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ON THE TRAINING OF PERSONS TO TEACH AGRICULTURE IN THE PUBLIC SCHOOLS

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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
WASHINGTON, D. C., *February 13, 1908.*

SIR: I have the honor to transmit herewith a manuscript entitled "On the Training of Persons to Teach Agriculture in the Public Schools," and to recommend its publication as the first number of the bulletin of the Bureau of Education for the year 1908.

By the so-called Nelson amendment to the agricultural appropriation bill for the year 1908 the sum of $5,000 was added to the appropriation to each of the States for the better endowment and support of the agricultural and mechanical colleges which had been previously endowed and aided under the two Morrill acts, of July 2, 1862, and August 30, 1890; and it was provided that this addition should be increased by the sum of $5,000 annually till it should reach the annual amount of $25,000. When this maximum is reached, at the end of a five-year period, each State will receive annually, including the $25,000 previously granted under the second Morrill Act, a total of $50,000 for agricultural and mechanical college purposes.

With these liberal endowments and the still larger amounts appropriated by the State governments the "land-grant colleges" have been able to give a great impetus to agricultural education. They have helped to form the rising demand for a wide extension of such education in high schools, normal schools, and schools of elementary grade.

As was pointed out in the report of the Commissioner of Education for the year 1906, there is grave danger that the demand for the teaching of agricultural subjects shall far outrun the supply of properly qualified teachers. Such a mischance might result in a serious setback to a great educational movement—one of the most promising educational movements, in fact, of the present generation. It is accordingly significant that the Nelson amendment contained the following provision: "That said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

The Bureau of Education bears some responsibility in this matter, since the Department of the Interior is charged with the distribu-

tion of the annual appropriations under both the second Morrill Act and the Nelson amendment, and this Bureau is the agency through which that function is discharged. With a view to rendering some assistance in the shaping of plans for such training of teachers as may be undertaken by the colleges with the aid of these new funds, I have asked Prof. Liberty Hyde Bailey, director of the New York State College of Agriculture at Cornell University, to prepare the bulletin which is presented herewith. Professor Bailey is among the foremost of those who are making the new movements in agricultural education, and his suggestions will have value and interest, not only for the authorities controlling the agricultural and mechanical colleges, but also for all who are interested in these new educational undertakings.

Very respectfully, ELMER ELLSWORTH BROWN,
Commissioner.

The SECRETARY OF THE INTERIOR.

INTRODUCTORY NOTE.

The most significant contemporaneous movement in education is the effort to adapt the work of schools directly to the lives of the pupils. It is the expression of the effort to make the school training applicable. The normal activities of the child are to be directed and trained in such a way that real education will result therefrom. Education will grow out of the child's experience, rather than be imposed on him.

If this is to be the motive of popular education, then agricultural and industrial subjects will be made more and more a means of school work. It is therefore a question of the first importance how to organize these subjects into an educational harmony. The agricultural subjects are specially difficult of organization, because they are so many and so diverse and so unlike in different regions. The character and success of the teaching of these subjects lie immediately with the teacher; there have been no institutions consciously to train teachers for such work; therefore it is not strange that many educators should consider the training of persons to teach agricultural subjects to be the most important educational question now before us.

ON THE TRAINING OF PERSONS TO TEACH AGRICULTURE IN THE PUBLIC SCHOOLS.

PART I.—THE NATURE OF THE PROBLEM.

It is first necessary to understand that the training of teachers for the teaching of agriculture in the public schools is not a simple or a single question. The training of teachers for the group of subjects embraced under the term "agriculture" can not be isolated from other training. It is not alone a question of giving the teachers the necessary technical knowledge and skill in agricultural subjects, but also of providing training and experience in methods of teaching, and in developing a point of view and a right estimate of education in general. There is great danger in the technical teaching of agriculture, even though it be well taught, if the teacher is not also well grounded in the social and pedagogical principles and problems involved in all education; and any such irrelevant or unrelated teaching will in the end react disastrously on the very movement that it is intended to promote.

The subject before us is not single in respect to the kinds or grades of schools that are involved in the discussion, the constitution or body of the subject-matter itself, or the nature of the sentiment that lies behind the movement for agriculture in the schools.

In the training of teachers it is necessary at once to know the kind of teaching that the prospective teachers are expected to undertake. With the widespread and unorganized interest in agricultural education it is impossible to make any definite classification, but we may roughly throw the schools in which the teaching of the subject is in question into three groups—the elementary schools, the high schools, and various kinds of special schools.

(1).—ELEMENTARY SCHOOLS.

We first consider elementary teaching of all kinds, meaning, in general, such range of work as is comprised in the first eight grades of a graded school system, or work in ungraded schools that is not more advanced than this. In this group the difficulties are the greatest. The group includes most of the so-called rural schools, the greater part of which are not graded to any extent, in some regions not at all.

These rural schools are most closely in contact with real agricultural needs, and it is in them that many persons seem to expect the quickest and best results from the teaching of agriculture; yet they are beset with very special difficulties, and we shall need to discuss them at some length. We may take this opportunity, also, to discuss some of the principles involved in rural school education.

The first thing that needs to be done with the rural elementary schools—the so-called district schools—is to redirect them and vitalize them, rather than merely to introduce agriculture as such. It is not unlikely, however, that this very agitation for the teaching of agriculture is to be the means of starting the reorganization. The demand for the introduction of agriculture is in reality the concrete expression of a desire to make the schools mean something real and tangible to the pupil, to relate them to his life and environment. The effort to accomplish this has recurred strongly at different epochs for at least one hundred years. Recorded discussions of fifty and seventy-five years ago read much like those of to-day. It is probable, however, that we have now arrived at a time when the agitation will produce concrete organizational results. Education by means of agriculture is but a phase of industrial education.

The special difficulties or handicaps of the rural elementary schools are such as these: Teaching in them is not recognized as a profession, but is undertaken as a preparation for other teaching or as a means of temporary employment, and the qualifications are low; teachers' pay is small; tenure of teaching is short, so that there is lack of continuity of effort; one teacher must handle all subjects in most cases; the school year is usually short; attendance is small and irregular; equipment, even in land, is practically nothing; the constituency is conservative and often even uninterested; supervision is slight, and usually not of a constructive or progressive nature. The whole scale of maintenance and organization is low.

In spite of all these disadvantages, however, the rural elementary school has useful characteristics that must not be overlooked, and that should not be lost. Some persons look for the practical abolition of this type of school, usually planning for it an evolution into a system of consolidated centers after the manner of city-school consolidation. It is a question, however, whether we are not likely to place relatively too much emphasis on the establishing of new institutions, whereas the greatest effectiveness and even the quickest results may probably be attained by utilizing agencies already in existence. It is easy, for example, to ridicule the country school, and then to plead for new isolated schools in which to teach agriculture; but in so doing we may forget that isolated special schools can not serve all the people, and that they also tend to isolate the subject. The present rural schools, with all their shortcomings, are good schools because

(1) they are already in existence; (2) they are the schools of all the people; (3) they are small, and thereby likely to be native and simple; (4) they are many, and therefore close to the actual conditions of the people. We should utilize them to the fullest by improving and redirecting them; and in the end these schools, when redirected, will present the fundamental solution of the problem of rural education. In the discussion of this question, we must not make the mistake of thinking of the welfare of the school alone. The open country needs more local centers of life and influence rather than fewer. It is a debatable question whether the best social life is to be secured by any general consolidation of schools that will make large and far-apart units.

The arguments in favor of consolidation are many and important. By consolidation, stronger teaching units are secured; more money is available for the employing of teachers and the providing of equipment; special subjects can be given adequate attention. The objections are many, but most of those commonly urged are trivial and temporary. The greatest difficulty in bringing about the consolidation of schools is a deep-seated prejudice against giving up the old schools. This prejudice is usually not expressed in words. Often it is really unconscious to the person himself. Yet right here may lie a fundamental and valid reason against the uniform consolidation of rural schools—a feeling that when the school leaves the locality something vital has gone out of the neighborhood. Local pride has been offended. Initiative has been removed one step further away. The locality has lost something. It is a question, even, whether the annual school meeting is to be lightly surrendered, whether it is not worth keeping as an arena for the clearing of local differences, and as a possible nucleus of a useful institution. By every legitimate means we should develop and fix local attachments. We have almost come to be a nation of wanderers and shifters. We are in danger of losing some of our affection for particular pieces of land. Farming is a local business. It develops into great effectiveness only when local feeling is strong. The State also needs the conservatism and steadiness born of this local interest.

Much of the impulse for the consolidation of schools, as already intimated, is a reflection of the centralized city graded school; but it is by no means certain that such institutions are to be the most important or dominating schools of the future. The small rural school, with its weaknesses, has the tremendous advantage of directness and simplicity. It is doubtful whether it would be improved by a rigid system of grading. It is a question, in fact, whether the graded schools do not still carry the onus of proving themselves. Unquestionably consolidation of rural schools is often advantageous, and is to be advised whenever it seems to be necessary for pedagogical

reasons. In some regions it may be a necessity. It is often urged for financial reasons; but this in the long run is not reason enough. We maintain our canals and Government work at public expense. The State must cooperate in the maintenance of its detached schools, by direct appropriations, if necessary, to their localities, always on the condition, however, that all effective control does not pass out of the community. Consolidation of schools is much more than a school question. It touches the very quick of local pride and progress.

There is every reason to expect that consolidation of rural schools will proceed, and with benefit. The point is that it should come naturally and that it should not necessarily be expected to operate advantageously everywhere. It should come as a result of conditions, and should not be forced independently of conditions. It will undoubtedly be found that some districts will be better off without consolidated schools. There is no reason in the nature of education why both separate and consolidated schools may not each render service that the other can not render. It will be unfortunate if the question of consolidation of schools falls into the hands of advocates or partisans. The social welfare of the community, as well as the school work, must be considered in every case.

The rural elementary school will be redirected by making it a natural expression of the community of which it is or ought to be a part. Education should develop out of daily experience. It is not necessary to have an entirely new curriculum in order to redirect the rural school. If geography is taught, let it be taught in terms of the environment. Geography deals with the surface of the earth. It may well concern itself at first with the school grounds, the highways, the fields and what grows in them, the forests, hills, and streams, the hamlet, the people and their affairs. As the pupil grows, he is introduced to the world activities. Similar remarks may be made for arithmetic, reading, and all the other customary work of the school. This is much more than what is now meant by "correlation." The problem of the rural school is not so much one of subjects as of methods of teaching. The best part of any school is its spirit; a school can be conceived in which no agriculture is taught separately, which may still present the subject vitally from day to day by means of the customary studies and exercises. The agricultural colleges, for example, have all along made the mistake of trying to make farmers of their students by compelling them to take certain "practical" courses, forgetting that the spirit and method of the institution are what make the work vital and what send the youth back to the land. The whole enterprise of elementary schooling needs to be developed natively and from a new point of view; for in an agricultural country agriculture should be as much a part of the school as oxygen is a part of the air. We should not isolate

agriculture from the environment of life in order to teach it; we should teach the entire environment.

If the foregoing points are well taken, we then see that the problem of training teachers to teach agriculture in elementary schools is much more than providing them with an equipment of agricultural subject-matter. Here and there the special teacher of agriculture will be needed in elementary work, as in certain consolidated rural schools, and in well-graded city or village schools. Now and then teachers will be needed to supervise the work in agriculture in several related schools; but experience will probably demonstrate that in most cases this will be only a temporary means of handling the subject, in order to organize it and to start it.

It is not alone a new kind of teacher that the rural elementary school needs, and no rural school constituency should be allowed to feel that emphasis should be put on teachers alone. In fact, the kind of teacher is usually an expression and result of the type of effort that exists in the district. The school is worth no more than the district pays for it. The same is true of a horse or a plow or a farm. The rural school premises are often unattractive or even repulsive. No work with spirit in it is likely to be accomplished under such conditions. Moreover, there is no equipment in most of these schools; and teaching can not, any more than farming, be well accomplished without facilities and appliances.

The school building is first to be considered. From Maine to Minnesota one will see in the open country practically one kind of schoolhouse, and this the kind in which our fathers went to school. There is nothing about it to suggest the activities of the community or to attract children. Standing in an agricultural country, it is scant of land and bare of trees. If a room or wing were added to every rural schoolhouse to which children could take their collections or in which they could do work with their hands, it would start a revolution in the ideals of country-school teaching, even with our present schoolteachers. Such a room would challenge every person in the community. They would want to know what relation hand training and nature study and similar activities bear to teaching. Such a room would ask a hundred questions every day. The teacher could not refuse to try to answer them. A room of this kind, containing perhaps a plow and a few agricultural implements, would itself constitute one of the means of training teachers.

Eventually, the entire school will partake of the informal character that is suggested by the single workroom. The pupil will be allowed to express himself; and it will be the part of the teacher to direct and shape this expression to the best educational ends. Unless the elementary-school teacher has some such outlook as this, his teaching of agriculture is likely to impose another task on the child.

We may next consider the equipment of land. A good part of all our laboratories should be out of doors. In the argument for separated rural schools, one is struck with the plea that good laboratories may be secured. A good part of this argument comes from college men. It does not at all follow that our four-wall laboratory methods are as useful for the elementary schools as for colleges and high schools. In fact, it is a question whether much of our college laboratory work is really worth the while as compared with good natural field work under the conditions that are everywhere at hand. The school land may be used for plantations of trees and shrubs, for school gardens, for experimental plats, and utilized as an arena of the natural wild life of the neighborhood. Equipment of land should go far toward developing a really effective nature teaching, redirecting some of our present laboratory methods. Laboratory teaching may be pedagogically just as incorrect as book teaching. If the school is fairly well equipped outside and inside, a good part of the difficulty of securing teachers will subside; for the good places naturally attract the good teachers.

It is well to consider briefly what may be taught in the elementary school, whether a town school or a country ungraded school. In some cases separate classes in agriculture may be organized, but in most cases the work for the present must be incidental to other teaching. In any event, the content of the agricultural work must be carefully considered, for this will have direct relation to the training of the teacher. The main effort of primary and elementary teaching, so far as the agricultural phase is concerned, should be to put the pupil in touch with himself and his environment. Before the sixth grade, or its equivalent, there should probably be no agriculture as such. Generalized nature study should here control the work. This will underlie and prepare for all future work. It will be a mistake to try to force formal technical agricultural work in any grade below the high school.

Every teacher should understand that the term "nature study" is a misnomer. It does not stand for a "study." It is not a subject. It is not a "method," as this term is understood by teachers. It is an attitude, a purpose, a point of view, a mode of education. It is a spirit. It is a fundamental educational intention, inasmuch as nature is the condition of our existence and as it is our duty to live in effective harmony with our conditions. Its underlying principle is one—to teach the things that are near at hand and that are naturally a part of the child's environment and activities, and to teach these things for the sake of the child, rather than to promulgate a subject. It will be seen, therefore, that no good subsequent teaching of agriculture is possible without the nature-study training.

The nature-study process and point of view should be a part of the work of all schools, because schools train persons to live. Particularly should it be a part of rural schools, because the nature environment is the controlling condition for all persons who live on the land. There is no effective living in the open country unless the mind is sensitive to the objects and phenomena of the open country; and no thoroughly good farming is possible without this same knowledge and outlook. Good farmers are good naturalists. It would be incorrect to begin first with the specific agricultural phases of the environment, for the agricultural phase (as any other special phase) needs a foundation and a base; it is only one part of a point of view. Moreover, to begin with a discussion of the so-called "useful" or "practical" objects, as many advise, would be to teach falsely, for, as these objects are only part of the environment, to single them out and neglect the other subjects would result in a partial and untrue outlook to nature; in fact, it is just this partial and prejudiced outlook that we need to correct.

We must have it in mind that the common elementary schools do not teach trades and professions. We do not approach the subject primarily from an occupational point of view, but from the educational and spiritual; that is, the man should know his work and his environment. The mere giving of information about agricultural objects and practices can have very little good result with children. The spirit is worth more than the letter. Some of the hard and dry tracts on farming would only add one more task to the teacher and the pupil if they were introduced into the school, making the new subject in time as distasteful as physiology and grammar often are. In this new agricultural work we need to be exceedingly careful that we do not go too far, and that we do not lose our sense of relationships and values. Introducing the word agriculture into the scheme of studies means very little; what is taught, and particularly how it is taught, are of the greatest moment. It is to be hoped that no country-life teaching will be so narrow as to put only technical farm subjects before the pupil.

We need also to be careful not to introduce subjects merely because practical grown-up farmers think that the subjects are useful and therefore should be taught. Farming is one thing and teaching is another. What appeals to the man may not appeal to the child. What is most useful to the man may or may not be most useful in training the mind of a pupil in school. The teacher, as well as the farmer, must always be consulted in respect both to the content and the method of agricultural teaching. We must always be alert to see that the work has living interest to the pupil rather than to grown ups, and to be on guard that it does not become lifeless.

Probably the greatest mistake that any teacher makes is in supposing that what is interesting to him is therefore interesting to his pupils.

In a rural community all the surroundings and customary activities should find expression in the school, as a means of putting the pupil into touch and sympathy with his environment: (1) The natural objects in the region and the character of the country; (2) the means by which people in the community live; (3) the household, or domestic affairs; (4) civic affairs, or the way in which human activities are organized and governed. All this is nature study in its best and broadest sense. These subjects may be taught in separate periods or classes; but the fundamental means is a complete redirection of the school activities so that vital and experience work will be a very part of the school life and dominate it. This redirecting of school-teaching, in both country and city, is taking place at the present time, although silently and unobtrusively.

As the child matures, nature-study work may become more concrete. In grades 6 to 8, it may be nature-study agriculture, perhaps following the suggested outline of the Report of the Committee on Industrial Education in Schools for Rural Communities to the National Council of Education, July, 1905 (pp. 44–45):

> After the explicit nature study ceases with the fifth grade, the pupil in the rural school may then be taken through the elements of agriculture in the sixth, seventh, and eighth grades. The work in these three grades should really be nature study, but agricultural subjects are the means. Some will prefer to call it nature study rather than agriculture. Its purpose is not so much to teach definite science as to bring the pupil into relation with the objects and affairs that are concerned with the agriculture of his region. When the pupil has completed his nature study in the fifth grade, he should have a good knowledge of the physiography of his region, and of the common animals and plants. He will then be able to carry his inquiries into the more specific field of the agricultural practice and operations. When he has completed his eighth year, he should have a well-developed sympathy with agricultural affairs and he should have a broad, general view of them. Entering the high school, he will then be able to take up some of the subjects in their distinctly scientific phases.

The general plan recommended by the committee is as follows: Sixth year, first half, the affairs of agriculture; second half, the soil; seventh year, farming schemes and crops; eighth year, animals.

> If the agricultural work in the grammar grades is to be of the nature-study kind and not of the science kind, it can then cover a somewhat wide range. In these grades, the pupil should not be put into "agronomy," "economics," and other technical subjects, but he should be brought into relation with his agricultural environment.

A statement is now given of what is actually accomplished in a one-teacher district school in New York, where special classes can not be organized. The teacher has been successful in interesting his pupils in various experiments and tests that have relation to farming. He gives all the pupils nature-study work, including the younger ones. Suggestions are had from books, from the State syl-

labus, and perhaps quite as frequently from something that happens for the time to be interesting the school or the community. He is introducing practical local problems into the arithmetic work. He suggests that if ten or twenty-five schools could work together in harmony in arithmetic, geography, and other subjects, thereby making it worth while for examination questions to be asked on these new lines of work, the results would be very marked. Some of the problems that have been more or less used are as follows (as expressed by the teacher himself, Mr. H. H. Lyon):

Air:

Test for moisture.
Test for carbonic acid gas. (Limewater, etc.)
Tests for ammonia. (In schoolroom and in cow stables.)

Seeds:

Germination. (Find per cent, etc.)
Manner of growth. (Monocotyledons, dicotyledons.)

Plants:

Water taken from soil. (Use scales.)
Transpiration. (Collect H_2O.)
Examination of nodules on leguminous plants.
Effect of nodules on luxuriance of growth.

Soils:

Search for water-table—different places and times.
Test with litmus paper.
Effect of lime or ashes on clay soil.
Effect of lime on clear and on muddy water.
Correct acidity with lime or ashes. (Result observed in growth of clover.)
Capillarity under different conditions.

Milk:

Babcock test.
Drill in making measurements, reading bottles, computations.
Test acid with acidometer.
Acid test.
Correct measurements, computations of acid.
Milk at different ages.
Under different conditions of cleanliness and temperature.
Bottle and cork tight; keep warm; observe odor; use different samples to compare.

Water:

Test for organic matter.
Bottle with a little sugar; keep warm; observe color, etc.
Use potassium permanganate.

Osmosis:

Using egg.
Using bladder.

Fungicides:

Formaldehyde for oats smut.
Hot water for oats smut.
Bordeaux for potato blight. (Use ferrocyanide test.)
Computations in each case.

Chemical action:

Caustic soda solution plus muriatic acid.

Evaporate; find the salt.

(Can teach chemical formula of this even at 10 or 12 years.)

Commercial fertilizers:

Handling and mixing—Nitrate of soda, muriate of potash, and dissolved rock. (Computations.)

Cows:

Dairy type. (Examine form, milk veins, hide, etc.)

Beef type.

Weather map:

Receive daily maps and determine location of storm center.

Physical experiments of various kinds taken from books on physics. Make suction pump with lamp chimney, etc.

Garden:

A grass plot has been substituted for the school garden, where farm grasses, fertilizers, and seeding may be studied.

It will be seen from a careful consideration of the foregoing discussions that much very good agricultural work can be introduced into the ordinary elementary school that is teaching the usual State syllabus. It can be taught as a part of geography and arithmetic and manual training and reading, as well as in the regular nature-study intervals; and it is not difficult to send a pupil home with a desire to attack some of the problems at the house, on the farm, and in the garden. The Report of the Committee on Industrial Education in Schools for Rural Communities denies the charge that the poor teaching in the common branches is attributable to lack of time, for the poor results are "not due to lack of time on the part of pupils so much as to poor teaching and lack of proper organization;" and also asserts that the poor results attributed to the overcrowding of the course of study are "not due to the number of subjects, but to the attempt to teach too many things in these subjects which are not worth teaching."

(2).—HIGH SCHOOLS.

The question of the teaching of agriculture in the high school is much simpler than the problem in the elementary school. The pupil now arrives at an age when he may begin in some slight degree to choose and to specialize. The school is organized and supervised. Teachers are provided for special subjects. Apparatus is more likely to be supplied.

On the other hand, the high school is more rigid and crystallized. It is usually in town and has no immediate contact with land. It is further removed from direct agricultural influence.

The content of agricultural work in the high school is not yet determined with any definiteness, although very explicit courses of study have been recommended and even adopted. It will require

some years to work the enterprise out satisfactorily. Yet the teacher who is preparing for high-school work in agriculture has a fairly definite and limited field, and can prepare himself concretely. The field is essentially a natural-science field. The high-school teacher of agriculture should be as well grounded in the science and practice of his subject as the teacher of physics or chemistry or botany is in his field. He should, in fact, have a deeper and broader training, since he must use physics, chemistry, botany, and the like, in his special agricultural work. For many years to come the natural-science teacher will probably be obliged to handle the agricultural work in many high schools that introduce the subject.

The teaching of physics, chemistry, and the other natural sciences would probably better be separate from the teaching of agriculture, as schools are now organized, and constitute a science foundation for the agriculture. The alternative is stated as follows by the Committee on Industrial Education in Schools for Rural Communities (p. 45):

> If the high school has no adequate course in biology, then the student can be given a good drill in botany and zoology with particular reference to its agricultural relation, and this might be called "agriculture;" but it would be better if the student could have his fundamental training in biology in the first year of his high school and let him take his agricultural science thereafter. The agricultural work in the high school should have a distinctly scientific value. It should be such as would count toward science entrance requirements in case the student should desire to enter an agricultural college.

The point is that the natural sciences are essential; whether they shall be taught as a part of the agriculture or developed in the school preceding the agriculture, is at present a local or special question. We may hope that eventually the teaching of the natural sciences may be so vital and applicable that these sciences may constitute a part of a real course in agriculture.

One of the most hopeful recent movements for secondary agriculture teaching is the introduction of unit courses in biology, whereby an effort is to be made to give the high school pupil a real conception of the processes of life, rather than a fragmentary view of parts of the subject here and there. Everything will depend on whether this teaching can escape from the text-book drudgery and the old four-wall laboratory method. Agricultural subjects are alive and they are out of doors; it is for this reason that many persons are looking to the introduction of these subjects to be a quickening agency in the schools.

Having had biology and some of the elements of physics and chemistry, the pupil then comes to his agriculture; and the teacher wants to know what this agriculture is to be. No one is prepared yet to say just what it shall be. Some of the schemes that have been prepared are so extended and so minutely divided that no teacher can hope to

cover them except by the text-book and recitation method. They seem to be conceived on the type of the present formal text and laboratory work in natural science. It has been the habit to say that the nature-study point of view is advantageous chiefly in the elementary schools, but it is equally needed in the high schools and even in the colleges.

Whether taught formally or informally, the work that the teacher must be prepared on embraces the actual problems of agriculture: The structure and composition of soils and their reactions to natural agencies, the operations of tillage, the reasons and practices underlying the growth and the improvement of plants, the raising and handling of crops, the rearing and improvement of animals, the care and feeding of animals, the marketing of crop and animal products, the diseases, pests, and handicaps of crop growing and stock growing, the use of farm machinery, the making and keeping of the home, the economic and social phases of the farmer's business and life.

Within this range is more subject-matter than any school can cover; but the teacher must know the field in its educational applications, and be able to segregate from it such parts as will make a useful course for any given place or given length of time. Two modes are open to the teacher in organizing such work: (1) To work on problems, choosing those that are applicable in the community, as the growing of corn or cotton, the making of butter, the raising of hay, the growing of fruit; or (2) to endeavor to develop in the pupil a comprehensive view of the practice of agriculture in general, in much the same way as one endeavors to develop the body of a science. In either case the teacher will require the same fundamental training in the real facts and in educational processes.

The teacher in the high school, as in the elementary school, must nowadays be equipped in school gardening. A laboratory of living things is a necessary part of the best work in nature-study agriculture. It is customary to call this laboratory a school garden. We need to distinguish three types of school garden: (1) The ornamented or planted grounds; this should be a part of every school enterprise, for the premises should be attractive to pupils and they should stand as an example in the community. (2) The formal plat garden, in which a variety of plants is grown and the pupils are taught the usual handicraft; this is the prevailing kind of school gardening. (3) The problem garden, in which certain specific questions are to be studied, in much the spirit that problems are studied in the indoor laboratories; these are little known at present, but their number will increase as school work develops in efficiency; in rural districts, for example, such direct problems as the rust of beans, the blight of potatoes, the testing of varieties of oats, the study of species of grasses, the observation of effect of fertilizers, may well be under-

taken when conditions are favorable, and it will matter very little whether the area has the ordinary "garden" appearance. In time ample grounds will be as much a part of a school as the buildings or seats now are. Some of the school-gardening work may be done at the homes of the pupils, and in many cases this is the only kind that is now possible; but the farther removed the laboratory, the less direct the teaching.

(3).—SPECIAL SCHOOLS.

There are two current theories as to the best means of developing popular agriculture education: (1) By adding it in existing public schools or evolving it out of their present work; (2) by establishing special schools in which industrial, domestic, and agricultural subjects shall predominate. The latter means is now gaining rapid currency. It assumes several forms, namely, a county school system, as in Wisconsin; a Congressional district system, as typically represented in Alabama and Georgia; an adjunct to existing colleges or universities, as is now beginning in New York; a development of such schools in special localities here and there. The county or centralized high school in new regions that are dominated by agricultural interests becomes strongly industrial and agricultural, and the same will probably be true of new consolidated schools. In Minnesota an agricultural high school has been established in connection with the State University. All these schools are supported by public funds. Aside from these classes, there are various kinds of agricultural schools on private and denominational foundations.

These various kinds of schools do not belong to one educational class, but they are thrown together here because they are not a part of the regular public school system. So far as the preparing teacher is concerned, however, they are homogeneous in the sense of requiring a special training for special work, rather than a generalized training. In the higher and more specialized examples the work is carefully differentiated, so that some one phase of agriculture is given exclusively to one teacher.

There is every prospect that these special agricultural schools will increase in number in the next ten years, and they open the most attractive present field for those who would teach agriculture of a secondary public school grade. In fact, it is chiefly the demand created by these special isolated schools that has demonstrated the great lack of teachers for good agricultural work.

It may be well to raise the question with the prospective teacher, however, whether these disconnected schools are always to hold undisputed leadership, for thereby we shall be able to emphasize a very important pedagogical principle—the principle that agriculture edu-

cation should not of right be separated from all other educational effort. Education by means of agriculture is but a phase of education in general. The great effect of these special schools will be their influence in breaking down old prejudices, in setting new and independent standards of education, in arousing enthusiasm, in developing ways and methods of teaching the common affairs of life. They will react powerfully on the general public school system if their work is not too much insulated by mere technical teaching, perhaps contributing the most productive single influence in the much needed reform and reorganization of all the schools that represent rural communities. There is danger that in the isolation of these institutions we may also isolate the educational programme, and it is the duty of the teacher to see that this does not occur. The final solution is not the organization of special detached schools, but the redirecting of the existing public schools in such a way that they shall teach the members of their communities how to live.

PART II.—THE MEANS OF TRAINING THE TEACHERS.

Having now examined the nature of the demand for teachers of agriculture and the grades of teaching that are required, we may attack the question of determining where these teachers shall be trained. Where and how a teacher shall be prepared will depend, of course, on the phase or range of agriculture teaching in which he is to engage.

The degree of a teacher's preparation will be conditioned by the pay he is to receive. The general elementary schools, and most of the high schools, do not pay sufficient salaries to warrant a teacher in spending much time and money in perfecting his equipment in both agriculture and education. Good agricultural college training is practically out of the question for these fields at present, because graduates from such colleges of good abilities command better salaries elsewhere.

The schools will not command good teachers in these new subjects until they are able to supply fairly good equipment in the way of land, material, and apparatus. Very few schools are yet ready for good teachers of agriculture, wholly aside from the question of salary. No really good agricultural work can be accomplished by the customary schoolroom method.

The demand for teachers will arise here and there in the public school system largely in the desire to combine the teaching of agriculture and science. There is every indication that this demand will spread with considerable rapidity. The elementary grades will not yet demand special teachers for these subjects. The special or separate agricultural schools will demand special teachers, with thorough preparation. The demand for nature-study teachers is increasing. These teachers should be able to handle the agricultural work in the grades.

As to the kind of preparation that the teacher should have for good work in agriculture, the first requisite is a new point of view in education. The person need not be afraid to set sail on the ship of current educational theory, but he should be ready, on occasion, to throw overboard all his luggage. He is to land on the home patch, where he will meet new problems that he may want to attack naturally in his own way, and his progress should not be impeded. He

will not need all the things that he has picked up on his travels. He is to study the objects and materials just about him and as they actually exist, and he is to study them himself, and then impart his interest and his enthusiasm to his pupils. He will need tools of various kinds, as implements, books, notebooks, and apparatus, but they are only tools.

Again, he must teach first-hand fact, not mere theory or mere text-book. The recitation is only incidental; perhaps he will not utilize it in a good part of the work. All agricultural subjects must be taught by the nature-study mode, which is accurately to see the real object or the real phenomenon; to reason correctly from what is seen; to establish a bond of sympathy with the object or phenomenon that is studied. One can not see accurately unless one has the object itself. If the pupil studies corn, he should have corn in his hands, and he should make his own observations and draw his own conclusions; if he studies cows, he should make his own observations on cows and not merely repeat what some one has said about them. So far as possible, all nature-study work should be conducted in the open, where the objects are. If specimens are needed, let the pupils collect them. See that observations are made on the crops in the field as well as on the specimens. Nature study is primarily an out-door process; the schoolroom should be merely an adjunct to the out of doors, rather than the out of doors an adjunct to the schoolroom, as it is at present. It can not be too often repeated that the teacher and the pupil must *get out of doors*.

Again, the mere details of "method" are of very secondary importance. When the teacher knows a thing of his own experience and is consumed with enthusiasm for it, he will teach in spite of himself. The teacher must be taught to teach the significant things. Many a pupil is wearied of a subject by the endless attention to mere details, and to exceptions, and to overcareful explanations of this and that. Teach the detail only when the detail is relevant. Do not teach mere processes so far in advance of the need of them. It is the finest thing in teaching to have a nice sense of proportion.

Still again, the intending teacher of agriculture should not neglect the home side of farm life. What we call "home economics" is not necessarily a woman's subject alone. It is central to all effective agriculture. The country girl has just as much need of being put into touch with realities as the country boy has, and no teacher of agriculture, whether man or woman, should neglect or overlook the home any more than he should neglect or overlook the barns.

We may now consider the institutions that may train teachers. In the effort to elucidate this perplexing subject, correspondence has been asked of all State superintendents of public instruction in the United States and of all agricultural colleges, and appeal has been made to

many persons who have given this matter much thought. The correspondence culminating in this publication has covered several years, although not all undertaken for the particular purpose of this report. The kindest and freest responses have been given, for which the author now makes due acknowledgment. This correspondence discloses the most diverse opinions in respect to the means to be evolved for the training of persons to teach agriculture. All the respondents indicate a desire to see some means developed whereby teachers can be fitted for this work, evidencing their feeling that a question of great public moment is before us.

The subject may be clarified at once by dividing the efforts to train teachers for agriculture into two groups: (1) Those agencies that aim to aid teachers already in the schools to "get up" agricultural work; (2) those agencies that aim consciously to prepare new teachers for this field.

(1).—AIDS TO TEACHERS.

With the exception of the newly organized special agricultural schools, the present work in the teaching of agriculture will fall mostly to teachers who are now engaged in the schools. They have had no regular school training in the subject, as a rule, and they must now prepare themselves as best they can. They are often forced to pass an examination in what is called agriculture, even though there may be no means whereby they can compass the subject. For the present teachers various aids and short cuts are provided, and some of these agencies are also invoked to spread the propaganda of the new education among the people.

These agencies may be ranged under seven heads: (*a*) Summer schools and institutes; (*b*) introduction of agricultural work into brief teachers' institutes and convocations; (*c*) lectures before teachers, farmers, and various organizations, emanating from an educational center; (*d*) correspondence, reading club, and leaflet work; (*e*) short courses in agricultural colleges and other institutions; (*f*) supervising or advisory teachers who inspect the nature study or agriculture in a group of schools; (*g*) work of the United States Department of Agriculture.

These diverse agencies have exerted a powerful influence on public sentiment touching education that shall prepare men and women to live. In fact, the present momentum of the movement is very largely due to the extensional and propagandic work that these agencies represent. These enterprises can not be expected, however, to give persons the real initial foundation and point of view that will be needed in the coming teaching of agriculture; this real preparation in any teacher must come gradually as the result of work extending over a sufficient period to develop the time element in education. One or

more of these various enterprises is often sufficient, however, to put a good and experienced teacher into real touch with the problem and to enable him greatly to extend his usefulness. For many years to come they will be an important means of providing the agriculture teachers in elementary grades. Even if they should eventually cease to be important means of preparing teachers, such temporary agencies—much improved and intensified—will always be needed to reestablish teachers in the faith and to aid them in keeping alive to the progress of their time.

(A).—SUMMER SCHOOLS.

The vacation school probably affords the best means of aiding the teacher who can not take a year or more for preparation. These schools are of two orders: (1) those connected with an institution; (2) those held by State departments of education, being in the nature of prolonged and specialized institutes. If a person devotes himself to mathematics, language, literature, or science in a good summer school of six weeks' duration connected with an institution, he is able to receive a year's college credit for it; there is no reason why he should not cover similar ground in agriculture, if the subject is well taught. The summer schools are becoming more and more explicit and concrete. When they are held at an established institution, they have the advantage of the facilities that have been collected through years of effort. They are also dominated by the teaching spirit, as most of the students are themselves teachers. For agriculture teaching these schools may be very effective, because they come at a season when crops are growing. Many institutions now provide summer schools or sessions in which agricultural and kindred subjects are offered. It will not be long before all agricultural colleges will offer such work. This summer-school work in agriculture is coming to be very direct and practical. The University of Maine, for example, offers a five weeks' course in which one week is given to soils, one to plants, one to animals, one to birds and insects, and one to agricultural economics.

In many of the States the departments of public instruction hold one or more summer schools or institutes of one to four weeks, called also "summer normals" and "junior normals," for the benefit of teachers, at which definite agricultural subjects are taught. The college of agriculture often cooperates. In Minnesota, for example, about thirty-five summer training schools are held, that are in session from four to six weeks. These schools are supported by legislative appropriations. One or more lecturers are employed at these schools "to arouse the interest of teachers in the subject of agriculture and to outline simple courses of work that can be carried out by rural

teachers." Other States follow similar plans. One difficulty often reported is that speakers do not really give instruction in agriculture, but expand on the beauties of country life and on the means of keeping the boys on the farm.

(B).—THE REGULAR TEACHERS' INSTITUTES.

It is noticeable that even the regular brief institutes and teachers' meetings, held throughout the year, now are giving much attention to agricultural subjects, most often, perhaps, in their nature-study phases. These meetings may render the greatest help in putting teachers in touch with the most recent progress, new books, and new methods, although it should be distinctly understood that they can never of themselves give teachers sufficient training for any really effective teaching of agriculture. In their agricultural work, they are yet too prone to emphasize the extraordinary, the semisensational, and the wonderful, evidencing the fact that we are now in the exploitational stage of our agricultural education evolution. The teacher who is not well grounded may be led astray.

(C).—LECTURES.

One of the most useful recent movements is the interchange of speakers between teachers' institutes and farmers' institutes. The agricultural colleges are also called on for much lecture work on educational topics; this is good both for the people and the college. Farmers are being called on more and more to recite their experiences. The farmers' institute organization in Illinois has been able to create a strong sentiment in favor of teaching agriculture in the rural schools, being regarded by the Superintendent of Public Instruction as the most powerful agency in this work. In other States the institutes have exerted a similar effect by means of traveling speakers. Such work not only establishes a point of view in the people, but discovers the promising teachers here and there and gives them courage and support.

(D).—CORRESPONDENCE AND LEAFLET WORK.

This class of work has now assumed large proportions in some quarters, and has fairly passed the epoch of hostile criticism, although it has not yet passed its experimental stage. When it has fully passed this stage, much of its spontaneity and usefulness will have ceased. The correspondence and leaflet method does not make as strong impression on the teacher as good summer school work or other means of direct personal contact with a good teacher; but it is most effective in arousing a sentiment for better things, and it may be very useful to the individual teacher who wants to work

at his problem quietly and resourcefully. It produces the maximum result at the minimum expense. Various clubs are organized, and crop-growing and exhibition contests are arranged. Combined with an organized lecture system and visitation system, it is probably the most powerful single engine to aid the teacher of agriculture and related subjects in the rural schools. Its greatest danger is its tendency to hold too many names on the lists, thereby limiting its usefulness to each one. One of its greatest faults has been the issuing of publications that are too technical and too dryly agricultural. On the whole, no other agency has placed so many real helps before the teacher.

(E).—SHORT COURSES IN AGRICULTURAL COLLEGES.

Many of the agricultural colleges have long been giving brief courses for farm youth. They are now beginning to adapt some of this instruction to the needs of teachers, and it is probable that the demand for such adaptation will increase. Some of the colleges are offering courses of one and two years' duration, but these partake of the nature of real normal departments and may be considered in a subsequent part of this paper.

In two or three States spring schools are held at the agricultural college. The schedule of such a school given by the North Carolina Agricultural and Mechanical College is as follows:

Four weeks' spring normal agricultural courses.

[Twenty-four hours per week; total, 88 periods.]

	Periods.
Animal husbandry	8
Dairying	8
Horticulture and floriculture	8
Soils and farm crops	8
Bacteriology	2
Physiology and hygiene	4
NATURE STUDY.	
Plant studies	5
Animal studies	4
Insect studies	4
Common branches: Arithmetic, grammar, geography, reading, and history	20
Methods of teaching	16
School sanitation	1

(F).—PERIPATETIC TEACHERS.

Following the city school plan of having a visiting teacher of music or manual training, some places have adopted a similar plan for rural schools. One teacher can visit several schools, either giving the instruction himself, or, what is better, supervising and directing the work of a teacher in each school. The former phase (the peripatetic

teacher doing all the teaching) may be worth the while in starting the new education, or in the lack of teachers. The second phase (the directing of other teachers) is very effective when the individual teachers are not themselves expert, and it should have a marked effect on the teacher. This plan has been tried in Canada, and one teacher there writes:

> The teacher must be trained, and it may be by a graduate of a normal school or an agricultural college, or by a director or supervisor of nature study. I think the last way is a good one. It improves the instruction in the school at the same time that the teacher is being trained, and many teachers think they can learn to better advantage in a school of their own than at a normal school. Of course, normal training should come first, and further training in nature study can be given the teacher while at her work, by a director of nature study; but this director should be an educator and not a mere specialist in some branch of natural science.

In some places it may be possible for a teacher of agriculture in a high school to inspect and supervise the agriculture teaching in the elementary schools of the region. If he is himself well trained, he should be able to exert a great influence in putting the other teachers on their feet.

(6).—UNITED STATES DEPARTMENT OF AGRICULTURE.

Much of the work of the national Department of Agriculture is distinctly educational and is of great value to teachers; and the Office of Experiment Stations maintains an organization to aid schools, colleges, and teachers in their pedagogical work. This Office is able often to send speakers to teachers' institutes and elsewhere: it maintains a large correspondence with school men; it publishes bulletins of information and advice on school gardening and agricultural teaching; it collects data on both foreign and American school work for the purpose of keeping the public informed of the state of agricultural education; and in general it lends counsel and encouragement to those in need of it.

(2).—THE TRAINING OF NEW TEACHERS.

We now come to the real question before us—where the agriculture teachers of the future are to be prepared.

Seven types of institutions or organizations are now beginning to train teachers for agriculture: (*a*) State normal schools; (*b*) local normal schools; (*c*) high schools and training classes; (*d*) separate agricultural schools; (*e*) special detached foundations for industrial work; (*f*) education departments of colleges and universities, and teachers' colleges; (*g*) agricultural colleges. It is not the purpose of this report to make any full discussion of these categories, unless perhaps the last one, but only to indicate what seems to be the most

promising field for each group of institutions. The agencies comprised in the above categories are not always distinct from some of those that aim chiefly to aid the present-day teachers (see page 25). These two groups merge, some of the shorter-course agencies often being conducted by the organizations mentioned in the present list. The purpose of the division into the two groups, however, is not to classify organizations or agencies, but to clarify the discussion by calling attention to the two main lines of effort. In general, an organization that maintains a continuous course of work for at least one school year is placed in this second group. It is not the object, in either of these groups, to make a complete list of the subclasses of institutions or organizations, but only to indicate the leading types. It may probably be taken for granted that in the end adequate preparation for the teaching of agriculture in the secondary schools, special industrial schools, and normal schools can be secured only in some kind of professional institution organized for the training of teachers; but the serious work of training teachers for agriculture in the schools is only begun here and there, and adequate systems are yet to be worked out.

(A).—STATE' NORMAL SCHOOLS.

Nearly all the correspondents who have contributed suggestions to this report express the opinion that the regular normal schools should train teachers for agriculture. Theoretically this may be true, but the normal schools, as other institutions, face the practical conditions under which they exist. In a western State where cities are few and small, where agriculture is the dominant industry, and where normal schools are new, the educational problem is very different from what may obtain in one of the easternmost States. In the Eastern States the normal schools are taxed to their full capacity to supply teachers for the cities; the cities pay good wages for teachers; the normal schools are likely to be located in cities and without farm land; their energies are consumed in a line of work for which they have become adapted by years of effort. In such cases good agricultural work can not be added without a new and radical type of extension of the school; and it then becomes a question whether it would be better for the State to make such extension or to establish a new kind of training school elsewhere. It is a question, also, whether the normal method, as developed in some of these schools, is sufficiently elastic and adaptable to render good agriculture teaching possible. At all events, one can not look to all the existing normal schools in the older States, or even to any considerable part of them, for the training of teachers for this kind of work.

In the Middle West and in the newer States many of the normal schools are beginning to train in agricultural subjects. Heretofore the courses in these subjects have been largely adjuncts to the natural science teaching, but the work is now being differentiated. In Georgia it is expected that the State normal school will train teachers of agriculture for the elementary schools. "No one is given a diploma who does not take the prescribed work in agriculture. There is a regular professor of agriculture and he has about 20 acres under cultivation." Such courses, the correspondent thinks, "will assure a constantly increasing number of trained teachers for the elementary schools." For the most part, however, the regular State normal schools, particularly in thickly settled States, will probably train teachers for graded town and city schools rather than for elementary rural schools. Public pressure may force such of them as are most advantageously situated to establish special courses or classes to meet the needs of the rural schools, in much the same way that agricultural colleges have been obliged to organize short courses for farm youth.

In some States a special effort is made to interest the country boys and girls in the normal-school training. In Illinois, for example, a law was passed in 1905, called the "Normal school scholarship law," which provides that one pupil from each township in the State, selected by competitive examination, shall annually be awarded free tuition in one of the five State normal schools for four years. This makes it possible for each of the 1,887 townships of Illinois to have in the normal schools four pupils who at any one time are taking advantage of these scholarships. These boys and girls are from the common schools, graduates of the eighth grade, and, as the law is now working, 95 per cent of them come from the country districts. Having been born and bred on the farm, they are familiar with farm conditions, and have sense experience of farm life. These persons go into the normal schools for one term, two terms, or a year of work, and then return to teach in the country schools, coming again, it may be, to the normal school to do further work. It is expected that this plan will supply many energized teachers for the rural schools.

(B).—LOCAL NORMAL SCHOOLS.

The inability of the regular normal schools to supply teachers for rural elementary work has led to the establishing of county and other normal schools. In Wisconsin there are sixteen county institutions, and four more in process of organization. The sole purpose of these Wisconsin schools is to train teachers for the rural communities. The diploma is a three-year certificate, permitting the holder

to teach for that length of time in the rural or ungraded schools. These certificates may be renewed for another three years, provided the holder can give evidence of having taught successfully. The Dunn County Normal School, one of the first to be established, has been in operation for eight years, and it is reported that there is scarcely a rural school in the county that is not taught by its graduates. It is apparently only a question of time and legislative action before practically all the counties of the State will have such schools.

The Wisconsin county normal or training schools are among the best institutions yet developed in this country for the direct training of teachers for local rural schools. They are organized for a specific purpose. The salaries are now as good as in the State normal schools. In Menomonie, Wausau, and Marinette the county normal school is in the same building with the county agricultural school; the instructor in agriculture in the latter school takes the normal school students for work in agriculture, and the normal school reciprocates by giving an equivalent amount of academic work to the agricultural students. This tends to set a standard for the pedagogical instruction in such other normal schools as are not fortunate enough to be in direct connection with a school of agriculture. The course of study in the normal schools is now two years, or high school graduates may take a one-year course. A well-known educator of Wisconsin writes that "the schools have so thoroughly approved themselves to school officials and to the public generally in the counties where they have been in existence that it is almost impossible for a person to get a position in the counties where these schools are located who has not had at least the work which the training offers." The work in agriculture in these normal schools is as yet not large, but it will increase. The course of study in the Richland County Training School is here given as an illustration of the content of the work, as all these schools have similar curricula:

First year.

FIRST QUARTER.
- Algebra.
- Agriculture.
- Grammar.
- Primary reading and orthoepy.

SECOND QUARTER:
- Algebra.
- Political geography.
- Composition.
- Expressive reading.

THIRD QUARTER:
- Algebra.
- English history.
- Primary constructive work.
- Expressive reading.

FOURTH QUARTER.
- Arithmetic.
- United States history.
- Spelling and penmanship.
- Literary reading.

Second year of the two-year course, or the one-year course for those prepared to take it.

FIRST QUARTER:
- Arithmetic.
- Drawing.
- Reading and orthoepy.
- Physical geography.
- Psychology and pedagogy.

SECOND QUARTER:
- Arithmetic.
- Grammar.
- Literature.
- Political geography.
- Methods.

THIRD QUARTER:
- United States history.
- Composition.
- Literature.
- Physiology.
- Practice teaching.

FOURTH QUARTER:
- United States history.
- Constitutions.
- School management and spelling.
- Agriculture.
- Practice teaching.

After having taught in a rural school for a time, it is to be expected that most of the graduates who desire to continue to teach will enter State normal schools or other institutions, and prepare for city school work. The rural schools do not yet offer sufficient attractions to secure well-prepared teachers for a long tenure.

(c).—HIGH SCHOOLS AND TRAINING CLASSES.

It is often urged that high schools give instruction in agriculture as a part of their general course for the purpose of fitting teachers in the subject. It is very doubtful, however, whether we should really look to the ordinary graduates of high schools for rural teachers. It requires more than the usual maturity, and considerable experience in affairs, to handle a rural elementary school effectively; and if a direct appeal is to be made to the farming constituency on the basis of agricultural work in the school, the teacher must be sure of his practical ground. Again, the high schools are not professional schools, and are not organized for normal work. The teachers that may be expected from them are mostly women. Agriculture should be introduced into the high school for its educational value. It will then constitute a good ground work for later training in education in a training class or elsewhere.

Another means of fitting teachers for rural elementary schools is in training classes developed in high schools or other institutions. These agencies have been widely adopted, but opinion as to their ultimate value seems to be divided. They are usually organized specially to meet rural school conditions. They are commonly connected with an accepted high school. The course of study covers one year or more. The students may or may not be high school graduates. Usually the work covers the elementary syllabus of the State, and this syllabus may contain agriculture. The successful completion of the course certifies the student to teach in certain of the schools. Agriculture is often a regular part of the course of study in these

classes. In Michigan "elementary agriculture" is in the fourth quarter of the year's course in the "County normal training classes." In Nebraska a very full two-semester course in agriculture, with laboratory work, is provided for "Normal training in high schools." This normal training in Nebraska is given in the eleventh and twelfth grades. "Credit for such training shall be given upon the completion of the prescribed course in normal training and the regular high school course of study."

A canvass of an apparently representative high school training class in one State showed four members to be high school graduates and nine to have had considerable high school work. Six of them were from farms and considered themselves to be fairly well qualified to teach some of the subjects relating to farming. The ages ranged from 17 to 22, the average being 19. All were women.

A further inquiry in the same State showed that 345 out of 470 training class students had spent most of their lives on the farm. Of this number, 322 considered themselves capable of teaching agriculture, but it should be said that agriculture teaching has not yet been introduced practically in that State. The ages of these students, nearly all women, range from 17 to 34 years, the average being 21 years.

No general opinion can be expressed on the efficiency of training-class work in the fitting of persons to teach agriculture, for everything depends on the organization of the enterprise, the safeguards thrown about it, the age, experience, and qualifications of the students, the extent of the agricultural work, and the way in which it is taught. These classes, of one kind and another, are now sending out very many teachers to the rural schools. Their great handicap is that they themselves can not secure teachers properly qualified to give instruction in agriculture. No real preparation of training class students to teach the agriculture of a syllabus can be expected unless the teacher of the class has himself had good preparation in the subject.

(D).—SEPARATE AGRICULTURAL SCHOOLS.

The county and other schools of agriculture and domestic science that have lately been organized have thus far confined their energies to regular agricultural or industrial work; but many persons expect that they will also become important centers for the training of teachers for elementary and secondary schools. If they enter this field, it is a question whether they will not be in danger of alienating their regular farming support, unless they can command more resources than are now in sight. These schools are organized chiefly to supply a direct agricultural need. It will require considerable increase in funds if they hold this field and also enter another. It

is expected that these schools, of all others, will send youth directly back to the farms. In Wisconsin, where there has been experience in both agricultural and normal work, the two functions are separated; and this would seem to be the logical result for all States.

(E).—SPECIAL FOUNDATIONS.

Various institutions on private or semiprivate foundations, and not a regular part of public school enterprises, offer facilities for teachers to prepare in agriculture and kindred subjects. A marked example of this group is the Macdonald Institute at the Ontario Agricultural College, Guelph, Canada. "Its equipment and accommodation is ample to furnish long and short courses in home economics, nature study, and manual training—the last two for teachers, male and female, and the home economics for farmers' daughters and other young women who desire to learn the theory and practice of cooking, ventilation, general housekeeping, laundry work, sewing, dressmaking, millinery, home decoration, etc." Summer courses are provided at Guelph; also a one-year normal course "to provide instructors fitted to carry on the work of nature study and school gardens in a group of rural schools, in a large consolidated school, or in an agricultural high school." The new Macdonald College, near Montreal, will have a profound influence on the teaching of country life subjects.

The Hampton Normal and Agricultural Institute, Virginia (a parental type of others in the South), provides normal training for negroes and Indians. The year for agricultural students is twelve months, with a vacation of a few days or weeks only. At the close of the academic year class-room work stops, but each student is given work in the different divisions of the department, where he can get experience in planning and directing labor and field operations and in assuming responsibility. At the same time he is given instruction in the best methods of managing labor. Actual class-room work under normal methods, and practical field work, seem to fill a great need in fitting the students for teaching what they have acquired in the class room.

Students of Hampton who design to teach receive, before being graduated, four months' instruction in psychology and the principles of teaching, four hours per week, and also engage for four months in actual teaching in the class room. The student teaches all of the common school subjects of the State of Virginia. A large school garden affords opportunity for the teacher students to work with children in the open during April, May, October, and part of November. For the winter season, an indoor course in nature study and agriculture supplements the outdoor work. Post-graduate students

receive two months' training in teaching classes in the training school. These students teach agriculture and elementary science. They plan their lessons, teach children to work in the garden, and conduct field trips.

(F).—EDUCATION DEPARTMENTS AND TEACHERS' COLLEGES.

Much is to be expected of schools and departments of education in universities in the preparing of teachers for the higher ranges of public school teaching in agriculture. This is particularly true when a college or department of agriculture is comprised in the same university. In such case a four-year course can be assembled, involving two years of sound general scientific study, followed by two years in which the study of agriculture and related subjects is combined with training in education, all having special reference to high school and normal school problems. This would involve the modification of some of the regular instruction in the agricultural departments, or, preferably, new courses in them to meet the special needs of teachers. Professional schools of education that do not have regular agricultural connection may well cooperate with a neighboring college of agriculture by incorporating a year, more or less, of the work of such college as a part of its own course of study for those who desire to prepare specially for agriculture teaching. Teachers College of Columbia University in this way catalogues certain courses of the College of Agriculture at Cornell University.

Following is the statement of Teachers College in respect to the cooperation mentioned above (1908):

Agriculture in high schools.—The rapid development of agricultural instruction in many public schools is creating a demand for specially trained teachers. It is the consensus of opinion of school officers that for such instruction there is need of teachers who have been thoroughly trained in general sciences, biology, in particular, with its application to agriculture, and also in the principles of education. Many agricultural colleges give the subject-matter which is needed, but they do not deal with the educational applications. In order to combine the advantages of an agricultural college with those of a strictly educational institution a plan of cooperation has been arranged between Teachers College and the College of Agriculture at Cornell University, whereby students preparing for special work as teachers of agriculture may take the appropriate courses in the science of agriculture at Cornell University (especially principles of agronomy, horticulture, and animal husbandry) and then study the educational problems at Teachers College.

As already stated, it is desirable that agriculture should be combined with nature study and biology, or with nature study and physical science. Such combinations may be made by candidates for the bachelor's and master's degrees at Teachers College. The intimate relation of elementary agriculture to biology and nature study makes it desirable that their educational aspects should be involved in the same courses. Hence the student giving especial attention to agriculture will arrange a course at Teachers College as suggested above for biology and nature study; but having had previous special work in

the subject-matter of agriculture at Cornell University, or elsewhere, the individual work, such as preparation of papers and theses, will in the educational course be centered around problems of agricultural teaching.

Approved courses in the science of agriculture taken in agricultural colleges other than Cornell will be credited at Teachers College.

In the University of Missouri the Teachers' College utilizes courses in the College of Agriculture for teachers who desire to fit themselves for teaching agriculture in the public schools. These courses in the College of Agriculture are in the main distinct from the regular agriculture courses, and are designed primarily for teachers. Credits are given for the work only to students in the Teachers' College who are expecting to be teachers. In addition, for the university students who have taken sufficient of this elementary work for teachers and who have also the requisite preparation in the natural sciences, provision is made for electing and receiving credit for some of the technical courses in agriculture and horticulture which are given in the College of Agriculture. A good many teachers in the Teachers' College are enrolling regularly in these courses in agriculture and horticulture, and some of them later elect the more technical courses in the College of Agriculture, in order still further to increase their training in agricultural subjects for the distinct purpose of enabling them to teach agriculture in the public schools.

Speaking of their various experiences in aiding teachers to handle agricultural work, an officer of the University of Missouri writes as follows:

In my judgment the most effective results in proportion to the energy expended have been secured through the courses offered to teachers in the university. Perhaps the majority of teachers who take agriculture regularly in the university courses do not themselves teach directly in the country schools, but in the better high schools of the State, in smaller towns surrounded by good farming communities. These teachers in the high schools have the training of a large number of young people who teach in the country schools later, so that it is safe to say that every teacher who takes our regular university courses in agriculture reaches with this teaching hundreds of young men and women who will go out into the country schools as teachers. A good many schools of this State are teaching agriculture and kindred subjects in one way or another. Many of them are correlating the work with geography, with language, and even sometimes with other subjects in the schools, through the aid of school gardens or school plantings, and by a study of the material with which the pupils come in contact at their homes. In addition to correlating the work with other subjects, some of the schools give regular courses in agriculture and horticulture.

(c).—COLLEGES OF AGRICULTURE.

The agricultural colleges are now beginning to devise means of extending their efforts to the training of teachers in agriculture. This movement is of such vast importance in the field of practical pedagogy that it may now be separately discussed in a final chapter.

PART III.—THE GENERAL OUTLOOK AND THE SIGNIFICANCE OF NORMAL WORK IN THE COLLEGES OF AGRICULTURE.

We have now taken a general look at the demand that is arising for teachers in agriculture of a public school grade, and we have reviewed the main types of agencies that promise to aid us in supplying these teachers. We may now throw these normal agencies into something like a classified system, and indicate the main lines of a rational procedure.

1. The elementary schools demand general teaching. Not much that is named agriculture is possible with the pupils of elementary school age, but nature study and the industrial spirit should constitute the foundation of their work. The district rural schools are elementary schools. They pay small wages and offer few attractions to teachers. For the most part they are able to secure the services only of those persons who are on the way to other employment. Their teachers are mostly women. Until these conditions change, the rural schools must draw their teachers chiefly from the region of the high schools. Whenever good science work is an important part of the high school course of study, and particularly when good agriculture teaching is also introduced as a regular part of the curriculum, a training class in connection therewith and requiring a high school diploma for the completion of the work should be able to make great progress in preparing teachers for the elementary grades. Some of the teachers for the grades will be recruited from the ranks of those who do not complete normal school courses, and some States or counties may provide special means of training such teachers by organizing normal school work below the regular normal school grade. In the end special local means or institutions must be provided for the training of these teachers, and it is time that this were recognized. At present, however, it may be repeated, it is incumbent on the secondary school region to train the teachers for the elementary region.

2. The teachers who are to train these elementary teachers must themselves be trained. They must have real preparation, if the agriculture teaching is to be of permanent value; they can not be trained in the common teachers' institutes or by other mere short cuts. The teachers of this secondary normal work must be trained in institutions where genuine agriculture is established; some of the State normal

schools may provide this work; some of the special separate schools of agriculture may provide it; some of the education departments or teachers' colleges in association with agricultural departments of higher institutions may provide it; the agricultural colleges will be obliged to provide it. The best trained and best adapted of the graduates of the colleges of agriculture, however, will find better openings than most schools of the secondary region are at present willing to pay. The preparation of such teachers should include general scholarship and training in the principles of education, as well as specialized scholarship in agriculture and other industrial work, and also sufficient hand practice outdoors and indoors to give them command of the technique of instruction.

3. If the regular agriculture teachers of secondary schools and the teachers of secondary training classes are to be prepared in the State normal schools, then these normal school teachers must themselves be trained in agriculture. Their training must be more than can be secured in the normal school itself. They may be trained in education departments of universities and in teachers' colleges, provided always that these institutions are associated with real agricultural work, such as is possible in an agricultural college; or they may be trained in the agricultural college itself.

4. The agricultural college necessarily stands at the head of the system. It holds the key to the situation. It must provide the leaders.

The body of knowledge and philosophy that is comprised under the modern word "agriculture" is of such vast range, the subjects are so numerous and so difficult, the equipment required to teach it is so large and so expensive, that only such institutions as are specially devoted to the subject can understand it or properly represent it. These institutions express a great phase of our national life. More than any other institutions they stand for the very democracy and nativeness of education, for their purpose is nothing less than to reach the last man on the last farm by means of the very things by which that man lives.

It is good to have seen these colleges of agriculture gradually emerge and then enlarge their territory, quietly annexing this subject and that, until they have come to be one of the great social and spiritual forces of the day. They have not yet developed a pride of education, and they have not reached the limit of the territory that they will annex. It may be found, in good time, that they have forced new standards of education. These colleges will now add normal departments and they will attract the teaching type of mind. The graduates of these departments will supply some of the normal schools; some of the high schools; some of the training classes and special normal organizations; and what they give will be passed on

from school to school and grade to grade, until it fertilizes the whole enterprise. This is not at all a mere visionary outlook, and for the very good reason that the agricultural colleges are the only teaching institutions that are in possession, at first hand, of the essential facts of rational agriculture.

A number of the colleges of agriculture have already undertaken to develop teachers' courses, either on their own account, or in association with the education departments of the universities with which they are connected. Congress has also given them a direct opportunity to establish such work in a provision of the Nelson amendment to the agricultural appropriation bill for 1907–8: "Said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

The Nelson amendment provides, when it shall have matured, for the appropriation of $25,000 annually to the land-grant colleges of each State. This is the only national appropriation that specifically recognizes this particular kind of college work. This fund will afford an unexcelled opportunity for some of the stronger institutions to establish a department or school in which persons shall be trained directly for the teaching of agriculture and the mechanic arts in the public schools.

MASSACHUSETTS AGRICULTURAL COLLEGE.

The Massachusetts Agricultural College established in 1907 a department of agricultural education, with a professorship. W. R. Hart, formerly of the State Normal School at Peru, Nebr., has been chosen to head the department. This department is organized under a State law that makes an annual appropriation of $5,000. This law originated from a recommendation of the Massachusetts commission on industrial and technical education, in 1906. (The report of this commission is a most valuable contribution to the subject of industrial education.) The first move was the organizing of a summer school of agriculture of four weeks, which had an attendance of considerably more than two hundred. Following is a course of instruction for the year 1908–9:

1. *The meaning of education*, dealing with the biological and psychological aspects of the processes of learning.
2. *Vocational education*, being chiefly historical. This is given in 1907–8.
3. *Methods in agricultural education.*
4. *Seminar*, a study of problems in agricultural education.

COLLEGE OF AGRICULTURE OF THE UNIVERSITY OF ILLINOIS.

The College of Agriculture of the University of Illinois has an instructor in secondary school agriculture, D. O. Barto, an experienced school-teacher and a graduate of the college, who for two years has

been employed to give his entire time to the question of teaching agriculture in the public schools. He visits farmers' institutes and teachers' institutes, freely discussing these questions, and offers two courses of instruction during the university year. One of these courses is designed to train teachers for the secondary schools, and the other to train them for the grades. These courses are repeated in the summer session. The particular courses offered in 1907–8 are as follows:

1. *Principles and methods of high school agriculture.*—This course, designed for students who have had not less than two years' work in agriculture, will be devoted mainly to considering what features of agricultural science are best adapted to high school conditions, the best order and methods of their presentation, how to suit the course and instruction to the special interests and needs of each school community, what laboratory work shall be given, what apparatus may be used, what field experiments can be planned and executed.

2. *Elementary agriculture.*—This course is for those students who are preparing to teach in secondary schools, especially for teachers of science, but who have had no work in agriculture. A study of the soil, its origin, nature, functions, properties, and classification; problems of temperature, aeration, control of moisture; enrichment and impoverishment of the soil; the plant, how it feeds and grows, its modes of reproduction, factors in crop production, rotation, value and use of legumes, selection and testing of seed, their types and breeds, care and management; dairying, production of milk, testing and care of milk; farm plans, farm machinery; economics of agriculture.

3. *Farmers' institute management.*—A study of the farmers' institutes as a factor in our system of public education. This course is designed to set forth principles underlying the organization and conduct of farmers' institutes and agricultural associations and to systematize into definite lines the knowledge acquired in college to the end that the student may render more distinct service in institute and agricultural associations. Lectures; assigned readings and parliamentary practice.

NEW YORK STATE COLLEGE OF AGRICULTURE.

In the New York State College of Agriculture at Cornell University a two-years' normal course in nature study, leading to regular academic credits, was organized in 1903, and this is now known as a normal department, with six persons giving instruction. This organization is the natural outgrowth of the nature study and other extension enterprise that has been under way in the institution for many years. Summer schools of nature study were held in 1899 and 1900. A regular summer session is in process of organization. A rural schoolhouse, accommodating thirty pupils and provided with workroom and located in a school garden, is part of the equipment. Following is the course of study for 1907–8:

This course is organized to help persons who expect to teach nature study and country-life subjects in the public schools. Persons actually engaged in

teaching and also all persons in the university who signify their intention to teach are eligible. A certificate will be given on the completion of sixty hours in the courses prescribed below, together with such other work in the College of Agriculture as may be approved by the director. Designed to prepare students to teach elementary agriculture. Practice work is given in the public schools of Ithaca.

	No. of course.	First term.	Second term.
FIRST YEAR.			
Botany	1	3	1
Botany	2		2
Invertebrate zoology	1	2	
Vertebrate zoology	2	2	
Entomology	3		3
Physical geography	1	3	3
Chemistry	185	5	
Nature study	91	3	
Nature study	94		2
		16	11
Elective, at least two-thirds agriculture		0-2	4-7
SECOND YEAR.			
Vertebrate zoology	6	3	3
Botany	5		2
Entomology	15	3	3
Soils	101	3	
Farm crops	111		3
Nature study	92		1
Nature study	93	2	
		11	12
Elective, at least two thirds agriculture		4-7	3-6

91. *Nature study.*—Lectures and discussion of methods. First half year. Credit, three hours. M., W., F., 12.

92. *Home nature-study work.*—Work in the training classes in the Ithaca schools in which students are also to take part. Second half year. Credit, one hour. By appointment.

93. *Practice work in nature study* in the public schools of Ithaca, comprising schoolroom work, excursions, and other exercises with children. First half year. Credit, two hours. By appointment.

94. *School gardens*, comprising actual garden making with children on school grounds and in the university school gardens. In winter the work will be conducted in the forcing houses where plant-growing subjects will be taken up in such a way as to adapt them to elementary school conditions. Second half year. Credit, two hours.

98. *Seminary in nature study and elementary agriculture.*—Devoted to the study of the methods of teaching nature study and elementary agriculture, and to the review and criticism of courses now offered in our elementary and secondary schools. Credit, one or two hours. F., 12.

99. *Nature study.*—Advanced course. Individual work on special problems. Registration only after consultation.

UNIVERSITY OF MISSOURI.

In the Teachers College of the University of Missouri provision is made for pedagogical work in agriculture. In this college John C. Whitten is "professor of the teaching of horticulture," and Frederick

B. Mumford "professor of the teaching of agriculture." The following courses are offered by these officers:

(a) *Agriculture.*

Professor MUMFORD.

1a. *Soils and plant studies, with reference to agriculture.*—This course will aim to give a clear general knowledge of the principles of agriculture. The character of the work is adapted to those who are preparing to teach in the elementary schools. *Three times a week, first semester.* Hours to be arranged.

2. *The principles of agriculture.*—Fundamental conceptions of soils, plants, and animals, and their application to agricultural practice. Lectures, reading, laboratory work, and field excursions. A course for high school and academy teachers. *Three times a week.* Hours to be arranged.

Other courses in agriculture may be elected by students in the Teachers College.

(b) *Horticulture.*

Professor WHITTEN.

1b. *Cultivated plants.*—How they grow under culture, their relation to their environments, and common methods of propagating and managing plants; the materials for a school garden and how to use them. Lectures and laboratory. This course is intended for those who are preparing to teach in elementary schools and who may not have time for the longer courses offered by the department. *Three times a week.* Hours to be arranged.

1a and 2b. These two courses taken together constitute a year's work in which the topics mentioned in 1b are given fuller and more scientific treatment. They can be taken after 1b or independently of it, and are designed to meet the needs of those who are preparing to teach in any branch of biological science. *Three times a week.*

4a. *The evolution of cultivated plants.*—Lectures and assigned readings. A study of organic evolution as applied to the modifications of plants, particularly those in cultivation. *Three times a week.* Hours to be arranged.

Other courses in horticulture are open to students in the Teachers College.

COLLEGE OF AGRICULTURE OF THE UNIVERSITY OF MAINE.

The College of Agriculture of the University of Maine late in 1907 organized the following course in agriculture for those who intend to become teachers of this subject in the public schools:

This course is offered in response to a call for teachers capable of teaching elementary agriculture in schools and academies. In order to receive a degree one hundred and fifty hours, or 30 credits, must be received. The following course as laid down covers one hundred and forty-six hours. The remaining six hours have been purposely left open for elective work in order that the student may receive as liberal a training in cultural studies as is consistent with the amount of technical work necessary. It is recommended that the electives be taken from the departments of biology, history, economics, chemistry, physics, or English.

Freshman year.

FALL SEMESTER. Subject.	Hours.	SPRING SEMESTER. Subject.	Hours.
Chemistry	2	Chemistry	3
Laboratory chemistry, 2 [a]	1	Laboratory chemistry, 2 [a]	1
Public speaking	1	Public speaking	1
English composition	3	English composition	3
Drawing, 6 [b]	2	Drawing, 6 [b]	2
Modern language	3	Modern language	2
Algebra	5	Solid geometry / Trigonometry	5
Military, 5 [a]	2½	Military, 5 [a]	2½
	19½		19½

Sophomore year.

Soils	2	Fertilizers	2
Soil laboratory, 2 [a]	1	Animal breeding	2
General biology	2	Stock judging, 2 [a]	1
Laboratory biology, 2 [a]	1	General botany	2
Qualitative analysis, 8 [a]	4	Laboratory botany, 4 [a]	2
History of education	3	History of education	2
English	1	Qualitative analysis, 8 [a]	4
Wood shop work, 4 [a]	2	Principles of fruit growing	2
Physical training	½	Forge work [a]	2
Elective work	(?)	Physical training	½
	16½		19½

Junior year.

Agricultural engineering, 4 [a]	2	Farm crops	2
Animal breeding	2	Laboratory farm crops, 2 [a]	1
Stock judging, 2 [a]	1	Vegetable gardening	2
Physiology	2	Handicraft, 4 [a]	2
General methodology	3	Child study	3
Pomology	2	Veterinary science	2
Laboratory pomology, 2 [a]	1	School gardening, 3 [b]	1
Modern language	2	Modern language	2
Physical training	½	Physical training	½
Elective work	(?)	Elective work	(?)
	16½		15½

Senior year.

Animal breeding	2	Dairying	2
Biological chemistry	5	Laboratory dairying, 3 [a]	1½
Agricultural botany	2	Agricultural chemistry	5
Laboratory agricultural botany, 2 [a]	1	Entomology	2
Landscape gardening	2	Laboratory entomology, 4 [a]	2
Physics	5	Veterinary science	2
Elective work	(?)	Bacteriology	2
		General forestry	2
		Laboratory physics, 4 [a]	2
	17		20½

[a] Two hours count as one.

[b] Three hours count as one.

NORTH CAROLINA COLLEGE OF AGRICULTURE AND THE MECHANIC ARTS.

The North Carolina College of Agriculture and the Mechanic Arts is now providing a one-year normal course in agriculture, the following announcement of which will appear in the next catalogue of the college:

One-year normal course in agriculture, North Carolina College of Agriculture and the Mechanic Arts.

Subject.	Periods a week—		
	First term.	Second term.	Third term.
Methods of teaching agriculture	2	2	2
Agriculture (general)	3	3	3
Horticulture	3	3	3
Animal husbandry	3	3	3
Dairying	3		
Diseases of live stock		3	
Botany	3		
Poultry		3	3
Entomology			2
Agricultural literature	1	1	1

Electives in college departments, e. g., agricultural chemistry, land surveying, physical and physical laboratory, drawing, and others.

NORTH DAKOTA AGRICULTURAL COLLEGE.

The College of Agriculture in North Dakota offers a "teachers' course," described as follows (1907–8):

Under the provisions of the "Nelson law" enacted by Congress in 1907 the following course is offered for the training of teachers, fitting them to teach the elements of mechanic arts and agriculture. It is also the aim of this course to provide the three terms' work in pedagogy which graduates must have in order to benefit by the statute entitling them to a State certificate on their diplomas. To the many students who frequently have to turn to teaching temporarily before completing their studies, this line of work will be found very helpful.

During the past three years regular work has been given in nature study and elements of agriculture in order to meet the rapidly increasing demand for rural teachers able to instruct in these subjects. In addition opportunity was given to review all subjects required for first and second grade certificates. As there was no desire to duplicate the courses of the normal schools or to enter on their field of pedagogy, the work was neither emphasized nor given prominence.

The new law, however, has marked out a definite field for agricultural colleges in the training of teachers and given them a mission in harmony with their general plan and purpose. In order to fit teachers to teach elements of mechanic arts and agriculture and fill positions in common, village, or city schools, it has become necessary to add another year's work to the course as outlined heretofore. The units constituting this additional year are all, with the exception of the history of education, of a technical nature, and fall either under the head of mechanic arts or agriculture, or the pedagogy of these branches.

The entering student is expected to have had eighth grade or one year's high school training. In addition to a thorough training in elementary subjects, there is required a course in elementary agriculture taught by the professor of agriculture. The course covers three years. The agriculture is as follows:

Teachers' Agriculture II.—Agricultural physics, fall term.
Teachers' Agriculture III.—Agronomy, winter term.
Teachers' Agriculture IV.—Animal husbandry, with laboratory, spring term.
Teachers' Agriculture V.—Horticulture, afternoon work, spring term.

Following is the full schedule of the teachers' course at the North Dakota College:

First year.

Fall.	Winter.	Spring.
Grammar, 8 a. m.	Physiology, 8 a. m.	Grammar, 8 a. m.
Civics, 9 a. m.	United States history, 9 a. m.	United States history, 9 a. m.
Reading, 10 a. m.	Geography, 10 a. m.	Theory and practice, 10 a. m.
Arithmetic, 11 a. m.	Grammar, 11 a. m.	Formation of soils, 11 a. m.
Nature study, 3 to 5 p. m.	Elements of agriculture I, 3 to 5 p. m.	Nature study, 3 to 5 p. m.

Second year.

Psychology, 8 a. m.	—, 8 a. m.	History of education, 8 a. m.
Elements of chemistry, 9 a. m.	Physics I, 9 a. m.	Physics II, 9 a. m.
—, 10 a. m.	Algebra I, 10 a. m.	Algebra II, 10 a. m.
Zoology, 11 a. m.	Physical geography, 11 a. m.	English III, 11 a. m.
Chemical laboratory, 2 to 5 p. m.	Physics laboratory, 2 to 5 p. m.	Physics laboratory, 2 to 5 p. m.
Zoology, 2 to 5 p. m.		

Third year.

Manual training I, 8 a. m.	Geometry I, 8 a. m.	Geometry II, 8 a. m.
Philosophy of education, 9 a. m.	Manual training II, 9 a. m.	Manual training III, 9 a. m.
Algebra III, 10 a. m.	Methods, 10 a. m.	Botany II, 10 a. m.
Elements of agriculture II, 11 a. m.	Elements of agriculture III, 11 a. m.	Elements of agriculture IV, 11 a. m.
Shop (manual training IV), p. m.	Horticulture, 2 to 5 p. m.	Botany, 2 to 5 p. m.
		Horticulture, 2 to 5 p. m.
		Agriculture, 3 to 5 p. m.

CONNECTICUT AGRICULTURAL COLLEGE.

The Connecticut Agricultural College has for several years offered a two-year course of preparation for the special teaching of nature study in the public schools. The course is offered to graduates of high schools and to those who have had the first two years of their regular course in agriculture or in home making. This course "for rural school teaching" includes much work in agricultural subjects, selected from the regular courses in the college. It is intended to be supplemented by the work for teachers in the summer school, and by one year in a good normal school.

WASHINGTON (STATE) AGRICULTURAL COLLEGE.

In addition to the regular courses in the college at Pullman, Washington, courses are offered in education, specially intended to train teachers in methods. Whenever a student expresses a desire to engage in school teaching, he is encouraged to elect at least two courses in the department of education. One of these courses is "the principles of education," the other "methods of teaching agriculture." The latter is taught largely by the department of agriculture itself.

The above examples constitute the only instances known to the writer of agricultural colleges, or agricultural departments of colleges, in the United States that have actually put pedagogical courses or departments into operation, although other colleges or departments are each cooperating more or less with the education department of the university or college of which it is a part. Several of the colleges of agriculture are now considering the establishing of education courses. It is probable that such courses will constitute the most marked departure in agricultural college work in the immediate future. As yet the whole subject is in a formative and experimental stage. These colleges have a very large and varied constituency, and they properly represent all the phases of country life. It is incumbent on them to reach directly the educational phase, and it is incumbent on the people to see that they are able to enter this field, for this is a necessary condition to the evolution of the public schools.

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