BULLETIN, NO. 2, 1907 WHOLE NUMBER 368
DEPARTMENT OF THE INTERIOR : : BUREAU OF EDUCATION

# AGRICULTURAL EDUCATION

INCLUDING

## NATURE STUDY AND SCHOOL GARDENS

By JAMES RALPH JEWELL
SOMETIME FELLOW OF
CLARK UNIVERSITY

WASHINGTON
GOVERNMENT PRINTING OFFICE
1907

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# LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
*Washington, May 28, 1907.*

SIR: I have the honor to transmit herewith the manuscript of a monograph entitled "Agricultural Education, including Nature Study and School Gardens," by Mr. James Ralph Jewell, of Louisiana. This monograph was originally prepared as a thesis for the degree of doctor of philosophy at Clark University, and in its original form was accepted by the faculty of that institution in partial satisfaction of the requirements for the degree. It presents an unusually comprehensive survey of the provisions for agricultural education and for instruction in closely related lines in various parts of the world, but with especial reference to our own country.

There is at this time a very unusual movement in progress looking to the wide extension of agricultural education among the elementary schools and high schools of the several States of the Union. This movement has undoubtedly been stimulated by the growth of the agricultural and mechanical colleges endowed by the National Government under the Morrill acts of 1862 and 1890, together with the recent activity of the Department of Agriculture at Washington in the encouragement of all movements looking to the development of such instruction. It is, I think, clear that this movement has in it the promise of great benefit to both the economic and the educational interests of the country at large. In order that such benefit may be realized to the full, however, it is important that information regarding experiments in agricultural education which have already been made in this country and in foreign lands should be rendered available to those who are charged with the direction of the new schools and courses of study. It is with a view to furnishing such information where it is most needed and can be most effectively used that the issuance of this number of the Bulletin of the Bureau of Education is proposed.

I have the honor to be, very respectfully,

ELMER ELLSWORTH BROWN,
*Commissioner.*

The SECRETARY OF THE INTERIOR.

## AUTHOR'S PREFATORY NOTE.

One who has undertaken any study which is largely a collection and compilation of data from varied and scattered sources owes a debt of gratitude to many people but for whose assistance a well-rounded work would have been impossible. The present writer is no exception. To President G. Stanley Hall and Dr. William H. Burnham, of Clark University, his thanks are due for their critical suggestions throughout the entire preparation of the manuscript; and to Dr. Louis N. Wilson, the librarian of Clark University, for aid and resources beyond measure.

This study has been revised and brought up to date in connection with the staff of the United States Bureau of Education and in consultation with members of the United States Department of Agriculture, whose assistance and criticism have been invaluable. Especial acknowledgment is due to Mr. Dick J. Crosby, United States expert in agricultural education, for the free use of the proof of his article on Progress in Agricultural Education during 1906, to appear in the forthcoming number of the Yearbook of the United States Department of Agriculture.

# AGRICULTURAL EDUCATION, INCLUDING NATURE STUDY AND SCHOOL GARDENS.

## CHAPTER I.

### NATURE STUDY.

At this time a definition of the term "nature study" may seem somewhat superfluous, but the words come so near meaning all things to all men that it may be well in the beginning to decide how we shall use them. There are those who insist that nature study is not primarily a subject of study, but a method of study. Prof. Patrick Geddes says: "Nature study is not a new subject, to be squeezed into already crowded programmes, but the symptom, and in great part the leaven also, of the progressive transformation of these."[a] Prof. L. H. Bailey says that nature is studied from the standpoint of the child, who is encouraged toward close and careful observation of the world around him; in a word, "he is taught to see what he looks at and to draw proper conclusions from what he sees, and therefore comes into personal relation and sympathy with the object."[b] This makes nature study, if it be a method, nothing else than the so-called "scientific method" applied to the casual observations of the child, who is to be taught to reason from cause to effect. But this can not be expected of the child in his first school years; for him such a view of nature study could not obtain; on the other hand, he must be taught to observe—and why is it not much better to tell him what to look at than to leave him to look where he may?—while he is taught the larger relations of things by analogy rather than by abstract processes of reasoning. For example, after a heavy rain the teacher may call the attention of the children to the effect of the little streams by the roadside, and then explain how, in like manner, our great rivers have made and changed their courses. It seems, then, that nature study is hardly a method. Best of all, perhaps, is the definition of Prof. C. F. Hodge, in his ideal book, Nature Study and Life: "Nature study is learning those things in nature which are best worth knowing, to the end of doing those things that make life most worth living." Epigrammatic, perhaps, but true, every word of it.

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[a] Geddes, Patrick. Introductory course of nature study, p. 1.

[b] Bailey, L. H. Nature study idea, 1905, p. 15.

Nature study came into our schools after efforts to teach agriculture had failed, owing to lack of demand for it and want of preparation among the teachers, after the "object-lesson" fad had begun to die away, and when so-called "elementary science" proved too dull even to awaken thoroughly the interest of the child. That nature study has taken an agricultural trend, to some extent in our cities and to a predominating extent in rural sections, is not strange; the common things of the country are needed to round out the knowledge of the penned-in city child, and to lead him away from the city and its necessary evils as much as possible, while a sympathy with their life work and surroundings—the very essence of nature study—is more needed among the children of our country homes than anything else. Experience has shown that the innate curiosity of the child may be directed toward nature in a way which will make him a keen observer, and during his comparatively few years of formal school life the acquisition of facts alone is of less importance to him than are correct habits of observation and inquiry.

It is hard to draw a sharp line defining the geographical limits of nature study. In most of the northern countries of Europe such subjects as gardening, agriculture, and horticulture are taught in a very practical way, but the instruction is so technical as hardly to be considered nature study. In some of the countries of southern Europe, where school gardens have not as yet been made a part of the educational system, more is done in a direction corresponding to our idea of nature study. In Portugal the prescribed higher elementary course of instruction includes "elementary notions of physics, chemistry, and natural history, as applied to industry, agriculture, and hygiene."[a] In both Italy and Hungary nature study work is made very technical. In Germany it is even more formal and full of examinations, approaching more nearly to elementary botany than to nature study. It seems very stiff and wooden to us, but the German children, perhaps because they have never had a glimpse of the dynamic side of it, seem to enjoy it thoroughly, even though there are infinite detail and minutiæ in the work, and though the children have no property right in the materials raised and used. Technical instruction in agriculture has never been introduced into the primary schools of the Netherlands; and here, more than anywhere else on the Continent of Europe, nature study is seen in its best form. It is found in the infant schools, for children under 5 or 6, and since 1889 has been obligatory in all primary schools, where it is taught very thoroughly. Nature study courses are given in every teachers' training school in Holland. Mr. J. C. Medd, one of the experts of the British education department, reports that in the primary schools in Holland natural objects are

[a] Leitao. Technical instruction in Portugal. Special reports on educational subjects [England], vol. 8, 1902, p. 449.

taken into the school for study, and then the things are studied out of doors; lessons are given under various trees on the varying structures and properties of these trees. Country walks are taken to collect plants, insects, etc. The whole of this instruction is given in school hours.[a]

Coming to England, we find nature study in a surprisingly good condition, considering the fact that there is such a universal tendency there to judge of the value of things by examinations, a method to which this subject does not readily lend itself. The nature study exhibition and conferences [b] held in London during July and August, 1902, marked a great step in advance, by bringing to the notice of the nation the efforts already made in this direction, and the unanimously favorable opinion of them by the more progressive educators of the country. Profs. Lloyd Morgan and Patrick Geddes, Mr. M. E. Sadler, and Sir Joshua Fitch, as well as Lord Balfour and other prominent members of the nobility, addressed the conferences in advocacy of such a study of natural objects as obtained in the better schools of the United States which had sent exhibits.

Nor has all this been without effect. The better schools, such as Eton,[c] have published their courses in nature study, school gardens have greatly increased in number, and, above all, in the New Code of 1904 the board of education took a favorable stand upon nature study as a subject of study for all English elementary schools. The New Code differs fundamentally from all that have preceded it—hence its designation, the "New Code." The code of 1900 changed the old system of giving grants to schools for specific subjects taught, to that of "block" or "principal" grants, saying that instruction should be suited to the circumstances of the children and the neighborhood, but containing a list of subjects which must be taught, and one of subjects which should be taught when, in the opinion of the inspector, circumstances made it desirable. The principal object of the New Code is "to exhibit, without undue elaboration, the course of instruction as a connected or coherent whole,"[d] which makes it one of the most important educational documents England has seen for many years. This prescribed course is woven around "knowledge of the common phenomena of the world," or nature study. "The purpose of the public elementary schools"[e] is to assist "both girls and boys, according to their different needs, to fit themselves, practically as well as intellectually, for the work of life.

[a] Medd, J. C. Nature study in Holland. Special reports on educational subjects [England], supplement to vol. 8, 1902, p. 10.

[b] Nature study exhibition, 1903.

[c] Hill, M. D., and Webb, W. M. Eton nature study and observational lessons, 1903.

[d] New Code of 1904, Section III, p. 6.

[e] *Ibid.*, Section III, p. 11.

With this purpose in view, it will be the aim of the school to train the children carefully in the habits of observation and clear reasoning, so that they may gain an intelligent acquaintance with some of the facts and laws of nature." County councils are urged by the education department to "provide suitable schoolbooks for the use of those who are in the midst of the busy and interesting life of the country. The reading books and lessons themselves should bear some direct reference to rural conditions."[a] Section VIII of the New Code consists of specimen courses of "object lessons" (nature study) in use in English rural elementary schools. Some of these are very good, some are too much like elementary science, but on the whole they show great progress. Plans of several successful school gardens are given.

This places England well in advance of Scotland so far as nature study is concerned, though the demand for it from the teachers of Scotland is such that the universities give summer courses for them. The Scotch education department suggests as part of the course for rural schools the study of newspaper market reports, with exercises and calculations based upon them. Several of the agricultural colleges of England have made provision for training teachers in nature study by means of special summer courses, in addition to the courses given at convenient centers on Saturdays for those already in the teaching profession who see the need of it. Yorkshire College held such classes on thirty-five Saturdays between October and June. The Midland Agricultural and Dairy Institute gave three summer courses of two weeks each during the 1904 vacation, and other colleges gave like courses of varying length.[b]

Nature study suffers in Australia, as it has in England, from the system of payment by results. There are sporadic instances of the teaching of this subject in most of the States. In South Australia there is a definite movement on foot toward its introduction into the elementary school curriculum, while in Victoria, where the dynamic side of nature study is being more and more emphasized, the work is more like that done in the United States than is that of any other country. Both the government and the educational department of Victoria have recognized that a new country, such as theirs, where the helpful and the destructive forces of nature are not well known, and hence can be but poorly utilized or counteracted, as the case may be, is in greater need of such a study than an older country. About the middle of March, 1905, a boy in one of the elementary schools discovered a natural enemy of the destructive codling moth, which costs our own apple growers millions of dollars annually. This discovery alone will save Victoria many times the cost of instruc-

[a] Annual reports, Board of Agriculture, London, 1903–4, pp. 104–109.
[b] *Ibid.*, p. vii.

tion in nature study for decades. The education department furnishes all teachers with pamphlets on nature study and gardening. The School Paper, really a series of little supplementary readers published monthly, with different editions for the different grades, contains nature-study readings, and the Arbor Day numbers each year are models in this respect. The Educational Gazette, published monthly by the department for all Victorian teachers, has a regular nature-study department, with now and then the larger part of some number filled with extracts from the better publications on topics of the kind. Twice in the last three years one of the nature-study experts of the State has published in these gazettes full outlines of a course which might easily be followed.

Nature study occupies a somewhat prominent place in the schools of New Zealand, also, where it is modeled closely after the work outlined by the educational department of Ontario. Certain of the New Zealand text-books are now generally used in Tasmania and Victoria.

In the Philippines, nature study is treated as a synthetic subject, upon which to correlate the primary school course; for instance, the official course of study requires number work to be done by the use of natural objects. School gardens are fast increasing in number, and nature-study readers are prescribed for grades four and five.[a]

Coming to our own continent, we find nature study perhaps more widely spread through the United States, but the best work is probably done in parts of Canada, where Macdonald Institute furnishes to teachers wishing to become proficient in both matter and methods advantages not equaled elsewhere on the continent. The prescribed course of study of all the rural and graded schools of British Columbia includes nature study, and inspectors see that it is properly taught. Passing a rigid examination in it is necessary to enter any high school of the Province. Nature study is obligatory in all the free public elementary schools of the Northwest Territories in Standards I, II, III, and IV, and agriculture is added in Standard V. The schools are supplied with a programme in outline, which is a minimum requirement. "The pupil must study the animal, the plant, and the soil themselves, other than book descriptions of them. He may only consult books after he has made his observations." In Manitoba nature study is obligatory in all eight grades of the public elementary schools, but it is called elementary science in the higher four grades. The entire work is laid out by the advisory board of the Province, though much is left to the teacher's discretion in meeting local conditions. The programme is admirable and is meeting with great success. The superintendent of the Winnipeg schools writes:

[a] Courses of instruction for the public schools of the Philippine Islands, 1904, pp. 5, 6, 12.

"The interest taken by the teachers is genuine, and among the children this interest rises to the height of enthusiasm."

Newfoundland, with her triple educational system, is not able to introduce any subject simultaneously into all her schools, and up to the present little has been done toward the teaching of nature study, but the superintendent of education of the Church of England has informed me that he is working out a plan to be placed in the syllabus soon. In Prince Edward Island there is very little of this work done aside from that at the Macdonald consolidated school, which will probably act as leaven, as has been the case in the other Provinces. "Nature lessons with especial reference to agricultural pursuits" are given in all the public schools of New Brunswick, instruction in this subject is given in the provincial normal school, and the government grants a bonus to teachers and schools that will establish and carry on instruction in nature study in connection with school gardens.

In both Ontario and Nova Scotia nature study is an integral part of the provincial school system, but there is this difference: In Ontario the work given in the first four forms is really a very elementary course in agriculture, introductory to the strictly agricultural course in Form V, as may be seen from the published outline of the work; while in Nova Scotia, on the other hand, there is prescribed "the noting, examination, and study of the common and most important natural objects and laws of nature, as they are exemplified within the range of the school section or of the pupil's observation. There should be a short nature lesson given every day on the daily collections and observations of the children themselves—not on the statements of teachers or books."[a]

The status of the schools of Nova Scotia is a reflection of the masterly mind of Dr. A. H. MacKay, superintendent of education for the Province, and this holds with especial force in relation to nature study, for it is due to his influence alone that Nova Scotia stands at the head of the Dominion in this respect. One of his innovations, which is meeting with approval in many parts of the Dominion and of the United States, and which has been taken over bodily into the Denmark schools, is his compilation and introduction of a 4-page circular,[b] two copies of which are placed in every school of the Province, and in which are kept the observations of the children of the schools concerning things happening right around them. One copy each year is filed with the school register for reference, the other is sent to Doctor MacKay, who thus has at hand the "local nature observations" of the entire Province. There are spaces for a general description of the physical conditions of the neighborhood, of the

[a] Nova Scotia manual of school laws, 1901, pp. 111, 112.

[b] A copy of this circular is contained in the Appendix.

"time first seen" and the "time when becoming common" of some 40 wild plants, a dozen cultivated plants, a number of meteorological phenomena, and the migration of more than 20 common birds. These things have been the object of study of the Botanical Club of the Royal Society of Canada since 1891. During 1905 Doctor MacKay was able to turn over to it careful and complete observations from over 300 schools of Nova Scotia—representing many times that number of pairs of eager eyes. It would have taken the botanists years to obtain a like mass of material, and the data would have been far less accurate, since these school observations are made every day of the week, instead of only once a week or at rare intervals of leisure, as would necessarily have been the case with the scientists, crowded five or six days a week with business or teaching.

The provincial normal school of Nova Scotia, which is affiliated with the college of agriculture, gives courses in nature study, especially during the annual summer school, but it is at the Macdonald Institute, at Guelph, Ontario, that nature study may be said to have its home on the American continent. This institution was founded in January, 1902, by Sir William C. Macdonald, for the purpose of "providing courses of instruction and training in nature study for teachers in rural schools, and of providing courses in domestic science for young women from country homes, and others." Two magnificent buildings have been erected on the campus of the Ontario Agricultural College and equipped in the best manner possible. It was recognized from the first that if nature study were to be introduced into the schools of the Dominion and made a permanent part of the educational system, the first requisite was competent teachers, hence the best of opportunities must be provided to make them efficient. Macdonald Institute is sending out yearly a body of experienced teachers who have done special work in nature study, and who are better equipped to teach it than perhaps any group of teachers engaged in the same work in the United States. This institution now offers a normal course of two years and four three-months courses for actual teachers each year. Each of the short courses is attended by thirty or more teachers from the five eastern Provinces, each of whom receives traveling expenses, free tuition, and a scholarship large enough to meet necessary expenses, this provision to extend over the first three years—1904–1906. In addition, the Provinces concerned have in many cases provided substitute teachers to take the places of their short-course students to enable their better teachers to take the work without loss of situation or salary. These teachers do the same work which they will later expect their classes to do, the various subjects of the course being school gardens, agriculture, botany, zoology, physics, chemistry, bacteriology, nature in literature, manual train-

ing, and methods of teaching. As at the Hyannis (Mass.) Normal School, great attention is given to the correlation of the other subjects with nature study and to the way it should be taught to give it its true value as an educational factor. Recognizing that the entire function of the institute is not fulfilled by courses given only to those teachers so fortunate as to be able to attend them, free bulletins are published, and every Canadian teacher is urged to write to the institute freely and fully concerning experiences in practical teaching, or to ask any questions for information.

This "Macdonald movement," which included consolidated schools and school gardens, nature study, and manual training in every elementary school, has not been without result. Nova Scotia has built and equipped a college of agriculture and has correlated it with the provincial normal school at Truro and with the rural schools, $36,000 has been voted by the government to help consolidate rural schools, nature study is required in every school, and school gardens are rapidly increasing. New Brunswick is considering the question of the consolidation of schools for the purpose of "making them more adapted to the country life of the children." The educational department of Ontario offers liberal grants to all schools maintaining school gardens, publishes an outline of nature study obligatory on all pupils of the first four forms of the public schools, and makes a two-years course in agriculture optional "in those lower schools where the staff, equipment, and accommodations are adequate." In addition, the five older Provinces will presumably assume the entire cost of maintenance of the Macdonald consolidated schools within their boundaries. These examples can not but show such a contrast to the small, inefficient rural schools that they will eventually provoke a desire for better schools in everwidening circles.

No one alive to the present status of education in the United States needs to be told of the spread of nature study during the past few years. It is now an integral part of the course of study in several of the States. In 1903 the National Council of Education appointed a committee of five on industrial education in schools for rural communities, which studied the question for two years and recommended among other things[a] that elementary agriculture, as such, ought not to be taught in the schools before the fifth year, while nature study should be taken up in the first grade and carried on until the elements of agriculture might take its place. Competent lecturers on nature study are in great demand for teachers' institutes and summer schools, and the market is almost flooded with books on some phase or other of this subject, many of them so crude and technical as to show what

[a] Industrial education in schools for rural communities. Report committee of five, National Educational Association, 1905.

an early stage the subject is in. A number of States publish illustrated leaflets for the purpose of interesting children in the subject. The Rhode Island College of Agriculture publishes monthly The Nature Guard, sent free to any boy or girl who asks for it, a large number of the names on its mailing list being from other States of New England than the one supporting the movement. The children are encouraged to write to the director of the work about their observations and discoveries, and to ask any questions they or their teachers are puzzled over. The New Hampshire College of Agriculture has published a series of such leaflets. The Ohio State University publishes a series of agricultural extension bulletins, and others are published in Maine, Michigan, Pennsylvania, Missouri, and New York. Hampton Institute, Hampton, Va., began in 1901 the publication and distribution through the Southern States of monthly nature-study leaflets for teachers, which are models of their kind. They are furnished to Southern teachers at quite nominal rates, and to others at about the cost of production. The material is not only written by experts, but it is expressed in interesting style and made attractive with illustrations. Cornell University offers a teachers' course of two years in nature study and school gardening, but much more is really accomplished in this field by means of the extension work of this department of the university, which makes use of lectures, leaflets, correspondence, and the organization of pupils into clubs, with the object of "interesting teachers and pupils of public schools in nature study, with special reference to agricultural conditions." In 1905 there were 486 of these "junior naturalists' clubs" in New York, with a membership of 14,318 children, whose dues are a letter or a composition a month on some one of several topics suggested in the monthly publication of the organization.

Nine-tenths of the rural and village schools of Missouri have adopted the 1905 course of study prepared by Mr. W. T. Carrington, the State superintendent of schools, which urges that "all the formal subjects may be taught to better advantage through a proper correlation of each with nature study and literature." Nature study is given a definite place in the curriculum during the first four years, with the purpose of "putting the child into sympathetic touch with the world of nature in which he lives, and to use this as a means of educating him." Nature study is now included in the uniform course of study for the elementary schools of Indiana, the subjects being largely from the plant and animal life of the farm and garden. At the summer schools of the agricultural colleges of Nebraska, North Carolina, Connecticut, and possibly other States, courses in nature study for teachers are given. Hundreds of southern teachers annually take such courses in the North Carolina school mentioned, or in

the great summer school of the South, in session each summer at the University of Tennessee.[a]

Since the publication in 1901 of the official course of study for the Indian schools of the United States[b] nature study has been a compulsory subject of instruction in these schools. Here it has proved itself of special value in the teaching of English, for the little Indians can be induced to talk freely about the objects studied because of their natural interest in such things, and the consequent loss of their self-consciousness.

In deciding what kind of work in the field of nature study one should give to school children, the standpoint of Dr. C. F. Hodge, already quoted, seems to me to be the proper one. After pointing out that the purpose of nature study is "the learning of those things in nature that are best worth knowing, to the end of doing those things that make life most worth living," Doctor Hodge goes on to show that the things best worth knowing, for this end, are fundamentally the relations of the individual to nature and its forces, toward life in general, both animal and vegetable. Nature study, well taught and with this end kept constantly in view, will produce the highest of all educational values—the proper response of the individual to his environment.

Unless there be gardening, the work of the first two grades must and should be mainly that of observation rightly directed by the teacher, but by the third year the economic relations of plants and animals may well be brought to the attention of the children. I have known few young boys who were not seemingly natural enemies of toads until they learned the economic value of the little creatures—and none who were not their friends afterwards. Any child would rather have an apple that is not wormy; let him learn the cause of the wormy apples and you have a new force in the horticultural world, not to mention the encouragement offered birds for nesting around the house and orchard by the provision of nests and food, rather than the killing of the birds and the stealing of the eggs, as has too often been the case.

Nature study may be made of as great ethical value as economic, by putting the child in the place of other people whose rights he has not appreciated before, and hence has failed to respect. The suggestion to a child that he may raise a tree of his own will give him the desire to do so; peach pits are easily supplied, and the lesson in practical ethics is well under way. "Some real knowledge of the amount of care, time, patience, and money, and of the chance for

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[a] The teaching of agriculture in the rural common schools. Ninth report, committee on methods of teaching agriculture, Association American Agricultural Colleges and Experiment Stations. Office of Experiment Stations, circular 60, 1905, pp. 7, 8.

[b] Reel, Estelle. Course of study for Indian schools, 1901.

success or failure in raising a shrub or tree, will do more in getting a boy voluntarily to respect public parks than all the police which a city can afford to place on watch over it."[a] The good teacher, moreover, will direct the religious feelings of the child to nature, with the certainty of adequate response. There is nothing in nature which man has not worshiped, nor which primitive man to-day fails to worship—the stars, sun, moon, wind, clouds, water, rocks, flowers, trees, animals. President G. Stanley Hall urges that "the sentiments on which the highest religion rests are best trained in children on the noblest objects of nature."[b]

The aesthetic side of nature study is one to be emphasized. It is significant of its aesthetic possibilities that the American Park and Outdoor Art Association urged the introduction of nature study into all the schools of the country, and that its successor, the American Civic Association, is doing the same. One of the most important missions of nature study is to bring the country children to see and feel the beauties spread all around them, the beauties which those from the city who are able each summer pay large sums to enjoy. As Prof. L. H. Bailey points out, even many country children too young to feel the appeal of more bushels of potatoes or more pounds of wool have yet thus early formed their dislike for the farm. A flower garden and a pleasant yard would do more to content them with living on a farm than 10 bushels more of wheat to the acre.[c] In the city nature study is the best vehicle for introducing the blessings which nature has supplied to mankind, but which paved streets, tenement houses, and attendant conditions have denied to so many thousands who need them most of all. It is but a short step from teaching the school child to love plants and flowers, to their introduction into the home, and then to window gardening, even though nothing more extensive be possible; and this has transformed such cities as Cleveland and Dayton, Ohio, to mention but two examples.

Many teachers would be glad to take up nature study, were it not for two things: (1) The school curriculum is already crowded, and (2) the teacher feels that the children would prove to know more about nature than he himself does. To consider the second objection first, one of the best arguments for this work is that it furnishes a ground where teacher and pupil can meet as friends, where it does no harm for the teacher to be taught, for once. Many cases might be mentioned where nature study work has transformed the atmosphere of the entire room through a better understanding between teacher and

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[a] Lloyd, F. E., and Bigelow, M. A. The teaching of biology in the secondary schools, 1904, p. 41. Hodge, C. F. Nature study and life, 1902, pp. 28, 29.

[b] Hall, G. S. Adolescence, vol. 2, pp. 144–232.

[c] Bailey, L. H. Nature study idea, 1905, pp. 80, 81.

pupils. Of course, the class should be kept well in hand, but the teacher should only guide them wisely, tell them very little, and let them discover as much as possible for themselves. A child who has made a discovery on his own initiative, especially if he has been able to convey his discovery to others usually better informed than himself, has taken a step more valuable to him in an educational way than a large amount of formal training would give. It offers him the opportunity for his bit of research work, it gives him an interest which may take him far afield into science.

There is another consideration. One of the most serious criticisms to which our American teachers are liable is that they acquire a teacher's attitude to their pupils out of school and toward the world in general; that they are no longer possessed of the spirit of the learner. Nature study offers teachers a way of escape through allowing them to learn with and from their pupils. Lack of suitable training is a serious handicap, of course; if it be possible, at least a short course should be taken in nature study and school gardening, such as those given at the summer schools held at the University of Tennessee, the North Carolina Agricultural College, and Hampton, or at some good normal school which offers such work. Two or three of the better books on nature study should be thoroughly read, but they should be carefully chosen, and if possible after consultation with some one who is familiar with them, for many of them are more conspicuous for their lack of good points than the opposite. The United States Department of Agriculture distributes free a circular [a] giving a concise bibliography of nature study and school gardening. The Nature Study Review gives monthly a bibliography of what has recently appeared. The Hampton nature study leaflets will prove very valuable, especially No. 16, Course in Nature Study for Primary Grades. Prof. H. W. Fairbanks has a valuable article in the Nature Study Review [b] in which nature study work is correlated throughout the entire eight primary grades with geography and history. The four-page pamphlet on Local Nature Observations, published by Dr. A. H. MacKay, superintendent of education for Nova Scotia, might well be copied anywhere, with local corrections. If the teacher feels the need of a well-outlined course to follow, there are at present few, if any, better than the Outlines of Nature Studies [c] of Prof. Wm. Lochhead, now head of the nature study department of the Macdonald-Robertson Institution at Ste. Anne de Bellevue, Quebec. In the course of study of the Indian

[a] Crosby, D. J. Bibliography on nature study, school gardening, and elementary agriculture for common schools. Circular 52.

[b] Fairbanks, H. W. The relation of geography to nature study, with a complete outline for a course of eight grades. Nature Study Review, vol. 1, Sept. 1905.

[c] Lochhead, Wm. Outlines of nature studies. Ontario Agricultural College, bulletin 142.

schools[a] will be found outlined a seven-years' course which is excellent. In the report[b] of the committee of five of the National Educational Association on industrial education in schools for rural communities, pages 28–44, is a syllabus of a five-years' course in nature study, intended to suggest the kinds of subjects that may be most profitably undertaken. Southern teachers, at least, should procure the North Carolina teachers' bulletins, Nos. 2[c] and 5[d], the latter of which contains an especially full outline, and bulletin No. 85 of the University of Texas, The Teaching of Agriculture in the Public Schools.

The Department of Agriculture, at Washington, has published a number of pamphlets of value, and will send lists of all available publications upon request. If the teacher should meet with technical difficulties, the staffs of the State agricultural colleges and experiment stations are always ready and willing to lend their aid. There is no reason for the teacher's neglecting nature study because he is inexperienced, if only he has the will and persistence. I know personally one or two teachers who started in this work with as little technical equipment as any one could, but who have learned with their pupils, studied what they could obtain in the way of printed matter, and have been conspicuously successful.

As to crowding another subject into the school curriculum, the matter is not so serious as it may seem. Few doubt that our schools teach too many subjects to our children, and spend too long a time on many of them. Certain nature-study enthusiasts believe it is the part of this subject to take such an important place in the course that it will crowd out some of the other work or, rather, give it better under another name. Principal W. A. Baldwin, of the Hyannis (Mass.) Normal School, has made his model course center around nature study and school gardening, and is greatly pleased with the result. In our best city schools geography has been made to take in all the odds and ends of subjects not included elsewhere and to cover perhaps, five hours a week for five years. A change is under way nowadays, however. In Chicago nature study and geography are combined for the first three years; in Boston and New York nature study entirely takes the place of the geography for the same length of time. The University Elementary School of Chicago closely correlates the work in both throughout the course. Almost all the usual subjects of the curriculum can advantageously be correlated with nature study, as is done in the Philippines, without any loss of

[a] Reel, Estelle. Course of study for Indian schools, 1901.

[b] Industrial education in schools for rural communities. Report committee of five, N. E. A., 1905.

[c] Coon, C. L. Geography, nature study, and agriculture in the elementary schools, 1905.

[d] Stevens, F. L. A course in nature study for the teacher, 1905.

time. It is better to give some special time to definite nature-study work, but it need not be great to be of value; it has proved of great benefit when consuming but one hour a week. However, the experience of some of the Canadian schools, as well as of some of those in our larger cities, has shown that the children do better and more work in their other studies if they are freshened a bit daily by some work in nature study and gardening, even though the time left for the regular programme be shortened by an hour a day.

# CHAPTER II.

## SCHOOL GARDENS.

Some few German States gave encouragement to school gardens well toward ninety years ago; but Austria and Sweden first made the movement general, and each officially promulgated its plan in the same year. The Austrian imperial school law of March 14, 1869, prescribed that "where practicable a garden and a place for agricultural experiments shall be established at every rural school." At the present time there are almost 20,000 school gardens in Austria, and in some provinces there is no school without one. In Sweden the Crown announced on October 15, 1869, that at "every school a garden of from 70 to 80 square rods must be laid out." In 1894 there were 4,670 school gardens in Sweden, but since then there has been a falling off of considerably more than a half, attention to them having been drawn away by the wide introduction of manual training.

In Germany the different States carried out their own ideas. In 1814 Schleswig-Holstein placed instruction in culture of fruits and vegetables in her rural school curriculum, and Nassau did the same three years later. The Prussian village schools began to give elementary agricultural instruction, usually by means of gardens, in 1819, and other States adopted the same ideas as the years passed.[a]

At the present time the city of Berlin has large grounds for gardening, just outside the city limits, in which every child who applies may have a small garden of his own. Besides, there are sent every day to all elementary schools of the city two wagonloads of leaves, flowers, and plants for use in nature study, drawing, and elementary science from an immense central botanical garden, which is open freely to the public, and there the children may watch expert horticulturists at work. Breslau in 1898 founded a large central botanical school garden, which has since been more than doubled in size. Plants are sent to any school on the order of the teacher. The children do not work in the garden, but are taken in classes to it to see experts work, and are given plants to take home. A smaller plot has now been acquired by the city, where teachers and scholars together

[a] Crosby, D. J. School gardens; their development and function. Outlook, vol. 71, pp. 852–861.

may have plots of ground. Since 1888 Leipzig has given to every new school 400 square meters of ground for a botanical garden. Besides this, a centrally located piece of ground of 12,000 square yards has been made a central school garden. Here the children are taught by the chief gardener and his eleven assistants, but they themselves are not allowed to work there; "there are too many of them." There are in the city six or more schools for children of the laboring classes, where there are large gardens for the children, and they are taught agriculture in a very practical way.[a]

Dr. Erasmus Schwab, of Vienna, some thirty years ago was the chief European educator strenuously advocating gardens for every school[b], and the effect of his pamphlets setting forth the pedagogic importance of gardening for children is reflected to-day in the school gardens of Vienna, which have a wide reputation, and in the spread of the movement from Austria proper into Hungary, where gardening and agriculture have long been obligatory studies in all the elementary, higher elementary, and citizens' schools, to which all children must go from their sixth to their fifteenth year.[c] The writings of Cronberger,[d] Schulleries,[e] and Wilsdorf[f] must figure in any historical study of school gardens, because of the influence they have exerted throughout Germany. Switzerland maintains school gardens in connection with all her normal schools, and each teacher is obliged to receive this special training. Since 1885 the Swiss Government has subsidized gardens in connection with the elementary schools of the Republic, and has offered, to both teachers and children, prizes for essays and plans for them, as have also certain of the larger towns, such as Zurich.[g] Since 1873 Belgium has required every school in the Kingdom to maintain a garden of at least 39½ square rods, to be used in connection with instruction in botany, horticulture, and agriculture. School gardening has given a remarkable impetus to vegetable gardening at large—a matter of great importance to this the most densely populated country of Europe.[h]

In 1880 the French ministry of education decreed that such instruction should be given in the normal schools as would enable their

[a] School gardens in Europe. Special consular reports, vol. 20, pt. 2, 1900, pp. 159–224.

[b] Schwab, Erasmus. Der Schulgarten. Wien, 1876.

[c] School gardening. Special reports on educational subjects (England), vol. 8, p. 490.

[d] Cronberger, Bernhard. Der Schulgarten In- und Auslandes, 1898.

[e] Schulleries, Josef. Der Volks-Schulgarten nach Anlage wirthschaftlichen und pädagogischen Ausnutzung, 1895.

[f] Wilsdorf, Oskar. Errichtet Schulgarten! 1894.

[g] Der Schulgarten. Preisgekrönte Arbeiten, 1886.

[h] Crosby, D. J. School gardens; their development and function. Outlook, vol. 71, pp. 852–861.

graduates to "carry to the elementary schools an exact knowledge of the soil, the means of improving it, the best methods of cultivation, the management of a farm, garden, etc." There are now over 100 normal schools, and good work is being done at last, although the plan existed only on paper for some time after its promulgation. Nominally, since 1887 no plan of a rural school building to which the State was to contribute support has been accepted, unless a garden was attached to the school. As a result, the French Government reports about 30,000 elementary schools with gardens. But Mr. Cloudesley Brereton, after a long and careful investigation among the schools of France, asserts that probably over 45,000 of the French rural schools have gardens attached to them, "but not, as several writers have rashly asserted, with a view to instructing the pupils in agriculture but for the benefit of the teachers."[a] Dr. H. P. Frissell, principal of Hampton Institute, tells me that in an extensive trip over France to study its educational system he found that a large part of the elaborate system of teaching agriculture was not yet in practice. But the people themselves have lately awakened to the economic importance of elementary agriculture for all the children, and the gardens already existing are now being used as demonstration plots by thousands of teachers. M. Réné Leblanc, to whom is due much of the credit for the revival of interest in agriculture, is now leading an agitation for making an examination in agriculture one of the requirements for the "leaving certificate," and if this were done no elementary school in France would be without a garden.

The movement in Russia began in the seventies, but did not advance very rapidly until encouraged by the Crown in 1887. At that time were begun the free distribution of plants and seeds, the sending out of expert itinerant gardeners to instruct teachers and to organize and direct garden operations, the organizing of certain agricultural courses of study, and the distributing of implements and books on gardening among the more energetic teachers. More recently the Czar has taken a personal interest in this work, and the Government now supplies seeds and seedlings free to normal schools up to a cost of 50 francs.[b] In 1897 there were already some 8,000 school gardens in the Empire, many of which contained colonies of bees, silkworm hatcheries, etc. Since 1891 the Government has supplied, during the spring and summer months, short courses of instruction in school gardening for teachers. In 1902 some 520,000 children had small gardens of their own at the schools. In the remodeled Nikitsk school during the winter three hours a day are allotted to schoolroom study, and from four to five hours to work in

[a] School gardening. Special reports on educational subjects (England), vol. 7, p. 56.
[b] *Ibid.*, p. 163.

the garden, vineyard, etc. In summer, the lessons in class never last more than two hours, while the practical studies occupy from six to eight hours.[a]

Practically all the infant schools of the Netherlands for children under 5 or 6 have gardens in which the children work. Most of the primary schools of the country have gardens, not so much for instruction in practical gardening, as in Belgium, France, and England, as for the purpose of nature study and a means of correlation of the other school studies.[b] Italy is just in the beginning of the school-garden movement. An official of the Norwegian Government writes me that gardens are in successful operation at a number of the people's schools, but that the Government has no information as to their number.

It is rather strange that the British have seen the value of school gardens for certain of their colonies and have lost no time in organizing complete systems of them, but have been so slow to establish them in England. In Jamaica, for instance, there were school gardens here and there prior to the new school code of 1900, but since that time gardens have been established at practically every school on the island. Special grants are given by the board of education for agricultural teaching, and the grants are from three to five times as large as otherwise if in connection with the school there is at least a quarter of an acre under cultivation, with four hours or more of practical instruction thereon each week.[c] This is true to a less extent all over the West Indies, where the British Government is urging elementary agricultural education along the lines laid out by the French for their own rural school system, including a garden at every rural school.[d]

Contrast this with England. "Cottage gardening" was for years the only thing of the kind ever found in a school in England or Wales, and for this a small grant might be earned by the school if it were properly taught. In 1895 only one school obtained this grant; in 1898 only 84. "A large part of Wales is agricultural, and the people gain their livelihood by farming, and yet in 1898 only 31 boys in the whole country had the opportunity to learn anything about gardening." It was not until after this time that the education department recognized that besides the improvement which a thorough knowl-

[a] Knight, G. H. Public school gardens. Camp and Plant, vol. 1, p. 29.

[b] School gardening. Special reports on educational subjects (England), vol. 8, pp. 5–8.

[c] Sadler, M. E. The teaching of agriculture in elementary and high schools in the West Indies. Special reports on educational subjects [England], 1901, vol. 4, pp. 594, 595. Wallace, R. H. Agricultural education in the British colonies. Journal Society of Arts, vol. 48, p. 666.

[d] School gardens in the West Indies. West Indian Bulletin, vol. 3, 1902, pp. 13–15. School gardens in the West Indies. Barbadoes Agricultural News, January 3, 1903.

edge of gardening may effect in the condition of the working classes, "as a school subject its teaching also serves a general educational purpose."[a] The counties of Surrey and Berkshire first took up the matter of school gardens, as such, in connection with their continuation schools. Prior to the opening in London, in 1902, of the nature study exhibition, these had proved an unqualified success, and many prominent educators of the country pleaded for the encouragement of the movement. At that time there were less than 100 school gardens in Great Britain, and I have been unable to learn of a more recent census of them. But with the new course of study of 1904 for all the English elementary schools, in which nature study is given first place and a special grant for gardening offered to every school,[b] it will not be strange if England soon comes into the front rank in this matter. The report of 1905–6, just published, says that at least 32 counties have gardens connected with day schools, and 22 counties maintain other gardens either connected with evening schools or worked independently by boys and young men.

The educational department of Ceylon provides a plot of ground for every elementary school for the purpose of gardening, and teachers are "urged to pay especial attention" to this feature of the curriculum, in which gardening is made very practical rather than a means of general education. The pupils have a share of what they raise to take home.[c] There are school gardens attached to the three European schools of Natal, and they are compulsory for all the native schools. They are found at practically all the mission schools of the Gold Coast, and are becoming rather common now in most of the British colonies and protectorates in Africa.[d] In Tasmania school gardens are found at some private and some State schools, but the movement is not extensive. Such work is hampered in Australia by the system of payment by results, and while there is a vigorous agitation in its favor in almost every State it will come but slowly so long as the present system exists. Victoria, however, has taken up school gardens in connection with nature study, which is taught in most of the schools, and elementary agriculture, which is taught in all the better rural schools. Each teacher in the State is furnished with a pamphlet, Gardening for Victorian State Schools, and considerable space every month in the Educational Gazette is devoted to reports from school gardens. For some years the Australian Natives' Association has donated prizes of £1 sterling each for the best-kept

[a] School gardening. Special reports on educational subjects [England], vol. 4, pp. 819–829.

[b] Annual report, 1903–4, Board of Agriculture, London, pp. 104–109.

[c] Wallace, R. H. Agricultural education in the British colonies. Journal Society of Arts, vol. 48, pp. 665, 666.

[d] *Ibid.*, pp. 338, 339.

school garden in each inspectorial district. The minister of education each year grants first and second class certificates to all schools whose gardens are worthy of such recognition. Photographs of these gardens, published in the Educational Gazette, represent them as very creditable indeed. Several horticultural societies of Melbourne and vicinity supply shrubs and flowering plants free of cost for school gardens.[a]

The school-garden movement in Canada is very recent—with the exception of the Province of Nova Scotia one might say it began in the spring of 1904—but already it bids fair to outstrip that of the United States before many years. The priority and supremacy of Nova Scotia is due almost wholly to the influence of Dr. A. H. MacKay, superintendent of education, who has long kept nature study in the van. In 1903 there were 52 school gardens in the Province, 79 in 1904, and 103 in 1905. In the other eastern Provinces the school-garden movement came with the establishment of the Macdonald school gardens, 5 in each Province. Sir William Macdonald's idea included a garden at each school that "should be used as a large slate, for the use of the scholar, where he might see his examples before his eyes, and which might be rubbed clean again as soon as the lesson was learned and another came up." Here the encouragement of the cultivation of the soil as a life work is made ideal, it is true, but the primary aim is "the symmetrical education of the individual." The garden is the means, the pupil is the end. The five eastern Provinces have now incorporated the Macdonald school gardens into their educational systems, others are being established along the same lines, and in more ways than this the movement bids fair to become Dominion wide. Ontario makes an initial grant of $100, and a later annual grant, to every rural school establishing and maintaining a school garden.[b] In Nova Scotia, "within or near the grounds of rural sections there should be an area for cultivation as a school garden, to serve for the objective study of nature and for practical training in the rudiments of such arts as agriculture, horticulture, or forestry."[c] In New Brunswick grants of $30 are made annually to elementary schools having school gardens. Each group of these school gardens is under the supervision of a traveling instructor in gardening and nature study, who plans to spend a day each week at each school. The Northwest Territories have, of their own initiative, established large school gardens in various larger towns, such as Lacombe and St. Albert.[d]

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[a] Educational Gazette, vol. 3–8, 1902–1907.

[b] Regulations, Ontario educational department, Aug., 1904, p. 40.

[c] Nova Scotia manual of school laws, 1901, p. 72.

[d] School gardening. Special reports on educational subjects [England], vol. 4, pp. 457, 458.

The thing which, above all else, assures solidity to this movement in Canada is that it has been recognized that such plans have failed elsewhere because of the lack of suitable teachers; to meet this the training of teachers has been undertaken before there is even a great demand for them. In Nova Scotia the provincial normal school is affiliated with the new agricultural college, and all students are taught how to manage a school garden. There are also several Macdonald school gardens within a short distance of Truro, and these too can be visited. There is also maintained a summer session of five weeks in natural science, nature study, horticulture, and school gardening, attendance on which gives the teacher one or two weeks extra vacation. During the summer of 1905 there were 24 attending this special session. In the new Macdonald Institute at Guelph, Ontario, is to be found the finest equipment in the world for the teaching of nature study, and school gardening receives a very prominent place in every course offered. Sixty experienced rural teachers from other Provinces than Ontario receive free short courses here each year, and these teachers are going back to their schools with new inspiration, to preach the gospel of nature study and school gardens, if their districts have not already provided for such. In Canada this movement is anything but a fad; it is a new movement in education, and is being pushed both by the provincial governments and by individuals privately interested.

In our own insular possessions, there are gardens at each of the 20 agricultural schools in Porto Rico, established in 1901 by Doctor Lindsay, at that time commissioner of education, and there are gardens in connection with a few graded schools, while the present commissioner is endeavoring to have one attached to every rural school of the island. Gardening has been in a course of gradual progress in Hawaii for some years; there are at least 11 school gardens in Honolulu alone, perhaps more, and the Territorial normal school now gives all of its graduates special training in nature study and gardening; so that before long a school without a garden will be a rare thing. The principal of this normal school writes that the greatest obstacle is that the schools of the island have such small amounts of land at their disposal.[a]

Dr. David P. Barrows, general superintendent of education in the Philippine Islands, in the course of instruction for the public schools of the islands, published June 15, 1904, directs all primary schools to establish school gardens within twelve months if possible, and the civil authorities of each barrio have been instructed to fence in strongly suitable ground. Each boy of the third and fourth grades is given a plat of his own, and the products belong to him, abso-

[a] Reports American Park and Outdoor Art Association, vol. 7, pp. 20, 40–46.

lutely. The cultivation of the staple economic plants is taught with special care.[a]

In 1691, George Fox, the old Quaker, willed a tract of land near Philadelphia "for a playground for the children of the town to play on, and for a garden to plant with physical [medicinal] plants, for lads and lassies to know simples and to learn how to make oils and ointments." Two hundred years later, the first school garden in America was established on the grounds of the George Putnam School, of Roxbury, Mass., by Henry Lincoln Clapp, its master. From 1891 to 1900 only wild flowers were cultivated there, but by the latter date Medford, Framingham, Hyannis, and other Massachusetts towns had made such a success of vegetable gardening in connection with school work that the Putnam School put in a kitchen garden with 84 beds. The Framingham, Hyannis, and Boston normal schools by this time were giving good courses in gardening, and at Hyannis, especially, the garden had furnished a large share of the material for other branches of study—writing, composition, arithmetic, bookkeeping, banking, etc. In 1901 the Twentieth Century Club of Boston established a garden of 82 beds on Dartmouth street at the English High School; the following year the Massachusetts Civic League maintained 350 small gardens for school children. The young ladies of the Boston Normal School have taught gardening to the pupils of the Rice School in the city.

In 1901 the Hartford School of Horticulture gave a course in gardening to 34 boys from the city schools, who went out to their gardens once a week. Each boy had to care for his own plot well, all through the season, or relinquish all claim to it, in which case it was given to one of the many boys on the waiting list. In 1902 the school provided gardens for 163 pupils, and it has had large classes of school children up to the present time. School gardens have also been maintained in St. Louis, Chicago, Washington, Omaha, Worcester, Cleveland, Brookline, Mass., New York City, Rochester, Yonkers, Philadelphia, Hampton, Va., and many other places. Most of them have proved so successful that they have been made permanent features of the various cities; in some few cases they have been abandoned because they did not have any adequate financial support. Each city that has provided for school gardening has studied its own needs in that direction and has worked out its own salvation. Boston still leads in number of gardens, probably because of the interest taken in the movement by so many different organizations.

As a counterpart to such many-sided encouragement may be mentioned a kindergarten in St. Louis where, in 1898, an old brick-paved yard, 12 by 24 feet, was transformed "by the aid of 80 pairs of little hands into a real live flower garden. The children themselves made

[a] Courses of instruction for the public schools of the Philippine Islands, 1904.

beds, transplanted vines, planted seeds, and cared for the plants." One of the St. Louis papers took up the movement, made a specialty of it, and offered prizes for the best gardens, until it was well under way. The Missouri Botanical Garden later gave to the Civic Improvement League as much of 160 acres as should be needed for this purpose, where each child who applied was given five plots 5 by 10 feet and one plot three times as large for corn, but one kind of vegetable being planted in a plot. In 1903 the Englemann Botanical Club sold seeds to school children at 2 cents a package with very gratifying results, but the work was partially stopped the following spring by four seedsmen, who presented the matter to the school board as an interference with their business. This would seem to be rather a short-sighted policy, for the seedsmen of Rochester and Worcester have been giving free seeds for school gardens and report their sales in those cities in some years doubled thereby, while the Cleveland seedsmen in every way encourage the sale of penny packets of seed by the Home Gardening Association.

In Colorado the movement started in Pueblo in 1902 in connection with three summer kindergartens in three widely separated parts of the city. Owners of property adjoining the schools furnished the land rent free, while the city water company furnished free all the water necessary for irrigation. Half the ground was cultivated in common, the other half was divided among the pupils, so that the work usually was done each morning between 9 and 10.30 o'clock. The gardening proved very successful, and each of the three kindergartens exhibited flowers and vegetables at the Colorado State Fair, "which might well have had space and blue ribbons in the horticultural department."[a]

In 1902 the Chicago committee on vacation schools directed their attention to school gardens, and home gardens as well, distributing over 4,000 packages of flower seeds among the grammar grades early in May. Later in the summer it was found that over 3,000 children had started home gardens either "in back yards, window boxes, or on the roof." In the garden of the Burr School fully 300 children were often at work at the same time, "an object lesson of interest and labor to the neighborhood. In spite of its location the garden was practically unmolested and very little thievery or mischief was done."[b]

This gardening movement was approached from an entirely different side when in the spring of 1897 the National Cash Register Company, of Dayton, Ohio, employed a gardener to lay out 40 plots, 10 by 130 feet each, to be used for gardens by boys of the neighborhood. Why should a corporation do this? Its factory was located in a section popularly called "Slidertown." Building lots sold at from $200

[a] Knight, G. H. Public school gardens. Camp and Plant, vol. 1, No. 2.

[b] Annual reports, committee on vacation schools, 1902.

to $300 apiece, many of the employees drank hard, and few had homes that attracted them to remain there while not at work. The president of the company decided that he owed his success to those habits of industry which he had acquired as a boy on the farm. With him the opening of the gardens and the expenditure for land, gardener, tools, seeds, etc., were purely a business investment of dollars and cents. And it has paid. The company has more than doubled the land used for this purpose; it still pays all the expenses of the gardens, including seeds, and gives prizes worth $50 each year for the best gardens. Conditions in the neighborhood have become so desirable that lots are now worth from $900 to $1,500 apiece, the vicinity is known as South Park instead of Slidertown, there is hardly an unoccupied house there, many of the factory people own their homes, and houses for rent are almost never vacant. The president of the company lays to the gardening and to little else the change in the character of the people, both adults and children, and in the entire spirit of that section of the city. More than that, it has shown that the very boys who worked in these gardens developed in their schools much more rapidly than those who did not. It has paid so well that in the spring of 1905 the company organized a neighborhood garden club for the children of South Park, who applied for gardens in such large numbers that only a fraction could be accommodated. The expert gardener in charge of the regular gardens became the director of the new venture, and, for the nominal fee of 10 cents, seeds, plants, and instruction were furnished to the children for home gardens during the summer.

The Home Gardening Association of Cleveland, Ohio, has made a success of its movement to beautify the city, much, though by no means all, of its work being done through the medium of the schools, and with the hearty cooperation of school officials and teachers. Each spring lessons are given in the schools on the ways to plant and care for gardens. Each school building holds an exhibit in the autumn, and prizes of money or bulbs are awarded to the best exhibits. In one case, every child from the entire school had an exhibit. Usually the majority of children in each school are exhibitors. In 1904 the board of education took up the matter officially, employed an expert nature-study lecturer, and established four large school gardens where the children should own the plots of ground and all the things which they should raise on them. During 1903 over 132,000 packets of seed were distributed to school children. "The results substantiate the wisdom of the oft-expressed idea that to gain immediate results in the improvement of home surroundings the effort must be made through the medium of the public school children." [a]

[a] Annual reports, Home Gardening Association, Cleveland, Ohio, 1903–1906.

The Woman's Institute of Yonkers, N. Y., in 1903 started two small gardens in the tenement district, in which 36 boys did so well that the institute decided to make gardening more extensive, "in the hope that eventually its benefit both as an educational and social factor might be so demonstrated as to induce the board of education to incorporate such instruction into the work of the public schools." In 1904 a "garden school" was opened on some 2 acres of land divided into 240 plots, the size of which varied slightly with the age of the boys who were to work them. Each boy paid a fee of 2 cents a week "to instill a feeling of proprietorship," but if he were unable to pay this he could give an equivalent in produce when he had raised it. Each boy was required to be at his garden at least twice a week. Usually he was there almost every day. The estimated market value of the produce raised, which of course belonged entirely to the boys, was about $1,200. The number of plots in 1905 was increased to 250, and there were twice as many applicants as plots. Had girls been admitted probably 1,000 children would have been kept busy. Besides this garden school, the Institute Civic League provided three small gardens on school grounds, one of them for girls only.[a]

Because of the publicity it has attained, the children's school farm in the De Witt Clinton Park, of New York City, has had perhaps a wider influence than any other similar undertaking in America, unless it be the Whittier garden at Hampton, Va.; for, as a direct result of the former, the Philadelphia board of education appropriated $3,500 for two large school gardens; the board of education of East Orange, N. J., started one garden, and gardens were maintained by the Teachers College of Columbia University and the New Paltz, N. Y., Normal School. The school farm in question owed its origin to Mrs. Henry Parsons, who, during 1902 and 1903, maintained a garden of 150 plots on 7 acres of what was to be a part of New York's park system. This tract is situated in the heart of the tenement district, where the rougher element considered that they owned everything in sight and thought nothing of a term in prison. The land had been used as a dumping ground for years, and the park department had no plow strong enough to break the ground, so a street-breaking plow was resorted to, unearthing nothing but lime, rags, wire, bottles, tin cans, and stone. A second treatment unearthed little else than a second layer, and so the first year only an area of 84 by 114 feet was prepared, and this was not planted until July 29. The first tools the little urchins had were clam shells. There was only one teacher. And yet the "school farm" was a success in every way. The neighborhood adopted it and made it its own, and the next year more ground was

[a] School gardens. Department of Agriculture, Office of Experiment Stations, bulletin 160, 1905.

cleared up, so that 277 children had gardens of their own, raising over 30,000 radishes, 1,745 beets, 350 quarts of beans, 3,000 heads of lettuce, etc. In 1904 the work was carried on as well as possible while the contractors proceeded with the construction and permanent improvement of the park. The park board has kept the school-farm feature, and it has been made a part of the New York park system.

In the heart of the New York ghetto the teachers of a school on Rivington street have conducted a garden on a lot 40 by 70 feet. Two thirds of the 2,400 children attending the school had never before seen a plant growing save in a flowerpot. Only early vegetables were raised, for after the close of the school for the summer the lot was turned into a playground. Here the children could not be kept away from their garden. They were there early in the morning and late in the afternoon, and woe came to any little weed that dared to show its head among the vegetables.[a]

Philadelphia[b] has seven school gardens—two supported directly by the board of education (the first instance of this in any of our cities), one by the Civic Betterment Association of Germantown, two by the Civic Club, and two by the Vacant Lot Cultivation Association. The two gardens first mentioned accommodate over 500 children; the others are somewhat smaller. One of these larger gardens was located in Weccacoe square, in the heart of the foreign tenement portion of the city, where criminality was common. Two plowings brought to light as many layers of broken bricks, and the soil underneath was hard clay. Some applicants for plots waited in vain all summer. The average yield from the plots of the school board, 8 by 16 feet, was 496 radishes, 21 beets, 2¼ pecks of beans, 15 heads of lettuce, 22 turnips, 202 tomatoes, and 1 quart of lima beans. One hoe was stolen, the only loss during the entire season. There were hundreds of applicants for plots for the next year. Gambling and rioting have disappeared from the neighborhood, there have been fewer arrests than before, and the college settlement, a block away, reported that "never had there been a summer so peaceful."

It was seen in Washington, D. C., that progress in other places was slow, from the fact that the public school-teachers had had no training in either horticulture or agriculture. To meet this condition, the United States Department of Agriculture cooperated with the two normal schools for white and for colored students in the city. Government experts lectured to the students, and opportunities for practical work were given them on the grounds and in the greenhouses of the Department. Normal School No. 1 has carried this

[a] Parsons, Mrs. Henry. Report, First school farm of New York city, 1903–4. School gardens. Department of Agriculture, Office of Experiment Stations, bulletin 160, 1905.

[b] Keen, Dora. Philadelphia school gardens, 1905.

work on for four or five years now; No. 2 (colored) began in 1904. In 1905 the board of education asked Congress for a new normal school building with grounds ample "for carrying on work in school gardening." At one city school where there is but little land each pupil is allowed to plant one seed and to care for and own the resulting plant. Even that has been enjoyed by the children. Home gardening was encouraged last year by the schools, 66,000 penny packages of seeds having been sold to the pupils, not more than three packages to any pupil. Teachers gave lessons in the school rooms on the manner of planting and the care of the garden in summer. In 1905 the superintendent of schools officially took up the matter, asking every school to plan work for the year, and wherever there was sufficient ground each grade in a building would be assigned a portion. In 1904 every colored school in the District of Columbia had a garden, with the exception of one school with no grounds whatever connected with it.[a]

Owing to the impetus given by the lectures on nature study by Dr. C. F. Hodge, of Clark University, a number of residents and teachers of Worcester, Mass., were led to assist in establishing gardens in connection with several of the city schools. These have been a success in every particular, save the essential one of rousing the school authorities to a sense of their importance; for the only official cognizance taken of the movement so far is an appropriation of $25 for hauling to school buildings soil which the teachers themselves might beg or buy. Miss Mary C. Henry, principal of the Upsala Street School, has made an oasis of her school yard, and here was demonstrated the practicability of the work outlined in Doctor Hodge's Nature Study and Life. Mr. Walter D. Ross, a seedsman, in 1903 and 1904, gave seeds and fertilizers free to those schools desiring them; 27 schools accepted this offer during the summer of 1904. The Worcester County Agricultural Society offered a considerable list of prizes for the best collection of garden products from the pupils of any one town, from any one school, from any one schoolroom, and from any school child. Fourteen of these premiums were taken by children from the Downing Street School, namely, that for the best school collection, and six first, four second, and three third prizes to individual children. These exhibits were all the products of home gardens; most of these belonged to children in homes where there had never before been gardens, and the entire work of the Downing street children was supervised by Miss Edna R. Thayer, who had previously never made a vegetable garden. Over 400 children from this school worked in their gardens all summer, each one being visited at times by Miss Thayer, who herself made a garden at her home and, with the children, took care of four large beds of plants and vegetables in the

[a] School gardens. Department of Agriculture, Office of Experiment Stations, bulletin 160, 1905.

school yard. Last summer Miss Thayer was not able to give her time to the work again, and no one else was willing to undertake it, yet it was learned during the summer that over 200 of the children, who had been aided by Miss Thayer the year before, had, of their own initiative, bought seeds and fertilizers, prepared their own ground, and were taking care of their home gardens just the same.

The encouragement given in Worcester by one seedsman is more than duplicated in Rochester, N. Y., where the seedsmen, nurserymen, and florists are the leaders, perhaps, in encouraging the school children to beautify the school grounds with flower gardens, trees, and shrubbery. The board of education is generous in providing land, the daily papers keep the movement before the public, and the Woman's Industrial and Educational Union distributes penny packages of seeds provided by the city seedsmen for this purpose. The children have not had such great obstacles to overcome as in other cities, but their enthusiasm has, as it were, sought for difficulties which they might surmount. For example, the children of school No. 26 one afternoon carried sod for half a mile of parking along the sidewalks near their school, in 70 small push carts, each of which made the round trip of half a mile and back ten times. On another day they set out 70 elms and 60 poplars along the street, and all summer they cared for a flower garden the entire length of these strips of turf on either side of the street.

The school garden in all America that is sending its influence over the widest sphere is that of the Whittier School, of Hampton Institute. This school is at once the practice school of the normal department of the institute and the local school which the 400 colored children of the neighborhood attend. Two hundred plots of ground are each given to two children to be planted and cultivated by them, the crops belonging to them equally. This gives them both a sense of ownership and of cooperation—things of especial importance to the negro. The size of the plots varies with the size of the children. About three-fourths of the children have come to cultivate their plots through the summer. In this garden not only does every child attending the school learn practical gardening, but every young woman who goes out from Hampton to teach her people in the South how to live better than before has both learned and taught gardening under expert supervision. The results are all that could be wished. When the gardening began in 1900, compulsion was necessary with the older girls, who not unnaturally thought it a disgrace to "work in the fields." Within two years no other part of the curriculum was approached with such eagerness, the average attendance was greatly improved, and the scholars were more constantly under the teachers' influence. President Frissell tells the writer that he believes

this to be the most important work of the institution and that school gardens managed by Hampton graduates are springing up through the South with the best of results.

The importance of school gardens is indicated by the impetus given them from so many sides, by the fact that they are not in any way the fad of some one class of people, but that they are used—and successfully used—by organizations with widely different purposes to further their own aims and to solve the problems of special interest to them. France originally established school gardens to provide a convenient means of supplementing the teacher's income, thereby simplifying the problem of maintaining the public schools. It was largely the same in Germany at the beginning of the movement, though now the gardens are used mainly to furnish material for the practical study of botany, while in Prussia there is the practical end of promoting the cultivation of fruit trees. In Sweden school gardens were provided for the express purpose of promoting agriculture. In France and Belgium they have been made to serve in educating the people to the better cultivation of fruit, vegetables, and flowers.[a] In Austria, as in Canada, general education is made paramount, the development of the child in heart, head, and hand proceeds simultaneously, while practical gardening is only of secondary importance. The movement began in England in a severely practical way, as is necessary where the evils of payment by results obtain, but this is changed by the new code into a means for the study of nature and of natural objects and for the correlation of the various studies of the elementary school.

All of these countries have made school gardens more or less an integral part of their educational systems, but how different is the case in the United States. The board of education of Philadelphia, it is true, entirely supports school gardens for its children; East Orange, N. J., Rochester, N. Y., and Cleveland, Ohio, have made their gardens a part of their school systems. Cleveland, Ohio, during 1905 supported 8 gardens,[b] and employed an expert, Miss Louise Klein Miller, as curator of school gardens,[c] and plans are now in course of preparation for a considerable extension of the gardens in size and number. There are also school gardens at present in probably half a hundred cities, and in a large number of country districts of the Middle West, notably in Illinois, Iowa, Minnesota, and Wisconsin, where individual teachers or country superintendents of schools have aroused some local interest. The United States Department of Agriculture estimates that there were about 75,000 school

[a] Cowley, R. H. The Macdonald school gardens. Queen's Quarterly, 1905, p. 399.
[b] Miller, Louise K. Children's gardens, 1904.
[c] Annual reports, Home Gardening Association, Cleveland, Ohio, 1903–1906.

gardens maintained during 1906. Illinois led in number of gardens, and New York, Pennsylvania, and Massachusetts followed in the order named.

Moreover, each year sees a longer list of normal schools giving courses in school gardening under the supervision of experts. In addition to those already mentioned, Tuskegee gives good courses in this branch to any of her students who care for it; the three State normal schools of Missouri teach gardening, as do the normal schools of Willimantic, Conn., Johnson, Vt., Los Angeles, Cal., and Salt Lake City, Utah. Over a dozen of the State agricultural colleges are either offering or preparing to offer courses in school gardening. But despite all this, the movement as a whole is fostered not so much by educational authorities as by other organizations and by individuals. Most of the money for the work in New York is given by the park board and by interested individuals. In many places the work is done directly by some few interested citizens; often a city civic club fathers the movement, as in Bradford, Pa.; one of the best and most widely known gardens, as already related, is supported entirely by an Ohio corporation. In two cities newspapers have started and taken care of the movement until enough public interest could be aroused to assure it of success under other auspices. In Rochester, N. Y., the seedsmen have been its principal supporters, while in St. Louis they have been hostile to it. College settlements in all the cities have lent their aid, and everywhere local agricultural and horticultural societies have given at least moral support. The committee of five of the National Educational Council has attested to the value of a garden with every school. The American Civic Association has organized a department of children's gardens, which is spreading abroad information concerning school gardens, conducting an active propaganda for the further extension of the movement, and helping communities to secure proper teachers of gardening.

I believe school gardens in America have come to stay, but just what kind of plan they will finally conform to is far to seek, if indeed they ever become systematized, as is inevitably the case in countries where reforms work from the government down. Certainly, as a national movement, they will not come to be utilized merely for the teaching of gardening, in any of its forms, as a trade, as is done on the continent of Europe, nor is it likely that they will very closely approximate the "Macdonald slates," from which the lessons "are wiped off as soon as they have served their educational purpose." For they have not fully served their purpose until their products have been harvested by the little landowners, who have been thus allowed to taste the sweet fruits of their labor. The educational value of school gardens is by no means limited to the formal studies of the school curriculum; the ethical value to the child is perhaps their

greatest good. True, if they are to be really school gardens, the garden instruction must be put on a pedagogical basis, and this has already been done in more than isolated examples. For instance, Principal W. A. Baldwin, of the Hyannis, Mass., State Normal School, exhibited at the St. Louis Exposition charts and diagrams of a correlated system of instruction in all the studies of the ordinary curriculum, based upon the school garden. This is the result of the work of years, and has proved successful in practical use in his school. It has been published in several places,[a] and a number of systems are now based on it. The American Civic Association publishes a 15-page pamphlet by Mr. Baldwin on School Gardens and their Relation to Other School Work,[b] which shows concisely and with many illustrations just how gardening is used in three grades of the elementary school as the correlating factor of the course, not as a new and separate subject. The teachers of the Whittier School at Hampton have worked out plans whereby they each day use the work just done in the garden as the basis for the instruction for that particular day, and in few schools can you see such interest in every study, or such a record of daily attendance. If so many of our teachers did not feel incompetent the minute they left their text-books, the above-mentioned method, it seems to me, would furnish the ideal elementary education. It would supply the "Sachunterricht" which Lay [c] and other German reformers are to-day so insistently demanding for the German schools. Perhaps the school garden may aid directly in bringing our American teachers to work always for the natural and harmonious development of the child, rather than to teach him a number of separate subjects as such. If it shall do this, it will mark a notable step in our educational progress.

Have school gardens as yet in this country proved of practical value in strictly school work? Those best acquainted with them are confident that concrete instances may be given. In the first place, in practically every school heard from directly they have given an interest to some scholars, probably to those of a predominantly motor type, to whom in the past the lessons in the books had meant little. A wholesome interest once aroused, the school work was more easily done. Were there no other advantage in this subject, it would be justified by this result in a country where we have few special schools for those a little slow or backward in their studies. But this is not all. Prof. H. D. Hemenway, of Hartford, Conn., says: "It has been found that school gardening tends to inspire one to do better work in other

[a] School gardens. Department of Agriculture, Office of Experiment Stations, bulletin 160, 1905, pp. 26–31.

[b] Baldwin, W. A. School gardens and their relation to other school work. American Civic Federation, 1905.

[c] Lay, W. A. Methodik des naturgeschichtlichen Unterrichts, 1899.

branches. In Dayton, Ohio, where school gardens have been conducted for six or seven years, boys taking gardening make 30 per cent more rapid progress in their studies than those without gardens."[a] The increased efficiency in other school work has been noted in Philadelphia, Cleveland, Hampton, and the Rice School in Boston. In the announcement of the department of children's gardens of the American Civic Association is the statement by Mr. Dick J. Crosby, of the Office of Experiment Stations, of Washington, that "experience has shown that devoting four or five hours a week, or even two hours a day, to nature study and gardening, if properly conducted, enables the pupils to accomplish more in the remaining time than they formerly accomplished in the whole time spent in school."

I have remarked that the educational value of school gardens was not at all limited to the school curriculum. President Eliot, of Harvard, says: "A leading object in education for efficiency is the cultivation of the critical discernment of beauty and excellence in things, and words, and thoughts, in nature, and in human nature," and he believes that this may come in a large measure from nature study and school gardens. Sharing this view, the American Civic Association decided to further school gardens as much as possible, because of "the firm conviction that there is no more potent influence for better civic conditions in America than the educated youth, in whom there is developed this critical discernment of beauty and excellence in nature and art, an abiding love for these things, and a feeling of personal responsibility for better civic conditions. Furthermore, its members are firmly convinced that there is no more efficient agency for the attainment of those high ideals in education than school-garden work, properly correlated with other school work."

Is this belief visionary? Quite the contrary has been proved. Prof. J. E. Davis, of Hampton, says: "Since the introduction of school gardens the children have more respect for the trees and shrubs of the school yard, and show a sense of responsibility for the neatness of the grounds, picking up paper and other litter without being told."[b] Director Martin, of the Philadelphia bureau of health, writes: "In the slums of Philadelphia I have found that in the houses where there are flowers—a result of our school gardens—there is neat cleanliness, although all around is squalor."[c] School gardens in the slums of a number of cities have taught more civic righteousness than all the police courts or college settlements have been able to do. In Philadelphia the residents of Weccacoe square themselves hooted at the idea of property rights being respected, yet only one hoe was stolen.

[a] Hemenway, H. D. Importance of rural school gardens. Southern Workman, vol. 32, p. 527.

[b] Davis, J. E. The Whittier school garden. Southern Workman, vol. 31, p. 603.

[c] Keen, Dora. Philadelphia school gardens, 1905.

There was no other loss during the season, and the police records show that crime diminished materially in the neighborhood. "The children of the vicinity were taken off the streets, even the big boys, at that formative period of 12 to 16, when so many begin to go to the bad." The children began to ask for books on gardening; this led to the formation of quite a little circulating library by the teachers, and not a book or magazine disappeared.

The country over, a more trying place could hardly be selected for a garden than De Witt Clinton Park, in New York City; but not a thing was stolen. Respect for ownership spread from the garden to the neighborhood, children who had already become criminals in a small way were completely changed, the city was shown "how willing and anxious these children were to work, and they were taught private care of public property, economy, honesty, application, concentration, self-government, civic pride, justice, the dignity of labor, and love for the beauties of nature, which they had never before had the opportunity to see." The lady living next the yard of the Downing Street School, in Worcester, Mass., had never seen the pears ripen on her trees until the summer when 400 of the school children planted and cared for gardens of their own; that fall she sent the children a large bag of pears as an evidence of her gratefulness to them for not touching a pear all summer long, so far as she knew. "Best of all the results of the gardens of our Cleveland school children, some few of the most troublesome boys have found their natural line of interest, and seem to be quite reformed." Such instances might be largely multiplied. Professor James says: "Manual training is the most colossal improvement that ever came into the schools of America, because the boys learn to work together, to look at each other's work, and to help each other work, and become cooperative instead of selfish little imps who are trying to get ahead of their fellows and crow over it."[a] School gardens possess all these advantages of manual training, with the added ones, over some forms of this discipline, of their feasibility almost anywhere, of easier inculcation of the sense of ownership, of working with the fundamental instead of the more accessory muscles, and of being essentially out-of-door work.

This matter of health is of no small import, especially to those children of the cities who otherwise would not work in the open air and in the fresh soil. The district nurses of New York report cases of little children with a pronounced tendency to tuberculosis in the spring, who, after a summer spent in gardening, "became quite well and strong by autumn." The children are not only taken off the streets during the vacation period but are given a pleasurable occupation, one disposing them favorably toward work, and especially toward the fundamental industry upon which our life depends, the

[a] Report, 1904, Ontario Dairymen's Association, p. 35.

enlarged practice of which would tend to counteract the congestion of our cities. It is on this last account that the movement is being aided by the New York Male Teachers' Association. In this connection it should be noted that gardening has proved to be of such importance in the development and training of the feeble-minded and the defective that it is rapidly spreading through all the better institutions for these unfortunates in the country.

Of course it is not to be denied that in some places there has been a lack of success in carrying out the school garden idea. Usually this has been for reasons which can be clearly pointed out. Perhaps the greatest may be likened to that of the man who started to build a house without considering the cost thereof. It is very easy for the novice to underestimate the attention and labor which the garden must receive. "There can be no more serious mistake than to suppose it is only necessary to plant the seeds and let them grow."[a] Cases are numerous where a teacher has attempted single-handed to carry on extensive gardening without any previous experience in such work and has been successful; witness the instance of Miss Thayer in Worcester, who made a success in every way of 400 children's gardens, though she had never before raised vegetables herself. But her whole plan was carefully mapped out beforehand, and one without her initiative and tenacity would have failed. This lack of preparation on the part of the teacher is amply met in Canada by the training given in Macdonald Institute; in the United States it is partially provided for in the normal schools mentioned above. It may be met by the teacher who has no special training by reading a few of the better books on gardening, studying some of the better seed catalogues, and, when the time for practical work comes, by being satisfied with a small beginning. There is plenty of time to enlarge; if the garden is at first limited to one class or grade, a spontaneous interest in the work is usually awakened in other grades, and they will either plan and manage a garden of their own, or find some one who will oversee it for them.

When the gardening has been efficient, and yet has not been kept up, the cause is usually that the people in general and the board of education in particular have not been convinced of the value of it, and this is all the more serious since values vary so with the community or people in question. Canada has become convinced that the garden is of great educational value, and is prosecuting the work with eagerness. In the Middle West, the people are more inclined to ignore the garden as a means for the bettering of the immediate teaching, and look at it from a utilitarian point of view; they want to see

[a] Jackman, W. S. School gardens. The Elementary School-Teacher and Course of Study, vol. 2, p. 574.

financial results. Superintendent Kern, of Winnebago County, Ill., has made a success of about 25 gardens at rural schools,[a] one of them where there were only seven pupils; Miss Laura Fitch, of Lucas County, Iowa, found this almost impracticable, but got scores upon scores of her country school children to make gardens at home, in connection with their school work, and on through the long summer vacation. In the fall a three days' school fair is held at Chariton, the county seat, where the children exhibit their products and receive small prizes for the best exhibits. Two of the faculty of Iowa State College are present, do the judging, and make addresses to the children. The movement in this shape is well supported by the people, because they can see the direct good to come from it; their children are made better farmers and better housekeepers. Perhaps it is in this way that gardening must get into the western schools. Already the farmers' institutes of several States have officially indorsed the movement, and the agricultural colleges of Ohio, Indiana, Illinois, Wisconsin, Iowa, and Minnesota, among other States, are giving what aid they can. The movement is spreading with an ever-growing impetus, for the very reason that the farmers are seeing their children taught that mind can do a great deal toward growing more bushels of corn to the acre, and a better variety of sugar beets. Put into practice with this end in view, its value as an educational tool will come, and it will have a doubly firm hold.

The two things, then, that school gardens need to make them adopted in our entire American educational system, are (1) a true appreciation of their value, both to the child and to the people; and (2) a body of suitably trained teachers, so that no disastrous miscarriage may occur in the beginning.

In planning the first school garden some such book as Hemenway's How to Make a School Garden is useful, though a cut-and-dried plan is not best for any school. Aside from a short course at Macdonald Institute, Guelph, Ontario, a visit to the Whittier garden at Hampton, Va., would be the best thing advisable. In the yearly reports of the committee on school gardens of the Massachusetts Horticultural Society are published the names and addresses of those especially interested in the movement, any of whom are glad to give advice. The outline plan of the school garden and grounds of the Bowesville Consolidated School, of Bowesville, Ontario, will be found in Cowley's article on the Macdonald school gardens;[b] one of the Oakdale School, of Dedham, Mass., is given in Mr. Hemenway's book. The former is a good example of what may be done with new school grounds just as easily as to lay them out without the beauty of curved walks, masses of shade, open vistas, individual

[a] Kern, O. J. Reports, Winnebago (Ill.) County schools, 1903–1906.

[b] Cowley, R. H. The Macdonald school gardens. Queen's Quarterly, 1905, p. 419.

garden plots, and an experimental garden for the use of the school as a whole. Each year sees a growth in the number of consolidated schools in the United States; it is time for a plea that none should be established without suitable garden space attached, as is obligatory in France and Russia. In Dr. Helen C. Putnam's pamphlet on School Gardens in Cities[a] are given plans of the gardens of the Russian primary schools and of the gardens at Possner, Thuringia, from Doctor Lukens's article on it.[b] The Hampton Nature Study Leaflet No. 15 is very good and practical, the best thing obtainable for southern schools. In any case it is better to have a small number of plots of ground and to have them large enough to hold the interest of the pupil than to give beds to a larger number of children at the risk of a loss of interest through too little variety and the impossibility of producing results large enough to offer some inducement to the individual pupil.

The length of time necessary to be spent on the garden can not be determined accurately in advance. In the largest school gardens of Nova Scotia—2 to 3 acres—two hours per week by all the pupils was found requisite to keep the garden in proper condition. In other places more time has been necessary. Sometimes the work is done during school hours; often, as in Cleveland, the enthusiasm has been so great that the children have enjoyed doing their work after school or Saturdays. In some cities the work is done during the regular nature study period. This is a matter lending itself to adjustment so readily that local conditions can easily settle it.

In planning a garden it will be well to keep Professor Jackman's hints in mind: "(1) Select plants which do not present a wide diversity of habit unless the garden will lend itself to a variety of conditions of water, sunshine, and soil; (2) avoid so-called novelties in plants; (3) allow plenty of time for systematic care; odds and ends of time will not do—the weeds do not grow by fits and starts."[c] The necessary seeds are the easiest to provide. They can be bought of the Home Gardening Association, Cleveland, Ohio, for 1 cent a packet; they may also be obtained gratis through Members of Congress, or the Secretary of Agriculture will send packages of seeds to any teacher who will apply. During 1906 the Department of Agriculture distributed 377,540 packets of seed for school gardens.

Are there too many obstacles in the way of establishing and maintaining a garden in connection with the average school, urban or rural, to prevent its being a success? I believe not. I do not know

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[a] Putnam, H. C. School gardens in cities. Rhode Island school reports, 1901.

[b] Lukens, H. T. A school garden in Thuringia. Educational Review, vol. 17, pp. 237–241.

[c] Jackman, W. S. School gardens. The Elementary School-Teacher and Course of Study, vol. 2, p. 575.

in what other undertaking there are so many demonstrations that where there is a will there is a way. The work of Mrs. Henry Parsons in New York and of Miss Thayer in Worcester show what may be accomplished by the enthusiasm of one person—in the latter case without any financial backing whatever. At Hampton a success has been attained despite the innate prejudices of the people of the neighborhood. There is no record of a failure in any city slums except for want of funds, although, so far as I know, every neighborhood has been, if not hostile at the first, at least incredulous of the possibility of success. It would perhaps be hard to name a difficulty which has not been overcome or circumvented in some way by the enthusiasm of the children and the careful planning of a competent teacher.

Nor is this educational agency confined to city schools. In Europe the school garden is held to be especially an adjunct of the rural school; in Canada the consolidated rural schools have the best gardens. True, there can not be a very elaborate garden at a school of only ten or a dozen children; school gardens having a *raison d'être* of their own demand better schools. But in Nova Scotia, a Province of rural schools, there were last year 98 school gardens besides those of the consolidated schools. In our own Middle West school gardens flourish best in connection with the consolidated schools, but Superintendent Kern and others have taught the teachers under them to make the most possible of gardens in very small rural schools, with no aid except that so readily given by the children. It is strange that other countries think gardens especially fitted for rural schools, while we think them better for city schools. Probably it is because we are apt to fold our hands complacently and say that the children of our rural communities learn practical agriculture at home. Well and good, but do they learn the best? Would not the school garden in the country teach even more than the children pick up from what they see done at home? The farmers of Illinois have made their land worth over $100 an acre to them; one can not live among them without knowing that they are good farmers. But there are plenty of instances among the best farming communities of the State where a boy has learned at school to mix his agriculture with brains, and where his school experiments have taught him to raise more bushels of corn to the acre than his father had ever done, and better corn at that, ear for ear. How many a farmer boy, who will practice farming all his life, goes through his life in the school and at home without knowing how the roots of corn spread out, or how to cultivate the corn properly to insure the largest yield, except as he follows what he sees others do and without knowing a hundred things of the kind which science is waiting for him to learn and utilize? How many country boys have been given any-

thing to think of as they hoe potatoes except that their city cousins are not blistering their hands so?

Of what value are school gardens? What can they be depended upon to do? Certainly, what they have done, at least. They have given whole schools a new incentive, and have raised the daily attendance materially; they have proved an open sesame into both the problems and interests of life, to children always before considered dull; in cities where some children had school gardens and some had not, the former are reported to have made much greater development in a given time than the latter; after certain schools had allowed their children to devote as much as two hours a day to their gardens, the pupils accomplished more with their regular studies during the rest of the day than they had done before in all the time. Country children have become interested in the science of their future life occupation, and so have been taught to think for themselves and to respect their calling. Children have been taught through these gardens more about practical ethics than by any other means yet devised, besides learning something of the fundamental occupation of mankind—tilling the earth. The sociological studies of Flynt, Wyckoff, and others, show us how many boys produced by our American school system are at some time obliged to say, with the unjust steward: "I can not dig; to beg I am ashamed." There are but two results possible from such a premise: Crime, or begging in spite of shame. Prof. C. F. Hodge has painted in vivid colors the moral turpitude involved in not giving to every child a feeling of independence in any strait, through the knowledge that no matter what comes, he can gain an honest livelihood from the soil. Last, but not least, school gardens have assisted nature to throw off the tightening clutches of tuberculosis.

# CHAPTER III.

## ELEMENTARY AGRICULTURAL EDUCATION.

Since the system of agricultural education of France is better known than that of any other country, it will be well to begin there in the consideration of primary agricultural education. As far back as 1850 agriculture was made an optional study in the primary schools.[a] In 1879 it was provided that agriculture should be taught in every normal training school, and three years thereafter should be obligatory in all the primary schools. But it was not until 1896–97, when a circular was issued making the course very practical and well defined that much real progress was made. At the present time agriculture is taught in every rural primary school in France[b] beginning with "object lessons" for children between 7 and 9. From 9 to 11 four half-yearly courses are given, in the first of which the three states of matter are considered, animals are studied and compared with each other, and there is a short description of the human body. During the second half year plants in all stages of growth are studied, objectively as much as possible, and then some "first ideas of agriculture." In the second year are included elementary ideas of science as related to agriculture, including personal investigations of different kinds of soil, largely made during school walks. In the higher section of the elementary primary course, from 11 to 13, the middle course is extended and made more detailed. The hygiene of man and animals is taught, also vegetable physiology and the chemistry of plants. The more important technical terms of agriculture are explained and used, and much is made of the experimental plot, of cultivation, pruning, and grafting; "the work must be rational, requiring the exercise of the intellectual faculties as well as labor with the hands."

The girls in all the rural primary schools are taught "physics and natural science as applied to agriculture, horticulture, domestic economy, and hygiene." In some Departments the girls follow the same course as do the boys; in practically all Departments they

[a] Brereton, Cloudesley. The rural schools of northwest France. Special reports on educational subjects [England], vol. 7, 1902.

[b] Medd, J. C. Rural education in France. Special reports on educational subjects [England], vol. 7, 1902, pp. 268–277.

are taught "certain notions connected with milk, butter making, poultry, and gardening," for the French peasants look upon gardening as woman's work, and help only when they have nothing else to do. Almost every rural school has a garden attached, where intensive work is made the essential thing. A large number of the primary schools use the text of M. Barillot,[a] the best elementary text I have seen in any language, but often one finds that a departmental professor of agriculture has written a text dealing with things of special importance to that locality, and that the schools in his Department are using this special text-book.

In the higher primary schools a theoretical course in agriculture is given in each of the three years of the general section, one hour a week; while in the agricultural section, which may exist in any school in which there is a demand for it, there is agricultural instruction three hours a week and six hours of practical work, except on rainy days, when there is experimental work indoors and the studying of farm machinery. This latter section is found in but few of the higher primary schools, because, as M. Réné Leblanc says, "on the one side the teachers assert that there are not enough pupils to form a section, and, on the other, the agriculturists do not send their children because that section is not organized." The Government now urges the inclusion of such a section in all these schools, saying, and truly, that the école pratique does not take its place. M. Leblanc[b] is leading an agitation for the inclusion of an examination in elementary agriculture as one of the requirements for the leaving certificate, which, once done, would make this subject as efficiently taught as any, since the leaving certificate is the one thing for which every French boy strives.

There are in France two classes of strictly agricultural primary schools, viz, farm schools and practical schools, the former, however, now being rapidly supplanted by the latter. The farm school is purely a money-making affair with the owner of some farm, approved by the Government, who gets the apprenticeship of some 20 boys of from 14 to 16 years of age in return for "allowing them to receive theoretical instruction" less than one-third of the time from a few teachers employed by the State. In this class, because of its management, may be included one successful school, the National Shepherds' School at Rambouillet, which gives practical instruction in the management and care of sheep. Both board and tuition are free during the three years of the course.

The écoles pratiques were created in 1875 to fill the gap between the farm schools, for the sons of laborers, and the national schools,

[a] Barillot, V. Cours élémentaire d'agriculture, 1902.
[b] Leblanc, Réné. L'enseignement agricole, 1894.

intended to give a secondary education to the sons of the larger landed proprietors. There are now over 40 of these schools, attended by the sons of peasant proprietors or small farmers, and the ministry hopes before long to have one, at least, in operation in each Department. They are usually farms of the better class, carried on with a view to profit, taking pay pupils who are taught the theory and practice of the types of agriculture peculiar to the district in which the school is situated. The director is usually the owner of the farm or the tenant on a long lease. There are usually nine teachers, whose salaries are paid by the State, which also provides from $800 to $1,000 yearly for scholarships at each school. The course of study usually covers two years, and the pupils are divided into two sections, performing manual labor and receiving theoretical instruction alternately morning and afternoon.

In France there are a large number of small schools which combine some general agricultural instruction with an education in some special branch, such as the manufacture of cheese and butter, of which there are five, with a course of one year, four of them being for young girls. There are also two practical schools of poultry farming and one of horticulture. These schools are intended to fit young people for managing small establishments and to serve as models for farmers in the immediate neighborhood.

Belgium has one of the most complete systems of agricultural education and research in existence to-day, which is largely a development of the last fifteen years or less. This system was based in the beginning largely upon the French one, but the Government has paid so much attention to meeting local needs that now no other system has more individuality. Agricultural theory and practice are taught in most of[a] the rural primary schools of the Kingdom, as a branch of general instruction. To provide competent teachers, the course of study in the State normal schools includes agriculture, and special normal courses during vacation are given for those already teaching. At least two lessons each week in agriculture must be given in every grade of every primary school, and the Government gives financial and other encouragement to teachers who excel in such instruction.

Just over in the Netherlands all higher instruction in the elementary schools since 1857 has included "the elements of agriculture," but except in 17 of these schools this is to-day interpreted to mean both intensive and extensive nature study. The 17 schools mentioned have extensive courses in agriculture, with considerable technical instruction. Nature study is taught at every training college for teachers in Holland, agriculture and horticulture only at Nijmegen,

[a] Genonceaux, A. The school system of Belgium. Report of the Commissioner of Education, 1904, pp. 1218–9.

Haarlem, and Middleburg, but special diplomas are offered to all teachers for proficiency in these subjects. Nature-study work in these elementary schools is given such an agricultural turn, however, that graduates are fitted to enter the secondary agricultural schools.

In Finland [a] lower agricultural instruction is given (1) in the lower section of the Mustalia Agricultural and Dairy Institute; (2) at more than 20 lower agricultural schools, some State and some private; and (3) in winter agricultural schools for farmers, of which there are several, with a course of seven months the first winter and six the second, the instruction being furnished free by the Government. Many schools of the latter two classes give elementary instruction in dairying, and males are usually barred from this course of one year, or sometimes two years. There are also about half a dozen elementary gardening schools. Forestry is taught at the lower agricultural schools in a very elementary way.

In the Norwegian Government's scheme of education agriculture is taught only in schools ranking as secondary. The British Royal Commission on Technical Instruction [b] reported that in Denmark "it is a national belief as well as a custom that agriculture should be taught in every rural school." The entire elementary course is woven around this subject of such vital import to the prosperity of the people, but so thorough a course is given later that the previous instruction is not called agriculture at all. After completing the elementary school (Folkeskoler) the pupil in agriculture becomes an apprentice under the care of the Royal Agricultural Society for two years on approved farms of the Kingdom, one year on the islands and one in Jutland. The society provides the apprentice with a small collection of books on natural history, agriculture, and stock management, which becomes his property at the end of his service. Before proceeding to an agricultural high school he takes either (1) a course of five or six months' instruction in one of the agricultural schools attached to a primary school, such as he graduated from two years before; or (2) a more complete course of nine or ten months at certain schools of the same class, or at others especially designed for this purpose (Landboskoler).

Elementary ideas of agriculture and forestry are taught in all the rural schools of Sweden, especially by means of school gardens, which most of the Swedish schools possess. There are also two classes of elementary agricultural schools, viz, agricultural schools, of which there are 26, and farmers' schools, of which there are 21. The former are supported by public funds, and their aim is "to give exercise, competence, and ability in all kinds of farm work, and to produce

[a] Forslag fra den Parlementariske Landbrugskimmission til Ordning af den lavere Landbrugsuntervisning, 1898, pp. 165–168.

[b] British Royal Commission on Technical Instruction, 1884, vol. 2, pp. 165–173.

able farm managers." Every school is situated on a large estate, and in 23 of them the course covers two years. All the pupils must have an elementary education before entering, and most of them are at least 20 years of age when they enter. The purpose of the farmers' schools is "to give an elementary theoretical knowledge of agriculture and practice in its scientific application" to those young farmers who would not otherwise receive any education above that of the primary schools of the country. Many of of the students come from the poorer classes, and receive free instruction and board. The State pays $260 annually for each free student, and provides that each school must have at least three teachers. The course of study covers only six months and is given during the winter. Excursions of a week or ten days to the better farms and schools are a feature. The State gives two years of elementary instruction in dairying, preparatory to the courses in the two dairy high schools. For the first year the young women are distributed among 18 dairy stations, and during the second among 8 others, no one being allowed to spend both years in the same station. The first year they are taught the entire care of the cows and dairy plant, the management of a steam engine and separator, bookkeeping, and butter making, including the making of "sour butter" for export. In the second year they learn how to make different kinds of cheese and to judge dairy products.[a]

Germany supports a complete system of agricultural education for all except the laboring classes, who seem neglected, at least in comparison. As is well known, there is no one course of study running through all the German schools, with possible electives, or the choice of different courses in the same school, but rather a series of complete school systems. Consequently, to study agriculture one must attend a strictly agricultural school. But in all these schools, except the agricultural institutes attached to the universities, the subjects which form part of a liberal education are taught, and agriculture, with the sciences of which it is an application, takes only the time which in other German schools is devoted to the dead languages and advanced mathematics. There are two classes of lower agricultural schools, viz, Ackerbauschulen and rural Fortbildungsschulen (continuation schools), the sessions of which are held at night or on Sunday, or in the winter in south Germany—very like the English continuation schools. To enter the Ackerbauschulen a boy must be 14 years of age and have passed through a primary school. The course extends usually over two years, and if given in the preparatory department of a secondary school (Landwirt-

[a] Sundbarg, Gustav. Sweden: its people and industry, 1904. Forslag fra den Parlementariske Landbrugskimmission til Ordning af den lavere Landbrugsuntervisning, 1898, pp. 157–165.

schaftsschule) is purely theoretical, while, on the other hand, those schools in country districts with a farm in connection give practical instruction as well. These latter correspond quite nearly to the Amt schools of Norway. When school gardens are attached, they are used only for purposes of demonstration.[a]

The instruction in the rural Fortbildungsschule is given by the regular school teachers, covering a period of two years, and is limited to the principles of agriculture and to supplying deficiencies in general education. In south and west Germany these are often in combination with higher schools, and usually have four or more teachers, the purpose being, as in the Danish people's high schools, to give farmers a better education than they can obtain in the common schools. The agriculture taught is simple, most of the time being devoted to going further with the common school branches. The course extends from November to March for two years, the first of which is usually occupied with common education, the second with agriculture. There are now some 1,500 rural Fortbildungsschulen in Prussia alone, with 2,000 teachers and over 20,000 scholars. Some of these schools are of a special character and give instruction suited to local needs. For instance, there are in Prussia[b] 9 schools for the cultivation of meadows, 118 for gardening and fruit culture, 18 dairy schools, 57 schools of household economy (for girls), 49 horseshoeing and blacksmithing schools, 10 beet culture schools, flax-raising schools, etc. The dairy schools for girls are peculiar in that most of them give instruction in housekeeping, poultry keeping, and gardening, in addition to the course in dairying, which usually lasts from six to twelve months, besides giving graduate courses of three months. Many of these schools give short courses for those who are already well acquainted with the principles of dairying, but who wish to learn the latest methods.[c]

In Switzerland there are 10 winter agricultural schools in the various Cantons, with an aggregate of some 500 pupils annually. These schools very closely approximate in character schools of the same class in Germany. Four cantonal schools are called "Ackerbauschulen" in the Norwegian investigation, but although they begin with rather elementary instruction in their effort to meet the needs of the people, a study of their curriculum and of their reports shows that they should rather be considered secondary schools, as they really rank in the Swiss educational system.

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[a] Stand und Entwicklung der landlichen Fortbildungsschulen in Preussen, 1904. Statistik der Landwirthschaftlichen und zweckverwandten Unterrichts-Anstalten Preussens für die Jahre 1900–1902.

[b] Statistik der landwirthschaftlichen und zweckverwandten Unterrichts-Anstalten Preussens für die Jahre 1900–1902.

[c] Forslag fra den Parlementariske Landbrugskimmission til Ordning af den lavere Landbrugsuntervisning, 1898.

Austria's system of agricultural instruction is very similar to that of Germany. There are several hundred Ackerbauschulen and Winterschulen, with courses varying from one to three years. The State helps support them, but in no case founds them. The Winterschulen are nearly all under the management of agricultural associations. The first Fortbildungsschule was founded in 1868, and the movement is now universal. In all these schools material for demonstration is secured from the gardens attached to them. There are also lower schools of gardening, fruit growing, hop growing, wine making, etc., but all are operated according to some local plan and so do not lend themselves to grouping. Some have only winter courses; others are more like continuation schools and extend over as many as four years. Miss C. I. Dodd, one of the British educational experts, reported[a] concerning the Hungarian system of education that since 1868 all parents and guardians have been compelled to send their children to school from their sixth to their fifteenth year; and that in all the elementary, higher elementary, and citizens' schools and in the normal schools for teachers, gardening, farming, and agriculture have been obligatory studies since that time.

From a publication issued by the ministry of public instruction of Servia it appears that since November, 1899, the elementary school curriculum for boys has included natural science with agriculture, three hours a week in the two higher classes.

The higher elementary course of instruction in Portugal, as prescribed by the Government code, includes "elementary notions of physics, chemistry, and natural history, as applied to industry, agriculture, and hygiene."[b] There are also elementary agricultural schools at Vizeu, Bairrada, Torres Vedras, Faro, Porto, and Regua.[c]

Though the teaching of agriculture in Japan is of very recent introduction,[d] so alive to its possibilities has the Government been that few countries have now a more complete system. At the present time the educational department is working out a comprehensive plan of nature study and school gardens, to be an integral part of the elementary school system, and has had agents studying the better experiments in these lines in the United States, France, and Germany during a period of some two years. There are in the Empire 47 public and 2 private elementary agricultural schools,

[a] Dodd, C. I. Hungarian education. Special reports on educational subjects [England], vol. 8, 1902, p. 490.

[b] Leitao. Technical instruction in Portugal. Special reports on educational subjects [England], vol. 8, 1902, p. 449.

[c] L'Enseignement supérieur de l'agriculture en Portugal, 1900, p. 53.

[d] Education in Japan. Department of Education, Tokyo, 1904.

which have some 3,000 pupils enrolled.[a] For twenty-seven hours a week (exclusive of time spent in practical work) during three years, these children of 12 years and over study the common school subjects, and also soils, manures, agricultural products, stock breeding, sericulture, injurious insects, etc.

That Japan has put forth the most strenuous efforts to meet the needs of her people is shown by the supplementary industrial schools, of which there are over 500, for the teaching of agriculture. In 1904–5 there were 23,000 children enrolled in these schools, most of whom were engaged in work on the land of their parents and were unable to complete the elementary schools. Local conditions are almost wholly consulted in arranging the courses, hours of instruction, etc., for though there is an official course of study, the greatest freedom is allowed as to the length of time devoted to any one subject. In some places the school is in session on evenings of week days, in some on Sundays and holidays, during the winter seasons or between busy farm seasons. The instruction given is very practical, and covers a range of topics as wide as those of even the secondary schools.

Great Britain has not made nearly so much progress as most of the countries just mentioned in taking care of her farming people in an educational way. The most recent critical presentation of the problem with which the United Kingdom is confronted in this sphere may be found in an article by Mr. John C. Medd, one of the British educational experts, in the Nineteenth Century and Later for January 1907.[b] Until 1900 agriculture was officially included in the elementary school programme under "elementary science," but the latter was one of the so-called "class subjects," and so under the code could not be taught unless either history or geography was omitted. The introduction of "block grants" in 1900 allowed those teachers who cared to do so to teach "some notions of agriculture," but offered them no encouragement. The New Code of 1904, however, includes "knowledge of the common phenomena of the external world," as has been seen; and if the aim of the primary school, "to fit the boys and girls, practically as well as intellectually, for the work of life," be carried out, nature study will take a distinctly agricultural turn. It is very difficult to grade the special institutions for teaching agriculture proper, for the instruction in the colleges, even, is scarcely more than elementary. But since the other branches taught rank as college subjects, perhaps it had better be considered under that head.

Ireland was the scene of some of the earliest agricultural teaching

[a] Primary education in Japan. Department of Education, Tokyo, 1904.

[b] Medd, J. C. Agricultural education in the United Kingdom, Nineteenth Century, January, 1907, pp. 108–118.

in Europe, for the school at Templemoyle was founded in 1826 by a committee of the Ulster gentry. About 800 pupils from different parts of Great Britain were educated at Templemoyle previous to 1850, when the school was given over to the board of national education, because, owing to the famine of 1847, the committee became financially embarrassed. Not only an agricultural but a general education was given, and that such instruction was valuable is proved by the fact that, as Sir Patrick Keenan reports, many landlords paid the expenses of their tenants' sons at the school "for the sake of the speedy and remarkable improvement of their lands which was sure to follow."[a] An agitation in England against the State's paying for the training of farmers was begun in 1858; successive chief secretaries barely tolerated its existence, and finally Templemoyle was abandoned in 1866, against the earnest protests of Ireland. Agricultural education had been given in the workhouses, but this was dropped in 1862 because of the same opposition. Some agriculture was later taught in the Irish primary schools, but was changed to "elementary science with special reference, in rural districts, to the principles underlying agriculture and horticulture," because of the lack of trained teachers for such a subject.[b] At present the commissioners of national education are working out a system of primary education for Ireland, which, "since the Irish are essentially an agricultural people, shall place the instrument of their own salvation in their own hands." Until a supply of expert agricultural teachers has been trained, there must be technical agricultural schools; and it has not been decided whether these shall continue or whether agriculture will be taught in connection with the secondary schools; "probably they will appear in both forms."[c] According to its last report the department of agriculture and technical instruction spent during the year 1904–5 for its agricultural work the sum of £166,895, but very little of this went toward elementary school work in any form. Winter agricultural schools running from six to twenty-six weeks were held at 16 centers, and 317 students were enrolled. The department had 20 itinerant instructors at work, who delivered short courses of lectures, visited farms and advised farmers, answered letters, etc. More such work would have been done, but it was impossible to secure a greater number of instructors with adequate training and experience.

Happily England has pursued a different course with her colonies. Every effort has been made to encourage agricultural education in Jamaica and the other West India islands, and with conspicuous success. Special grants for this teaching are given, and the subject

[a] British Royal Commission on Technical Instruction, 1884, vol. 2, pp. 281–283.
[b] Ireland, agricultural and technical, 1902, p. 278.
[c] *Ibid.*, pp. 289–291.

is taught in most of the elementary schools of the islands, the system being modeled after that of the rural schools of France. School gardens are common, and on most of the islands courses of lectures are provided during the holidays for active teachers, whose expenses are paid by the imperial department of agriculture in the West Indies.[a] So well satisfied is the British Government with the results that larger appropriations are freely given for the continuance of the work. In speaking on this subject before the House of Commons, Mr. Joseph Chamberlain said: "I regard the whole of this cost as being an expenditure intended to relieve the British Government of future charges."

In the Straits Settlements a Malay translation of an English text-book on the Principles of Agriculture is used as a reader in all the native schools, and in the English schools agriculture is one of the extra subjects of the code, and thus may be taught. The elements of agriculture are taught as a specific subject in the Government schools of Ceylon, for which a primer has been published and is used. The rudiments of agriculture are taught in connection with the Fijian botanic station and technical school at Viti Levu, owing to which the natives have learned how to propagate the more important food and economic plants. It is less than a decade since agriculture was made a part of the general educational programme of the lower schools of India, but already there are many good text-books both in English and the vernacular, and good work is done. The change was largely brought about by the action of the Government in placing agricultural degrees, diplomas, and certificates on the same footing as corresponding literary and scientific degrees for admission to Government appointments. For over six years now the Government has labored "to make instruction in the rudiments of agriculture a part and parcel of the primary system of education of the country." The botanic gardens of the British colonies and protectorates in Africa, some of them established almost twenty years ago, are all teaching stations, like that in the Fiji Islands. Indeed, their primary aim is to instruct the natives in the agricultural knowledge and methods of the Europeans. The duties of the director of agriculture of Zanzibar are chiefly educational. Natal provides for the teaching of the principles of agriculture in three European schools and in all the native schools, and fieldwork is compulsory there for all school children, boys and girls alike. Practical agriculture is taught in the mission schools of the Gold Coast, and in Malta the third reader contains short lessons on that subject.[b]

[a] Sadler, M. E. The teaching of agriculture in elementary and high schools in the West Indies. Special reports on educational subjects [England], 1901, vol. 4, pp. 592–833.

[b] Wallace, R. H. Agricultural education in the British colonies. Journal Society of Arts, vol. 48, pp. 336–339.

Elementary agriculture is a part of the school curriculum of New Zealand, which has adopted State text-books, some of which are used in parts of Australia. Most of the States of the latter country are considering the introduction of agriculture into their schools, but are hampered by their system of payment by subjects. Victoria gives her broad nature-study course such an agricultural trend that the question seems happily solved there. Lectures on agriculture are given to the young men on the four Government experimental farms of New South Wales who live there for two years each for the sake of the experience gained.[a] In South Australia "agriculture is taught as a specific subject in the country schools." All the colonies publish agricultural bulletins, which are sent free to farmers willing to pay the postage.

The consideration of nature study in Canada included, of necessity, a description of what the Dominion is accomplishing in elementary agricultural instruction in her schools. It is not easy to differentiate these two branches throughout the eastern Provinces, for in many places we, in the United States, would call certain teaching agricultural which in Canada goes under the title of nature study. In the Northwest Territories, however, agriculture proper is taught in Standard V of the public schools, following nature study in the first four standards. The so-called "elementary science" of Manitoba, taught in the higher four standards of the elementary schools, is rather an elementary form of agriculture taught according to the method of nature study. In Ontario, on the other hand, it is the work in nature study of the first four forms that rather approximates elementary agriculture.

The minister of colonies and agriculture of Bolivia has issued an elementary text-book of agriculture for the primary schools of that country. It is probable that the near future will witness a considerable development of agricultural education in a number of the countries of South America.

So far as formal instruction in schools is concerned, there is but little elementary agricultural instruction given in the United States. But considering the fact that an innovation in our school system must work its way slowly, instead of being put in practice the country over by order of the Government, as is the case in Europe, we have every cause for encouragement. Manual training is taught in practically all of our cities to-day, while only a decade and a half ago the movement was fighting for its very life. The effort to introduce agriculture into the curriculum of at least our rural schools is very recent, and in some parts of the country it is the result of successful nature-study teaching to which an agricultural trend has been given.

[a] Wallace, R. H. Agricultural education in the British colonies. Journal Society of Arts, vol. 48, p. 333.

To-day no other educational question is exciting more consideration than that of teaching agriculture in our elementary schools. Since about 1901 this agitation has spread all over the country, and has been taken up by bodies differing widely in purpose. The farmers of the Middle West were perhaps first in demanding it, but before January 1, 1907, the movement had so spread that at present an examination of teachers in agriculture is required in Alabama, Georgia, Mississippi, Missouri, Nebraska, New York, North Carolina, South Dakota, Virginia, and Wisconsin, while agriculture is required by law to be taught in the rural schools of Alabama, Georgia, Louisiana, Maine, Maryland, Mississippi, North Carolina, South Carolina, South Dakota, and Wisconsin. One sees, then, that a body of teachers is growing who will be able to teach agriculture intelligently when it seems best to do so, and to interest their pupils in it now. The teachers themselves have, in a number of cases, urged attention to this subject, and the State educational authorities in more than 12 States and Territories have done likewise by offering regular courses in agriculture in their State normal schools. The 7 State normal schools of Wisconsin are furnishing their State with a host of young teachers well equipped for the giving of elementary instruction in agriculture, and similar work is being done in 3 such schools in Illinois, 5 in Missouri, 4 in Nebraska, 2 each in North Dakota and Oklahoma, and 1 each in Alabama, Georgia, Michigan, Porto Rico, Texas, Virginia, and Washington. In Missouri, State Superintendent Carrington has included in his course of study, which has been adopted by nine-tenths of the counties of the State, not only nature study in the first four grades, but a study of "How plants grow" for the spring of the seventh year, and a definite course in agriculture for the eighth year, and he has published a pamphlet on The Elements of Agriculture for the use of rural teachers, which is exceptionally good in the hands of those who feel helpless with the subject but who wish to do the best possible under the circumstances.

The committee of five of the National Educational Association, already mentioned,[a] recommended that agriculture be taught in the last three years of the common school, but that it be not made mandatory upon the teacher of the 1-room rural school, because he is apt not to be prepared to teach the subject, and often the school year is too short to permit an addition to the course of study unless the age of leaving school be raised. It might be well to point out here, in passing, that the introduction of agriculture into the rural schools of France and Belgium has caused parents to keep their children in school from one to three years longer. If the subject were well taught in the United States, there is no reason why the same result

[a] Industrial education in schools for rural communities. Report of the committee of five, National Educational Association, 1905.

should not obtain. The American Civic Association is urging that elementary agriculture be introduced into our country schools, at least in the shape of gardening. The American League of Industrial Education, organized in 1904, has for its aim to promote "an industrial public school system which should include the teaching of domestic science and both agricultural and manual training in all public schools," and "the establishment of public manual-training school farms in every county of the United States, and of as many such manual-training school farms in the vicinity of all cities, by State, municipal, and National Governments, as may be necessary to give every boy the opportunity to learn how to earn his living by his labor, and to till the soil for a livelihood, and to get his living from the land."[a]

Certain of the State universities and many of the State agricultural colleges are assisting in this movement. Cornell University is giving an ever greater agricultural bearing to the bulletins sent to the junior naturalist clubs over New York State, and the State educational department has prepared a valuable syllabus on agriculture for the elementary schools of the State.[b] Iowa State College is using all its influence toward interesting the boys and girls of the State in agriculture, and during 1906 an extension department was organized with a faculty of six members. The Ohio State University has employed Mr. A. B. Graham as superintendent of agricultural extension work, whose duty it is to cooperate with the common schools in every way possible in extending such education. Agriculture is taught in a number of the schools of Indiana, where State Superintendent Cotton has for some time been publishing monthly bulletins to prepare the teachers for such instruction, and where the State board of education is at present recasting the course of study so as to include this work for the country schools of the State. Purdue University is quietly but efficiently working toward the same end, especially by stimulating favorable sentiment in the farmers' institutes. The University of Illinois has from the beginning led this movement in its State, and the course in agriculture which is followed in many of the rural schools of the State was prepared by Dean Davenport, of the college of agriculture. The course is arranged by months, and a large number of experiments are outlined, with suggested observations.

Perhaps the extent to which any educational movement is gaining ground may be gauged by the rate of publication of text-books on

[a] The teaching of agriculture in the rural common schools. Ninth report committee on methods of teaching agriculture, Association American Agricultural College and Experiment Stations. Office of Experiment Stations, circular 60, 1905, p. 4.

[b] Ellis, A. C. The teaching of agriculture in the public schools. Bulletin University of Texas, No. 85, Dec. 15, 1906.

that subject. Certainly this is true of the one in question. Beginning some three or four years ago with texts issued hurriedly to supply the first demand, there has been a constant improvement, although as yet we have none in America comparable to those of some foreign countries, especially of France. A special text has been written for the use of the Nebraska schools, and others have been adopted in Louisiana, Georgia, Tennessee, North Carolina, Alabama, Virginia, most of the counties of Maryland and Florida, and by a number of counties in California. United States editions of some of the better Canadian books have been published.

In Illinois, Indiana, Iowa, Kansas, Nebraska, Ohio, and Texas various county superintendents have solved the problem of promoting agricultural education where formal instruction in the schools seemed impossible by the formation of boys' agricultural clubs, and in every case that I know of there has been hearty cooperation of the farmers' institutes and of the agricultural colleges. The movement in Macoupin County, Ill.,[a] was started in 1901 by the president of the farmers' institute, who had been unable to get more than a dozen or so of the farmers to attend the annual meeting of the institute, notwithstanding several advertising schemes which he had tried. Finally he advertised that he would send free to any farmer boy who applied as much of the finest seed corn procurable in the State as a 1-cent stamp would carry, the boys to exhibit their product at the annual meeting of the farmers' institute and receive small prizes for the best corn raised. Five hundred boys responded. When the time for the meeting came the farmers were told they might stay away if they cared to. This meeting was for the boys, who were there by scores with their corn. It was judged by an expert from the State agricultural college and pronounced as "fine a display of corn as he ever had seen." But the farmers themselves were there, too—over 500 of them—and the problem had been solved. The other county superintendents of schools took up the idea, organized boys' agricultural clubs in their schools, and gave pure-bred seed corn to them gratis. The boys went to their teachers with their difficulties and they studied the problems of practical agriculture together, school gardens were introduced, and the movement before long spread into other States.

One of the most fascinating exhibits at the Louisiana Purchase Exposition was the 1,000 little pyramids, each of 10 ears of corn, grown by 8,000 Illinois boys, members of these clubs. Many of the counties have girls' clubs as well, the members of which do practical work in domestic economy, horticulture, and floriculture, all with especial reference to farm life. The Ohio State University has fos-

[a] Crosby, D. J. Boys' agricultural clubs. Yearbook Department of Agriculture, 1904, pp. 489–496.

tered this movement in Ohio, where, in three years, there have been organized 35 boys' clubs in 22 counties, with an increase last year of 100 per cent. The university furnishes to those children of rural schools who apply packages of vegetable seeds, flower seeds, seed corn, and litmus paper for testing the acidity of soils. The Texas Farmers' Congress cares for a like movement in its State, where the girls are as much looked after as the boys. In Iowa Superintendents Miller, of Keokuk County, and Ports, of Iowa County, organized boys' agricultural clubs in 1904, within twelve days of each other. Both undertakings were even more successful in 1905 than in 1904, when each numbered over 300 active members. Miss Laura Fitch, superintendent of the Lucas County schools, held a school fair during the fall of 1905, at which the products of her boys' and girls' club were exhibited. The agricultural products were judged by Professor Holden, of the State agricultural college, who gave a lecture to schoolboys only on the selection and testing of seed corn, which held the attention of the little fellows from start to finish. Miss Rausch, professor of domestic science, was present also, and talked to the girls and their mothers. A small admission fee was charged all except exhibitors, and almost 600 people of the county paid to see the handiwork of their school children, of which the local papers and the judges spoke very highly. Miss Fitch believes the schools of her county are doing better all-round work for this one feature and that the children are more interested in their school work than ever before. A number of boys and girls of Mason County, Ill., have learned in their club to raise corn of such a grade that it readily sold for $1.50 per bushel, while that of their fathers was bringing the customary 40 cents.[a]

In working over the material for this study two surprises were experienced, so gratifying that they must be mentioned here in some detail. As oases in the midst of a barren desert of school and agricultural reports there stand out the 1905 report of Mr. O. J. Kern, superintendent of the Winnebago County, Ill., schools, and the 1905 report of the Illinois State Farmers' Institute, of which more will be said later. Superintendent Kern's report of 80 pages is unlike any other school report I have ever seen. At first glance it is more like the catalogue of an expensive finishing school. Printed on fine book paper, filled from cover to cover with pictures, all of them beautiful except where one is used occasionally to preach a lesson not to be enforced otherwise, 2 or 3 pages of figures which are really eloquent in their exposition of how much cheaper a fine consolidated township school is than half a dozen small, inefficient 1-room schools, descriptions of school gardens, boys' agricultural clubs, and girls'

[a] Industrial education in schools for rural communities. Report committee of five, N. E. A., 1905, p. 60.

home culture clubs—it is no wonder that the Louisiana Purchase Exposition gave the Winnebago County schools a special gold medal for their educational exhibit. A large share of the pamphlet is devoted to a description of the school gardens, of the work done by the boys' and girls' clubs (which have now over 500 and 300 members, respectively), and of the two days' excursion made each year by them to some State agricultural college. There is also a plea for more extensive work along the same lines and for the beautifying of the school houses and grounds by planting trees, shrubs, vines, and flowers around them. In a county where the farmers are already raising 50 bushels of corn per acre, school gardens and boys' clubs have been heartily indorsed by the farmers' institute, because many members of the club raise over 100 bushels per acre yearly, some 125, and one boy 150. The Illinois experiment station wanted to know whether or not sugar beets could profitably be raised in the State; 70 of the Winnebago boys tried it and sent in to the station the finest beets received that year. The club maintains a lecture course of its own and has experts from neighboring States come and speak on their special lines of work. The farmers now offer cash prizes for the best products instead of asking the merchants of Rockford to donate prizes in goods, which the merchants are willing to do, however. From 200 to 300 persons go annually on the excursion of the club, for which the railroads have made rates of about half a cent a mile, considering that to be nothing more than business policy. Two visits have been made to Urbana, Ill., one to Madison, Wis., and one to Ames, Iowa, over 300 miles away. The circulating libraries sent from one school to another contain, partly at the request of the pupils, a greater proportion of agricultural books and pamphlets every year.

The influence of such organizations upon education is felt now in a rapidly increasing number of districts each year, from Michigan to Texas, from Kansas to Pennsylvania. Mr. Dick J. Crosby, of Washington, D. C., has described this movement in the 1904 Yearbook of the United States Department of Agriculture, and in noting some of the results observed he says: "The boys have learned to observe more closely the crops and things affecting the crops; they have met and learned to solve some of the problems in the improvement of crops; they have learned to keep simple accounts, to read good literature, and to know the sources of agricultural literature; their views have been broadened by contact with others and by visiting institutions of learning, and finally the power of taking the initiative has in many cases been strongly developed in them. Collectively, the social instinct—of almost paramount importance in rural districts—has been developed in them, while the influence upon the communities has been most wholesome." This last-named result

can be seen in many ways. In Illinois, for instance, the State Farmers' Institute took the matter up, and in most of the counties one or two meetings of the local institutes each year are given over to the school children and teachers, while often the teachers' and farmers' institutes unite for a meeting. Indeed, during 1904–5 the total attendance at the farmers' institutes in Illinois was in round numbers: Farmers, 20,000; wives, 10,000; teachers, 2,000; pupils, 20,000.

In 1904 the Scott County Institute gave as a first premium for corn judging by school boys a trip to the University of Illinois and two weeks' instruction at the college of agriculture. So many counties in 1905 did the same that the dean of the college arranged for two weeks of suitable instruction for boys during the latter part of January, 1906, in such things as the study of corn, stock judging, rope tying and splicing, milk testing, etc., a course which some eighty school boys attended. The county superintendents and individual teachers cooperated to encourage corn judging contests, and most school boards and teachers accepted the two weeks spent in the college as the full equivalent for the time lost from the home school. An elementary course in agriculture has been added to the State course of study for common schools at the demand of the State Farmers' Institute, which has also induced the State normal schools to teach agriculture to all their students.

This brings us to the 1905 report of this organization, which is a most notable one. It has scores of illustrations, showing the condition and progress of both agriculture and education in Illinois. It contains the addresses of Miss Van Rensselaer of Cornell University, on The Relation of the Farm Home to the University; of Superintendent O. J. Kern on Boys' Clubs; of Dr. David Felmley on Domestic Science in the Normal Schools; of Prof. L. D. Harvey, of the Dunn County, Wis., Agricultural High School, on What the Country Schools Should Do for the Country Boy and Girl; and of Prof. O. T. Bright, for eleven years the superintendent of the Cook County, Ill., schools, on the Improvement of the Farmers' Schools. And this was not a teachers' convention. Along with these addresses there were others by some of the greatest agricultural experts of the Middle West. Surely great progress has already been made when a host of farmers and their wives come together from all over a large State to have such a feast served to them. I feel strongly that every teacher who is able to obtain this report ought to read it as carefully and thoughtfully as if it had been promulgated as an educational document.

There are some few primary schools in the United States in which the basal instruction is agricultural, where the boys are taught, young as they are, to become practically self-supporting, and so independent, but without any neglect of formal education; schools, that is to

say, quite like the famous Abbotsholme in England, except that they are lacking in sufficient equipment, and that, almost without exception, they are farm schools for indigent boys, or for waifs not yet vicious, but who have been committed for vagrancy. Best of all these schools and most widely known is the Boston Asylum and Farm School for Indigent Boys, on Thompsons Island, in Boston Harbor, a school with ninety-two years behind it. Only boys of good morals and fair physique will be accepted at this institution, on being relinquished by parents or guardian until they are 21. Boys work half of each day and attend school the other half. All the common branches are taught, and a diploma admits without examination to the Boston high schools. A number of industries are taught, and well taught, while all in turn help with the making and mending of clothes, cooking, baking, laundering, and farm work. For many years "simple instruction in the sowing of seed, care of crops, harvesting, etc.," has been given, and in 1902 a course in agriculture, under a trained college man, was begun, which extends through all the grades, and with which the instruction in all the other branches is correlated, so that it is probably the first grammar school in the country to offer a basal course in agriculture. The island is well stocked with animals and fowls, and the economic side of the subject is emphasized; for example, one class has undertaken to keep the brown-tailed moth off the island, another wages war relentlessly on the mosquitoes, each with success. One of the boys writes, spontaneously, "every month we have an examination in agriculture, and most of the boys like it very much." Surely further comment is unnecessary.

The Plummer Farm School, on Winter Island, Salem, Mass., is a smaller institution of the same kind, sixty years old, usually with 30 to 40 boys in attendance, and is giving proportionately as good results. From the Boys' Busy Life Club of Milwaukee, managed by the junior probation officer of the city, has grown the Wisconsin Home and Farm School, opened in 1903 at Delafield to indigent or neglected boys from anywhere in the United States, without regard to nationality or creed, the number being limited only by the support received.

The Good Will Farm, at East Fairfield, Me., is unique in that it offers the same advantages to girls as to boys, and has been successful through many years, though dependent from month to month upon voluntary contributions. The Beulah Home, at Boyne, Mich., is a farm school of 120 acres for boys of any religious faith, where nothing is given the boys free, work is not compulsory, though study is, but the boys get credit slips for all that they do. The boys govern themselves and staying at the school is not compulsory, but there are no desertions. The boys are allowed to work away from the school during the twelve weeks of summer vacation, and have the money they receive for their own use.

A remarkable institution with a remarkable history is the Berkshire Industrial Farm, at Canaan Four Corners, N. Y., which is entirely dependent upon charity, and is for just the boys whom the schools mentioned above refuse to take, that is, the "unruly, vagrant, and vicious," and even for young criminals, who may be allowed to go there by judges knowing of the school and of its twenty years of successful efforts at making citizens. There are usually from 70 to 100 boys there, some of them very young indeed, who are kept in almost a separate environment from the older ones. Almost all the boys who have been there have been transformed into good men and good citizens by "a course of steady and interesting work for mind and body, imposed by an authority at once kind and inflexible; * * * the habit of work becomes fixed only by keeping the boy constantly and usefully employed." Manual training in other than agricultural lines is taught, but Superintendent Mayo has not found such good effects as from agriculture—from teaching the boys to make an honest living for themselves out of doors, in the country. In Everybody's Magazine for October, 1905, appeared an article by Eugene Wood entitled "A school for boys," describing the admirable Boys' Industrial School at Lancaster, Ohio, maintained by the State for boys convicted of habitual truancy or petty crimes. The article is replete with cases of men now prominent in business and social life who go back to Lancaster to visit, with gratitude, the school that "made men of them," and of boys who call Lancaster "home" as if they mean it. Since then the press has often contained letters from parents asking why there were not such schools to which they might send their boys for both education and training. In 1901 appeared in the Boston Transcript the statement of a widely traveled and highly educated man: "It is an interesting and curious fact that the three best boys' schools in the country are available only to Indians or negroes (Hampton and Tuskegee) or boys from indigent families (Thompsons Island)." Statements from all the schools mentioned above remind one forcibly of those to which Mr. Wood has given such wide publicity.

In April, 1897, Edmond Demolins published in Paris his book, "À quoi tient la supériorité des Anglo-Saxons," which in a few weeks ran through some ten editions, and was quickly translated into many other languages.[a] Few books of recent times have stirred whole nations to thought more than this one has done. M. Demolins, one of France's most scientific economists, asserts in the beginning that "every nation organizes its education in its own image, in view of its habits and customs," and that if a nation is to thrive its educational system must above all else "prepare men capable of

[a] Demolins, Edmond. Anglo-Saxon superiority, 1898.

creating for themselves independent positions and really taking care of themselves." From this view point he discusses the question, "Does the French, the German, and the English school system form men?" and answers his first two questions in the negative, the last in the affirmative. But it is not the great English "public schools"—Eton, Rugby, etc.—which are commended, but rather such schools as Abbotsholme and Bedales, which M. Demolins describes in detail, and to which he gives his unqualified approval, for such schools are first of all for the prime purpose of forming men capable of taking the initiative. It is directly owing to this book that other such schools have been founded in France, Germany, and Switzerland, and I have not been able to learn of one of them that has failed of success.

Certainly this book and its fundamental questions are germane to our consideration. Do our schools, with their course of study decided beforehand by college entrance requirements, form men? We need not be pessimistic, of course. The introduction of manual training and domestic science has brought us a long way in the right direction. But these are not available to rural children, nor is the most fundamental science of all—agriculture—provided for, as at Abbotsholme and its prototypes, where agriculture is made the basal study. We are not deprived of models, however, either in primary or secondary schools. Thompsons Island, the Berkshire Industrial Farm School, and like institutions unquestionably do form men, and that from material not inferior at all, but rather misdirected in the beginning, so that the results are the more marvelous. Is it not passing strange that such examples as these, and the few large secondary schools of analogous methods, should have so long fulfilled their own mission without teaching us more about the best system of education—that which should give its special attention to forming men?

We have had for a number of years in our country another class of schools, about which but little is generally known, whose sole purpose from the beginning has been to form men and women rather than scholars, namely, the Indian schools of the United States. Each annual report of the Superintendent of Indian Schools since 1882 has been a record of the attempt to make the Indian students capable of creating independent positions for themselves, and really taking care of themselves. Since Miss Estelle Reel became superintendent, in 1887, the teaching has been given more and more an agricultural bearing, and with the most satisfactory results. "Twenty-five per cent more Indians are self-supporting now than ten years ago," she says in the twenty-first annual report of the Indian schools. Wherever the schools are large enough to command the facilities, those industries are taught which the Indian might use at or near his own home. Most of the young Indians go back to their allotments, upon

which the teachers urge them to make their homes, instead of leasing their land or neglecting it for town life. Consequently, of all the occupations open to them, those of farming, dairying, and stock raising are of most importance. In 1901 Miss Reel issued a course of study to be followed in all these schools, which had been worked out during three years of planning and observation. This course pays more attention to gardening and agriculture than to any other subject, gives full outlines of the work by years, requires gardening and practical work from the first school year to the end, and gives concrete instances of ways in which various agents and teachers have made the work interesting to the boys and girls, instead of drudgery, as the Indian naturally considers the tilling of the soil. The students are taught how best to raise and preserve the grasses which they use in basket making, and several distinctly indigenous arts are thus preserved.

The results are admirable. Subsequent reports show increased interest in agriculture on the part of both teachers and pupils. Children in schools near their own homes carry home vegetables which they have raised and cook them for their parents, so that a diet partly vegetable—formerly a rare occurrence—is now a more usual thing among the adult Indians. The graduates who go back to farm their allotments necessarily give up a nomadic life. The "blanket Indian" is fast disappearing. Miss Reel in 1904 reported having seen small gardens near tepees, in a few places "the direct outcome of the instruction at school." Agriculture is teaching the Indian the importance of steady habits to an extent he has never learned before. Above all, it has taught him to be self-supporting and not to depend upon Government rations and allowances. It has already raised the Five Civilized Tribes of the Indian Territory to the level of American citizenship, so that the time is already at hand when the Five Nations will cease to exist and will become merged into our own people.

There are in the South a number of schools for colored people somewhat analogous to those just described, such as the Brick Agricultural, Industrial, and Normal School, at Enfield, N. C., which has over 1,100 acres of land under cultivation and which has a considerable endowment. But most of these schools accommodate their curriculum more or less to the craving of the negro for a literary education, more than seems best if there be kept in view what we have assumed to be the true ideal of education—to make men; and examples of the better of these schools will find consideration later.

It is true that there are obstacles in the way of a sudden and general introduction of agriculture into the rural school curriculum; obstacles so serious that the committee of five of the National Edu-

cational Association recommended [a] that "any law making mandatory the teaching of the elements of agriculture, manual training, or domestic science in the entire body of rural schools within a State is unwise;" but it seems to the writer that, grave as the difficulties confronting us are, they are not insuperable. The lack of good text-books is less and less apparent, and in a number of States the lack of properly trained teachers, as well, is becoming less. This latter deficiency is the one which appears gravest to the committee of five, and to it are due in large part the failures of the past. Perhaps the most serious trouble is our national one—that of the lack of professional training for rural teachers, and, consequently, their lack of initiative and their necessary dependence upon text-books. This is being overcome somewhat in certain States which, like Michigan, are establishing small county or district training schools for rural teachers and instructing them in the elements of agriculture, among other things. A dozen other difficulties might be chronicled, such as the short school year, already overcrowded programme, lack of equipment, great number of recitations each day, etc.; but these may all be summed up in the one phrase, "inefficiency of our rural schools." Their condition certainly is not one most to be desired. More than 95 per cent of their pupils never go to any other school, but their curriculum shows the constant struggle to fit the 5 per cent to go to a high school with a course governed, in turn, by the college entrance requirements.[b] Is there any remedy? There seem to me to be two, each of them needed: (1) Consolidated schools, and (2) nature study and the elements of agriculture taught as best may be done under the circumstances.

To consider the second rubric first, the committee of five recommends that teachers in all the States be made to prepare themselves for this teaching as soon as possible, by (1) statutory provision requiring all teachers in the rural schools to pass an examination in nature study and elementary agriculture (which we have already seen has been done in a number of States); and (2) by including at least one book on agricultural instruction in each teachers' reading circle course in States having such a course. One might suggest, in addition, that the State agricultural colleges should provide short courses for teachers, and especially should offer such courses during the summer. All normal schools ought to introduce agricultural courses as soon as possible, as has been done in a number of States. Indeed, the most admirable plan at present is that of Nova Scotia, where the provincial normal school and the agricultural college are

[a] Industrial education in schools for rural communities. Report committee of five, N. E. A., 1905, p. 10.

[b] *Ibid.*, p. 14.

affiliated and all normal students are required to take certain short courses in the college. But even without such professional training as teachers must have, to do the best work, a considerable degree of success may be attained where an active and earnest effort toward that end is put forth.[a] There have been noted above instances of remarkable success in those States where the teaching of agriculture is made compulsory. Superintendent Carrington, of Missouri, himself one of the committee of five, states in his course of study (p. 48), and he speaks from experience, "It is not necessary for the teacher to have training in scientific agriculture to teach this work well." In many an isolated county of the Middle West an enthusiastic county superintendent of schools has secured magnificent results by interesting the children themselves and by obtaining the cooperation of the local farmers' institute and of the State agricultural college, and so has fairly forced his teachers to fit themselves for instruction along the line of greatest interest.

As with nature study, this is a subject which the teacher should know as thoroughly as possible, but at the same time, if the pupils are wisely directed in this branch it will not be demoralizing to the school, the pupils, or the teacher for the latter to work along with the children and to allow them to do as much of the teaching as they are capable of doing. The United States Department of Agriculture issues a number of pamphlets which the school should have for its use, among them an excellent bibliography [b] of works on nature study, gardening, elementary agriculture, and reference works; Office of Experiment Stations Circular No. 60,[c] already referred to; and a large number of farmers' bulletins, especially Nos. 54, 109, and 218. The report of the committee of five[d] should be in the hands of every teacher. The teachers of Missouri have been very successful with the Elements of Agriculture for Public Schools, published by Superintendent Carrington in 1904, which is just the thing for teachers who are willing but who lack initiative. The Illinois Course of Study, which is already largely used throughout the Middle West, contains an outline of agricultural teaching prepared by Dean Davenport, of the State agricultural college, which is successfully used in its home State. From the publisher of the course of study can be

[a] The teaching of agriculture in the rural common schools. Ninth report, committee on methods of teaching agriculture, Association of American Agricultural Colleges and Experiment Stations. Department of Agriculture, Office of Experiment Stations, circular 60, 1905, p. 8.

[b] Crosby, D. J. Bibliography on nature study, school gardening, and elementary agriculture for common schools. Department of Agriculture, Office of Experiment Stations, circular 52.

[c] The teaching of agriculture in the rural common schools, 1905.

[d] Industrial education in schools for rural communities. Report committee of five, N. E. A., 1905.

obtained, at 1 cent each, pamphlets[a] in five series of a dozen each, on the study of farm crops, farm animals, horticulture, agriculture, and animal husbandry, all written by experts. Each school should have the bulletins of the experiment station of its own State sent free on request, and as many as possible of the bulletins on nature study mentioned in Chapter I. There is by no means a dearth of material—it is only necessary for the teacher to attack the problem with sufficient energy and tact.

It has been difficult to write this chapter without making a good part of it an argument for the consolidated school. The advantages are many, the disadvantages are so few as to be practically negligible. Experiments in some thirty States have shown that it is cheaper to transport the child to the school than to bring the school to the child. Not only is the actual expense less, but there results a much better building of several rooms, hygienic and with modern equipment, better teachers, longer recitation periods, avoidance of exposure to the weather, longer school years, increased average attendance, and a raising of the age when the children leave school, as well as a multitude of other advantages. Half of the school children of the United States go to rural schools, and they have a right to demand that their schools be efficient, but that is impossible under present conditions. The only remedy is consolidation. Dr. J. W. Robertson, at the head of the Macdonald educational movement in Canada, said in the presence of a large number of Ontario farmers: "Suppose you start for a creamery with 100 pounds of milk, and 45 pounds leak out on the way, could you make your business pay? And still, of every 100 children in your elementary schools, 45 of them fall out by the way—in other words, the average attendance is but 55 per cent of the school children. The consolidated schools in the five eastern Provinces, with their gardens, manual training, and domestic economy, now bring 97 of every 100 children to school every day—and with no additional expense to you." Doctor Robertson's reasoning is cogent here. County superintendents who have one or more consolidated schools are annually publishing statistics showing a largely increased number of boys and girls over the age of 14 over the number before or the number of such pupils in groups of analogous schools. Consolidated schools would not only make possible able teaching of agriculture, but would also make the consolidated rural school as efficient in every way as are the schools of our towns.

[a] Parker's agricultural leaflets.

# CHAPTER IV.

## SECONDARY AGRICULTURAL EDUCATION.

A thorough and comprehensive system of agricultural education is of more importance to France than to many other countries, because, owing to the law of divided inheritance, most of the sons of French peasants will one day have a strip of land of their own, if indeed they do not first purchase one with their savings, as many are doing. In small communes one person in every four is a proprietor. Whenever any large estate comes on the market it is bought up by a syndicate or speculator and cut up into small farms, which are at once snapped up by peasants.[a] It is largely because of this condition that France has such an excellent agricultural system and that the agricultural schools which the Government ranks as secondary are really on a par with the higher institutions of several other countries.

Instead of maintaining a large number of small secondary agricultural schools, France supports three large national agricultural schools in widely separated districts, at Grignon, Montpellier, and Rennes, with the purpose of "disseminating among the cultivators of the country the great discoveries of modern science, in order that the educational standard of the rural landed proprietors and farmers shall be raised so as to make them enlightened and expert agriculturists." The teaching staff of each is about 25 and the course of study covers two years, but great freedom in the arrangement of the curriculum is allowed, to meet the needs of the various sections of the Republic. Grignon deals especially with artificial pasturage, the cultivation of cereals, stock breeding, and the wine industries of northern France. At Montpellier, where students from most of the southern countries of Europe congregate, the types of agriculture prevailing on the shores of the Mediterranean are studied, especially vine and olive culture, sheep farming, breeding of silkworms, and the making of wine and olive oil. Rennes pays special attention to cider making, pasturing, farming on the métayer system (on shares), and the agricultural products of most importance in western France. The students of all three of these schools must spend their vacation on a farm, and report what takes place there.

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[a] Brereton, Cloudesley. The rural schools of northwest France. Special reports on educational subjects [England], vol. 7, 1902, p. 217.

Four special schools should be included here, namely, the National School of Horticulture at Versailles, of Agricultural Industries at Douai, of Dairy Farming at Mamirolle, and the Colonial Agricultural School at Tunis. The course of study of the School of Horticulture extends over three years, tuition is free, and 40 pupils only are admitted annually, although foreigners may be admitted by special permission. The work is divided into the following sections, from one of which to another the pupil passes each fortnight: The growing of fruit trees, of early vegetables, of hothouse plants, flower gardening in the open air, ornamental arboriculture, vegetable gardening, and work in the shops. Under no consideration may a foreigner be admitted to the National School of Agricultural Industries at Douai, which sends out trained managers and foremen capable of directing brewing, distilling, sugar making, cheese making, and of executing the orders of chemists and engineers in an intelligent spirit. The course of study lasts two years and the holidays are spent by students in private factories. The Mamirolle Dairy School was organized to perfect methods of making Gruyère cheese, but now teaches everything connected with the manufacture of butter and of the different kinds of cheese suited to the French market. The course lasts but one year, and foreigners may be admitted only in case of a vacancy not applied for by a French student—practically an unheard-of thing.

The Colonial Agricultural School at Tunis was organized in October, 1898, to deal with the kinds of agriculture most prevalent in Tunis and the French colonies, and is quite like the three national schools in France, with a two-year course. An experimental garden and orchard in connection collects plants and fruit trees from all climates, and tests which are most suitable for propagation in northern Africa. Large numbers of young olive trees are produced, which are sold to colonists at low rates.

Both agricultural "schools" and agricultural "sections" are included in the Belgian scheme of secondary education,[a] the former giving exclusively professional instruction, while in the latter a part of the time is given to the general education of the students. The agricultural schools have a three-year course with the exception of Huy, where study lasts but two years. These schools are for farmers' sons who intend to continue in their fathers' vocation; tuition is free, and the State gives scholarships to deserving students, all of whom must have been through the elementary schools. There are eighteen of these schools, and to graduate from one of them a boy must pass a Government examination. A Government official writes: "The greatest service these schools have rendered has been

[a] Agriculture in the Kingdom of Belgium. Ministère de l'Agriculture, 1904.

to raise the agricultural profession to an interesting art which fascinates the learner, and which he never desires to abandon."

In the agricultural sections young farmers may get a general, as well as a professional, education, and the transformation of an agricultural school into a "section" has made many a school more popular and successful. Thirty public and private secondary schools give short courses in agriculture and horticulture at least once a week throughout the year, outlining the theory and practice of agriculture. Doctor True, of the United States Office of Experiment Stations, suggests that this plan might easily be adopted in the rural high schools of the United States, and doubtless it would be of great value. Excursions to the best farms and orchards in the neighborhood are a feature of all the Belgian schools. There are four agricultural sections for girls in the Kingdom, and several high schools of agriculture, with courses of at least two years for girls. For the children of small farmers and gardeners who can not attend one of these secondary schools the State has arranged analogous courses, to be given at most of the rural centers of importance, which may be attended only by graduates of the primary schools. Secondary agricultural education is given at the State reformatory at Ruysselede. There are four dairy schools for young men in the various provinces, with four-months courses, to provide managers for dairies. There are also ten traveling dairy schools for women, giving four-months courses of a notably high grade. Two hours a day, six days a week, are devoted to theoretical instruction, and three hours daily to practical work. No tuition is charged.

Besides numerous winter classes, there are in Holland six permanent winter schools of agriculture and horticulture, in session from October to April, with a two-years course of study. They are intended for the sons of small farmers and market gardeners, and the course is eminently practical. The fees are about $5 a year, and may be remitted for poor children. There are also four horticultural schools organized upon the same lines but with a little less theoretical work. The Société de Bienfaisance, in its noted colony for those who otherwise would be paupers or criminals, maintains among other things well-equipped schools of agriculture, horticulture, and forestry, each of which is subsidized by the State.

Finland supports secondary agricultural schools at Mustalia and Kronoborg and provision has just been made for a like course to be offered at the University of Helsingfors. The course runs through two years, is both practical and theoretical, and presupposes at least two years of farm work.

The agricultural schools and the high schools of Denmark are so closely connected that in some parts of the country it is difficult,

if not impossible, to distinguish between them. The importance of keeping up to date is constantly urged upon the pupils, and no doubt this largely accounts for the supremacy of the Danes in the markets of England. Only theoretical agriculture is taught in the high schools, but there are numerous agricultural trade schools which have grown largely during the past seven years. Since 1892 the State has granted funds to any people's high school which teaches agriculture and gardening, and many of the schools now receive in consequence about $2.50 yearly for each agricultural scholar, together with one-third the running expenses of the school, plus a bonus of $75, but no school may receive more than $700 annually.

The highest agricultural education provided for by the Swedish Government is that of the two agricultural high schools of Ultuna and Alnarp, at the latter of which dairying and farriery are also taught.[a] Each has a two-years course, and an exceedingly large and well-equipped faculty in comparison with the number of students, which is small. The practical work includes absolutely everything done on a farm, including the operation of a steam engine. Before the final examinations each student must submit to the rector a plan of an estate, carefully platted out, with directions how to manage it, including rotation of crops.

The standard of secondary education in Germany is that which meets the official requirements necessary to avoid two of the three years of compulsory military service. For this purpose Landwirthschaftsschulen have been established, so that the sons of farmers may escape service in the army and at the same time acquire knowledge which may be useful to them afterward in the cultivation of their farms or estates. The languages and mathematics of the Gymnasium are, during the last three years of the course, largely supplanted by the natural sciences and the principles of agriculture. To enter one of these schools, one must present a certificate from a Gymnasium or Realschule of the first rank, showing that he is entitled to enter the third class (tertia) of such a school. Every province possesses at least one of these schools; some have more. These schools really correspond about to the lower agricultural schools of Sweden and are in no way comparable with the French schools described earlier in this chapter.

Austria supports a smaller number of these schools than does Germany; the work done is more practical, and they, too, release their graduates from two of the three years of compulsory military service. In addition, there are two special Mittelschulen, one a gardening school, the other a "fruit and vine" school; the former

[a] Sundbarg, Gustav. Sweden: its people and industry, 1904. Feilitzen, M. von Kungl. Landbruksstyrllsens Underdåniga Berättelse, 1904.

with a course of three years, the latter of two. A thorough primary education and at least a year's practical work is necessary to enter either.

Turning to Switzerland, the Zurich Polytechnic gives a secondary course in agriculture and another in forestry. There are four "theoretical and practical schools of agriculture," about corresponding to those of Germany and Austria just described. All the theoretical work possible is given during the winter, so as to leave the summer for outdoor work. In addition, winter courses are given for those unable to attend the full course. At Chatelaine there is a school of horticulture, market gardening, and viticulture, which seems to be quite a model; the faculty is large, the course covers three years, and the work done has shown valuable practical results.

There are in Portugal two secondary agricultural schools; the National School of Agriculture at Coimbra, dating back to 1864 and the School for Agricultural Managers at Santarem, founded in 1886.

A secondary agricultural school may be established by any city, town, or village of Japan, when the local finances permit without detriment to the elementary schools of the place, and the Government gives a subsidy to each such school, running for five years.[a] In 1904 there were 57 of these schools, only two of them private, with 7,146 pupils, and the number of such schools is rapidly increasing. The course of study is usually one of three years, but sometimes extends over another year. The number of hours of instruction exclusive of practice must not exceed thirty per week. A preparatory course of two years and a graduate course of the same length may be established when it seems best. The minister of agriculture writes me that the sons of middle-class farmers are now attending these schools largely, as being better suited to their abilities and requirements than are the universities. There are three higher technical schools of agriculture, at Tokyo, Osaka, and Kyoto, which devote their energies to special lines, such as brewing and the making of yeast, cider, wine, and vinegar. The courses are three years in length.

As has already been seen,[b] England is trying to work out in her own way a system of agricultural education fitted to her peculiar conditions. Comparatively few of her people are farmers; still fewer can ever own a foot of land. Up to 1889 only nine county schools had attempted any teaching of agriculture, and the movement to introduce it was fought by the headmasters of the schools.[c]

[a] Secondary education in Japan. Department of Education, Tokyo, 1904.

[b] Annual reports, 1901–1905, Board of Agriculture, London.

[c] British Royal Commission on Technical Instruction, 1884, vol. 2, pp. 213–217.

At present four counties have local farm schools for their own counties, and most of the colleges and institutes give instruction quite analogous to that called secondary in other countries.

Although the commissioners for national education for Ireland have under way plans for a system of secondary agricultural schools, there are at present but three such institutions, and their work is really very elementary. The Munster Dairy and Agricultural School, near Cork, devotes most of its energy to the teaching of dairymaids, who may take two courses of six weeks each. It is owing to the work of this school alone that Cork butter has regained its old-time supremacy in the British market. There is also a department for "the training of farmers' sons in the theory and practice of agriculture," with two courses yearly of four months each. Only 50 students can be admitted to the institute during any one session, and at the time of the last report nearly 250 applicants were on the waiting list of the department. Agricultural instruction is also given at the Royal College of Science in Dublin. For advanced work, however, students who are able usually go to the Albert National Agricultural Training Institution at Glasnevin, near Dublin, but here there are only two courses of four months each. The practical work is admirably suited to the needs of the students, all of whom are taught dairy husbandry, rearing and fattening of different breeds of cattle, field culture, and permanent improvement of the soil. Three acres are cultivated as a kitchen garden, a little over 6 acres are used as a model small farm and cultivated entirely by hand (as are an eighth of all the holdings of Ireland), about 22 acres are used as a model for farmers able to own 1 or 2 horses, while the rest forms a large farm—for Ireland—where farming on a pretentious scale is taught.[a]

Special lecture courses in agriculture by qualified men furnished by the agricultural department are given now in practically all the secondary schools of Jamaica and the British West Indies. By means of aid from the department each of the larger and better high schools has been enabled to add a member to its faculty who gives regular instruction in agriculture. Since September, 1900, secondary agricultural schools have been opened at St. Vincent, Dominica, St. Lucia, and St. Kitts. These schools are run on apprenticeship lines. The scholars remain five years and are fitted to become managers of estates. The boys are trained, fed, and clothed free.

Since 1898 the department of education of the Cape of Good Hope has maintained an agricultural school at Stellenbosch, which was already ten years old when it was taken under government control. The boys stay here two years, the work of the first year being quite preparatory. An experiment station has now been established on the

[a] Ireland, agricultural and technical, 1902, pp. 284–287.

farm of the school. The agricultural assistant writes me, "a proposal is now on foot to establish a chair of forestry in the South African College, Cape Town, and the subject will be ventilated at the next meeting of the British association."

There are no agricultural high schools in Canada, though in Quebec there are several small farm schools, such as the colleges of St. Anne, Richmond, and L'Assomption. Agriculture is prescribed for all the high schools of Manitoba, and in the Northwest Territories the elementary course is reviewed and expanded in the high schools, while physics, chemistry, botany, and physical geography "must be given an agricultural bearing." In the other Provinces agricultural courses are optional. Prof. J. W. Robertson, administrator of the Macdonald funds, is urging the eventual establishment of an agricultural high school in every county, but not until the elementary schools have been so fitted to the needs of rural life that there shall be a demand for secondary agricultural schools on the part of those prepared to take advantage of them.[a]

As a protest against the secondary education of England Dr. Cecil Reddie opened at Abbotsholme, October 1, 1889, his "New School" [b] now of world-wide fame. The training there obtained is (1) physical and manual, (2) artistic and imaginative, (3) literary and intellectual, and (4) moral and religious. Probably a good part of Doctor Reddie's success is owing to the fact that no one of these divisions has ever been allowed to crowd out, even to the slightest extent, any other one from the attention due to it. Every boy receives some training in the manual arts, especially in the trades upon which man is most dependent. Emphasis is laid upon the rudiments of agriculture and gardening as the essentials of human life and its activities. The boys raise their own vegetables, groom their horses, take care of the cattle, make hay, and learn the elements of the numerous trades and occupations practiced on the better farms. Begun in a modest way, Abbotsholme has been successful, both educationally and financially, and has attracted attention the world over. M. Edmond Demolins took it as the subject of his work on Anglo-Saxon superiority, already mentioned,[c] and France, Germany,[d] and Switzerland now have schools patterned after it and in most cases governed by men who have taught at Abbotsholme. Tentative plans for like schools have been made in Russia, and more than one such plan is now well underway in the United States. Bedales, in England, founded by a former teacher at Abbotsholme, differs from

[a] Report, 1904, Ontario Dairymen's Association, p. 38.

[b] Reddie, Cecil. Abbotsholme, 1900.

[c] Demolins, Edmond. Anglo-Saxon superiority, 1898.

[d] Sanford, D. S. Two foreign schools and their suggestions. New England Magazine, May, 1902.

its parent only in that it receives female pupils as well as male, who live in a separate home near by. This is a unique thing in England, but seems to be a pronounced success. In 1897 Dr. Hermann Leitz, another of Doctor Reddie's teachers, founded a similar school at Ilsenberg, Germany, which has grown so that he now has another for older boys at Haubinds near by, in the Black Forest. L'École des Roches was opened in October, 1899, at Verneuil, France, on a farm of some 60 acres, by M. Demolins and a number of other French sociologists. In none of these continental schools has the everlasting routine of French or German school systems entered, and no one would accuse one of their pupils of lacking originality.

An analogous school, more pronouncedly agricultural, is the "Land-Erziehungsheim" at Glarisegg, near Steckborn, Switzerland, which, though founded only in 1902, in 1903–4 had students from Italy, Switzerland, France, Germany, Hungary, and Roumania. In all these schools the boys and teachers live and work together, devoting, at Glarisegg, for instance, five hours daily to study of the arts and sciences, three hours to work in the garden, fields, workshop, and house, five hours to free play and gymnastics, an hour and a half to meals, and nine and a half hours to sleep. The pupils of these various schools correspond with one another and so have interests unusually broad for children. They learn not only practical agriculture and gardening, but the use of tools is taught them, and they are sent out into the world not only efficient, but resourceful, "fit to rely upon themselves in all emergencies, and quick to fall on their feet after all accidents"—such young men as Cecil Rhodes had in mind for his Oxford scholarships when he provided that "scholarship" should count but 50 points out of 200 in determining the rank of contesting applicants.

In the United States progress in secondary agricultural education is coming more slowly than in the elementary schools, it is true, but the advance is none the less sure. No hard and fast lines can be drawn between the secondary agricultural schools and those above and below; consequently we shall be obliged to consider in this chapter on the one hand those schools offering more or less work that should not be ranked as primary, and, on the other, those whose curriculum will not allow them to be called colleges in the strict sense of the term. Such a category will include the 16 land-grant schools for colored people in the Southern States; for though they are supposed to correspond to the agricultural colleges of the same States, the material equipment is much less, the courses fewer and inferior, and the income is not sufficient to retain experts of so high a grade as will be found in the colleges for whites. Most of these schools offer certain collegiate courses, but only about a third of the student body attain to them, while less than 5 per cent of the

students are in the four-year course leading to the bachelor's degree.[a] The educational problem of the South is a serious one, and the best solution can not be worked out in a day; given the possibility of schools either to train up a few agricultural experts or a large body of practical farmers, but not both, and the present course is without doubt the wiser.

The total number of students enrolled in these secondary schools for the colored race is something over 6,000, to which several hundred more should be added who are students at the Tuskegee Normal and Industrial Institute, which is not a land-grant school, but which gives as good work in agriculture as any of this class of schools, unless it be Hampton. Each of the two latter schools makes elementary agriculture compulsory on all students in their academic courses, Hampton for four years, Tuskegee for two, although a more complete three-years' course is offered. Tuskegee offers a year's graduate work, while Hampton offers three graduate years of work, which is made very practical, though theory is in no sense neglected, and President Frissell urges upon his students the importance of this course above all others. It is here, more than anywhere else in the South, that the ennobling influence of scientific agriculture is taught and emphasized by precept and example. Hampton has brought the state of farming on the peninsula overlooking Hampton Roads to such perfection that it forms an object lesson which is a model to hundreds of students from all parts of the South, the abject poverty of whose homes is due for the most part to the absolute neglect of the first principles of agriculture. Both Tuskegee and Hampton annually hold a short farmers' conference, attended by scores of the more ambitious colored men and women of the surrounding country, many of them traveling comparatively great distances over roads none too good, who tell freely of their successes and failures during the past year, and receive words of advice and encouragement from leaders of their race. Each of these institutions publishes agricultural leaflets which are sent free to applicants, and which seek to help the poor farmer to solve his vital problems in a very definite way. Each summer Hampton gathers together from 400 to 600 colored teachers from all over the South, and gives them not alone instruction in texts and methods, but a vast deal of inspiration. During the past few years each attendant upon these summer courses has been obliged to take either elementary agriculture or nature study. A model farm is maintained by the institute, and the students in the regular agricultural courses learn the practical management of this.

A word as to the results of these southern schools will not be out of place here. Throughout the black belt of the South slavery is still

[a] Crosby, D. J. Agriculture in negro schools. Department of Agriculture, Office of Experiment Stations, 1903, pp. 719, 720.

a vivid recollection, which means that a hatred of "work in the fields" has to be overcome. When school gardening was introduced at Hampton compulsion had to be used with the girls—now they look forward to it with pleasure. Agriculture is demanded of every Hampton student, and every year several times as many young people demand admission as can be accommodated. In almost every State of the South Hampton graduates are conducting small industrial schools, none other so well known as the large one at Tuskegee, but each forming a center of progress for the negroes. During the last twenty-five years more than 70 per cent of the negro farmers of the 33 counties of tide-water Virginia have come to own and manage their own land. These schools have been sending out missionaries to preach the gospel of work, of landowning, and of scientific agriculture. I know of a colored man who worked his way through one of these schools by studying nights while he labored all day in a sawmill. After he went back to his former home to teach, he induced his scholars to help him build a larger and better schoolhouse; he built his own home on land which he managed to buy; he taught the people around him—almost all of them renters—how to farm and make money, and helped them to buy land and make homes. To-day there is not a saloon in his county, over 90 per cent of the negro farmers own and manage their own land, and for more than five years not a negro from this county has gone to the penitentiary. His case is a notable one, but not exceptional. The negroes of the black belt of Florida, according to the report of the State superintendent of schools, now not only maintain all their own schools but pay some $5,000 annually to the support of the white schools of these counties.

In this connection should be mentioned the Chilocco Agricultural School, in Oklahoma, an outgrowth of the Indian school at that place. An immense farm of 8,600 acres is being transformed into the "great agricultural school of the Indian Service," and here hundreds of Indian boys and girls from other elementary Indian schools can be accommodated and taught scientific farming. This is a practical outgrowth of the introduction of agricultural instruction into all the Indian schools, and is an excellent commendation of the plan. Only a limited number of Indians can be received at Hampton each year, many of whom learn some other industry than farming. Chilocco will henceforth be the principal means of educating leaders among the Indians in that most necessary art for them—agriculture.

Secondary schools of agriculture are now maintained in connection with the agricultural colleges of Idaho, Louisiana, Maine, Minnesota, Montana, Nebraska, Rhode Island, Texas, and Washington. Minnesota in 1895 established the first of these schools, offering a three-years course for the purpose of "training the students to become good

citizens, good farmers, and good housewives." No tuition is charged, and the school has proved an unqualified success. At present upward of 500 students are taking the regular course, while over 150 more annually attend the short course for farmers and the dairy school. The university has found that a larger percentage of these students go back to the farm than mean to when they enter the school, so favorable to farm life is the atmosphere in which they live for three years. The last session of the Minnesota legislature established another secondary agricultural school, at Crookston, but it is not in operation yet. The school of agriculture of the University of Nebraska, established about 1898, has essentially the same courses as the one just described, except that it lacks work in domestic science, which, however, is to be added in 1907. Washington maintains a three-years course, while the secondary work in Maine and Rhode Island covers but two years. A few of the other State agricultural colleges, Illinois, for example, accept students coming directly from the elementary schools, but do not differentiate a secondary course, although there seems now to be a tendency to do so. The Connecticut agricultural college offers a special group of courses to pupils coming from the common schools, and the New Mexico agricultural college teaches agriculture in the preparatory department which it maintains. The differentiation of the secondary courses is a hopeful sign of a definite intention to prepare not only experts, but also a corps of excellent farmers who shall be thoroughly grounded in the science which underlies their profession; and, as well, of the establishment in all of our States, eventually, of separate secondary agricultural schools.

Agricultural high schools, supported in part at least by the State, are in successful operation in Wisconsin, Alabama, and California. In 1902 the first two of four county agricultural high schools were opened at Menomonie and Wausau, Wis., the State paying a substantial share of the first cost, and afterwards "a sum not to exceed half of the amount actually expended in such school." In connection with the Dunn County school, at Menomonie, is a county training school for rural teachers which gives the county a body of teachers well trained in agriculture. Various magazines have given prominence to these schools, and the town of Menomonie has grown materially by reason of people from many parts of the country moving there to give their children an education in agriculture, manual training, and domestic science. The course of study covers two years, and short winter courses for farmers are given annually. The farmers themselves have shown such a lively appreciation of these schools that the legislature has established two more in other parts of the State. Each year sees a larger number of the country boys and girls attending a higher school after leaving the rural school.

In Dunn County the annual teachers' institute is now made a part of the agricultural summer school, and the teachers are given special instruction in agriculture, manual training, and domestic economy, instead of reviewing the common branches over and over again. Indeed, these subjects are making their way into many of the rural schools of the county; books and bulletins on agriculture are furnished the schools free; school buildings and ventilation systems are planned without expense, as are school grounds and gardens; school apparatus is planned and prepared at actual cost. To operate one of these schools costs the farmer 20 cents on each $1,000 of his assessment, and besides teaching his children for him without tuition, the members of the faculty attend local farmers' institutes, speaking and giving stereopticon lectures; they select pure-bred stock for buyers, furnish bulletins on farm subjects, and furnish plans and blueprints of good roads, barns, silos, poultry and milk houses, water and ventilation systems for houses and barns, and land drainage and sewerage systems for barns and houses; they test clover and other legumes for bacteria, test farm and garden seeds, test milk and cream for butter fat, treat oats for smut and potatoes for scab, and graft apple trees when the scions are furnished.

In 1896 the legislature of Alabama established an agricultural school in each Congressional district of the State, in which, though some elementary school work is done, agriculture is taught in the seventh to tenth grades, inclusive. Simple experiments in farm management, animal industry, and horticulture are carried on by the students of both sexes upon the school farm. Until within two years these schools were practically under local control, consequently their development agriculturally was slow and far from uniform; but now they are regularly inspected by the State commissioner of agriculture, and the board of control has taken steps to make them more efficient. Over 2,000 boys and girls attend these schools annually, and a larger proportion of them are doing definite work in agriculture now than ever before. Assistant Secretary of Agriculture Hays during the summer of 1906 inspected these institutions and commended them highly. The closer relation felt with the Department at Washington is reflected in the attitude of the Alabama farmers toward the schools this year.

The most recent progress in the organization of a State system of secondary agricultural education is to be seen in Georgia. A law was enacted during the summer of 1906 providing for the establishment of a secondary school of agriculture in each of the 11 Congressional districts of the State, the schools to be branches of the State College of Agriculture. The annual income of each of these new schools is estimated at $6,000, but the locality securing a school must furnish not less than 200 acres of land, and necessary equip-

ment in the way of buildings, live stock, machinery, farm implements, etc. The localities bidding for these institutions have given evidence of their genuine interest in the movement by donating to the State 2,744 acres of land, worth about $132,500, cash for buildings amounting to $440,000, and various other things, bringing the value of gifts from private sources up to approximately $800,000. Nine separate buildings are contemplated for each school. The course of study will cover four years, including one year of elementary school work, and will prepare graduates for entrance to the State College of Agriculture. At least three hours daily will be given to class work, and three hours or more to farm, home, shop, or laboratory work. Complete courses in domestic science and economy will be provided for girls, and as many short courses as possible for adult farmers.

Michigan established in 1903 ten county normal training schools for rural teachers, in which instruction in elementary agriculture is given during the spring only, so that it really amounts to work in school gardening and to becoming familiar with the better textbooks on agriculture. The three State normal schools of Missouri give each year a good course in agriculture, two of them devoting five periods a week through the entire year to it. The California Polytechnic School, at San Luis Obispo, a State institution established January 1, 1902, offers secondary courses in agriculture, domestic science, and mechanics, covering a period of three years. Two large buildings have been erected on a farm of 280 acres, and the agricultural course is made the leading one.

Only one class of secondary schools remains to be considered, viz, private agricultural schools maintained without State aid, the number of which is growing larger every year. Some of the best of these schools are fostered by religious sects. The Youth's Directory, of San Francisco, a Roman Catholic organization for the rescuing of destitute boys, in 1902 opened a secondary school, the St. Joseph's Agricultural Institute. On a ranch of 1,000 acres in Napa County the boys are taught to care for vineyards, orchards, stock, and dairies, and have instruction in certain secondary branches as well. The Mount Hermon School, near Northfield, Mass., founded by D. L. Moody, a secondary school of some 900 students, has blazed the way for other such schools to follow by offering ten terms, of sixteen weeks each, in agriculture, horticulture, landscape gardening and forestry, animal industry, and dairying, although the school is in no sense a technical institution, and has before prepared only for college. On the farm of 1,000 acres are some 200 cows and a quantity of pure-bred horses, sheep, and swine. There is a forest of over 3,000 acres, managed under the advice of the United States Forest Service. Large orchards furnish fruit for a cannery on the grounds of the school. The various courses are elective, and within a year of their

foundation they were being taken by more than 8 per cent of the students.

One of the best of the secondary agricultural schools is the National Farm School, at Doylestown, Pa., although it is at present able to accommodate only about 40 boys. An excellent faculty, at the head of which is a former president of one of our better agricultural colleges, gives courses covering four years. Boys from any State are accepted as students, and they need not be of any particular creed, although the school is primarily for young Jews and is almost exclusively composed of them. The children of Abraham, though tillers of the soil during their early history, have for centuries in some of the older countries been denied the right to own land, and are more universally dwellers in cities to-day than any other race. Most students in other agricultural schools have lived more or less on a farm—these lads without exception come from the larger cities. But the science and practice of agriculture are taught them so thoroughly that the graduates have all been successful farm managers or have demonstrated their skill in analogous lines. Several of them have entered the service of the Department of Agriculture at Washington, and are doing work in experimental lines. The Baron De Hirsch Agricultural School, of Woodbine, N. J., opened in 1894, is doing somewhat similar work though in a less pretentious way.

There are other and newer ventures in this field, such as the Winona Agricultural and Technical Institute, at Winona Lake, Ind., founded in 1902. A year's work in agriculture is given in the preparatory department, and four years of secondary work in agriculture follow. All students are required to work about fifteen hours per week, for which they are paid $1.25. Union Academy, of Belleville, N. Y., in 1903 offered a four-years course in agriculture, taught by Professor Carrier, formerly of the Elyria, Ohio, High School. The Girls' Industrial College, of Denton, Tex., opened in September, 1903, gives instruction in horticulture, floriculture, truck and berry growing, dairying, bee culture, and poultry raising. The Briarcliff Manor School, of New York, taught practical agriculture and horticulture for several years. By the time its first class had finished its two-years course, the demand for admission to such work was so great that efforts were made to provide more extensive facilities, but as the necessary financial support was not forthcoming the school was discontinued.

Wellesley College now offers a year's course in horticulture and landscape gardening. Simmons College announces work covering three or four years in theoretical and practical horticulture, for women. The last year or two were to be spent at the Amherst Agricultural College, but this plan has been abandoned. At Groton, Mass., there is the Lowthorpe School of Landscape Gardening

and Horticulture for Women, with a two-years course given by a faculty of six members. There is also a year's course for gardeners. Tuition is $100 per year, but "if students can not afford to pay, their tuition and living expenses are given them." The Hartford School of Horticulture, like Lowthorpe, is a private school, but is better known than most of its kind, owing to the number of skilled gardeners it has graduated. At present a large part of its work is in training Hartford children in horticulture and in giving summer courses to teachers.

The introduction of agriculture into the public high schools as a branch of study is no longer a rare occurrence, as it was only two or three years ago. There are now at least 200 high schools in Missouri offering courses in agriculture, 30 in Ohio, and one or more in 21 other States. Agriculture is to be taught in each of the 150 new high schools soon to be opened in Virginia under the authority of the State superintendent of education. A new agricultural high school has been established at Calvert, Md. An elective course in agriculture is offered in the public high school of St. Louis, Mich., as has been done at Elyria, Ohio, for some time. Perhaps this latter one is the largest city school in which agriculture proper is taught. In the same State there are 190 township high schools, quite a large number of which teach elementary agriculture, but the exact number is not available. The Ohio law permits the teaching of agriculture in any elementary or high school, and as more and more of the rural schools become consolidated a year or more of secondary school work is done, agriculture often being included. The University of Illinois is doing all in its power "to hasten the consolidation of country schools and to place in these schools courses of agriculture." The school at Seward, Ill., is the only one at present, so far as could be learned, which fulfills this ideal. The Missouri State board of agriculture is now urging the establishment of county or district agricultural high schools throughout the State and is taking active steps to bring about that end.

We have seen something of the progress of secondary education in agriculture during the past decade. It may be considered certain that the movement now under way will make still more rapid strides in the near future, but whether it will be through the medium of large State secondary schools, such as that of Minnesota at St. Anthony Park, or of scattered agricultural high schools of a more local nature, as in Wisconsin, Alabama, Georgia, and California, or of the introduction of agriculture in the public high schools of the country, can not now be determined. Each of these ideals has its advocates, and each its opponents. Minnesota has made its school of agriculture an unqualified success, but Oklahoma changed its preparatory course into a "twenty-weeks course in agriculture" because so many of the

students took the preparatory course just "to say they were going to college." President Northrup, of the University of Minnesota, says, "Our school of agriculture stands in the minds of our agricultural classes for the whole university and the college;" and President Jesse, of the University of Missouri, objects to it just for that reason—"it is a screen between the people and the college and university." Each believes in making the entrance requirements of the agricultural college equal to those of other colleges; the former, however, would at once supply the deficiency in our school system by establishing a first-class agricultural high school to prepare boys and girls for the entrance examination, while the latter would require the public high schools to prepare for the agricultural college requirements, and so "make the high school agricultural as far as it ought to be agricultural. It is the long way, the slow way, the toilsome way, but I believe it is finally the right way." Doctor Jesse has done a similar work for the classical high schools of Missouri, in twelve years raising the number preparing for college from 5 to 125, and by raising the requirements for admission into the college of agriculture he has more than doubled the number of students.

It seems to me that the second of the three classes of schools mentioned—such as the county agricultural high schools of Wisconsin—is greatly to be desired, at least so long as it is not practicable to introduce agriculture into all of our secondary schools. Those already in existence are doing a great work in giving an education, and a good one, to scores of young men and women who otherwise would settle down to the routine of farm life with no instruction save that of the common school. If schools of this class are to be successful, however, they must have the services of teachers so well fitted as to command the respect and support of the residents of the community from which they draw their scholars, and this can not be gained and maintained by excellent school work alone. It will be necessary to reach the farmers directly, to make them feel that the agricultural high school is their school, and that its teachers are willing and able to cope with economic situations troublesome or overburdensome to them. This has been done in Wisconsin, and is more and more the condition in Alabama, as the schools are being put on a better basis.

Serious objections have been raised in several States to the plan of smaller agricultural high schools at different points in the State, because of a belief that the existing system of public schools should not be paralleled by schools more or less technical—that "it is wrong to set agricultural instruction off by itself and to make it only a class subject." The introduction of agriculture into the elementary schools of a number of States is a step toward overcoming this, for it thus becomes a study on the same plane with all the others, and

not merely a technical or occupational subject. Probably in time agriculture will become a common feature of our educational system. This done, two solutions of the problem of providing for those who can not attend large secondary schools of agriculture are possible—its introduction into all the public high schools or the practical abolishment of entrance requirements in the agricultural college. Until the former is feasible, which certainly is not the case at present, there seems to be no good reason why the latter course should not be followed. This would not mean in the least the lowering of the standard for a degree, or better, for graduation. Happily, there is an instance in point to serve us as an example. Just as Missouri doubled her number of students by raising her entrance requirements, Illinois in six years increased her attendance from 20 to 340 by providing a large faculty, competent in every way, and by then saying to the farmer boys of the State: "Come to the university as you are and choose the subjects you wish to study. We teach about 80 agricultural subjects; elect what you feel you need, and we'll do the best we can to teach them to you. Of course, if you choose certain subjects, you must take certain others with them, because they belong together." And the boys go to the college, often without very much thought about a degree, but rather to learn those things they have found they need to make them successful farmers. Aside from what they do in the way of short courses, most of the other agricultural colleges aim to produce agricultural experts and leaders almost exclusively. Illinois does this to a marked degree, but furnishes the facilities as well for the young farmer who desires to become proficient in his chosen life work. There are, then, instances where opposite methods have been efficacious toward increasing the usefulness to the State of its agricultural college. But either probably would have failed had it been undertaken in a half-hearted way, as may be seen in certain other such institutions. Either the requirements for admission must be kept high or else the work offered to applicants must be so thorough that it will be far from play, and so not be sought by young people who merely wish to say they "are going to college."

There is one other alternative, viz, the inclusion of agriculture in the high school curriculum. This is not visionary, as is proved by the few schools such as that of Elyria, Ohio, where it is successfully taught, and by the large number of consolidated schools where it is taught in what secondary courses are given. The most serious obstacle at present in the way of efficient secondary agricultural courses is the lack of suitable instructors. They should certainly be graduates of agricultural colleges, which would necessitate training courses in the latter institutions. There are few suitable textbooks to-day, but these will come with the demand for them. It

has not been so very many years since our high schools had little more than one classical course. Manual training has been the iconoclast which has destroyed this old fetish, and we may reasonably suppose that as soon as our educators and taxpayers are brought to see the advantages inherent in high school courses in agriculture, their introduction will follow. For generations we have been supplying an education suited to the wants of those who wished to continue their classical studies. During the last decade we have offered to those who will spend their days working in the city with their hands a preparation for their life work, but the farmer still remains to be considered, although he represents about half of our population.

The introduction of agriculture into our public high schools would not mean that the instruction must necessarily be very technical—the agricultural colleges fulfill that mission. It would not mean that branches of general culture value would be neglected; the men and women on our farms need to be made good citizens and home-makers as much as do any other class of people. But it would mean that the boys and girls would learn the real advantages of country life, the sources of information concerning recent progress in agricultural practice, and how to take advantage of the knowledge thus gained, and most of all, they would learn the relation of science to agriculture. No one longer questions the educational value of manual training; a good course in agriculture would present at least as great advantages, either as an elective course in city schools or as a part of the regular curriculum in village high schools. Chemistry, botany, and zoology, each given from a dynamic standpoint, in its agricultural bearing, could easily be taught in the first two years of the course, and agronomy, zootechny, and dairying in the last two, leaving ample time for English, algebra, geometry, history, one language, and physics, or some other elective. The prosperity of all country sections is directly dependent upon agriculture, and yet no facilities are provided for teaching the youth the sciences upon which its practice is based. And it is equally true that the prosperity of our cities is based quite as much upon the success of agriculture in their surrounding territories as upon the technical development of their commercial enterprises. For example, the redevelopment of the abandoned farms of New England, possible only through the most scientific handling of them, is of most vital importance to the urban population. It remains, then, for those interested in the development of agriculture to use every means possible to urge upon the people as a whole the need of providing suitable means for the education of the rural masses, toward the end that they may become at once better producers and better citizens.

The committee on methods of teaching agriculture of the Association of American Agricultural Colleges and Experiment Stations made their seventh report at Atlanta, Ga., in 1902, on the question of "secondary courses in agriculture," and among other things presented the present programmes of the high schools of Indiana, of Lowell, Mass., Des Moines, Iowa, and Washington, D. C., in each case showing, in a parallel column, a suggested agricultural course which might easily be given in such a school by a competent teacher. This report has been published[a] and should be consulted by anyone interested in working out such a course of study, as should other publications referred to in the bibliography at the end of this bulletin, especially No. 95, pages 79–91; No. 99, pages 481–500, and No. 25, pages 50–97. In the last publication referred to (No. 25) are given in full the courses of study of the Wisconsin and Minnesota agricultural high schools, with descriptive paragraphs about each study, together with an "Industrial course in the consolidated rural school, the agricultural high school, and the agricultural college, articulated into a unified scheme," by Prof. W. M. Hays, now Assistant Secretary of Agriculture, so planned that pupils may be transferred from country to city school, or vice versa, up to the end of the second high school year, without great loss.

[a] Secondary courses in agriculture. Seventh report, committee on methods of teaching agriculture, Association American Agricultural Colleges and Experiment Stations, 1903. Department of Agriculture, Office of Experiment Stations, circular 49.

# CHAPTER V.

## AGRICULTURAL COLLEGES.

France provides for a higher education in agriculture as liberally as she does for those who can profit only by a more meager course of instruction. The Institut National Agronomique, in Paris, is the crowning glory of this system. Entrance is obtained only by open competition, in which foreigners have the same status as French citizens. Only those receiving 70 per cent of the total number of points possible during the two years of the course receive the title of "agricultural engineer;" those receiving not less than 65 per cent receive a certificate. The tuition is $100 per year; there are 65 members of the school staff, and great emphasis is laid on theory and science. Each student must pass at least two of the three months' vacation on a farm, where he must make extensive notes on everything of agricultural interest in the neighborhood, and work up answers to an examination paper which he receives when leaving the institute for his vacation. Graduates are supposed to be experts in one or more branches of agriculture; many of them become chemists or directors of factories devoted to agricultural interests, directors of agricultural stations, or professors in some of the various agricultural schools of the Republic. The Institut Agricole, at Beauvais, maintained by Les Frères des Écoles Chrétiennes, is well above any of the French secondary schools, but not of so high a rank as the Institut Agronomique. The tuition is high—$320 annually for regular courses, and $200 for preparatory courses, besides extra fees for modern languages and other almost necessary courses. But the three years of instruction is quite thorough, and the practical work done, so far as possible, is to illustrate what is studied about at the time. The students spend three afternoons each week working on the Ferme du Bois, belonging to the school.

Since the establishment of the 15 State universities under the law of 1896, the advantages of this decentralizing measure are plainly seen in the efforts to grapple with the agricultural problems of greatest importance to the several Departments in which the universities are located. Some of these universities are now doing more work along lines of agriculture, horticulture, sericulture, etc., than in any other one direction, so that they seem quite comparable with the better of our own State agricultural colleges, where one may take

work in the liberal arts if he wishes. Clermont has established a limnologic laboratory in the midst of her 20 lakes; Besançon, laboratories for agricultural analysis and bacteriology, and two experiment stations; Bordeaux, laboratories for research into diseases of the grape, an experiment station, an agronomic and an œnologic institute; Nancy, an institute for brewing, and a fine section for the study of agriculture and forestry; Lyon, a school of tannery perhaps as excellent as any in the world; while at Caen special attention is devoted to the manufacture of butter and cheese. The happy thing about all this is that it has given education a hold on the commercial and agricultural life of the country as nothing before it has done. Corporations, societies, and interested individuals have given large sums of money to the universities for the use of these sections, and have been given representation on the governing boards of the institutions. The General Syndicate of the Industry of Hides and Leathers created and largely supports the school of tannery at Lyon; this has turned out so well and has attracted such favorable attention that the university is planning for the creation of an agronomic institute to be as fine and extensive as any in the world, and this plan has the moral and financial support of the large agricultural interests of southern France. These State universities have, in the past few years, all allied themselves with the farmers' societies, and are doing excellent work among the rural inhabitants, preparing the way for an intellectual awakening among the common people, as a new respect for education and culture is given them.

The size of the country being considered, it is Belgium to which we must turn for our model in higher agricultural education. In an area smaller than that of Massachusetts and Connecticut there are three institutions of university grade for scientific and technical training in agriculture and allied branches, if one include the school of veterinary medicine at Cureghem, which has the same entrance requirements as has the medical school of the university and has had them since 1888, when a law was passed "placing the instruction in veterinary medicine on the same level as that of human medicine." One must study a year and a half for the diploma of "veterinary candidateship," and two years longer for the degree of "veterinary surgeon." The State agricultural institute at Gembloux is the most important of these three schools, and is one of the best in Europe, though not so advanced as the French Institut Agronomique. Its farm of 160 acres, containing fields and gardens for experiment and demonstration in agriculture, horticulture, and forestry, is made to yield an annual profit, usually of more than $2,000; while few, if any, of the other such institutions of Europe make their farms pay the running expenses. All instruction is given in French, and at the end of three years of successful study the

diploma of "agricultural engineer" is given, which since 1876 has been a necessary qualification for those who desire to be employed in controlling the forests, drainage, and irrigation of the country. One must be familiar with all phases of actual farming before entering Gembloux, for the school is not regarded as a place to teach practical work but rather as one in which "to train future leaders in agricultural progress in Belgium." During the last year of the course a trip of ten days is taken in June to some of the more important farms in Belgium, Holland, the north of France, Normandy, Luxemburg, or the Rhine provinces, upon which reports and essays must be written. Two years of forestry are included in the regular agricultural course, with another elective year. One may do a year's graduate work in either woods and forests, agronomy, or chemical and agricultural industries. Since 1900 there have been also a dairy institute and a chemical and bacteriological institute. The standing of Gembloux may be seen from the fact that in 1904 42 per cent of the pupils were foreigners, coming from 26 countries of Europe, Asia, Africa, North and South America, and the East Indies. In 1901 the Peruvian Government asked the institution to send them agricultural engineers to organize superior agricultural instruction in Peru.

The Catholic University of Louvain has practically the same course of study as Gembloux, the same number of teachers, and in addition gives courses in philosophy, religion, and history. In connection there is operated the Heverlé Institute, which is a dairy school with a farm of 180 acres, used mostly for experimental grounds. There is also maintained a high school of brewery, and graduate courses of a year each are offered in agricultural science, chemistry, and industry, forestry, and colonial agriculture. Louvain is maintained at its present high standard "in order that young Catholics may receive as good an education here as elsewhere, without coming under Protestant influence."

The State Veterinary School of the Netherlands at Utrecht is very like the better ones of other European countries. It has a four-year course, and about half the time is given to practical work. As far back as 1884, since which time there has been improvement, a British blue book stated that "this school leaves nothing to be desired as a place for teaching the principles and practice of veterinary medicine and surgery." The agricultural college at Wageningen, however, stands at the head of Holland's system of agricultural education. It comprises four schools: (1) A higher burgher school with a course of four years, providing a basis for an advanced agricultural education. (2) An intermediate agricultural school, for those youths not able to take the full college course, and for sons of small proprietors or tenant farmers who want a certain amount of theo-

retical knowledge. There is in this school a year of graduate work, for those intending to spend their lives in the Dutch Indies. (3) The horticultural school with a course of two years, for practical gardeners, and an additional course of the same length for those who desire more scientific instruction. (4) The higher school of agriculture and forestry, divided into one section for home, and another for colonial, agriculture. The instruction given is essentially theoretical, although some hours of each Wednesday and Saturday are devoted to practical work, and excursions are made weekly "for purposes of demonstration." There are extensive experiment and demonstration plats, and a small farm used mainly to illustrate the class lessons.

The Royal Veterinary School of Denmark at Copenhagen was changed in 1856 to the Royal Agricultural and Veterinary Academy by the addition of a complete course of instruction in agriculture. Attendance—of native born—at lectures is absolutely free, and one can take advantage of them without any obligation to take examinations or even to enroll as a student. Many sons of peasants manage to attend the academy, probably a larger proportion than elsewhere in Europe. A large experimental laboratory devotes special attention to problems of dairying, especially to that of comparative feeding of milch cows.[a] There are usually about 350 students here, between 80 and 100 of them from other countries, especially from Finland and Schleswig.

Ever since the foundation of the first higher agricultural school at Möglin in 1806, Prussia has led the States of Germany in providing for the study of agriculture. At present there are in Prussia five agricultural institutes in connection with royal universities, the Royal Agricultural Academy at Bonn-Poppelsdorf, two royal academies of forestry, and two veterinary institutions which really ought to be considered secondary. These, with the independent agricultural academies of Hohenheim, in Wurttemberg, and Weihenstephen, in Bavaria, are the only agricultural institutions in Germany exclusively devoted to higher instruction in agriculture. Practically all of their students belong to the higher classes, and their object is to become efficient occupiers of their own land, large tenant farmers, managers of estates, or teachers of agriculture. The main course is usually one of two years, but the Government makes compulsory a three-years course for all who intend to teach. Most of these schools have large museums of agricultural implements. The Hohenheim

[a] Agricultural experiment stations in foreign countries. Department of Agriculture, Office of Experiment Stations, bulletin 112, pp. 1–6. Kennedy, W. J. Dairy methods in Great Britain, Ireland, Denmark, Holland, Channel Islands, Austria-Hungary, Germany, and Switzerland. Department of Agriculture, Bureau of Animal Industry, circular 76, 1905.

Academy operates a sugar factory, brewery, distillery, a vinegar and liquor factory, etc.

Portugal maintains the Instituto de Agronimia e Veterinaria at Lisbon, which gives four-years courses leading to the degrees of engineer of agriculture and of forestry, and also a four-years course in veterinary medicine. The students are often taken on trips to different parts of Portugal, and thus familiarized with the different methods of cultivation and cropping in vogue. The minister of public works writes me that this school has produced splendid results in promoting the prosperity of the country at large, and of the farming classes in particular.

There are in Japan three higher schools of agriculture, all of which rank up well with the best of our American institutions.[a] The Sapporo Agricultural School, founded in 1872 and reorganized in 1877 on the plan of the Massachusetts Agricultural College at Amherst, offers a preparatory course of two years, a collegiate course of four years, and special courses of three years each in forestry, civil engineering, and agriculture, this latter being more theoretical than the four-years course in agriculture. The College of Agriculture and Dendrology was incorporated with the Tokyo Imperial University in 1890, and includes a botanical garden, seismological observatory, marine biological station, a large forest for practice, several experimental farms, an orchard, veterinary hospitals, and a laboratory for forest technology, together with buildings for the study of sericulture. There are courses of study, each three years in extent, in agriculture, agricultural chemistry, forestry, and veterinary medicine, and a special course of one year for teachers in the supplementary agricultural schools already described. The school at Morioka was founded in 1903 to give a higher education in agriculture, forestry, and veterinary medicine to the inhabitants of the northern province of the Empire, where agriculture, horse breeding, etc., are the principal occupations. Each of the regular courses extends over three years. There is a general shorter course of two years, and a graduate course of two years.

The Royal Agricultural College at Cirencester was the first such institution in England. Chartered in 1845, supposedly for the purpose of educating farmers' sons, it did little more than to prepare for the examinations of the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland, while the tuition alone was $375, which, with living expenses, made the school impossible to any except young men of wealth who had in view land agency or colonial life. The college of agriculture at Downton, founded in May, 1880, with nearly as high fees as the royal college, prepared for the same examinations, and stated in its catalogues that "it is not

[a] Technical education in Japan. Department of Education, Tokyo, 1904.

the intention here to educate farmers' sons (unless wealthy) or farm bailiffs." A chair of agriculture was founded in the University of Edinburgh in 1790 and is still in existence. There is given here a one-year course in two parts, the first in the principles of agriculture, the second in agricultural practice. There are veterinary colleges in London, Edinburgh, and Glasgow, each giving three years of instruction.

In 1888–89 Parliament set aside £5,000 to be given to such institutions teaching agriculture and dairying as should measure up to a certain standard, but there were not enough qualified recipients to claim nearly all of the fund, and in the following year only about half of it was used by the 13 bodies which were qualified. In 1904–5 the grants amounted to £10,300. There were at the time of the last report (1905) ten colleges, three dairy institutes, an agricultural and horticultural school, a farm school, and the National Fruit and Cider Institute. Some of these institutions are almost wholly supported by individual counties from their own funds, for the local taxation act of 1890 placed at the direct disposal of the different county councils large sums of money, now annually available for instruction in agriculture and other technical industries. In most cases, however, the local authorities maintain village lectures, local demonstration plots, dairy and special teaching by means of migratory classes, and the state board of agriculture gives from its limited funds toward the support of the higher institutions. Through work done in certain of these colleges, one may now take the bachelor's degree in science in the University of Wales, Victoria University, University of Durham, Cambridge, or London University. Some of the institutions not affiliated with any university, such as Holmes Hall, for instance, give fully as long and thorough courses. Almost all of these schools provide courses of from four to ten weeks for such persons as are obliged to spend the rest of the year at work. All have short courses in practical dairying, and graduate courses for those who wish to teach the subject. During the last year or so more attention has been given to the training of teachers for elementary school work, and the attendance of teachers upon the short courses has been gratifying. Several of the colleges give winter courses for those who care for more thorough and theoretical instruction than is given in the shorter courses. Several traveling dairy schools are maintained by some of the colleges, and members of their faculties often give two or three lectures at some center near by. In the regular academic course comparatively little real agricultural instruction is given. In some of the schools giving a three years' course there is no agricultural instruction during the first two years, but rather thorough work in the sciences, often Greek and Latin holding a prominent place as well. In most of the two years' courses, no agriculture is taught during the first year. In short, the college work ranks up in no way with that of any other European

country we have studied; but the extra-academic efforts so abundantly put forth seem admirably suited to the needs of the people.

The government of Natal has provided a school of agriculture at Cedara, with a "two years' practical course" which is intended to be considered as of a collegiate grade. Natal is also preparing to offer to the farmers of South Africa a "farmers' reading course," to be given under the supervision of Prof. William Brooks, director of the Massachusetts Experiment Station.

The School of Agriculture opened at Colombo, Ceylon, in 1884, had in 1900 ten branch institutions, and a dairy institute in Colombo which is filling an important place in the welfare of the island, as well as a school of forestry with a two years' course which is very practical and popular. Besides the college work done, the school sends out agricultural instructors into remote rural districts to illustrate methods.[a]

In India several of the government farms have their agricultural experts give instruction of a higher grade to their apprentices. A course of lectures on agriculture is given annually in the Poona College of Science, and there is an agricultural course in Baroda College, Bombay. In Madras the Saidapet Agricultural College has been doing good work for a number of years. India this year (1907) opened her new Imperial Agricultural College at Pusa, on a government estate of 1,358 acres, and the buildings already in progress will cost considerably over a half million dollars. The staff will be composed of a carefully selected body of European specialists, with native assistants. It is further proposed to locate an agricultural college in each important province, with a course of technical training extending over three years.

New Zealand has an agricultural college at Lincoln, which is one of the affiliated colleges of the University of New Zealand. A student for the degree of B. S. studies two years at the university college and two years more at the college of agriculture. In 1900 instructors from Canada were procured by the State, and a dairy school was established as a department of the college. Free agricultural bulletins are furnished the farmers, and traveling instructors in dairy, fruit, and poultry farming teach in various centers the year around.

Turning to Australia, we find higher agricultural education in a flourishing state. Victoria, which prescribes agriculture in the elementary schools, leads as well in collegiate work. Besides the Dookie Agricultural College and the Burnley Horticultural School, each very excellent, the secretary for agriculture writes me that a degree in agriculture has just been arranged for by the Melbourne University, one of the requirements for which is "a year in practical

[a] Wallace, R. H. Agricultural education in the British colonies. Journal Society of Arts, vol. 48, p. 338.

work, spent to the satisfaction of the principal of the Dookie College." Besides lectures from time to time at various centers by experts, the colleges hold short courses in various places in the State instead of at their institutions. The Queensland Agricultural College has a course of three years of forty-two weeks each, and does special work in forestry because of its local importance, making use of some 1,000 acres of virgin forest close by the school for experiment and demonstration. The students of the Rosewater Agricultural College of South Australia pay special attention to viticulture, which is as important to them as is forestry to Queensland. Each student devotes half of every day of his three years here to practical work. For some years more young men than could be accommodated have applied for admission to the Hawksworthy Agricultural College of New South Wales, and when the announcement was made that for the session beginning in January, 1905, there would be room for fifty more students, there was again a waiting list more than eight weeks before the school opened. The course here is but two years in extent and is very practical. Much is made of excursions to the better farms, piggeries, and dairies of the State. Too much can hardly be said of the way in which Australia has accomplished the subjugation of a new and wild country; each State is considering the needs and problems of its own people and meeting them as best it may.

The Government of Mexico supports the National School of Agriculture, which should perhaps rank among the higher schools, and in which are studied courses leading to the degrees of engineer of agronomy, agricultural expert, and veterinary surgeon. The department of agriculture subsidizes three establishments whose functions approximate those of our experiment stations.

Until recently the Ontario Agricultural College at Guelph was the only Canadian institution giving higher instruction in agriculture, the Nova Scotia School of Agriculture, at Truro, and the School of Horticulture, at Wolfville, ranking rather as secondary schools. But during 1904–5 these two latter schools were merged, a larger and better faculty employed, the grade of instruction raised, and Nova Scotia now has an agricultural college of the first grade and has taken an important step in advance of the times by affiliating it with her provincial normal school in the same town. The young men of the normal school attend the short courses given in agronomy, horticulture, judging of beef, dairy cattle, and horses, and both sexes take the short course in dairying. The committee of five of the National Educational Association reported [a] that "in each country

[a] Industrial education in schools for rural communities. Report committee of five, N. E. A., 1905, p. 25.

where the experiment of teaching agriculture in the elementary schools has failed the authorities have reported that the chief reason was the failure to secure teachers properly prepared to teach the subject." In Nova Scotia the schools are being supplied in the beginning with technically trained teachers.

Manitoba is at present establishing an agricultural college, but as yet the plans are not definite enough to say much about them. Exactly the opposite is true of Guelph, now in its thirty-second year, which is known in the United States almost as favorably as in Canada. During its early history it was obliged to struggle against great prejudice among the farmers themselves—a prejudice which has proved of value, for through the effort to win over the agriculturists one by one they have at last been made to feel that Guelph stands to them in a personal relation, and it is doubtful if the people of any one of our States know as much about their own agricultural college or take a like interest in it. For example, each June the railroads run cheap excursions to Guelph from all parts of Ontario, and some 40,000 people visit the college at these times, to hear the special lectures and to inspect "their college." The degree of B. S. A. is given by the University of Toronto, with which the college at Guelph is now affiliated, after a four-year course. Tuition is $16 a year for residents, or $40 for nonresidents; candidates for admission must be 16 years of age and must have worked at least one year on a farm. There is a short creamery course during December, and a twelve-weeks course in milk testing, butter making, and cheese making later in the winter, for which neither an entrance examination nor tuition is required. There are also short winter courses in stock judging and poultry raising. Besides these facilities, any man, woman, boy, or girl in Ontario can go to the college at any time for practical work, with more or less instruction from the man in charge in one or more departments without entrance examination and with merely nominal tuition. In connection with the college there is now Macdonald Institute, where nature study, manual training, and domestic science are taught, which is meant to draw students from the entire Dominion and not merely from any one province.

In June, 1891, this college sent out two men in a wagon, provided with a full equipment for making butter, who traveled from place to place, giving instruction in the best methods of manufacturing, making attractive packages, etc. This proved so successful that each year has seen more such outfits sent over the province, until now the work is directed by the department of agriculture, which maintains two chief instructors and 35 special instructors, each of the latter having 20 or 25 factories or creameries in a certain district assigned to him, almost 800 factories receiving instruction in this way. Each maker receives a visit once a month, and many of them call

meetings of the patrons on the dates of the instructors' visits. Dr. J. W. Robertson pointed out to a parliamentary committee in 1904 some of the results of such teaching. "In 1891 the dairy output of Prince Edward Island was worth $8,448; the next year the government organized a government dairy station there and the best efforts were made to educate the people in this line. Ten years later, with no increase in the number of acres and little increase in the number of cows, the output was $566,824. The same thing obtained in Ontario, and it increased the value of its output of butter and cheese from factories by over $7,000,000 in ten years. In Quebec the same causes brought a like increase of $9,000,000."

Plans are now being brought to completion for the "Macdonald-Robertson Institution"—if such it shall finally be called—for agricultural instruction and research at Ste. Anne de Bellevue, 20 miles from Montreal, an institution which, when opened to students, will be such a model as only an experienced agriculturist and educator can make, with years to plan for it and an unlimited amount of money to carry out his plans and ideals to fulfillment. Professor Robertson, for many years commissioner of agriculture of the Dominion of Canada, has been given carte blanche by Sir William Macdonald in the way of funds, and this is the fourth year of active preparation for the school, although its founders steadily refuse to feature it before the public.

The entire college property has recently been deeded to McGill University, and an endowment of $2,000,000 besides the plant has been provided. The buildings will be ready for occupancy by the fall of 1907 and will accommodate 175 men and 225 women. There will be a department of research in the more important agricultural lines, equipped with the finest of laboratory facilities, a department of instruction of university grade, and courses "charged with the improvement and advancement of education for rural communities, suited to both men and women and boys and girls." Household science, manual training, and nature study will be emphasized as at the Macdonald Institute at Guelph, and thorough normal courses in these branches will be given. In addition, there will be a "department of farms" for object lessons, experiment plots, and to provide for an apprentice system. "These working apprentices will be given an opportunity to learn by doing and will receive instruction in advanced methods as well. Each farm will be conducted on a separate and profit-making basis, and within each of the illustration farms will be small farms of from 1 to 5 acres for management by groups of advanced apprentices." [a] In planning for this institution not only have the better colleges and systems of the United States and Europe been subjected to inspection, but the founders have visited

[a] The Macdonald-Robertson Institution. Farmers' Advocate, Dec. 1, 1904, p. 1633.

such schools as Hampton Institute, to quote only one example, and studied the way in which this institution is ameliorating the conditions of the Black Belt of the South and providing for the needs of the people at large.

A number of institutions of a secondary grade and higher for the teaching of agriculture were established in the United States during the second quarter of the nineteenth century, but all of them succumbed to various discouragements,[a] not the least of which was the lack of demand for them from the farmers. An agricultural school was established at Derby, Conn., in 1826, which flourished for a few years, but which eventually lapsed into a state of innocuous desuetude, from which it never recovered. Between this time and 1850 several small agricultural schools were opened in Connecticut and New York, most of which had but fleeting existences. In 1848 Yale College established a chair of "agricultural chemistry and vegetable and animal physiology," which Prof. John P. Norton occupied with distinction. In 1853 the State of New York established "The People's College," consisting of an agricultural college and an industrial school, which, after the passage of the Morrill Act of 1862, was given all the land acquired by the State at that time, but the land afterwards went to Cornell because of failure to comply with certain conditions imposed.

The first agricultural college in the United States was that of the State of Michigan, provided for when the State constitution was adopted, in 1850, and opened for students May 13, 1857. Less than two years later (February, 1859) the "Farmers' High School of Pennsylvania"—now the State College—was opened for pupils; later in the same year the Maryland Agricultural College was opened, and Iowa and Minnesota soon followed in the same path. Congress began to be asked to provide national aid for the foundation of other such institutions, State agricultural societies or State boards of agriculture leading the movement. The Hon. Justin S. Morrill, a Representative from Vermont, led the fight for Federal appropriations for this purpose; and although the Committee on Public Lands, on April 15, 1858, reported adversely on his bill to grant to each State 20,000 acres of public land for each Member of Congress, he succeeded in pushing his bill through both Houses, during the next session of Congress, only to have it vetoed by President Buchanan. In December, 1861, he introduced in the House of Representatives a similar bill, giving to each State approximately 30,000 acres of land for each Member of Congress, for the establishment of colleges "to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial

[a] True, A. C. Education and research in agriculture in the United States. Yearbook, Department of Agriculture, 1894, pp. 81–116.

classes in the several pursuits and professions of life." This bill passed both Houses, and became a law upon being signed by President Lincoln, July 2, 1862.

It is interesting to know something of the causes which led up to the passage of this bill, and of the several intentions of various advocates of it. It came just at the climax of the first decades of the application of the revived sciences to commercial production, and the consequent expansion of our trade which brought with it the material prosperity and high prices of antebellum days. For twenty years popular works on science and the application of its laws had made the American people perhaps overcredulous of the possibilities in store for those with the necessary knowledge in the sciences. A vigorous reaction against the universal college curriculum brought a demand for something other than the classics. Surveying could be studied at only one school other than West Point, while the great railway systems in process of construction and projected demanded skilled civil engineers. Baron Liebig's popular Letters on Chemistry gave marvelous hopes for a new agriculture which should increase the production of farm products many fold. These, and other things of their kind, were in the minds of the advocates of the Morrill bill, and the colleges resulting were intended, by many who worked or voted for it, to prepare youth for almost any profession aside from the three so-called learned professions. Indeed, the title "Agricultural colleges" was inserted by the engrossing clerk, and was not originally a part of the bill.

It was provided that the entire proceeds accruing from the sale of lands given to the several States should be so invested as to yield not less than 5 per cent interest, the principal to "remain forever undiminished," except that not more than 10 per cent of the amount received by a State "might be expended for the purpose of lands for sites or experimental farms." It was expected that the States and munificent citizens would provide ample buildings, laboratories, etc., which has now been done in almost every case, although it took years for most of the States to awaken to the important duty they were called upon to fulfill toward the colleges of agriculture and mechanic arts within their boundaries. Kansas received the smallest allotment of land, 82,314 acres; New York the largest, 989,920 acres. About this time the Government gave immense grants of land to railroads traversing new sections of the country, and opened for homesteading other vast tracts. Accordingly those States which at once offered for sale their allotments were but little better off than before, some States receiving from the invested funds not enough income to maintain properly even one department of a college. Other States held their land for a higher market, and sold it so judiciously that the agricultural colleges will forever be

fairly rich institutions as the result—New York and Michigan being notable examples. Some 1,200,000 acres of these public lands still remain unsold, while the remainder has produced a principal of over $12,000,000. At the present time there are 27 States having colleges of agriculture and mechanic arts as separate institutions, while 20 States maintain colleges of agriculture as departments of some university, State or otherwise.

Strictly speaking, comparatively little agricultural instruction was given in these schools during the first twenty or twenty-five years. Those farmers who did care to send their children to college wished them to receive training in other branches than agriculture, and these new schools, with so varying endowments and conditions, had each to solve its own problem. Most of them laid a deep and broad foundation in the natural sciences, but technical courses in agriculture were by no means neglected, and specialization in that branch produced results which drew attention to it as the years passed. Perhaps it was largely because there was no consensus of opinion as to what ought to be given in these agricultural courses that such a large number of States did little more at first than to add an industrial feature to a college already existing.

During the first quarter of a century of the existence of these schools a movement was springing up over the country which has made these institutions really deserve the name agricultural. The investigations of Liebig in Germany, of Boussingault in France, and of Lawes and Gilbert in England had shown to the world what science might do for agriculture as well as for the other arts. In 1851 some farmers of Saxony established the first experiment station, under the patronage of the University of Leipzig, and it was not long before the more progressive agriculturists of the United States were demanding like stations. The legislature of Maryland, in endowing its agricultural college in 1856, provided for "experimental studies in the cultivation of cereal and other plants adapted to the climate and latitude of the State of Maryland." In 1870 the University of California was doing similar work. In 1875 the State of Connecticut added to funds privately donated for the establishment of a State agricultural experiment station, the first separate institution of its kind in the country. North Carolina and New Jersey soon followed, while the faculties of agriculture in several States took similar work upon themselves as a part of their ordinary duty. State boards of agriculture and the Association of American Agricultural Colleges and Experiment Stations united in asking Congress to establish and provide for such stations in each State, but bills providing funds were several times voted down in the House of Representatives. Finally, in 1887, the Hatch bill became a law, which gave $15,000 each year, out of funds proceeding from the sale of public lands, to each State

and Territory for the establishment and maintenance of an agricultural experiment station, which must be a department of the land-grant college, except in States where separate experiment stations had already been established. These stations conduct original researches on plants and animals, or in other directions bearing directly on the agricultural industry of the United States, "having due regard to the varying conditions and needs of the respective States or Territories."

The stations, primarily for original research, to-day form, with analogous divisions of the Department of Agriculture at Washington, the highest branch of our system of agricultural education.[a] Many of the experiment station workers do more or less teaching in the agricultural college of the State, while their laboratories are open to assistants from the student body, who do their small part in opening new paths of knowledge. The United States Department of Agriculture furnishes extraordinary facilities to teachers and graduates of the colleges and experiment stations who wish to do further research work. Secretary Wilson, in his report for 1903, says:

> The Department has thus become a post-graduate institution, where groups of sciences are taught and applied. Comparatively little time is devoted to the ascertainment of abstract scientific facts. Every worker is helping somebody, and while doing this he is contributing to what is known relating to the farm and to the education of his associates. Since 1897, 496 students have been admitted to the Department for instruction in our several lines of work.

The Office of Experiment Stations is the Bureau through which the Department seeks to promote a better organization of the American system of agricultural education, from the common school to the graduate department of the college. Each individual station issues at least four bulletins a year concerning the work of its men, a copy of which is mailed, free of postage, to each newspaper in the State, and to all farmers who may request copies sent them. Dr. A. C. True has described the work of the experiment stations as follows:

> In general, the work of the agricultural experiment stations, as organized in this country, may be classified as follows: (1) They act as bureaus of information on many questions of practical interest to the farmers of their several localities; (2) they seek by practical tests to devise better methods of agriculture and to introduce new crops and live stock, or to establish new agricultural industries; (3) they aid the farmer in his contest with insects and with diseases of his crops and live stock; (4) they help to defend the farmer against fraud in the sale of fertilizers, seeds, and feeding stuffs; (5) they investigate the operations of nature in the air, water, soil, plants, and animals, in order to find out the principles which can be applied to the betterment of the processes and products of agriculture.[b]

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[a] True, A. C., and Crosby, D. J. American system of agricultural education. Dept. of Agriculture, Office of Experiment Stations, 1904.

[b] True, A. C. Education and research in agriculture in the United States. Yearbook, Department of Agriculture, 1894, p. 115.

In perhaps every other channel of our industrial life inventions and discoveries of commercial importance are patented, and a large share of the benefit accrues to some individual or corporation; but the discoveries of the experiment station workers are turned over freely to the American people.

Mr. Morrill, father of the bill establishing the agricultural colleges, became convinced that the demands for collegiate instruction in agriculture and the mechanic arts were greater than the facilities for supplying them, and he, with other friends of the measure, secured the passage of the second Morrill Act, which became a law on August 30, 1890. This measure gave to each State and Territory $15,000 for the year ending June 30, 1890, and an increase over that sum of $1,000 annually until each appropriation should reach $25,000 per year. These funds can be used only for "instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural, and economic science, with special reference to their application to the industries of life, and to the facilities for such instruction." Such States as desired were enabled to divide their appropriation between separate institutions for white and colored students, which has been done in 15 States and 1 Territory (Oklahoma), though no agriculture is taught in the Arkansas school for colored students—so that there are now 63 agricultural colleges. But the instruction in these schools for the colored is almost all below college grade.[a]

The Adams Act, which became a law March 16, 1906, added immediately $5,000 a year to the income of the State experiment stations. This sum is to be increased by $2,000 each year for five years, and these funds are to be expended only for original research in agriculture. About a year later a bill became a law adding $5,000 annually to the sum before received by each State for its agricultural college according to the second Morrill Act, until the total reaches $50,000 a year. This means that within five years each State and Territory will receive annually from the Federal Government $80,000 for its agricultural college and experiment station.

Such is the history of Federal aid given to the agricultural colleges. In a few cases private individuals have added in a small way to the endowment of one of these institutions. In Louisiana the Sugar Planters' Association has followed the example of many similar organizations in France in giving funds for the training of sugar experts. The States themselves have come to see the economic wisdom of providing liberally for the agricultural colleges in their midst, especially in the large farming States of the Middle West, where large sums are readily voted by the legislatures at the suggestion of the president or

[a] True, A. C., and Crosby, D. J. American system of agricultural education. Dept. of Agriculture, Office of Experiment Stations, 1904, pp. 8, 9.

regents of the agricultural college. For example, during the fiscal year of 1902–3 special appropriations "for the better equipment and maintenance of these institutions aggregating more than $1,500,000 were made;" while the next year more than as much again was given by the States—Iowa, New York, Pennsylvania, and Minnesota each appropriating over a quarter of a million dollars for new buildings and equipment—and all this in addition to the annual appropriations for maintenance.

This is allowing the extension of work in two directions: "(1) To make the courses of college grade more complete by the differentiation of the different branches of agriculture and the addition of courses in rural engineering and rural economy; and (2) to provide for the broader extension of agricultural education through secondary schools, short courses, summer schools, normal courses, correspondence courses, farmers' institutes, and other forms of university extension work." These have been the principal lines of progress of the last fifteen years. It has come to be seen that the real function of these collegiate courses is not to educate farmers generally—they must be provided for in some other way—but rather to train leaders in agricultural progress. It is hardly a serious criticism of such institutions to complain that comparatively few of their graduates return to the farm. Badly needed as they are on the land itself, they find a greater demand for men to open the way for new uses of products, or to discover and apply still other scientific laws to agriculture. And so the college course of four years in agriculture has come about in most of the colleges, while both the entrance requirements and the grade of undergraduate work done tend to become higher. The Association of American Agricultural Colleges recommends that the entrance requirements be on a level with those of other first-class colleges, and many have adopted this plan. Some institutions, under certain conditions, admit pupils from the rural schools as special students, because there are no secondary schools of agriculture to fit them for higher work. And so long as this condition exists there seem but two possibilities if the college is to meet the needs of the farmers: Either to admit boys and girls from the rural schools, or else to provide a secondary school of agriculture for them, as Maine, Minnesota, Nebraska, Rhode Island, and Washington have done.

There is everywhere a tendency to make the four-years course leading to the bachelor's degree fully equal in scope and thoroughness to those of the other colleges of a university, with a consequent enlargement of the electives possible during the latter part of the course. While the basal studies are comparable in the various States, each institution is specializing along lines of greatest advantage to the farmers of the State in which it is located, hand in

hand with the State experiment station. The University of Maine teaches forestry in its agricultural college. The University of Missouri, in connection with its new Teachers' College, will give especial attention to training for the instruction in agriculture demanded in the schools of the State. Wisconsin, besides special work in agricultural physics, is known the world over for its instruction and discoveries in dairying, especially through the apparatus for testing the amount of butter fat in milk, invented by Dr. S. M. Babcock, which is now used in practically every civilized country, and by means of which literally millions of dollars annually are saved to manufacturers of butter and cheese, and so to the consumer.[a]

Some years ago several of the colleges undertook to offer short courses in agriculture for young men who wished some practical knowledge of the better methods of farming, but who could not afford to spend four years at the college. For some time these courses proved disastrous, in that they were not sharply enough distinguished from the complete course, and there was a prevalent suspicion that they were every whit as valuable—"merely the four-years course with the frills left off." Happily the project was not abandoned, the true function of these courses came to be understood and appreciated, and now they have come to be the colleges' best means of keeping in touch with the mass of farming people. A greater and greater number of these courses are offered each year, by 44 or more of these institutions. They vary in length from two college years to a very few weeks, are usually given during the winter, and are designed for: "(1) Those preparing to enter a four-year agricultural course; (2) those desiring instruction in agricultural subjects, but having insufficient scholastic attainments to carry the full collegiate course; (3) those unable to leave home for an extended course, who desire instruction in some particular phase of agricultural science or who wish to become proficient in some branch of agricultural practice; and (4) teachers desiring to prepare themselves to give instruction in nature study and elementary agriculture."[b] Thirty colleges offer courses of the first or second class, all but 9 of which cover more than a year. There are many one-year or two-year preparatory courses, and a few colleges now give high school agricultural courses of two or three years. Most of these latter have proved to be of greater use in preparing young men and women to go back to the farm for a life of successful work than to train up candidates for the four-years' course—a strong argument for the agricultural high school. Instead of secondary courses,

[a] Harwood, W. S. The mastery of the earth. American Illustrated Magazine, Dec., 1905, pp. 123–133.

[b] Crosby, D. J. Special and short courses in agricultural colleges. Dept. of Agriculture, Office of Experiment Stations, bulletin 139, p. 7.

so-called, some of the colleges give what they term "practical agricultural courses," of one or two years, made adequate to the needs of those with limited previous education, by offering "a minimum of culture subjects and pure science, and a maximum of applied science." So long as a majority of the graduates of the four-years' courses are attracted away from the farm, as will be the case until the colleges send out enough trained men to supply the demand for them in special positions, just so long will the colleges be under obligation to keep the ranks of the farmers themselves filled with men trained in these secondary, or practical, courses.

There would still be no provision for those people, young and old, actually engaged in agricultural pursuits, who are unable to spend even one entire year away at school, and yet who are keenly alive to their deficiencies in the more recent and economical methods. For just this class all the better colleges now offer short winter courses of a few weeks in subjects of importance to the people of the State in question. In some of the farming States, where appropriations are liberal and the institutions are most progressive, many such courses are offered, six colleges giving a total of 44 of them each winter. Some courses cover only a week or ten days, some extend over three months, all are as practical as they can be made, the students doing as much actual work as possible. "The nature of these courses is even more varied than their length of term. Various colleges offer courses in general agriculture, dairying, creamery management, farm dairying, poultry raising, cheese making, animal husbandry, horticulture, domestic science, floriculture, agronomy, bee culture, forestry, beet-sugar production, farm mechanics, botany, bacteriology, entomology, stock judging, and corn judging."[a] It is these courses which are influencing our agriculture day by day, and which are awakening the farmers to the necessity of an agricultural education for themselves and their children. The University of Illinois during the winter of 1905–6 inaugurated a new feature in the way of a short course of two weeks for boys in the rural schools, who should be given scholarships by country farmers' institutes for their success in judging corn. This course contained a host of useful things from many of the agricultural branches, which would be useful not only in the lives of the students, but which would interest the boys in the schools at home, and perhaps arouse a permanent interest in the applications of science to their life on the farm.

The number of agricultural colleges maintaining summer schools for teachers or offering normal courses of one or two years is slowly increasing, and would probably be still larger were not most of the colleges already handicapped for want of funds and the members

[a] Crosby, D. J. Special and short courses in agricultural colleges. Dept. of Agriculture, Office of Experiment Stations, bulletin 139, p. 8.

of the faculties badly overcrowded with work. In the States where elementary agriculture is being introduced into the public schools the teachers attend these courses in large numbers and seem to enjoy the work and to be anxious to learn as much as they can in the time at their disposal. Originally nature study predominated in these courses, but now elementary agriculture seems to be receiving more attention. The "Summer School in Nature Study and Country Life" of the Connecticut Agricultural College may be cited as an example; the instruction is given during three weeks of July, and includes the following topics: Our common birds, insects, geology, botany, landscape gardening, forestry, flower growing, soils, cereals and grasses, vegetable growing, plant enemies, farm animals, stock feeding, dairying, and poultry culture. The course certainly is broad enough; the wonder is that so many things can receive any adequate attention in three weeks. The short winter courses are a monument to the noble efforts of the colleges to meet the present needs of the people; summer courses in elementary agriculture for teachers, at least in all States where there is an effort to introduce that subject into the rural schools, are needed fully as much, and will produce as great results.

Columbia University has just announced (May, 1907) as follows:

> We have arranged to accept at full value for the Columbia degrees work done in agriculture at any of the leading agricultural colleges. Our arrangements have been made especially with Professor Bailey at Cornell and have the Cornell scheme of course in view. Nevertheless, we can easily adjust our work to that done in any other institution if it be of the Cornell grade. * * * We are genuinely interested in doing what we can for the training of agricultural teachers. Necessarily our efforts will be directed mainly to the work of practice teaching and general theory in training schools for agricultural teachers and for positions of director, principal, etc., in such institutions.

Forty of the agricultural colleges now offer graduate courses for the master's degree, and 9 of them give sufficient graduate work to enable the student to take his doctorate. The research work necessary for the latter degree is frequently done in the experiment station connected with the college, directed by the experts in charge. During the summer of 1902 a graduate school of agriculture was conducted at the Ohio State University, the courses being given by experts from all over the country and from the Department at Washington. Seventy-five students were in attendance from 28 States and Territories. During the next four years no one State felt like assuming the expense of such an institution, but a committee of the Association of American Agricultural Colleges and Experiment Stations was engaged in working out plans for the establishment of such an institution as a permanent feature of our system of agricultural education. The summer of 1906 saw its revival under the auspices of the above association on a better basis at the Illinois

Agricultural College, the college, it may be noted, which stands for receiving the farm boy with whatever education he may have and giving him all he is capable of taking away.

The International Agricultural Institute at Rome will probably be opened, through the cooperation of the greater share of the important countries of the world, in 1908.

A great deal of extension work is being done by the agricultural colleges, aside from the millions of copies of publications of the Department of Agriculture which are supplied to farmers, and the bulletins of the State experiment stations. In half a dozen States "experimental unions," composed of graduates and former students, are organized to cooperate with the colleges in their experimental work and to spread abroad the results of their discoveries. Several of the colleges are at the head of the movement in their States for the formation of boys' and girls' agricultural clubs, and the consequent instruction in the rural schools. Many of the institutions publish pamphlets on nature study, school gardening, etc., which are sent free to children and teachers asking for them. Ohio University employs a man in charge of the extension work among the rural schools, as do the State agricultural colleges of Iowa, Illinois, and New York, and furnishes free to teachers' institutes competent lecturers on nature study and other such topics.

One of the most important features of agricultural extension work, and one which merits an entire book instead of the few lines that must suffice here for want of suitable space, is that of farmers' institutes. These are directly under the patronage of the Federal Department of Agriculture, but are often conducted under the auspices of the State agricultural colleges. Almost a million people annually attend these institutes, to which the colleges send their best speakers.

The agricultural colleges of New York, West Virginia, South Dakota, and Michigan, at least, conduct farmers' reading courses, and in some cases additional courses for farmers' wives. The colleges send out to members of the clubs questions on each course, which are answered, and, after being carefully criticised at the college, are sent back to the members again. Pennsylvania State College offers a correspondence course in agriculture, and the University of Wyoming gives similar courses in agriculture and horticulture. Mimeograph copies of lessons prepared by members of the university faculty are sent free to members, whose answers to examination questions are corrected and returned.

This innovation has been copied by four private institutions which now offer, among other correspondence courses, work in agriculture. A Springfield, Mass., institution offers yearly courses in agriculture, horticulture, and agricultural bacteriology, the work for which has been prepared by professors at Amherst Agricultural College, Cornell,

and Wesleyan. This work was first offered in 1901, and was followed two or three years later by a Washington, D. C., school, which offers 14 courses in agricultural subjects, the lessons of which are furnished by experts of the United States Department of Agriculture, and which consist, for the most part, of lectures delivered by them on their specialties. In addition, the institution has mailed to its students from the Department copies of farmers' bulletins bearing on the subjects of the lectures. Another Washington correspondence school offered in 1905 courses in general agriculture, tropical agriculture, and agricultural economics. Previous to that time some of the faculty of the Iowa Agricultural College offered courses in agronomy, animal husbandry, and veterinary science, through the medium of correspondence. These private institutions seem to fulfill a true function in teaching a certain class who would not otherwise study because the information was free. One of these schools frankly writes me that most of the things sent in their lessons are procurable from the Department of Agriculture free of charge, but that if free they would not be taken advantage of by their clientage. It is unnecessary to point out further that, through its distribution of vast quantities of reading matter, the Department itself comprises, among its other functions, that of a correspondence school, and that the experts of a State experiment station will answer questions of a technical nature which have proved too hard for the student.

Perhaps the latest phase of extension work is the cooperation of certain of the agricultural colleges of the Middle West with the railway systems traversing their States, in sending "corn-gospel" trains over the systems, in charge of members of the college faculty. Begun in the spring of 1904, in Iowa, by two of the railways crossing the State, a special train was taken through more than a third of the counties of the State, and at each of the 150 stops Prof. P. G. Holden, of the Iowa Agricultural College, addressed large numbers of farmers on the subject of "seed corn," demonstrating to them what had been discovered at the college shortly before, that only 63 per cent of the seed corn ordinarily used by them was worth planting. Not only did the farmers attend these lectures by the thousands, but many teachers heard them as well, and later had their pupils bring corn from home for testing, and carry the results back to their parents—an exceedingly good lesson on the economic value of nature study. This extension work proved to be worth millions of dollars annually to the farmers of Iowa, and since then the Rock Island, Burlington, Missouri Pacific, and other roads have carried such trains, without charge, through Illinois, Kansas, Missouri, and neighboring States.

# CHAPTER VI.

## PRACTICAL ADVANTAGES OF AGRICULTURAL EDUCATION.

It is hoped that the preceding study, even the historical portion of it, has pointed out, to a greater or less degree, at least two things: (1) The need of a good agricultural education for rural communities, and (2) the values, educational, economic, ethical, and social, of such an education; and that some of the problems have been indicated which such education has helped to solve, and which it may be expected to solve again in other places. In this final chapter, then, it may be of advantage to recapitulate by making cross-sections of what has gone before.

No serious student of our American system of education would defend the conditions in our rural schools to-day as being the best to prepare the pupils for successful, happy lives, or for the highest plane of citizenship. Many reforms would be necessary in order to supply adequate educational facilities to the pupils of our rural schools, who comprise about one-half the school children of our country. More than nine-tenths of the country school children never attend a graded school. Whose is the fault we need not stop to inquire. Not only do these children have the right to demand better training, however, but the nation has the right to demand better citizens than is possible under the present conditions. In some parts of the South, if not in most of the Southern States, the conditions of the people have in the past, at least, forbidden the levying of sufficient local taxes to support good schools; in well-to-do sections in many parts of the country the low educational ideals of the people must be lifted. In the South there is a great demand for agricultural instruction in the schools. In the West interest in education is quickened by showing the people the financial advantages to be secured through scientific agriculture. There are not a few examples of counties—indeed, of States—where the farmers are now leaders in the demand for a better and higher education; more bushels of wheat, corn, and potatoes to the acre have accomplished what the pleading of school men failed to do.

Our first schools were for the purpose of training young men for the ministry, and ever since the foundation of education in the United States the curriculum of even our elementary schools has

been tailor made, according to the fashions prescribed by the classical colleges. The conservatism which has cut out a course of study to fit the 5 per cent of the elementary scholars who go on into the high school, and which forces the remaining 95 per cent to wear a misfit or go without intellectual clothing, is scarcely worthy of our progressive spirit along other lines. Instruction in agriculture would force none of the present subjects out of the rural schools (although its introduction would seem to me justifiable even if it should do so), for several of the subjects could be profitably pruned down perhaps a quarter, as Doctor McMurry has shown.[a] Indeed, most of our text-books to-day are manufactured to suit every possible superintendent who wants certain features included, and who has no qualms against ruthlessly cutting out those parts which he does not think valuable. A proper correlation of agriculture with the other studies would furnish plenty of material for school use which would mean more to the children than would text-books, especially in arithmetic, compositions, etc. For example, Miss Shaw[b] tells of a Wisconsin boy near one of the county high schools, whose father scouted the theories of the school. The boy had two pigs, and he went to the high school instructor to learn how best to feed and care for them. They did better than did any of his father's pigs, and compositions, always greatly dreaded before, now came readily, in each of them a naive account of the progress in the conversion of his father.

Most of the pupils in our rural schools have but two sources of information, namely, the world around them and books. It is sad to think how little many of them get from either. Nature study in the earlier years teaches the child to observe, inference gradually comes in as he combines his observations, until in the higher grades he reasons from cause to effect. Until within the last two decades the education of our schools was confined to thinking, the doing was limited to work with pen or pencil. Manual training is now recognized as of great educational value, but the impossibility of suitable equipment for wood, clay, and iron working prevents our rural schools from attaining to the efficiency of our city schools. School gardens make good this deficiency and furnish the first opportunity for coordination between mental and motor activity. As the child grows and his interest enlarges he should be given larger opportunities for determining, guiding, exercising, and controlling his motor activities. The work of the boys' agricultural clubs is a good example of what may be done, and the increased attendance of scholars just

[a] McMurry, F. M. What omissions are advisable in the present course of study, and what should be the basis for the same? N. E. A. Report, 1904, pp. 194–206.

[b] Shaw, A. M. Backward country schools near cities. World's Work, Sept., 1904, p. 5252.

from the rural schools upon the more elementary courses of the Illinois Agricultural College shows the result.

There is almost as much need of nature study with an agricultural trend, of school gardens, and of agricultural instruction in many of our city schools, as in the country. Before the introduction of manual training, our educational system had made no provision for those pupils of a distinctly motor type. Many of them are now being lifted to a higher plane of life than before; and the introduction of gardening into the schools of cities of considerable size has saved a large number of others from dropping out of school without any broad life interest and with but a small part of what the school should give them. There are, moreover, in the schools of all our cities surrounded by farming or horticultural industries, a considerable number of children who must eventually gain their livelihood in such work, to say nothing of the pupils from rural communities who come into the urban schools because of their superior advantages. Certainly, if the aim of education is to fit for life, these boys and girls should be taught according to their needs and not along some hard and fast course of study mapped out for those who wish to prepare for college. A large number of our cities now have manual training high schools for children needing such training as they give, and it is right that it should be so. There is even more justification for the teaching of scientific agriculture, since it would probably tend to check the congestion of our cities, while the former has exactly the opposite trend. One extra teacher in a high school could give instruction in agriculture, open as part of an elective course to those who cared for it, along with most of the other scientific subjects, but with less language. Doctor True's suggestion,[a] that in case a small city inaugurated an elective course in agriculture, the outlying rural districts should help to pay the expense accruing and send their common-school graduates there, seems to me a good one.

It has not been possible to consider the need of a good agricultural education for the children of rural communities without touching, at almost every point, some argument for the educational value of agriculture. Before formal schools were thought of the race made its progress by studying nature and by manual training; later the school came in to supplement these and finally usurped their place, absorbing all the time of the pupil in the consideration of books. Every race has dug its civilization out of the ground; the boys are doing the same thing, successfully, in a number of our American schools. It is time for us to ask again, with Demolins, "Do our schools make men?" Are they helping to maintain the superiority of the Anglo-

[a] True, A. C. Progress in secondary education in agriculture. Yearbook, Department of Agriculture, 1902, p. 500.

Saxon? Few visitors to Hampton, Thompsons Island, or the Berkshire Farm School do not remark, wistfully: "How I wish I might have spent my school life in such a place!" Thompsons Island will not take a depraved boy; the Berkshire school takes but few who are not; both alike turn out efficient young men. Hampton and kindred schools are reforming the colored race in the South, educationally as well as materially and morally, and believe their best work is done through agriculture and gardening. We have long believed that the painter, the designer, and the sculptor express the highest form of thought in their handiwork. Lately we have accepted working in clay, wood, and iron as true expressions of thought. In the same way exact and well-ordered thought is required in the problems of the farm, in bringing the various kinds of soil to the maximum of productivity, and in the handling of the complicated machinery at hand.[a]

Indeed, the value of elementary agriculture in the common schools is now recognized almost all over our country, and each year sees its introduction into one or more States. It is natural that this should be so long before there is much agitation for agriculture in our high schools, because a professionally trained teacher is not absolutely necessary in the elementary school to make the instruction valuable. Perhaps it is wise to have such a study as this, in which the pupils may know as much as or more than their teacher, who shall study with them, only using his larger powers for the skillful guidance of the children. To make a success of school gardens without having had experience in gardening is more difficult than with nature study, but with foresight and pertinacity it can be done. In those States where the law has made such instruction mandatory upon elementary teachers there are hundreds of cases where teachers have made a success of teaching elementary agriculture, although practically not at all trained for the work. But in the secondary schools this is impossible. There must be trained teachers in those schools to assure scientific instruction.

If there were in the early days of our agricultural colleges any justification for their establishment, there is as much to-day for the foundation and maintenance of secondary agricultural schools. The advocates of the first Morrill bill never dreamed of the early opening of a distinctly university field of agricultural work; the colleges were meant to train skillful farmers. But these institutions have so kept up with the wonderful progress made in the science of agriculture that, except for the short and special winter courses, they do not to-day pretend to do much more than give to the world a body of trained leaders in agricultural progress—experts in various lines. The great

[a] True, A. C. Educational values of courses in agriculture. University of Ohio bulletin, series 6, no. 19.

gulf between the elementary agriculture of the rural school and the work of the college demands bridging, and our farmers have a right to insist on it. Some of the State universities of the West are urging the placing of agriculture in all the high schools already established; to others it seems best to establish separate agricultural high schools, at least for the present, when we have no body of suitably trained teachers to place in all our secondary schools.

The committee of five of the National Educational Association on industrial education in schools for rural communities, but one member of which might be an expert in agricultural education, concluded that as to agricultural high schools "the character of the work already done in the existing schools of this class, the interest they awaken, and the hearty support they receive from the agricultural communities maintaining them, the history of these schools in foreign countries, the value of their work both for disciplinary and practical purposes, all combine to present the strongest reasons for the organization of schools of this type in large numbers in agricultural communities. * * * In our opinion, the establishment of schools of this type is an absolute necessity for the proper development and organization of the rural school system." [a]

A last argument, but by no means the least, for the educational value of agriculture in our schools is that in France and Belgium its introduction has materially raised the age of leaving school—in many sections "from two to three years," Government officials say. What statistics we have in the United States go to prove the same thing; in the agricultural high schools of Alabama, Wisconsin, and Minnesota there is constantly a large percentage of students who would have dropped out of school with only an elementary education had there not been the opportunity to learn of the things in which they were naturally interested. Agricultural high schools would be worth all they cost if they were attended only by those young people who otherwise would have dropped out of school.

The economic value of up-to-date instruction in agriculture may seem to be so well recognized as to demand little more than a statement of its importance. But the essential thing to note is that our schools for the children of rural districts have not kept up with the wonderful progress made in agriculture. The workers in our experiment stations have discovered facts of the greatest importance to the masses of farmers, but the new truths are surprisingly slow in seeping down into the soil needing enrichment. Every farmer boy ought to be taught how to choose the best seed corn, but it has been impossible to get this information to the people of Iowa and neighboring States through the public schools. Hence the railroads

[a] Industrial education in schools for rural communities. Report, committee of five, N. E. A., 1905, p. 8.

came to the rescue, and they are freely furnishing trains to carry over their lines agricultural college lecturers who shall teach the farmers how to raise a fifth more corn through the careful selection of seed, and Iowa has already added $8,000,000 a year to her income as a result. Many boys' agricultural clubs are studying the selection of seed corn, with the consequence that some Illinois boys are selling their corn for five times as much as their fathers are able to get for theirs.

The economic necessity for such instruction is all the more imperative because even a farmer can not live unto himself and be successful. Half of our total exports are agricultural products, and our farmers must have good markets abroad to reap rich returns from their crops. Science, however, knows no geographical boundaries, and the latest discoveries bearing on agriculture are taught in the elementary and secondary schools of several of the European countries, as we have seen. Moreover, in a monarchy a change in the educational system works from the top down very quickly. In practically all the European states the government provides traveling schools and itinerant instructors for teaching young people and adults alike the new methods of production. Sweden each year selects scores of her most progressive farmers, one only from a locality, and sends them on a visit to the better farms and experiment stations of the surrounding countries; on returning each of these men acts as a center of information for his entire community. It is just in this way that the European farmer is enabled to compete successfully with us. For example, he buys our entire surplus of cotton seed very cheaply and feeds its meal to his cattle, thus making him a successful competitor of ours, while many of our Southern farmers do not yet fully recognize its value as a fattening product, although this was demonstrated at the University of Tennessee experiment station in 1901.[a] The Danes receive $8,500,000 a year more for their bacon, butter, and eggs than England pays to other countries for the same amount of such produce, although twenty years ago, before the children of Denmark were generally taught about such things, the Danish products received less than the usual market price.[b]

Prof. G. L. McKay, of Iowa State College, found Danish butter in England constantly bringing 2 to 3 cents a pound more than any other butter because of its dry, mealy appearance. Investigation, however, proved that the butter in question actually contained 2 to 3 per cent more water than American or Canadian butter. In other words, the Danes get 2 or 3 more pounds of butter to each 100 pounds of butter fat, and yet sell it for 2 or 3 cents a pound more.

[a] Annual report, University of Tennessee agricultural experiment station, 1901.

[b] Report, 1904, Ontario Dairymen's Association, p. 35.

Why? Because they have found the secret of making butter containing this extra amount of water appear to be extra dry, and the process is taught in the Danish schools.[a]

The farmers of Ontario have doubled their output since the founding of the Ontario Agricultural College, without any appreciable increase either in population or acreage.[b] The money value of an agricultural education was recognized by Mr. Joseph Chamberlain when he said before the House of Commons, while advocating a liberal appropriation for the agricultural schools in the West Indies: "I regard the whole of this cost as being an expenditure intended to relieve the British Government of future charges."[c]

The prosperity of our farming districts and States is not alone in demanding the scientific training of our future agriculturists and horticulturists. The welfare of our cities and of our great manufacturing States is dependent upon our agricultural prosperity to no slight degree. It would be of inestimable value to the factory employees of New England if the abandoned farms with which the States are still dotted could be made productive and economically valuable. Urban conditions in the South would be materially bettered by increased productiveness of the surrounding country, which can readily be brought about by a better education of its owners and tenants as to how to deal with their land. Intensive farming is already being made profitable on land once abandoned as not worth the taxes imposed, and scientific agriculture has netted a gain of $96.22 an acre on some of the poorest land in Alabama.[d] One of the Tuskegee farmers' leaflets tells how Mr. G. W. Carver raised 266 bushels of sweet potatoes on 1 acre of land, with a net profit of $121, while the average yield in the vicinity was 37 bushels. "The average yield of cotton throughout the South is 190 pounds per acre, usually below the paying point. Every acre can and should be made to produce 500 pounds of lint. However, if every grower added but 5 pounds an acre, it would be worth (at 1903 prices) $15,000,000 more than at present."[e]

Blinded as we are, too often, by our utilitarian tendencies and our search for the practical, it may seem rather strained at first to lay much stress on the ethical value of instruction in agriculture, but I am convinced that it is of great importance. Instances might be multiplied of transformations in character wrought by school gardens, to say nothing of the love for God's out-of-doors and for

[a] Report, 1904, Ontario Dairymen's Association, p. 142.

[b] Ibid., p. 205.

[c] Sadler, M. E. The teaching of agriculture in elementary and high schools in the West Indies. Special reports on educational subjects [England], 1901, vol. 4, p. 810.

[d] Washington, Booker T. Working with the hands, 1904, pp. 169, 170.

[e] Ibid., p. 165.

His creatures coming from nature study. Police officers and courts in New York, Philadelphia, Cleveland, and Dayton, Ohio, among other cities, are glad witnesses to the civic virtue arising out of the proprietorship of a little piece of land. Respect for others' property is engendered in no way so quickly as by letting a child possess some of his own, for thus economy, honesty, application, concentration, justice, and the dignity of labor are brought into the children's lives in a telling way. A study of the laws of nature may well teach one that "Whatsoever a man soweth, that shall he also reap," in his life as well as from the soil. In working through a long season, side by side with others, the child gets his earliest and best instruction in social responsibilities, in what he owes to his neighbor, one of the most important things an individual of to-day has to learn.

Early experience in success and failure, and the learning to plan for the future and to work in the expectation of reward later, are among other benefits of an agricultural education, and with these goes the consciousness of one's power to create value, to take care of himself if other things fail, to be independent when thrown on his own resources, the ability always to fall on his feet. As a corollary there will come an added respect for the farm and for the farmer, a thing greatly needed in America, where agriculture does not command the prestige which belongs to it in other countries. The country boy whose principal acquaintance with the soil has been unreasoning work with it, is not attracted back to it for his chosen residence after being called "farmer" by the contemptuous boys of the town. Both urban and rural people need to be educated in this respect, even more than our agricultural colleges have educated them, great as has been the change they have brought about.

Our better agricultural colleges are not satisfied to train men to be able to produce more grain to the acre, or more pounds of meat from a suitably balanced ration, but the students are being shown how they may best become leaders among their fellows; how they may "make agriculture a live, progressive art, which in the future shall provide a more stable and satisfactory basis for thrifty, intelligent, refined, and happy rural communities, as well as a stronger guarantee for the manufactures, commerce, literature, art, and science of a higher civilization."[a]

And along with the ethics which should result from such instruction the religious instincts of the child and the youth may well be appealed to and healthfully stimulated. That one could study nature, the out-of-doors, God's handiwork in the world, and not come to a truer reverence and love for Him who made all things and the laws by which they are governed, seems to me incomprehensible. A

[a] True, A. C. Educational values of courses in agriculture. University of Ohio bulletin, series 6, No. 19.

most appropriate motto for every school of agriculture, of whatever grade, or for any text-book unfolding the wonderful processes to which man can cause nature to respond, would be: "Open Thou mine eyes, that I may behold wondrous things out of Thy law."

Inseparable from a better ethical status of any considerable group of a people is the changed social status of the entire larger group. It is because of the certainty of improved social conditions that such organizations as the American Civic Association are putting forth their best efforts for the introduction of gardens into our city schools and of elementary agriculture into the schools of rural communities. It goes almost without saying that anything which exerts a favorable influence educationally, economically, and ethically will be of value socially. In addition, however, there may be pointed out several specific social problems confronting us to-day which theoretically a general education in agriculture ought to bring nearer a solution and which practical experiments show may be done in reality.

We have already noted the changed character brought about in the Indian schools since the introduction of agriculture into their curriculum; over 25 per cent more Indians are self-supporting than before, and around the tepees of the blanket Indians even little gardens are appearing, here and there, which mean a relinquishing of the nomadic life and a rise to a higher plane of civilization. The numerous farm schools over the country, including the large secondary school of the St. Joseph's Directory, of San Francisco, have turned scores and hundreds of youth out of the highways of crime into paths of industry and good citizenship. A large increase in the number of such schools would mean not only the prevention of crime, but the lessening of tramps and pauperism. Sociological students of the past decade have shown that only a negligible per cent of our tramps have ever tilled a foot of soil. Agriculture is the one occupation which is not at present deplorably overcrowded and in which there will be a place for at least twenty years to come for every intelligent, strong man to make and keep himself independent.

The most serious difficulty with which the American farmer has to deal, especially in manufacturing States or localities, is that of securing labor to carry on his work. This is not confined to any particular section—New England and Kansas are alike crying for help. I have lived in a locality where a great majority of the young men have left the rich farms of the surrounding country to reside in miserable little homes in the towns and cities, where they work in zinc smelters, amid the heat and fumes of sulphur, prodigal of their health and strength, though they know full well how soon a smelter employee breaks down. The same thing is seen in the factory districts of the South and in rural New England. This would not

occur were it not that our present schools are largely devoted to educating the country children away from the farm, and in farming districts of uneducated people one can not blame the young people for getting away from their usual surroundings as soon as possible.

Statistics of France and Belgium, among European countries, show here and there a movement of population toward the country from the city since an elementary agricultural education was made compulsory. It may be that this is nothing more than a coincidence, but if so it is a striking and very happy one. In such of our own States as Illinois and Iowa, where agricultural education is in its most flourishing condition in the United States, the young people are proud of their homes and of their farms, and with good reason. They go through the high school, with the intention from the first, often, of going on to their State agricultural college and of learning how to do better work with their home farms than their fathers have done before them; not alone to learn how "to raise more corn, to feed more hogs, to buy more land, to raise more corn," etc., ad infinitum, but how to live on as high a social and intellectual level as that of their cousins of the city. It is not so much because their land was originally rich that these farmers have been able to make it worth from $100 to $150 per acre for farming purposes, to have country homes with all modern conveniences, to send their children to college, and to have a piano and the best reading matter in every home, but rather that they have learned how best to use their land. A few years ago several colonies of people from two of the richest agricultural counties of Iowa sold their farms for $100 or more an acre, bought Kansas farms for half as much, and are now raising as good crops as before, thus doubling their money. It is largely because of the added social advantages which a good agricultural education gives that the farmers of the Middle West are so proud of their agricultural colleges and of such agricultural high schools as those of Wisconsin and Minnesota.

The American Institute of Social Service is conducting a propaganda for the establishment of schools "for children of weak and undeveloped constitutions whose power of resistance is small," where the buildings shall be surrounded by trees and where gardening shall be the particular feature. Such schools are well known in Germany, where they have proved of especial value in preventing tuberculosis. The largest of them, at Charlottenburg, accommodates 120 children, who are selected by the board of health, and, according to the report made to the Tuberculosis Exposition in Paris in October, 1905, over 70 per cent of their pupils have been entirely cured or greatly improved, while less than 2 per cent grew worse after admission. A recent editorial in Harper's Weekly reports organized opposition from the Gardeners' Union in Germany to the prescription of garden-

ing by physicians for anæmia, neurasthenia, chronic bronchitis, and chronic gastritis, a treatment now becoming rather common, because gardening, "being found useful in curing the sick and building up the weak, will tend to make a large number of such people immediately become gardeners." The district nurses of some of our American cities report much better health among children at work in school gardens than before such work was undertaken—a thing of no inconsiderable importance to us as a people.

Any exhaustive consideration of the subject at hand brings us sooner or later face to face with a problem that is ever growing more important and in connection with which, it seems to the writer, the question of agricultural education is especially apropos at this time. Sooner or later we must find a just and adequate solution of the negro problem. The spread of trades-unionism in the South and of rice growing by whites from the North together form a cloud on the horizon considerably larger than a man's hand. The trades-union follows the introduction of the white mechanic or of the factory operative, and "the negro is crowded to the wall."[a] More and more are the negroes being shut out of work in factories, for which, however, they do not seem naturally so well fitted as for agriculture; perhaps there is more truth than fiction in the assertion that the negro must dig his civilization from the soil as other races have had to do. There is still another reason, fully as pregnant with importance, why the negro of the South should be taught scientific farming. After a careful study of the negro, Dr. Carl Kelsey finds[b] that there are race troubles where—and almost only where—the blacks and whites "come into competition in cheap employment in the fields and otherwise." Good agriculture, and the consequent farming of their own land by both races, would overcome this, as it has done in dozens of sections of the South, such as tide-water Virginia and other localities where the people have been taught to raise diversified crops and to till the soil properly.

Now that the cheap lands of the West have so largely been settled, the tide of immigration is setting southward. Northern capital and industry are at work on a large scale in several of the Southern States. For instance, the rice industry of Louisiana has been revolutionized and the negro is utterly out of the field. If this is to continue, we shall be face to face with a problem even more serious than our present one. What shall become of the colored people already largely shut out of those industries which have been unionized? The negro of the South has never faced severe agricultural competition; will he become economically secure before he is called upon to live in spite

[a] Washington, Booker T. The future of the American negro, pp. 78, 79.

[b] Kelsey, Dr. Carl. The negro farmer. (University of Pennsylvania thesis.)

of it?[a] If so, there must be a great change, which can be brought about in no other way than by making an education in scientific agriculture available to the entire rural population of the South, where only 20 per cent of the people live in cities. It is almost impossible for one who has not lived in the South to appreciate the deplorable conditions among the small farmers, black and white alike, though as a whole the negroes live in more wretched circumstances than do the whites. Large tracts of land have become exhausted because of the poor methods of farming and have been allowed to grow up to woods. Cotton and tobacco are the staple crops to such an extent that rotation of crops is the exception rather than the rule. Diversified farming must be shown to be profitable and the people taught how to practice it successfully. This will not only prepare the negro to meet competition and prevent race troubles by keeping him from marketing his labor along with that of the poorer whites, but it will have its moral effect as well. With cotton and tobacco the only crops, the negro is idle a considerable part of the year, which is not particularly conducive to good morals or to habits of industry and frugality. In many counties of the Black Belt the great majority of the negroes mortgage their crops of cotton for food to live on while these crops are growing, live on rented land, and attempt to pay interest on their advances ranging from 15 per cent to 40 per cent per annum.[b] Raising their own garden truck is a rare thing; they hardly know how, and so have to buy any they may use. Diversified farming intelligently done has transformed large districts elsewhere in the South, increased the total production of the land, made a majority of the resident negroes landowners, and bettered their moral and social conditions to a striking degree.

Naturally an overwhelming share of the colored illiterates of our country are in the South, while with 24 per cent of the total white population 64 per cent of the white illiterates over 10 years of age live here also. Half of the negro children of school age and a large share of the whites are without any school facilities, and many of the rural schools are in session but from four to eight weeks a year.[c] Clearly something ought to be done, and that speedily, toward the amelioration of such conditions. Rapid as is the present progress along educational lines in the South, there is to-day in every one of the Southern States a crying need for more and better schools, and those for the negro, at least, should be industrial rather than classical, for in the effort to lift the negro to better social, moral, and hence mental conditions, the efficaciousness of such schools as Hampton and Tuskegee over those giving formal mental training is now hardly

[a] Kelsey, Dr. Carl. The negro farmer. (University of Pennsylvania thesis.) Pp. 68, 69.

[b] Washington, Booker T. The future of the American negro, p. 116.

[c] Sinclair, W. A. The aftermath of slavery, 1905, p. 301.

questioned. As we look backward over the efforts since the war to educate the negro, the pity grows that more of the money flowing southward for such purposes could not have been turned into agricultural and industrial channels; not that formal learning is needed the less, but that better conditions, agriculturally and in the home, were and are needed the more.[a]

We are in the midst of a new and great interest in rural development, in farm life, in the achievements of science in agriculture. This has come along with, and perhaps partly as the result of, the rapid increase of facilities for intercommunication among the farmers themselves, and between them and the towns and cities of their localities. Rural free delivery gives the farmer his paper and other mail matter delivered daily at his door. A mesh of telephone wires is binding together the homes of our agricultural population; often a larger proportion of the farmers of a county have phones in their houses than have the residents of a city. Electric railway lines are threading their way past the doors of the country homes and increasing greatly the facilities for travel. The progress in farm economics is reflected in the modern residences and in more pleasant habits of life than have ever obtained before. The children and young people are receiving a better education; in several of our States a more practical and useful one also. Often they are carried in warm, dry vans to a consolidated school, where they have the advantages of a graded school, competent teachers, and a hygienic building. Consolidated schools are spreading as fast as many of the other educational advantages of recent introduction, and rarely has one been abandoned after having been tried.

There has long been a certain species of rather technical literature designed especially for the farmer, but the past three or four years have brought into existence magazines of gardening, country life, and farming, which are among the most attractive and handsome periodicals published in the country. Such associations of rural people as the well-known ones at Hesperia, Michigan, and at Topeka, Indiana, are becoming more and more common, by means of which the farming people are making marvelous changes in their condition through the medium of good lecture courses, circulating libraries, reading clubs, better homes, and better farms. There are large organizations, by no means fundamentally agricultural, which are now giving agricultural education the impetus of their encouragement. The Michigan Academy of Social Science maintains a section of agriculture, and the American Civic Association, the National Educational Association, and the American League of Industrial Educa-

[a] Dabney, Charles W. Educational principles for the South. N. E. A. Report, 1904, pp. 235–241. Hill, W. B. The Morrill Bill *v.* the Blair Bill. University of Georgia alumni bulletin, v. 5, no. 1.

tion, all stand for the spread of agricultural education, because of the consequent bettering of the condition of the rural people which will result.

That which seems at present to be the most hopeful sign of all, however, is the closer alliance of progressive agriculture with our system of elementary education. The teachers of rural schools are coming to attend the farmers' institutes, while the farmers, in turn, give closer attention to school conditions in their midst. In a number of instances the State universities and the State farmers' institutes are working hand in hand for the making of efficient men and women out of the country children. Of course this largely means an agricultural education, and we have seen at some length the value which such an education has proved to have at home and abroad. Wherever tried in the United States, whether in elementary or in secondary schools, it has more advocates to-day than ever before. More States are introducing it into their public school systems; where it is now a matter of local option, the farmers of counties adjoining those in which agriculture is taught are demanding a like education for their children. The offering of agricultural courses for teachers by normal schools and colleges reflects the demand for such instruction. Minnesota and Wisconsin have each within a year doubled the number of agricultural high schools receiving State aid. The Indian Service has established a strictly agricultural Indian school in Oklahoma. The bright spots in the South have been made such by agricultural education. The Macdonald Institute at Guelph, Ontario, marks a final step in advance by keeping the supply of thoroughly trained Canadian teachers abreast of the demand for instruction of this kind.

Just what the future shall bring along these lines, one may not even prophesy. But it seems certain that it is only a matter of time until agriculture will be taught in the rural schools of every State, until thorough secondary courses in scientific agriculture will be within the reach of all country children who may desire them, and until there shall obtain a correlated course of instruction from the rural school up through the college of agriculture, with abundant opportunity for graduate technical work for those ambitious to become experts.

## SUMMARY.

Aside from the historical features of the foregoing study, its purpose has been to determine the advantages of nature study, of school gardens, and of an agricultural education. So far as experience has gone, it has shown that—

1. Nature study has already infused new life into our school system, and, when made a study of the relations of man to nature and

to its forces, it produces that great educational result, viz, the proper response of the individual to his environment.

2. Nature study, better than any other subject in the school curriculum, allows the teacher and the pupil to meet on the same plane and really to know and to understand each other.

3. The child himself becomes a life-long economic force in nature as soon as he learns to look at it with understanding eyes.

4. The ethical value of producing something can not be overestimated; in this lies the only road to altruism open to the child, as well as a guaranty of his respect for the products of others.

5. "The sentiments on which the highest religion rests are best trained in children on the noblest objects of nature."

6. Neither the educational, the ethical, nor the economic value of nature study overshadows its æsthetic value—its effect on the sentiments of the child. The psychological genesis of a genuine love of nature is the crowning result of nature study.

7. School gardens furnish to children the best possible means of giving expression to their thoughts through motor channels.

8. Children having the advantages of gardening do much better work—as much as a third better in some cities, it is said—in their other studies than do other children in the same school.

9. School gardens teach, among other things, private care for public property, economy, honesty, application, concentration, justice, the dignity of labor, and love for the beauties of nature.

10. Nature study and school gardens serve better than other agencies to "cultivate the critical discernment of beauty and excellence in nature and in human nature," as President Eliot has pointed out.

11. School gardens have the advantage over all other school work of promoting the health of the child, especially in cases of incipient tuberculosis.

12. In a number of our larger cities school gardens have transformed districts in the slums, morally, socially, and æsthetically.

13. Although half of the school children of the United States receive all their instruction in the country schools, the education given them does not suitably prepare them for their life work.

14. Agriculture furnishes admirable subject-matter for many of the other school studies.

15. In rural schools where other forms of manual training are perhaps out of the question for the present, practical agricultural work supplies the motor training needed by all and essential to the motor minded.

16. In at least two foreign countries the introduction of agricultural education has raised the age of leaving school between two and three years, and the same effect is observable in some of our own

States. With this there is also an increased average attendance of the total school enrollment.

17. The economic value of an agricultural education is seen on every hand. It is this which has materially increased, and in many cases doubled or tripled, the amount produced by the same land, numerous instances of which may be seen in every State of our country. More patent still, it is such an education which enables the smaller countries of northern Europe to compete with our American farmers.

18. Agricultural education, and perhaps that alone, seems likely to prove the salvation of the South, and especially of the negro, who above all else needs to be given self-respect and a higher code of morality through self-support.

19. Practical ethics are best insured by making every citizen, at least potentially, a producer. For example, a small, well-managed farm school has proved more successful than any other means for reforming boys with criminal tendencies.

20. The study of agriculture has its important artistic side; the problems of the farm and of farming demand as true and as artistic expression of well-ordered thought as do the "arts and crafts," whose artistic value we have recognized ever since the work of Morris.

21. All these effects must bring a changed social status in their train. We have good reason to believe that one of the most important among them will be a lessening of the influx into the cities from the country, if not a setting of the tide in the other direction. This beneficent change is already under way in France and Belgium, and it is believed that giving the people an agricultural education has had its part in bringing this about.

22. An agricultural education, better than any other, makes men, enables one always to fall on his feet, fills him with a lasting confidence that in any stress of circumstances he can obtain a comfortable livelihood from the earth.

Finally, our rural communities need, and have a right to demand, a good, practical, scientific education in agriculture. This must come largely through secondary schools, since our agricultural colleges have assumed the important task of training agricultural experts. Nature study should be taught in conjunction with gardening in every school, and agriculture should form a part of the curriculum of at least every rural primary school. And I find myself, at the close of this study, in accord with Mr. Dick J. Crosby, the Government's expert in agricultural education, in his suggestion "that there should be in every township an efficient high school giving instruction not only along the lines now commonly found in high schools, but also in agriculture and home economics; and that townships

unable to support such schools be required to pay the tuition of their pupils in such high schools in adjoining townships." But at the same time it seems of great importance that the high school courses in agriculture be so full and complete as to lead to practical farming on the one hand and to higher work in the agricultural college of the State on the other; so that ultimately there shall be a thoroughly correlated system of instruction from the primary grades of the rural school on through the collegiate and graduate courses of our best agricultural colleges.

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# APPENDIX.

## FORM EMPLOYED IN THE PROVINCE OF NOVA SCOTIA FOR THE RECORD OF NATURE OBSERVATIONS BY SCHOOL CHILDREN.

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[To be handed promptly on its receipt by the secretary of every school board to each teacher employed within the school section.]

### LOCAL "NATURE" OBSERVATIONS.

This sheet is provided for the purpose of aiding teachers to interest their pupils in observing the times of the regular procession of natural phenomena each season. First, it may help the teacher in doing some of the "nature" lesson work of the course of study; secondly, it may aid in procuring valuable information for the locality and Province. Two copies are provided for each teacher who wishes to conduct such observations, one to be preserved as the property of the section for reference from year to year; the other to be sent in with the return to the inspector, who will transmit it to the superintendent for examination and compilation.

What is desired is to have recorded in these forms the dates of the first leafing, flowering, and fruiting of plants and trees; the first appearance in the locality of birds migrating north in spring or south in autumn, etc. While the objects specified here are given so as to enable comparison to be made between the different sections of the Province, it is very desirable that other local phenomena of a similar kind be recorded. Every locality has a flora, fauna, climate, etc., more or less distinctly its own; and the more common trees, shrubs, plants, crops, etc., are those which will be most valuable from a local point of view in comparing the characters of a series of seasons.

Teachers will find it one of the most convenient means for the stimulation of pupils in observing all natural phenomena when going to and from the school, and some pupils radiate as far as 2 miles from the schoolroom. The "nature study" under these conditions would thus be mainly undertaken at the most convenient time, without encroaching on school time; while on the other hand it will tend to break up the monotony of school travel, fill an idle and wearisome hour with interest, and be one of the most valuable forms of educational discipline. The eyes of a whole school daily passing over a whole school section will let very little escape notice, especially if the first observer of each annually recurring phenomenon receives credit as the first observer of it for the year. The observations will be accurate, as the facts must be demonstrated by the most undoubted evidence, such as the bringing of the specimens to the school when possible or necessary.

To all observers the following most important, most essential principles of recording are emphasized: Better no date, no record, than a wrong one or a doubtful one. Sports out of season due to very local conditions not common to at least a small field should not be recorded except parenthetically. The date to be recorded for the purposes of compilation with those of other localities should be the first of the many of its kind following immediately after it. For instance, a butterfly emerging from its chrysalis in a sheltered cranny by a southern window in January would not be an indication of the general climate, but of the peculiarly heated nook in which the chrysalis was sheltered; nor would a flower in a semi-artificial, warm shelter, give the date required.

When these sports out of season occur, they might also be recorded, but within a parenthesis to indicate the peculiarity of some of the conditions affecting their early appearance.

These schedules should be sent in to the inspector with the annual school returns in July, containing the observations made during the whole school year and back as far as the preceding July (if possible) when the schedule of the previous school year was necessarily completed and sent in.

A duplicate copy of the schedule of observations should be securely attached to the school register for the year, so that the series of annual observations may be preserved in each locality. The new register has a page for such records.

Remember to fill in carefully and distinctly the date, locality, and other blanks at the head of the schedule on the next page; for if either the date or the locality or the name of the responsible compiler should be omitted the whole paper is worthless and can not be bound up for preservation in the volume of The Phenological Observations.

By the aid of the table given at the top of pages 3 and 4, the date, such as the 24th of May, for instance, can be readily and accurately converted into the annual date, "the 144th day of the year," by adding the day of the month given to the annual date of the last day of the preceding month (April in this case), thus: $24 + 120 = 144$. The annual date can be briefly recorded, and it is the only kind of dating which can be conveniently averaged for phenological studies. When the compiler is quite certain that he or she can make the conversion without error, the day of the year instead of the day of the month will be preferred in recording the dates.

PHENOLOGICAL OBSERVATIONS, CANADA.
(1906 SCHEDULE.)

For the *year* ending *July*, 190 .

Province.....County.....District.....Locality or school section.....No.....
The estimated length and breadth of the locality within which the following observations were made .... X .... miles. Estimated distance from the seacoast .... miles. Estimated altitude above the sea level....feet.
Slope or general exposure of the region.....
General character of the soil and surface.....
Proportion of forest and its character.....
Does the region include lowlands or intervales?.....and if so, name the main river or stream.....Or is it all substantially highlands?.....
Any other peculiarity tending to affect vegetation?.....
The most central post-office of the locality or region.....

| Name and address of the teacher or other compiler of the observations responsible for their accuracy. ..... ..... | When first seen. | When becoming common. |
|---|---|---|
| (*Wild plants, etc.—Nomenclature as in "Spotton" or "Gray's Manual."*) | | |
| 1. Alder (Alnus incana), catkins shedding pollen | | |
| 2. Aspen (Populus tremuloides), " | | |
| 3. Mayflower (Epigæa repens), flowering | | |
| 4. Field horsetail (Equisetum arvense), shedding spores | | |
| 5. Blood-root (Sanguinaria Canadensis), flowering | | |
| 6. White Violet (Viola blanda), flowering | | |
| 7. Blue violet (Viola palmata, *cucullata*), flowering | | |
| 8. Hepatica (H. triloba, etc.), flowering | | |
| 9. Red maple (Acer rubrum), flower shedding pollen | | |
| 10. Strawberry (Fragaria Virginiana), flowering | | |
| 11. " " fruit ripe | | |
| 12. Dandelion (Taraxacum officinale), flowering | | |
| 13. Adder's tongue lily (Erythronium Am.), flowering | | |
| 14. Gold thread (Coptis trifolia), flowering | | |
| 15. Spring beauty (Claytonia Caroliniana), flowering | | |
| 16. Ground ivy (Nepeta Glechoma), flowering | | |
| 17. Indian pear (Amelanchier Canadensis), flowering | | |
| 18. " " " fruit ripe | | |
| 19. Wild red cherry (Prunus Pennsylvanica), flowering | | |
| 20. " " " fruit ripe | | |
| 21. Blueberry (Vaccinium Can. and Penn.), flowering | | |
| 22. " " " fruit ripe | | |
| 23. Tall buttercup (Ranunculus acris), flowering | | |
| 24. Creeping buttercup (R. repens), flowering | | |
| 25. Painted trillium (T. erythrocarpum), flowering | | |
| 26. Rhodora (Rhododendron Rhodora), flowering | | |
| 27. Pigeon berry (Cornus Canadensis), florets opening | | |

| Day of year corresponding to the last day of each month: | | | | | | | | When first seen. | When becoming common. |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 31. | April | 120. | July | 212. | Oct. | 304. | | |
| Feb. | 59. | May | 151. | Aug. | 243. | Nov. | 334. | | |
| March | 90. | June | 181. | Sept. | 273. | Dec. | 365. | | |

For leap years increase each number except that for January by 1.

| | | |
|---|---|---|
| 28. Pigeon berry (Cornus Canadensis), fruit ripe | | |
| 29. Star flower (Trientalis Americana), flowering | | |
| 30. Clintonia (Clintonia borealis), flowering | | |
| 31. Marsh calla (Calla palustris), flowering | | |
| 32. Lady's slipper (Cypripedium acaule), flowering | | |
| 33. Blue-eyed grass (Sisyrinchium ang.), flowering | | |
| 34. Twinflower (Linnæa borealis), " | | |
| 35. Pale laurel (Kalmia glauca), flowering | | |
| 36. Lambkill (Kalmia angustifolia), " | | |
| 37. English hawthorn (Cratægus oxyacantha), flowering | | |
| 38. Scarlet-fruited thorn (Cratægus coccinea), " | | |
| 39. Blue flag (Iris versicolor), flowering | | |
| 40. Ox-eye daisy (Chrysanthemum Leucanthemum), flowering | | |
| 41. Yellow pond lily (Nuphar advena), flowering | | |
| 42. Raspberry (Rubus strigosus), flowering | | |
| 43. " " " fruit ripe | | |
| 44. Yellow rattle (Rhinanthus Crista-galli), flowering | | |
| 45. High blackberry (Rubus villosus), flowering | | |
| 46. " " fruit ripe | | |

| Day of year corresponding to the last day of each month:<br>Jan. 31. April 120. July 212. Oct. 304.<br>Feb. 59. May 151. Aug. 243. Nov. 334.<br>March 90. June 181. Sept. 273. Dec. 365.<br>For leap years increase each number except that for January by 1. | When first seen. | When becoming common. |
|---|---|---|
| 47. Pitcher plant (Sarracenia purpurea), flowering | | |
| 48. Heal-all (Brunella vulgaris), " | | |
| 49. Common wild rose (Rosa lucida), " | | |
| 50. Fall dandelion (Leontodon autumnale), " | | |
| 51. Butter-and-eggs (Linaria vulgaris), " | | |
| 52. Expanding leaves in spring made trees appear green—(a) first tree, (b) leafing trees generally | | |
| *Cultivated plants, etc.* | | |
| 53. Red currant (Ribes rubrum), flowering | | |
| 54. " " fruit ripe | | |
| 55. Black currant (Ribes nigrum), flowering | | |
| 56. " " fruit ripe | | |
| 57. Cherry (Prunus Cerasus), flowering | | |
| 58. " " fruit ripe | | |
| 59. Plum (Prunus domestica), flowering | | |
| 60. Apple (Pyrus Malus), flowering | | |
| 61. Lilac (Syringa vulgaris), flowering | | |
| 62. White clover (Trifolium repens), flowering | | |
| 63. Red clover (Trifolium pratense), " | | |
| 64. Timothy (Phleum pratense), " | | |
| 65. Potato (Solanum tuberosum), " | | |
| *Farming operations, etc.* | | |
| 66. Plowing begun | | |
| 67. Sowing " | | |
| 68. Planting of potatoes begun | | |
| 69. Shearing of sheep | | |
| 70. Hay cutting | | |
| 71. Grain cutting | | |
| 72. Potato digging | | |
| *Meteorological phenomena.* | (a) | |
| 73. Opening of (a) rivers, (b) lakes without currents | | |
| 74. Last snow (a) to whiten ground, (b) to fly in air | | |
| 75. Last spring frost (a) "hard," (b) "hoar" | | |
| 76. Water in streams, rivers, etc. (a) highest, (b) lowest | | |
| 77. First autumn frosts (a) "hoar," (b) "hard" | | |
| 78. First snow (a) to fly in air, (b) to whiten ground | | |
| 79. Closing of (a) lakes without currents, (b) rivers | | |
| 80. Number of thunder storms (with dates of each) | | |

Jan....., Feb. ....., Mar. ....., Apr. ....., May ....., June ....., July ....., Aug. ....., Sept....., Oct. ....., Nov. ....., Dec. .....

| Day of year corresponding to the last day of each month:<br>Jan. 31. April 120. July 212. Oct. 304.<br>Feb. 59. May 151. Aug. 243. Nov. 334.<br>March 90. June 181. Sept. 273. Dec. 365.<br>For leap years increase each number, except that for January, by 1. | Going north or coming in spring. | Going south or leaving in fall. |
|---|---|---|
| *Migration of birds, etc.* | | |
| 81. Wild duck migrating | | |
| 82. Wild geese migrating | | |
| 83. Song sparrow (Melospiza fasciata) | | |
| 84. American robin (Turdus migratorius) | | |
| 85. Slate-colored snow bird (Junco hiemalis) | | |
| 86. Spotted sand piper (Actitis macularia) | | |
| 87. Meadow lark (Sturnella magna) | | |
| 88. Kingfisher (Ceryle Alcyon) | | |
| 89. Yellow-crowned warbler (Dendrœca coronata) | | |
| 90. Summer yellow bird (Dendrœca aestiva) | | |
| 91. White-throated sparrow (Zonotrichia alba) | | |
| 92. Humming bird (Trochilus Colubris) | | |
| 93. King bird (Tyrannus Carolinensis) | | |
| 94. Bobolink (Dolychonyx oryzivorus) | | |
| 95. American goldfinch (Spinus tristis) | | |
| 96. American redstart (Setophaga ruticilla) | | |
| 97. Cedar waxwing (Ampelis cedrorum) | | |
| 98. Night hawk (Chordeiles Virginianus) | | |
| 99. Piping of frogs | | |
| 100. Appearance of snakes | | |

(Other Observations and Remarks.)

# INDEX.

O