course for prospective teachers of agriculture. This course includes 6 hours of agriculture, 31 hours of allied sciences, 17 hours of general cultural subjects, 6 hours in agricultural education, and 8 hours in general education. The work is divided as follows, the figures indicating the number of hours devoted to the subject:

Agronomy.....	21	Thermatology.....	24	English.....	4
Animal husbandry.....	16½	Botany.....	6	Rhetoric.....	9
Dairy husbandry.....	8	Chemistry.....	15	Economics.....	2
Horticulture.....	15½	Entomology.....	24	Education.....	8
Secondary school agri- culture.....	6	Zoology.....	5	Library science.....	2

The course in secondary school agriculture consists of a study of the features of agricultural science best adapted to high-school conditions; the best order and methods for their presentation; the process of suiting the course and instruction to the special interests and needs of each school community; and the planning and execution of laboratory and field work. The courses in education include "the principles of education" and "the principles of secondary education." The essential difference between this course and that offered by the University of California is in the amount of technical agriculture required, the Illinois institution requiring 61 hours of work against 25 in California. Illinois gives 6 hours of work in secondary school agriculture, and California 2 hours, while in general education Illinois gives only 8 and California 12. It should be noted, however, that part of the required work for the teachers' certificate at the University of California is graduate work, while the courses listed above given at the University of Illinois are all undergraduate.

The University of Maine also offers a four-year prescribed course which includes 50 semester hours of agriculture, 11 hours of education, and 89 hours of English, mathematics, sciences, and free electives. The course in education includes 6 hours in the history of education, 5 in the foundations of education, and 2 in child study. The work in agriculture, which is all in the last three years of the course, includes agronomy, animal industry, horticulture, forestry, farm management, veterinary science, agricultural chemistry, and bacteriology. The amount of technical agriculture coincides more nearly with that given by the University of Illinois, but at the University of Maine no courses are given to bridge the gap between these courses and the professional courses in education, as is done



at the University of Illinois and at the University of California. In other words, the student who has completed the course at the Maine institution must work out his own agricultural pedagogy and methods of teaching.

A better plan is followed by the Massachusetts Agricultural College, in which a department of agricultural education was organized by direction of the State legislature in 1907, just before the passage of the Nelson amendment by Congress. The department has but one sort of students to deal with, namely, those preparing to become special teachers of agriculture. Therefore it can devote its entire energy to the special needs of these men. Six courses are given by the department, all open as junior and senior electives: General psychology, three semester hours; history and philosophy of vocational education, three hours; general methods of teaching and special methods in agriculture, two hours; teachers' agriculture, three hours; seminar in education, four hours. The teachers' agriculture consists of a selection and review of such parts of the technical courses in agriculture, horticulture, and the biological and physical sciences as are adapted to the work of the public schools; the seminar in education is arranged for the special study of such topics as legislation and agricultural education, and the place and value of agricultural science in school courses. A department of rural social science gives 22 semester hours of elective work of special value to men preparing to teach in rural communities: Agricultural industries and resources, historical and comparative agriculture, cooperation in agriculture, agricultural economics, and rural sociology. The prospective teacher entering this college takes the prescribed course for the first two years in common with all other students. This includes 10 hours in elementary agriculture and horticulture, 20 hours in physical and natural sciences, 12 hours in English, 10 hours in mathematics, and 14 hours in French or German. In the last two years three hours are required in English and in political science. The student preparing to teach must take all courses in education, together with electives enough to make at least 17 hours of work each semester. The electives must be taken largely from courses in agriculture, horticulture, forestry, and the closely allied sciences, and from the courses in rural social science.

In his four-year course the graduate of this department has therefore had 42 hours in general cultural subjects, 20 hours in physical and natural sciences, 15 hours in agricultural education, and 67 hours of electives chosen from courses in technical agriculture, horticulture and forestry, the physical and natural sciences, and the rural social sciences. As the institution is an agricultural college with no mechanic arts college or liberal arts college included, all

courses offered are taught from the agricultural viewpoint and are closely correlated with the technical work in agriculture.

A prescribed four-year course is offered in the school of education of the University of Tennessee. The course includes even less agriculture than the University of California, only 18 hours of work being prescribed. This includes courses in agronomy, horticulture, animal husbandry, and dairying. Fifteen hours work are required in education, the courses including psychology and philosophy, the history of education, and the science and art of teaching. In addition to this arrangement students in the regular agricultural course may elect a few courses in education in their junior and senior years.

The University of Missouri was one of the first of the land-grant colleges to make special provisions for men desiring to fit themselves for teaching agriculture. Now provision is made for those intending to become general science teachers with a small amount of training in agriculture, and for those intending to prepare as special teachers of agriculture. The students in the first of these classes take all their professional work, including agriculture, in the school of education; those in the second class take their technical courses in agriculture in the agricultural college and their professional work in education in the school of education. The school of education offers three agricultural courses elective to all students preparing to teach. The "Administration of agricultural education" is a course dealing largely with the modern movements and methods in agricultural education from the standpoint of the superintendent of schools. No work in agriculture is a prerequisite. "Soils and plant culture" and "Animal husbandry" are two courses covering the fundamental principles of these subjects, arranged for prospective teachers who have had no other courses in agriculture. To secure a life certificate as a special teacher of agriculture candidates must include in their four years' work, in addition to the required subjects in the school of education, a minimum requirement of 15 hours in agronomy, animal husbandry, and horticulture from courses offered in the agricultural college for the bachelor's degree.

Mississippi Agricultural and Mechanical College has organized a "School of Industrial Education" which offers a special four-year course, leading to the bachelor's degree, in preparation for teaching agriculture or the mechanic arts. Students receive instruction in the languages, mathematics, history and civics, chemistry, physics, biology, geology, psychology, history of education, logic, ethics, sociology, besides technical courses in agriculture given in the department of agriculture. A course called "A study of the agricultural high school" is offered for advanced seniors and graduate students. This course aims to give the student a true conception of the kind

of education the agricultural high school is intended to provide, and a full understanding of the service it is to render the community at large. It aims also to give the student a practical knowledge of the most approved methods of scientific agriculture. A model farm connected with the school of industrial education is conducted to illustrate the proper function of the agricultural high-school farm. The institution is developing a one-year postgraduate course which will include work in general and agricultural education designed to fit its students for filling positions as principals of agricultural high schools. The study of the agricultural high school will be continued, and the men will be given practical work on the "model agricultural high-school farm" and practical teaching in the working boys' courses offered by the college. This additional year's work is very desirable for men intending to teach, because the college is obliged to accept in its undergraduate courses a large number of men who have not had the advantage of a complete high-school course.

Several of the land-grant colleges have made provisions for prospective teachers of agriculture, properly qualified in other respects, to become special students in agriculture or agricultural education. The Michigan Agricultural College allows graduates of other recognized colleges and of State normal schools who have had at least two years' experience in teaching to select technical courses in agriculture, entering with regular classes and taking the subjects in the same manner and at the same time as the regular students. The courses selected may be from those given in any year of the college course but must be approved by the classifying officer. A similar opportunity is offered by the Kansas Agricultural College. The University of Maine offers a prescribed one-year course open to college graduates, high-school teachers with at least two years' experience, and normal school graduates who have taught at least three years. The course includes agricultural botany, 2 hours; agricultural chemistry, 4 hours; agricultural economics, 2 hours; elementary veterinary, 5 hours; economic entomology, 2 hours; bacteriology, 1 hour; agriculture, 34 hours; horticulture, 15 hours; forestry, 2 hours; school gardening, 1 hour; and education, 2 hours.

#### AGRICULTURAL COURSES IN NORMAL SCHOOLS.

In all but a few cases the work in agriculture in the normal schools is intended as preparation for the required work in the elementary schools. Agriculture is a required subject in the common schools of 12 States and in the rural schools of 5 others, and is required for teachers' certificates in 14 States. This has forced it into the curriculum of the normal schools of the States where the subject is required and has aided in its inclusion in the curriculum of normal schools in other States. The past year agriculture as a separate subject, in

more or less complete form, was taught in 104 of the 196 State normal schools, and in the 24 county training schools of Wisconsin. About one-fourth of the State normal schools have graduates of agricultural colleges for instructors in agriculture. A large number of them offer brief courses extending from 4 to 12 weeks. A smaller number offer a full year's course and a few a course of greater extent.

The State normal school at North Adams, Mass., offers a three-year course in agriculture, as well as shorter courses in school and home gardening, agriculture, horticulture, and nature study. During the past three years the work was arranged and conducted with the cooperation of the State Agricultural College, which added to the faculty of the normal school an instructor and supervisor, who gave a portion of his time to instruction at the normal school and to supervision at its three training schools, a second portion to the promotion of elementary agriculture and nature study in the schools of Berkshire County—in which the normal school is located—and the remainder to instruction at the college in agricultural education. The three-year agricultural course includes all of the work in English, psychology, and pedagogy included in the regular two-year normal course. A graduate of the regular normal course or a college graduate may take the agricultural work given in the three-year course in one year. The work is intended to prepare special teachers of agriculture for supervisory work or for teaching in secondary schools. It includes the following subjects:

I. *Agriculture*: Soils; plant life—structures, functions, and diseases; fertilizers, tillage, crops; hotbeds, cold frames, and greenhouses; farm live stock, poultry, bees; dairying.

*Horticulture*: Flower and shrub gardens; window gardens; propagation, pruning, and cultivation; orchards and small fruits; forestry.

*Insects and birds*: Economic importance; control of injurious insects.

*Farm Buildings and Machinery*.

*Sanitary Science*.

(Agricultural physics and chemistry as these subjects are involved in preceding topics.)

*Rural Social Science*.

II. *Nature Study*: Its content and relation to science, literature, and vocational work.

III. *Manual Training*: Carpentry, cabinet work, forge work, assembling farm machinery.

*Drawing*: Freehand and mechanical, structural and decorative design, use of color, farm, and building plans.

IV. *English, etc.*

V. *Pedagogy and Psychology*.

The Fourth District State Normal School at Springfield, Mo., offers two elementary courses and one advanced course. The elementary courses together extend through five terms five hours a week and include a study of plant life, soils and soil fertility, farm crops, grain judging, enemies and diseases of plants and their control, crop rotation, feeds and feeding, live stock, poultry, dairying, and general farm management. The advanced course is a two-year course, which includes one term's work in each of the following: Dairying, animal husbandry, orcharding, farm management, poultry raising, and gardening. The institution has established a two-year agricultural high school in which the students devote one-fourth of the time to agriculture or domestic science and one-eighth of the time to pedagogy as applied to rural school teaching. The course is intended to prepare young men and women for rural school work; and graduates will receive a State teachers' certificate to teach in rural schools. The institution owns a model farm and good equipment for agricultural instruction. The instructor in agriculture is a man trained especially for teaching that subject.

The State Teachers College of Colorado, at Greeley, maintains a department of agricultural education offering nine courses. The work is arranged especially for rural teachers, and a special diploma in elementary agriculture is given to students completing the course.

The institution is equipped with a farm, nursery, gardens, greenhouse, and stables. The instructor is a graduate of an agricultural college. The courses given by the department are as follows, each being a 60-hour course: Nature study; elementary agriculture; school gardening; soils and crops of the farm; animals of the farm; dairy industry and poultry husbandry; horticulture on the farm; the farm home; and rural sociology; and the rural school.

#### NORMAL TRAINING FOR NEGROES.

Among separate institutions for the colored race two are offering excellent opportunities to prepare for teaching agriculture in secondary schools, namely, Hampton Normal and Agricultural Institute, at Hampton, Va., and Tuskegee Normal and Industrial Institute, at Tuskegee, Ala. The Hampton Institute offers a three years' vocational course in agriculture and a special one-year course to students who have completed the vocational course and are preparing to teach agriculture. The one-year course includes the chemistry of soils, manures, and fertilizers; chemistry of dairy products; fermentation; milk testing; geology in its relation to soil formation; biology in its relation to plant and animal life; farm engineering, including a study of farm machinery and structures, and farm physics, including soil physics, the relation of the atmosphere to agri-



culture, climatology, and the organic life in the soil and air. Students taking this course are required to take also the teaching course in the training school, where they are required to teach classes in agriculture under a critic teacher. Upon the completion of both courses they receive a special diploma.

At Tuskegee students in the agricultural department preparing to teach may elect a junior-year course in elementary psychology in its relation to teaching and a senior course in the history of education and methods of teaching. These courses in education may be taken as postgraduate work by students who have completed the undergraduate work at Tuskegee or its equivalent elsewhere.

## RECENT PUBLICATIONS OF THE BUREAU OF EDUCATION ON AGRICULTURAL EDU- CATION.

Agricultural and mechanical colleges. Washington, Government Printing Office, 1908-1911. 869-924 p. 737-769 p. 993-1027 p. 979-1015 p. 8°.

Reprints of reports of the Commissioner of Education for the years 1907-1910. Chapters 23, 15, 19, 22.

Items of interest relative to the agricultural and mechanical colleges; State legislation including appropriation bills affecting these institutions; statistics relative to the number of instructors, students, property, income, and the disbursement of the funds received from the Federal Government under acts of Congress of August 30, 1900, and March 4, 1907.

Agricultural education. Washington, Government Printing Office, 1910. 256-278 p. 8°.

Reprint of report of the Commissioner of Education for the year 1910. Chapter 4.

Current topics on the progress of agricultural education; provisions for training teachers of agriculture for the public schools; movement for securing Federal aid for secondary schools of agriculture and the trades; instruction in agriculture in colleges and universities not included among the land-grant institutions; auxiliary agents for the advancement of agricultural teaching.

Bailey, Liberty Hyde. On the training of persons to teach agriculture in the public schools. Washington, Government Printing Office, 1908. 53 p. 8°. (U. S. Bureau of Education. Bulletin, 1908, no. 1.)

List of references: p. 49-50.

Discussions of the nature of the problem, the means of training teachers, the general outlook, the significance of normal work in the colleges of agriculture. Prepared in connection with the staff of the United States Bureau of Education.

Bibliography of education in agriculture and home economics. Prepared by the library division of the Bureau of Education. Washington, Government Printing Office, 1912. 8°. (U. S. Bureau of Education. Bulletin, 1912, no. —. *In preparation.*)

Includes the most important recent publications on all phases of school and college work in agriculture and home economics; also a selection of the earlier literature on these subjects of current interests.

Federal laws, regulations, and rulings affecting the land-grant colleges of agriculture and mechanic arts. Washington, Government Printing Office, 1911. 13 p. 8°. (U. S. Bureau of Education. Miscellaneous publications.)

An administrative circular containing the text of the Morrill land-grant act of 1862, the amendment of 1883, the Morrill Act of August 30, 1900, and the Nelson amendment of March 4, 1907; also the rulings and instructions of the Department of the Interior relative to these acts and to the expenditure of the funds provided by them in aid of colleges of agriculture and mechanic arts.

Jewell, James Ralph. Agricultural education, including nature study and school gardens. 2d ed. rev. Washington, Government Printing Office, 1908. 148 p. 8°. (U. S. Bureau of Education. Bulletin, 1907, no. 2.)

A comprehensive survey of the status of nature study, school gardening, and elementary agriculture in the public schools in various parts of the world. Prepared in connection with the staff of the United States Bureau of Education.

Monahan, A. C. Agricultural education. Washington, Government Printing Office, 1912. 331-370 p. 8°.

Reprint of report of the Commissioner of Education for the year 1911. Chapter 9.

Digest of the reports of various State commissions on agricultural and industrial education; important legislation in several States in the 1911 session of the State legislatures; status of instruction in secondary

and elementary agriculture in each State; some types of secondary agricultural schools; a statement concerning what each State agricultural college is doing to prepare special teachers of agriculture for secondary schools; preparation of teachers in elementary agriculture in normal schools.

Monahan, A. C. Opportunities for graduate study in agriculture in the United States. Washington, Government Printing Office, 1911. 16 p. 8°. (U. S. Bureau of Education. Bulletin, 1911, no. 2.)

Data as to the courses available for graduate instruction in agriculture and the related sciences gathered in a systematic way from the State colleges of agriculture and mechanic arts, the State universities and the institutions represented in the association of American universities; classified by subjects and institutions. Courses are listed only from institutions requiring practically the completion of the standard high-school course for entrance. The bulletin is a result of an investigation of the conditions in each institution relative to the equipment for undertaking graduate work and the qualifications of instructors under whom the course is given. A supplement dealing with undergraduate courses in agriculture offered by the State colleges of agriculture has been printed for distribution in foreign countries for the benefit of students planning to come to the United States to study agriculture.

Mutchler, Fred, and Craig, W. J. A course of study for the preparation of rural teachers in nature study, elementary agriculture, sanitary science, and applied chemistry. Washington, Government Printing Office, 1912. 23 p. 8°. (U. S. Bureau of Education. Bulletin, 1912, no. 1.)

Outline of the courses presented for this purpose at the Western Kentucky State Normal School, with explanations regarding the methods of presentation.