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THE SCHOOL GARDEN II.

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In January, 1903, there was issued by the Eastern Illinois State Normal School a bulletin upon the same topic as that announced above. That bulletin presented an historical statement of the subject, gave the results of observations of certain German school gardens and of some of those in the United States, and discussed the need and applicability of the school garden idea in our own school system. The five year period since 1902 has seen a notable increase in experimental nature work throughout the United States. In some sections of the country this work is largely in the form of elementary agriculture, while in others it has the widest possible expression in nature in general. The school garden while being used in some of its forms by a very large number of schools has had its use range from those in which nothing beside the teaching of elementary agriculture is

attempted, to those in which agricultural instruction is almost entirely absent. Advocates of the various points of view have found pretty good arguments for their positions in the results of their work, since some gardens exemplifying each of these points of view have been successful. It does not follow from this statement that all gardens have been successful, such being far from the truth. This bulletin does not pretend to present an adequate statement of the garden movement throughout the United States, but confines itself chiefly to the work of this one school. It is not presumed that all the work done here is practicable for all schools, but in this descriptive statement it is possible that helpful suggestions may be given. In the autumn of 1902 school-garden work was begun in connection with the practice department, and has been continued regularly since that time.

The only work accomplished in that autumn consisted in plowing and harrowing a little more than one acre of blue grass sod, which was growing upon good black soil. While the soil was of good quality, the presence of the heavy sod offered serious difficulties, some of which extended throughout the first year of work. The selection for garden uses of this sod area stimulated a stream of more or less unfriendly criticism, which continued for two or three years. In addition to being accused of knowing little about soil conditions, it was said that we were going to try to make farmers of the boys, and farmers' wives of the girls. The first part of the accusation may have been true, and it might perhaps be to our credit were the latter part true. For experimental purposes in many ways it would have proved more instructive and of larger permanent value, doubtless, had it been possible to select poor soil for the garden. In this way an additional garden problem, that of reclaiming poor soil, might have been added to our experiment.

FIGURE 1

FIGURE 2

When the work began in the spring of 1903, it was decided to select the children from the second, fourth, sixth, and eighth grades for garden work, but the solicitation of the first grade children caused them to be added to those already selected. As was expected, the younger children showed more interest in the undertaking than did the older ones. The older pupils in some cases reported unpleasant home association with gardens, and furthermore were doubtless somewhat influenced by remarks made by "grown ups." A good many of the older children felt that it was undignified for them to work in the soil. This feeling was almost as conspicuous with children from country homes as with those from the cities. As consecutive years of gardening have passed, such a feeling has decreased until it is found but occasionally.

THE INDIVIDUAL GARDEN THE UNIT.—At the outset it was decided to introduce the individuality and ownership idea into the work. Consequently a plot of ground six by twelve feet was assigned to each pupil. It is evident that if the individual plot is made the unit of the garden, the general effect of the entire garden may sometimes be almost ludicrous. One pupil may grow onions and lettuce, and his neighbor petunias and pinks, while a third may be experimenting with Indian corn. Such a condition, although striking, is in perfect harmony with one of the determining elements in the garden, namely, the development of individuality, ownership, and responsibility. General landscape effect is not sought, but out of the same kinds of soils come the plant expressions of the pupils' attempts in experimenting with agricultural plants and with vegetable and flower gardening. Large landscape effects are not sought any more than are large fields of corn and oats. The individual plot is the unit, and, as such, often is quite beautiful. Those which

are failures artistically are illustrations full of potent suggestions to all children who work in the garden.

SELECTION AND ARRANGEMENT OF MATERIALS.—A list of things that might be had for planting was put before each class, the plants were discussed by pupil and teacher, and each pupil decided what things he would try to grow. With this point decided, the pupil was then asked to make plans as to the arrangement he would make in his plot of the things he wished to plant. In subsequent years some of the grades have made "drawings to scale" showing the distributions and quantities of different plants to be grown. Such drawings have proved very valuable in giving ability to formulate definite plans for action, and in forecasting the results that are to be secured. Without such plans pupils had no idea as to the quantity of materials required, or that might be produced from one plot, nor any notions as to the artistic effects that were possible from use of the materials. With these diagrams pupils give definiteness to this particular piece of work, and something is done toward forming the general habit of making definite plans for action.

In many cases the pupils wish to grow both garden vegetables and flowering plants. Such pupils sometimes plan their gardens so as to have these two groups growing together, and a few quite attractive effects have been produced thereby. In such cases most of the pupils can foresee that it is better to divide the plot and to have two smaller gardens, each set apart for a particular group of plants. It is interesting also to note that while the older girls usually choose to grow flowering plants and the older boys choose agricultural plants, some striking and highly successful reversed choices have been made. The younger pupils almost always choose both vegetables and flowering plants. A great interest is shown by all in growing plants of which they know, but which they have not seen growing, such as peanuts,

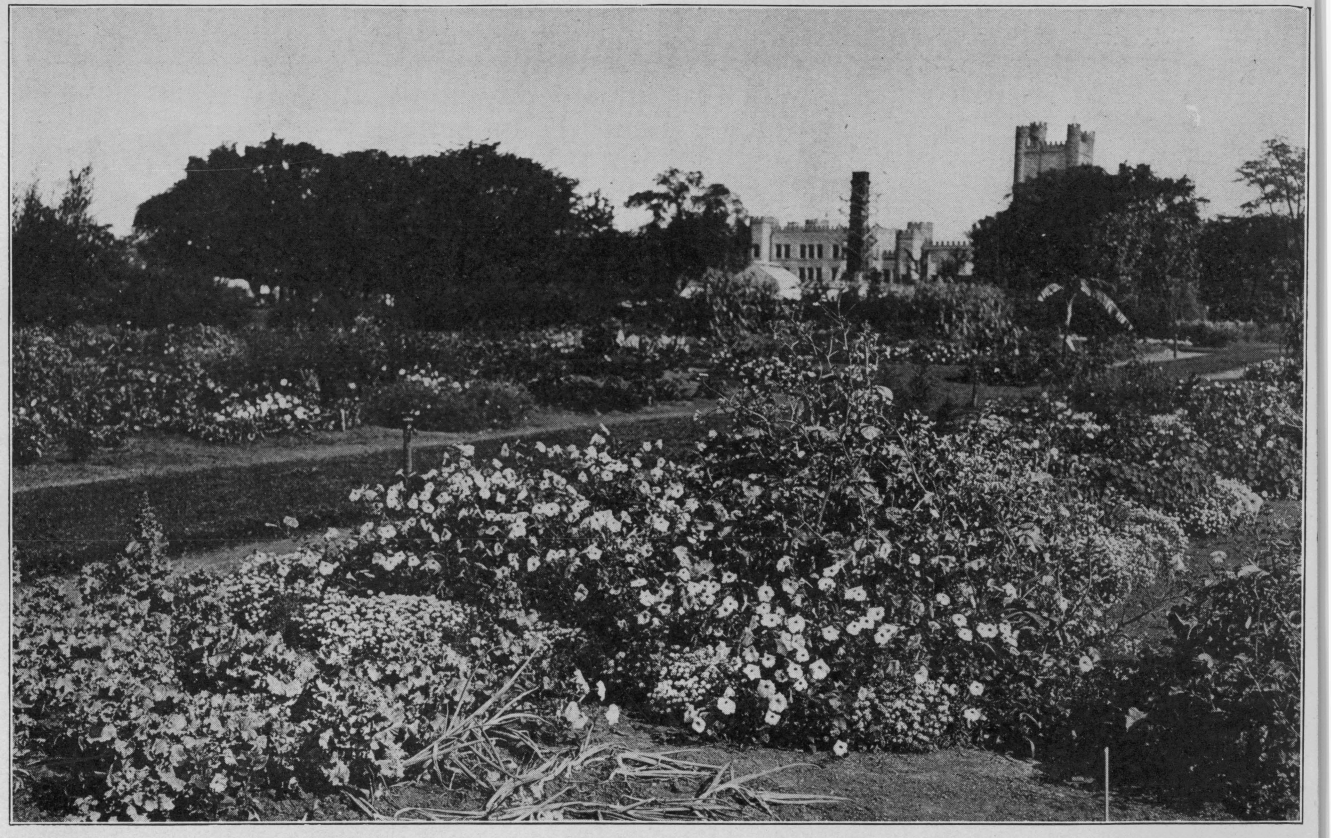

FIGURE 3

flax, and sugar beets. The older boys have shown considerable interest in growing all securable kinds of corn, oats, etc., and some experiments in plant breeding were begun but were not carefully followed until results of any consequence were secured. Several farmers and seedmen have been interested in supplying what they regard as the best seed of various agricultural plants, and considerable interest has attached to results secured from these seeds.

PREPARATION OF THE SOIL AND PLANTING.—Each year plowing and harrowing has been attended to by the gardener. The work of preparing the beds has been done by the pupils except in the case of those in the second grade, whose plots are made ready for the planting by the gardener. No work has been done in the garden as yet with poorly prepared or unproductive soils, though it was originally planned that such should be done.

The depth and nature of planting seeds and setting out young plants has been pretty carefully directed, the directions usually having been given in the process of discussions of what is known as to the probable needs of the germinating seeds and the young plants. In some ways, doubtless, less carefully directed experimentation might be of more educational value, but a failure at this time would obviate success for the rest of the season. Within certain limits such experimentation as has to do with depth of planting, irrigation, etc., is encouraged.

CULTIVATION.—It is in connection with the work of cultivation that the greatest difficulties of the school garden arise. It is fairly easy to get pupils interested in starting the garden in the early spring days when pupils and teacher alike are glad to be out of doors, but it is another matter to maintain interest in weeding and hoeing in the hot sun. Persistence in the work has been insisted upon just as in class work in any other subject. It is at least quite as easy to main-

tain diligence and to produce desirable results with uninterested students in garden work as in any of the older subjects of the curriculum. There have been very few pupils who have shown lack of interest in cultivating their gardens, and of those who were at first uninterested, most soon became anxious to do whatever they could to produce the best results with their plants. The motives back of the desire to do the requisite work of the garden doubtless are many. Most of the pupils labored because of their desire to produce a good garden. Some desired to secure the products from their garden. Some wished to excel their fellows, and some were interested in special problems. Those having any of these various interests became interested in plants, the soil, cultivation, and the climatic and environmental factors effecting plant growth.

The question of cultivation of the gardens during the summer vacation has often been a serious one. During the first years of the work but few of the pupils who remained in the vicinity of the school during the summer, kept up the care of their gardens. During the past two or three years practically all who can do so claim their plots and care for them all through the summer. Other beds are cared for by the gardener. A pupil who can do so, but fails to care for his garden, loses the right to claim it, and it is given to another. Such procedure has been necessary in but few cases.

The question as to the values of various processes of cultivation is constantly arising. The pupils often have their own notions, these sometimes having been given them by their parents, and interesting and profitable questions arise. The nature and needs of the particular plant in question and the kind of soil in which it is growing are discussed with the result that good reasons for a recommended method of cultivation become apparent. Often poorly cultivat-

FIGURE 4

ed and weedy beds are present and serve as valuable material for comparison. A very efficient gardener, to whom much of the success of the garden, is due, the grade teachers, and others have given needed information regarding the cultivation as well as the other work of the garden.

DISPOSITION OF PRODUCTS OF THE GARDEN.—The products of each bed belong to the pupil who grows them, but the gardener or teacher is consulted as to the proper time for harvesting them. Those who argue that ownership of the garden products is conducive to the mercenary spirit could find no fault along this line in the working of this particular garden. On the contrary it has produced most wholesome results in giving respect for other people's property. There has been a marked decrease of petty interference with garden products, though the garden is by no means recommended as a sure prevention for small pilfering.

Many of the pupils adhere closely to ownership of the vegetables, flowering plants, etc., during the growing season, then use them at home, sell them, or more often give all of them to teachers, fellow-pupils, parents, and friends. In this procedure the children are expressing much the same sort of interest in their work as men and women express in their own activities. We adhere tenaciously to our ownership, but give away the things owned, if we wish. Furthermore the idea of ownership may occasionally be the only means of securing the interest of some pupils. In the spring of 1905 a rather lethargic and somewhat troublesome boy did not want to work in the garden. Discussions of bees, of beautiful flowers, of thrifty vegetables, or experiments in crossing varieties of corn did not appeal to him. He was finally asked if he did not wish to see how much money he could make by growing radishes in a bed 6x12 feet. This appealed to him, and no sooner had he planted the bed

than he asked for another. He was allowed one half of another bed, thus making an area of 6x18 feet. He began at once to make plans as to disposition of his radishes, and engaged his entire crop to a local hotel, agreeing to furnish bunches of 20 radishes at five cents a bunch. A careful account of dates of sales and of quantities of material sold and of receipts was required by the teacher. The boy began work on his plot on April 1st and gathered the last of his last crop on June 18th. The receipts from the hotel were $2.65 and radishes worth 85c had been taken to the boy's mother for home use, thus making a return of $3.50. The succeeding season this boy persuaded his parents to rent a vacant lot for his use in growing potatoes, and during the season of 1907 he had charge of a small farm, and is now especially interested in the science of agriculture, and is planning to take a course in an agricultural college. It is worthy of mention that in addition to securing an active and abiding interest in something worth while on the part of this boy, there was also had a good demonstration of the possibilities of a small piece of ground if properly cared for. 108 square feet of earth produced radishes worth $3.50 with much of the growing season yet remaining. At this rate an acre would produce over $1400 worth of radishes in 90 days.

THE GARDEN AS A CENTER OF NATURAL HISTORY WORK. —In addition to activities mentioned above, numerous interests associated with the garden offer opportunities for nature work. The entire border of the garden and a central bed are planted and cared for by the gardener. For this he uses many kinds of plants. A number of economic plants that are unusual to boys and girls of the region, as coffee, bananas, rubber, and palms are transplanted from the greenhouse to this space for the summer. This region contains many plants in such an arrangement as to suggest possible treatment for making the home premises more attractive. A

FIGURE 5

rose garden in which grow many kinds of hardy roses was originally designed for purposes of experimentation in budding, grafting, cultivation, and a study of associated insects, as well as for decorative purposes. At this time the last of these purposes is the only one that has been realized, but its attractiveness and the interest shown in it have fully justified its existence. A lily pond, and a lake somewhat less then 2 acres in extent offer excellent materials that have been successfully used in the study of plant and animal life.

A forestry section of two thousand trees, and many young trees as well as numerous large native ones offer materials for study of various phenomena related to forests. The general problem of forestry is considered in some of the Normal School classes. The importance of the subject to such a state as Illinois is not easily overestimated, and for some time it is not likely to be reckoned at anything like its full value. Instruction in forestry is now becoming very necessary and those who are conversant with forestry conditions, believe that such instruction must soon become fairly general. The forestry work shown in the accompanying photographs serves at least three distinct purposes. (1) It is a means of instruction about trees and of illustrating to students of the school the possibilities of forest planting and methods by which these are carried out. (2) It serves as an illustration to the agriculturists of the local region, and to numerous casual visitors from a much wider region. (3) It is an important addition to the artistic phase of the school grounds. It should be said in this connection that experiments that have been carried on under the supervision of the United States Forest Service have produced results of such value as to make them of great educational and industrial importance. They have shown the increasingly great need of forestry planting. They have demonstrated that it does not take a lifetime to secure results. That certain kinds of for-

est planting will produce financial returns that will prove attractive to agriculturalists in general is shown by the following statements taken from a report published by the United States Department of Agriculture. "In Pawnee County, Nebraska, a 16-year-old catalpa plantation gave a net return of $152.17 per acre at the time the plantation was cut. This meant an annual profit of $6.24 per acre. A 10-year-old plantation of the same species in Kansas showed a net value of $197.55 per acre. Still another plantation, in Nebraska, gave a net income of $170.50 per acre when 14 years old, which amounts to an annual income of $8.69 per acre.* * * Osage orange has been known to produce as high as 2,640 first class posts and 2,272 second class posts per acre, and it is well understood that no posts are better than those of Osage oranges.* * * Red cedar in plantations 25 years old has reached a value of $200.54 per acre. European larch used for fence posts or telephone posts reaches an average value of $200.00 to $300.00. White pine plantations 40 years old have exceeded a value of $300.00 per acre, and it is known that eucalyptus, even when grown for fuel alone, can compete as to profits with oranges." It is hoped that the forestry plantation of the Eastern Illinois State Normal School may serve as a means of presenting some of the possibilities of modern forestry, in addition to serving other educational needs.

In some of the grades topics related to the garden work are used as a basis for nature work during the winter term. A study of soils afforded one class interesting and profitable study. The pupils collected all the kinds of soils that they could find, and examined them with reference to their physical structure, their tendency to "pack", their water holding, percolating, and lifting power. Seeds were planted in the various kinds of soils and the results noted. In the greenhouse during the winter some of the pupils planted

FIGURE 6

seeds in order to grow plants for later use in the garden. Others performed experiments in potting plants and in cutting slips and starting plants from them. The greenhouse also affords a constant supply of growing plants of a great variety of kinds, for use in the schoolrooms. Its water tanks afford winter supplies of a limited number of illustrations of water plant and animal life.

In addition to agricultural phases of the garden work already described, the following may be mentioned. Experiments have been made in growing alfalfa without soil innoculation, with innoculation, with specially grown bacteria, and with sweet clover soil. The treatment of corn with oil of lemon to prevent injury from corn root aphides resulted in highly instructive comparisons between treated and untreated corn. Indeed, much of the work of the school garden may be classed as elementary agriculture, as has been shown by the preceding discussion.

INTEREST IN THE WORK.—There has been an attitude of constantly increasing anticipation and enjoyment on the part of the children who have done this work. It is looked upon as a regular part of the school work. In addition to the regular school time given to it, however, most of the pupils plan to give time outside of school hours, and some of them may usually be found working in the garden before and after school hours with great enjoyment. Some of the teachers' interest has led them to take their places with the children in assuming the responsibilities of caring for a garden. Probably the best display of garden vegetables yet grown in this garden was grown by a lady teacher who planned and grew a bed of vegetables so artistically arranged as to attract the attention of all.

One of the best results of this work is found in the interest it has developed on the part of the parents. It is a common sight to see a boy or girl taking the father and

mother to see the garden. The pride with which a child exhibits the work of his own hands is commendable as are the results on the parents' part in the way of interest in what the child is doing. Furthermore, a new view of vegetable and flower gardening is had, new plants and arrangments of them are suggested and the homes year by year show the result of the development of a cumulative interest in the use of plants in making the premises more beautiful.

One of the most important relations that the garden bears to natural history work in general exists in the opportunity it presents for organizing a considerable part of the materials of natural history. The unorganizedness and indefiniteness of nature study work have had much to do with bringing about the inaccurate and inconsequential results that have so justly brought nature study into ill repute. From the preceding it is evident that there are gathered about the garden in a rather coherent way, many important nature materials. It has been shown that when the materials are so arranged they are interesting, instructive, practicable and profitable. Obviously the consecutive work demanded by successful gardening, constant exposure to a given line of nature materials, constant thought about the things that must be done to produce a bed of flowering plants, or a bed of vegetables, and to prevent undesirable plants and animals from thriving, does offer a plan of organization of certain nature studies in an excellent way.

It offers, furthermore, an introduction to nature first through economic plants, the ones best known and most closely associated with the home and with social life.

While the work here described has been successful and has become an important part of the work of the practice school, it is not believed that the garden may be looked upon as the solution of the nature study problem. It is but one factor in the solution. It cannot cure all nature study ills. Pos-

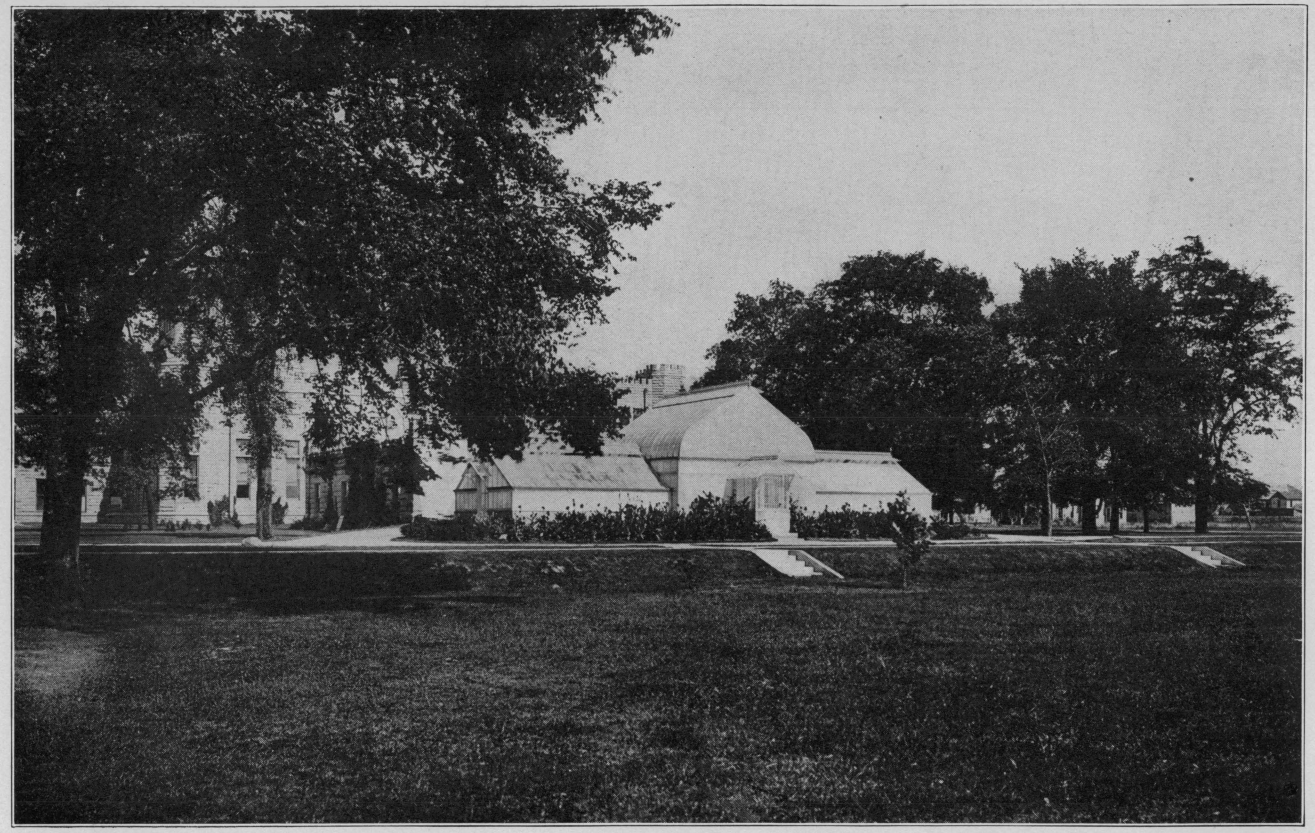

FIGURE 7

sibly some of them are incurable. In many sections of the country climatic conditions during school months do not permit much to be done with gardens. In some places where the climate is favorable other factors render it impracticable to attempt such work. Associated with the idea are numerous unsolved problems, which if unrecognized may bring failure. The kind of work needed or possible in one region may be totally unadapted to another region or another system of schools.

But if properly managed, the school garden may do much for the boys and girls and for their community. It should help to maintain that inborn interest in nature which so often is dulled almost to uselessness by a formal bookish scheme of education. It should help the pupil toward an appreciation of plants and animals of the earth, and of agriculture as the source of wealth. It should teach industry, economy of time, space, and material. It should teach the ability to adapt the means at hand to the performance of a definite piece of work. It should be the way through which pupils approach some of the fundamental laws of biology. It should help much toward an appreciation of the beautiful.

FIGURE 8

FIGURE 9

FIGURE 10

EXPLANATION OF PICTURES

FIGURE 1.

Sixth grade pupils and their work in May of the first year of the garden experiment. This view shows less than one fourth of the area of the entire garden, and gives an idea of the kind of region in which the garden lies.

FIGURE 2.

One of the 1907 gardens belonging to a pupil in the fourth grade is shown in the right hand forward portion of this picture. It is divided into a vegetable and a flower garden. The general view gives an idea as to the variety of things that is grown in the different gardens.

FIGURE 3.

A corner of the section of the gardens belonging to the eighth grade in 1907. The one shown in front at the left has grown onions and lettuce, back of it is a bed of petunias, and back of it is a bed of radishes "going to seed."

FIGURE 4.

A part of the sixth grade garden section, 1907, taken especially to show the garden of Indian corn. These four rows of corn were planted with seed from the same ear, but the seed planted in the two rows at the left was treated with oil of lemon to prevent growth on the roots of the aphides. During growth, aphides were found on the roots of the corn in the two right hand rows.

FIGURE 5.

A group of sixth grade "economic" gardens, 1907. The first of the row of three at the left contains flax, the second millet, the third broom corn; at the right of the broom corn is rape. Beds of alfalfa that do not show in the picture are on each side of the bed of Indian corn in the rear. This picture also gives an idea of garden border in the background, as well as of some of the flower gardens.

FIGURE 6.

One fourth grade boy's garden crop grown in 1903, consisting of sugar beets, peanuts, and one "table" beet. In the background is shown the first grade's nasturtium and gourd bed.

FIGURE 7.

The green house in which a limited amount of winter garden and nature work is done.

FIGURE 8.

Pond life adjacent to the garden.

FIGURE 9.

A general view of a section of the forestry plantation. At the right is the blue spruce, back of which is the white ash. At the left is the white pine, back of which is the green ash.

FIGURE 10.

The hardy catalpa, at the left of which a small amount of the Russian Mulberry section is shown. These trees were planted four years ago from four year old stock.