OREGON AGRICULTURAL COLLEGE
EXTENSION SERVICE

SCHOOL AND HOME GARDENING FOR
ELEMENTARY SCHOOLS IN OREGON

BY

M. O. EVANS, JR.

The bulletins of the Oregon Agricultural College are sent free to all residents of Oregon who request them.
The Extension Service of the Oregon Agricultural College embraces all instructional work done by the College staff outside the institution. This includes institute, lecture, and fair work in all its varied phases, supervision of the county demonstration and farm work provided for by state legislation; correspondence courses; preparation of educative exhibits; publication of bulletins and distribution of news matter; cooperative work with granges, farmers' unions, schools, churches, commercial clubs, and other progressive organizations in the promotion of industrial and social enterprises. The Extension Service, in short, consists of carrying out to the people of Oregon practical and usable information on all subjects taught at the College.

Applications for assistance along any of the lines indicated, together with all particulars relating thereto, should be sent to the Director of Extension as far in advance as possible. It is the desire of the College to help all who apply, but its staff, facilities, and funds are limited; consequently, short-notice requests may not find the department in position to render the best service.

Particular attention is called to the fact that counties desiring to organize for agricultural field and demonstration work, under the provisions of Chapter 110, Laws of 1913, must make an initial appropriation in order to secure the State aid. Those interested in promoting this work should communicate with the Director of Extension, or the State Leader, at the Agricultural College, with reference to the best methods of procedure.

To the Teachers of Oregon:

The school garden work has been so attractively and yet so definitely planned in this pamphlet, that I take pleasure in recommending it to you as your guide for that work. Every Industrial Club undertaking the Garden Contest should use the pamphlet as a basis for study, and all pupils interested in school and home gardens should be made familiar with its contents.

Very respectfully,

J. A. Churchill
Superintendent Public Instruction

November 11, 1914.
"In every school and community there should be at least one teacher who knows gardening, both theoretically and practically. This teacher should teach the elementary sciences in the schools during the school-hours and should, out of school-hours, direct the home gardening of the children between the ages of seven or eight and fourteen or fifteen. If possible, the teacher should have the assistance of an expert gardener, so that the work may be done in the most practical and profitable way. The teacher and the gardener should help the children find the plots of ground in back yards, front yards, and vacant lots near their homes best suited for gardening work, aid them by some cooperative method to have the lots properly plowed and prepared for cultivation, help them select seeds, show them how to plant, cultivate, and harvest, so as to obtain the best results.

"It is difficult to estimate the results of this plan when it shall be in full operation throughout the country. For the children it will mean health, strength, joy in work, habits of industry, an understanding of the value of money, as measured in terms of labor, and such knowledge of the phenomena and forces of Nature as must be had for an understanding of most of their school lessons. They will also learn something at least of the fundamental principles of morality; that each individual must make his or her own living; must, by some kind of labor of head, hand, or heart, contribute to the common wealth as much as he takes from it; must pay for what he gets in some kind of coin.

"Probably one of the most valuable results of this plan would be to make it easy for most children to attend school three or four years longer than they now do, a thing more and more desirable, since education for life and citizenship in our industrial, civic, and social democracy can not be obtained before the age of adolescence.

"If a child can contribute to its support while in school, it may remain in school much longer than if it must be carried as a dead weight until it quits school to go to work."

Dr. P. P. Claxton,
U. S. Commissioner of Education.
INTRODUCTION.

The purpose of this bulletin is to encourage school and home gardening among grammar grade pupils of the public schools, in the cities and towns of Oregon outside of Portland. The work in Portland has been so uniformly successful and productive of tangible results that there seems to be no reason why similar work cannot be done in other places. Among other benefits, it should prove a great stimulus to the Boys' and Girls' Industrial Club Work in Vegetable Growing.

In a great majority of the cities and towns of Oregon, climate and soil conditions are not so very much different from those found in Portland, except in the high plateau sections of Eastern and Central Oregon. Provided an early start is made, it is not a difficult matter to mature most early vegetables by the middle of June except in those cities and towns situated in the Eastern and Central portions of the State. The soil should be entirely prepared and ready for planting not later than April first. It is advisable to have it ready before that time, if possible, as many things can be planted in March, if the weather is favorable. This is often the case, and although early, warm weather is usually followed by a cold, wet spell, if the seed has had time to germinate before the mild weather is over, the plants will make considerable progress and generally keep ahead of later plantings. It is a very good plan to continue the garden work during the summer with those children who have the time and are willing to work a few hours each week. If beneficial results are to be obtained, however, there must be some older person familiar with gardening who will give time each week to supervising the work.

This bulletin is not issued as a textbook on gardening or nature-study. With the exception of contributions from Professor G. F. Sykes on Birds, and Assistant Professor A. L. Lovett on Treatment of Crop Pests, it is simply a collection of suggestions for beginners in school and home gardening. It is in no sense theoretical, but is based entirely upon the experience of the writer while Director and Supervisor of School and Home Garden Work in Portland, Oregon, during the seasons of 1913 and 1914 which was preceded by courses in Vegetable Gardening given at the Oregon Agricultural College by Prof. A. G. Bouquet, and previous home gardening for pleasure and profit. The illustrations in this bulletin were made from photographs taken by G. S. Crego of Portland, Oregon. All photographs and diagrams are for 1914 except Figure 12 and the frontispiece.

M. O. EVANS, Jr.,
Assistant State Leader
Extension Service
Oregon Agricultural College,
Corvallis, Oregon.
THE SCHOOL PUPIL AND THE GARDEN.

Influence of Gardening Beneficial. It is an accepted fact that gardening, if properly conducted, is a legitimate and profitable part of school activities. Many pupils, ordinarily indifferent to study and wasteful of time in the class room, get their lessons with alacrity if they are given school periods two or three times a week to do garden work, the penalty for poor lessons being the loss of such privileges. High school students, except those studying agriculture, do not generally take as much interest in the home or school garden as the pupils of the grades. They have too many other things to occupy their attention.

School Time for Garden Work. The writer is a firm believer in giving school time for gardening, especially where a large majority of the pupils in a room wish to engage in this work. After the ground is prepared and planted, two or three hours a week is usually sufficient to keep a school garden plot in good condition. The work should be done under the direction of the teacher. In cases where a minority only in a room wish to engage in the work, it is better to have it done mostly outside of school hours. As a reward for faithful work, it is a very good plan, however, to allow an hour from time to time to pupils who keep up in their studies.

Supervision. Pupils in general need considerable supervision, especially the first year they attempt gardening. Even then, they are quite sure to make mistakes from which they will profit the next season. There are several critical stages when special attention should be given them.

1. Preparing ground—all clods well pulverized.
2. Laying out beds and paths—straight and uniform.
3. Planting—rows straight—usual tendency to waste seed badly.
5. Thinning. Nearly all children fail to thin sufficiently.
6. Almost universal desire to water too often.
7. Cultivation—thorough stirring of ground as soon after rain or watering as it can be worked.

Several inspection trips should be made to the home gardens during the season by the teacher or a committee of other interested persons.

School or Home Gardens—Which?—Both. The ideal arrangement is a school garden supplemented by a home garden. The former is then in reality an experimental, and object-lesson garden, where each pupil, tilling a small plot, may learn how and why in order that he may operate at home on a larger scale.

Where the school grounds are large enough to afford a suitable area for a school garden, it is generally better to use them. The garden can then be made more of a permanent institution, and can be developed into a thing of beauty by the laying out of permanent flower beds set with perennial plants. Unfortunately, a great many school buildings have barely enough ground around them to provide suitable playgrounds, to say nothing of providing space for a garden. In such cases, vacant lots can usually be secured within a distance of from one to five blocks from the school building. It is always preferable to have the garden as close to the school as possible. The nearest vacant lots available should be chosen, unless the soil or drainage is very poor. One-quarter mile from the school house is about the limit in distance for a successful school garden. A small garden across the street, or a block away, receives much
better attention than one four or five blocks distant. All gardens should be well fenced, if possible. The fencing need not be expensive, as the manual training classes of the high school can do the work in case there is no manual training in the grammar grades.

Size of Garden and Individual Plots. A very nice little school garden can be made on a single lot 50 x 100 feet, or even less. A mistake may easily be made, in fact, in attempting to use too much ground. The average boy or girl in the fourth, fifth, or sixth grade does not need a larger plot than 5 or 6 by 10 or 12 feet, even if plenty of ground is available, and can get along very nicely with one 5 x 8 feet. Pupils in the grades above the sixth can usually handle a plot equivalent to 6 x 15, or 7 x 12 feet. Of course, pupils especially interested and energetic can handle a great deal more than the amounts specified, but for the average pupil these are sufficient.

Whether or not to include the smaller children of the first, second, and third grades is largely a matter for the teacher to decide. If she is interested, and willing to be with the children during most of the time that they spend in the garden, it is advisable to let them in. They greatly enjoy the work and are very energetic, often much more so than some of the older pupils. Unless closely watched, however, they do not get very much benefit from the work, and often do damage by pulling up the young plants with the weeds. If they are included, they should have a section in the rear, divided into long, narrow beds, in which each has a few square feet, or, if the space is limited, only two or three rows.

The forty-three Portland school gardens of 1914 varied in size from 40 x 50 feet to 2 acres, averaging about 100 x 150 feet, covering a total area of nearly 16 acres. Eight thousand one hundred pupils participated. There were about 3500 home gardens.

Class Room Instruction. Considerable valuable preliminary instruction may be given in the class room before taking the pupils into the garden. Seeds may be studied and short exercises written concerning a given vegetable and its uses, together with drawings of the seed and its matured product. Reasons for different operations may be explained and graphically illustrated on the blackboard. Examples—First. The reasons for finely pulverizing the seed bed. In order that many small particles of soil may come in close contact with the seed and its plant. That air
and moisture may be more uniformly distributed and rendered available for plant growth. Second. Reasons for planting rows north and south. In order that the warmth of the sun's rays may be more evenly distributed, striking the east side of the row in the forenoon, and the west side in the afternoon. Third. Prospective plans for both school garden plots and home gardens, together with planting schemes, should be worked out in the school room so that the pupils may at least have an idea what they are going to do when work starts outside.

Germination Tests of Seeds. In every case where a pupil is planning to grow any considerable amount of a certain vegetable or where the seeds for a school garden are purchased in bulk, germination tests should be made to ascertain the percentage of good seeds. It is difficult to make a hard and fast rule regarding the percentage which should germinate. If a considerable per cent fail to sprout, however, an attempt should be made to get better seeds. Tests may be made in sand or between damp pieces of blotting paper kept in a warm temperature.

PLANS AND ARRANGEMENT.

Types of School Gardens to Choose From. It matters not whether the area of ground to be cultivated is large or small. In either case, a choice between two entirely different plans of arrangement may be made, or a combination of the two may be used. First—A system of beds and walks. Second—A system of long, straight rows such as those for corn or potatoes when planted in a farm field. The first is the generally accepted type for school gardens, but the writer has tried out the second plan sufficiently to consider it very feasible for school garden work with certain crops. The first plan is the best where a relatively large number of pupils are participating, and where it is desired to grow mostly early crops such as radishes, lettuce, green onions, turnips, beets, peas, etc. Such a garden is without doubt the most attractive, if it is nicely laid out and the paths kept clean. It requires much more labor to make a garden of this sort, however, and much more labor to keep it looking well. If the ground is to be available for permanent use, or at least for several seasons, the beds may be spaded after the first or second year, thus saving a considerable amount of time early in the spring when every day counts. It has been well proved, however, in the opinion of the writer, that much better gardens will result where the ground is plowed at least every two years rather than spaded continually.

Fig. 2. Shattuck School Garden, June 18.
The second plan is desirable if the pupils are interested in selecting a few varieties and in growing them in marketable quantities, for example, corn—sweet, field, or popcorn—, potatoes, beans, or cabbage. The same area of ground can be more easily handled by a smaller number of workers. A large part of the work can be done with wheel-hoe and cultivator; work with these tools seems to be much more attractive to the average juvenile than labor with the old time-honored hand-hoe or rake. If a crop of late potatoes, corn, or shell beans is grown, which requires the whole season in which to mature, a very few boys or girls can take charge during the vacation in return for the crop. Where it is decided to have a garden of this sort, the pupils can raise the early, and more easily grown, vegetables at home.

**Grouping of Plots.** The writer does not favor a plan whereby every little individual plot is surrounded by walks on all four sides. The chief objection to this is the rapidity with which a small area of loose earth loses moisture when entirely surrounded by a hard packed surface. It is better to lay off beds which will accommodate two, four, or even six pupils. Unless the soil is very light with sand or gravel predominating, a long, narrow bed not less than 6 feet wide, nor more than 8 feet, is preferable. This can be anywhere from 16 to 24 feet long, or even longer, and can be divided into two, three, or four plots, according to the size and energy of the pupil. Where sand or gravel does not predominate, it is well to lay off a bed 10 or 12 feet wide, and anywhere from 16 to 40 feet long, divided into four or six plots. Several plans for laying out different areas of ground are shown in Figures 1-7.

Except in cases where the soil is very heavy and hard to drain, a low bed, raised only 3 or 4 inches above the level of the path, is preferable. They do not dry out so easily, and are much easier to construct.

**Systems of Planting.** Where a garden is nicely laid out, a uniform planting system may be used if desired. By this method the same kind of vegetable is planted in the same row in each bed the whole length or width of the garden. For examples of uniform planting systems, see Figures 5 and 6. The points in favor of this system are, first, it gives a
more symmetrical appearance to the garden; second, a large number of children can be supervised in a much shorter time by lining them all up at their respective plots and having each child plant the same kind of seed at the same time.

This system of planting has been objected to on the ground that it curbs the initiative of the pupil by making him do the same as all the others do. A uniform system is not necessary; but it is advisable to have every pupil plant his rows in the same general direction. Other systems which may be used to advantage are: (1) a whole bed planted to one variety of vegetable; (2) a whole bed given over to two varieties, each occupying a solid half. With the first of these the garden may be divided into different sections, each one of which is given over entirely to the planting of one kind of vegetable.

Whatever system of planting is followed, one thing should be insisted upon. Every pupil participating should be required to plant his garden at the same time as every other pupil. A school garden where many pupils are growing the same kinds of vegetables will never make a fine uniform appearance, no matter what system of planting is used, unless the entire garden is planted at about the same time.

GROUND PREPARATION AND FERTILIZERS.

An early Start Very Essential. The one important reason for issuing this bulletin before the early part of 1915 is to impress upon all teachers and pupils, who expect to do garden work next season, the necessity of a thorough preparation of their ground. This applies to home plots, as well as larger areas, which are to be used for school gardens. All ground which is to be used for garden purposes in 1915 should receive a liberal dressing of manure, and be plowed before January 1, the only exception being where the soil has been liberally fertilized and cultivated for several years. There are many home plots, of course, which have been kept in a high state of fertility, but few of the vacant lots or school grounds have

Fig. 4. Clinton Kelly School Garden June 17,
ever had enough to do them any good. It is not likely there is a town in this State where it will be found impossible to procure a few loads of good manure at a reasonable price. This should by all means be applied and turned under by January 1. Do not delay. If you intend to have a garden next year, get busy at once.

**Commercial Fertilizers.** Applications of commercial fertilizers just before planting, or during the growing season, are all right, but they are expensive, and as a rule will not be needed if the ground is well manured in the Fall, and the manure is plowed under. Do not leave it lying on the top of the ground any longer than is absolutely necessary. If you do, a lot of the best part may be washed away by the rains. There is little danger that too much manure will be used if it is applied before January first. Forty tons to the acre is a good liberal dressing, but not too much for ground previously unfertilized.

**Treatment of Sod Grounds.** All sod ground should be plowed or spaded in the Fall. Sod needs several months in which to decay and settle. Larger areas than a small home plot should be well cut up with a disk harrow before they are plowed, if it is possible to secure a disk. A second disk ing and plowing in early spring, followed by a third disk ing and a thorough application of a drag harrow, and combination clod masher and leveller, is often necessary before a piece of sod land is in the best condition to be worked by children. In the preparation of any ground for children's gardens, one thing must be constantly borne in mind, if the best results are to be obtained. The soil must be worked into as fine a condition as possible, or about twice as much work should be expended as would ordinarily be done in preparation for a grown person's garden. Even then, the youngster will have plenty of exercise getting it in shape to plant.

**Lime.** Most Western Oregon soils are acid and need lime, with the possible exception of parts of Jackson and Josephine counties. Eastern Oregon soils are for the most part well supplied with lime. The writer does not mean to give any one the impression that a good garden cannot be grown without lime, but in nearly every case a great deal better one can be grown following the use of it. Lime corrects acidity, sweetens the soil, liberates plant food, and aids materially in keeping down the pests which usually infest the garden. Burnt lime, or quick lime, should be applied at the rate of about three-fourths of a ton to the acre. Air
slacked lime, or ground limestone, should be applied at the rate of approximately 2 tons to the acre. Where the garden is used permanently an application as above stated will not be needed oftener than every third or fourth year. The time of applying varies with the form used. The first three kinds mentioned are more quickly available than the ground limestone, and may be safely applied at the time of final harrowing or raking. Ground limestone should be applied somewhat earlier.

**Land Plaster.** Land plaster, or gypsum, is a sulphate of lime, not a carbonate, and has no power to correct acidity. It may be considered a soil stimulant as it tends to liberate potash in the soil. A small application often gives good results temporarily, but its continued use will do a piece of land more harm than good.

**Wood Ashes.** Wood ashes so common in Oregon are very much worth saving. They should be kept dry until spread upon the soil as the most valuable parts are very easily leached out. Our ordinary soft wood ashes are not as valuable as those from hard wood, but they do contain a considerable quantity of plant food and lime. According to many analyses, made by Prof. H. V. Tartar, chief chemist of the Oregon Experiment Station, soft wood ashes from wood ordinarily used for fuel in Oregon, contain approximately 30 per cent lime, 5 per cent potash, and 2 per cent phosphorous. Ashes are especially valuable to lighten heavy clay soils, and may be used in any amount available up to two tons an acre. If a considerable quantity is used the amount of lime can be reduced or entirely dispensed with.

**Acid Soils.** Acidity in soils is caused by the decay of organic matter. Unless sufficient lime is present to neutralize this acid, it will accumulate and produce a sour condition. The easiest way to test a soil for acidity is with a small piece of blue litmus paper, which can be obtained at drug stores. Allow the paper to remain for five or six minutes in damp, closely packed soil. If the paper turns pink, the soil is acid.

**HOME GARDENS.**

**Size.** All pupils should have a garden at home whether or not they have plots in a school garden. Even if the space is very limited, it is better than none at all. If ground is available, any healthy boy or girl, from seven to nine years of age, can care for a garden containing at least

![Fig. 6. Rose City Park School Garden June 17.](image-url)
100 square feet, for example, a plot 10 x 10, or 5 x 20. The Industrial Club Project requirement of at least 1 square rod, is not at all excessive for boys or girls from nine to eighteen. The ten year old Portland boy, whose picture is shown in Figure 15 of this bulletin, has cultivated a piece of ground 60 x 100 feet entirely by himself for the past two seasons. Children should make their own plans for their home gardens, keeping in mind a few general rules, most of which are covered in the following section.

DONT'S FOR YOUNG GARDENERS.

1. Don't fail to make your beds level.
2. Don't plant your seed too deep. Carefully follow directions.
3. Don't try to grow too many different kinds of vegetables on a small plot.
4. Don't plant tall-growing vegetables where they will shade the low-growing ones.
5. Don't fail to make your rows straight. Use a planting board, heavy twine, or both.
6. Don't plant your seeds too thick. You will only waste them and make more thinning necessary.
7. Don't be in too great a hurry to plant your seed. You will gain time by thoroughly pulverizing the soil before planting.
8. Don't be afraid to thin out the young plants. It is better to waste three-fourths of them, if necessary, and give the other one-fourth a chance to grow.
9. Don't water your garden every time it looks a little dry on top. Even in dry weather a good soaking every third evening will be sufficient. Frequent applications of water cause the little roots to stay near the surface where they quickly dry out when the hot weather comes on.
PLANTING DIRECTIONS.

Varieties. So many different varieties of seed of every kind of vegetable are on sale that the writer does not feel like suggesting certain varieties which should be planted to the exclusion of others. Very often some new or little-known variety gives very good results indeed. Suggestions along this line will therefore be dismissed with the caution to plant only early varieties in gardens which you do not expect to care for after school is out in June.

**Radishes**—Plant in rows 6 to 8 inches apart, one or two seeds to the inch. Cover seed \( \frac{1}{4} \) inch.

**Lettuce**—Plant in rows 10 to 12 inches apart, one or two seeds to the inch. Cover seed \( \frac{1}{2} \) inch. To grow specimen plants set them 12 to 14 inches apart.

**Beets**—Plant in rows 12 to 15 inches apart, one seed to the inch. Cover \( \frac{1}{2} \) inch. Thin to 4 or 5 inches apart.

**Turnips**—Plant in rows 15 to 18 inches apart, one or two seeds to the inch. Cover seed \( \frac{3}{4} \) inch. Thin plants to at least 6 inches in the row.

**Carrots**—Plant in rows 12 to 15 inches apart, one or two seeds to the inch. Cover seed \( \frac{3}{4} \) inch. Thin plants to 4 or 5 inches apart.

**Cabbage and Cauliflower**—In order to mature early varieties by June, start plants in hotbed or indoors. Set early varieties 18 inches apart—later varieties, 24 inches.

**Onions**—If early green onions are desired, plant sets 3 or 4 inches deep. If dry bulbs are desired, plant 1 to 1\( \frac{1}{2} \) inches deep. One pound will plant a 25 foot row. If it is not desired to harvest the crop until Fall, seed may be used.

Fig. 8. Home Garden of Gordon Wiltshire, age 14, Hoffman School, 1st prize winner—City-wide contest, Class A. Pupils 13 yrs. of age or over.
Potatoes—Plant in rows 24 inches apart, placing two eyes every foot, or in the hills 18 inches apart with 4 eyes to the hill.

Peas—Plant the dwarf kinds in rows 18 inches apart; tall, late varieties, 24 to 30 inches apart. Plant seed 2 inches apart. Cover 2 inches deep. Vines should be thinned to one about every 4 inches in the row.

Especially for Home Gardens. Generally it will not be found advisable to attempt to grow those classes of vegetables in the school gardens which take up a large amount of room, or require the full season to mature, unless, as previously stated, it is decided to adopt a straight row plan for a garden, limiting the number of varieties to a few. Field corn, pumpkins, cucumbers, celery, squash, melons, etc. are much better for the home garden than for a school garden which is divided into a large number of plots.

Pole Beans—Plant in hills 3 x 4 feet. Drop four or five beans in each hill and set poles at time of planting. Cover 2 inches.

Beans (dwarf, snap, or green shell)—Plant in rows 18 inches apart. Drop seeds 3 to 4 inches apart in row. Cover 2 inches.

Corn—(sweet, pop, or field)—Plant in rows 3 feet apart. Drop 3 or 4 kernels every 15 inches, thin to one stalk, or plant in hills 2½ or 3 feet apart each way. Drop 5 to 6 kernels, no two being nearer than 2 inches. Cover 2 inches deep; thin to not more than 2 stalks in the hill.

Tomatoes—Set plants about 4 feet each way. Procure stakes about 4 feet high; set firmly and tie each plant to stake. Keep them tied up. When they reach a height of 3 to 4 feet, pinch off the tops. Except in Southern Oregon it is not safe to set plants in the ground before May 5 to 10.

**SALES AND RECORDS.**

Marketing. The marketing of the output of pupil’s vegetable gardens is a very important matter. Even in small towns enterprising children can make money selling their vegetables. Parents are often willing to buy their children’s products at market prices, thereby greatly encouraging
the child as well as procuring fresh vegetables immediately when wanted. Several Portland boys sold their parents over $20 worth of vegetables during the summer of 1914. Others sold nearly as much at the public markets or to customers near their homes. Altogether, Portland school pupils sold nearly $400 worth of vegetables last season.

One of the most interesting and instructive features of the home garden work should be a complete record, accurately kept with regard to the dates of various operations, amounts of fertilizer used, cost, number of hours of labor expended by the gardener, items and dates of produce sold, etc. The children should count their own labor in the costs at 10 cents an hour. Following is one boy's record kept according to instructions. Ten complete reports similar to this were sent to the Department of Agriculture at Washington, and received much praise from the officials.

PORTLAND, OREGON PUBLIC SCHOOLS

Home Garden Report

(Original blank filed with the Office of Farm Management, United States Department of Agriculture.)

Name   Emery C. Ingham, Age 14 years.
Address 1181-55th Ave. S. E.
School Woodstock

1. Area of garden. Total—1400 sq. ft. $ 1.00
2. Preparation of seed bed (10 hours' labor at 10c per hr.) .75
3. Cost of seed and plants .20
4. Cost of planting (labor at 10c per hour) 1.50
5. Cost of manure and commercial fertilizer .90
6. Cost of cultivation (labor at 10c per hour) .30
7. Cost of gathering vegetables 1.25
8. Cost of marketing the crop

Total $ 5.90

Fig. 10. Stephens School Pop Corn Garden July 27. This 1-5 acre field yielded at rate of 70 bushels per acre finely matured white rice pop corn.
Fig. 11. Thompson School Garden. Name formed of loose leaf lettuce and beets.

Garden Receipts.

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<th>Amount</th>
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<tr>
<td>10.</td>
<td>Receipt from fresh vegetables sold at Public Market</td>
<td>$13.50</td>
</tr>
<tr>
<td>11.</td>
<td>Kale, and sunflower seeds, for chicken feed</td>
<td>7.00</td>
</tr>
<tr>
<td>12.</td>
<td>Value of vegetables used at home</td>
<td>3.50</td>
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<td></td>
<td>Total receipts</td>
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Notes.

In preparing the soil I used a great deal of air slacked lime to keep the insects out of my garden, and especially out of the radishes.

I raised, onions, radishes, lettuce, cabbage, and beets; also kale and sunflower seeds for chicken feed.

I had success with everything until in August, when the army worms ate up several heads of lettuce and all of my late cabbage. I did not use any sprays, and watered my garden very little.

I have saved some kale, radish, lettuce, and onion seed for next season.

EMERY C. INGHAM.

FLOWER BEDS AND EXPERIMENTAL PLOTS.

Decoration. Flower beds always help greatly to make a garden attractive. They may be placed at the corners, in the center, as borders or dividing lines. It does not matter, provided only they are well planned and arranged. Where the ground can be used for several seasons many pretty effects can be worked out with biennial or perennial plants, but where the ground can only be had temporarily it does not pay to spend much money on decoration. In such cases, much in the way of beautifying may be accomplished by the dwarf or climbing nasturtiums. These are about the only flowers which, planted from seed in the spring, will bloom in profusion by June. The seed should be planted as soon as the weather permits, first having been soaked for a few hours. A sweet
pea hedge is a fine addition to a permanent garden, but the seeds must be planted in the Fall if the vines are to bloom before the close of school. For the spelling of the school name, English daisy plants do nicely, and are good for two or three years if well cared for. Where no considerable number of flowering plants are available, loose-leaf lettuce (variety, Grand Rapids) and beets afford an inexpensive material for working out letters and designs.

**Experimental and Industrial Gardens.** One of the most instructive features of the school garden should be a row of experimental plats where small areas or a very few rows of many different plants are grown. An Industrial section should be planted, containing samples of the many different crops used for manufacturing purposes, and for feeding animals. Such a section is a fine object lesson, for when pupils see plants growing they obtain lasting impressions of characteristics and remember their uses far better than from merely reading or seeing pictures. Nearly every crop produced commercially in any part of the United States can be grown large enough to give an idea of the appearance of the growing plant even though it may not mature in our climate.

**EXHIBITS, COMPETITION AND PRIZES.**

**Vegetable Exhibits.** The writer is inclined to discourage June exhibits of vegetables unless a sale can be held immediately afterward, for otherwise a large amount of more or less immature produce is usually wasted. In preparing vegetable exhibits for the school fairs and regular county fairs, pupils should always remember the following points:

1. Exhibit only clean produce.
2. Do not mix varieties in any display of one kind of vegetable.
3. Carefully follow premium list requirements as to number of specimens to be judged.
4. Select only marketable sized vegetables, for all exhibits, except where the largest specimen is called for.

**Competition and Prizes.** Competition in both home and school gardening is a great stimulus, but I do not favor the idea of an individual pupil or a whole room taking up gardening simply to win a prize. It is well to aspire to first place, but this should not be the only object. Prizes, when offered, should be something useful, preferably garden tools or young animals. In towns or cities having more than one grammar school, a healthy rivalry may be developed by offering a large pennant for the best school garden. The same plan is also feasible to promote interest between the pupils of different rooms having sections in the same school garden.

Some sort of local contest will be found very desirable in each district. A good plan is for the Parent-Teacher circles or other interested persons to provide prizes for the best home gardens in the district, the best plots in the school garden, and for the largest amount of a certain vegetable raised upon a given area of ground.

**CONTROL OF GARDEN PESTS.**

The following instructions for combatting pests in children's home and school gardens have been especially prepared by Assistant Professor A. L. Lovett, crop expert of the Oregon Agricultural College.

**Cut Worms.** I think there is nothing better for cut worms than the regular poison bran mash,—2 lbs. bran, 1 ounce paris green, 2 ounces sugar. Dissolve in water with a tablespoonful of salt. Add sufficient warm water to make a coarse crumbly mash. Place a heaping tablespoonful of this about each plant. Be sure and not get the mash sloppy as it will injure plants if it packs.

**Plant Lice and Similar Sucking Insects.** Use 1 lb. of whale oil soap to one gallon of water. First dissolve the soap in 1 gal. of boiling water, then remove from fire and dilute.

**Leaf-eating Insects and Worms.** Make a dust of cheap flour, 20 parts, and paris green 1 part. Mix thoroughly and place in coarse salt sacks.
By shaking these sacks over the plants in the early morning while the dew is on, the dust will stick to the plants and protect them.

**Cabbage and Radish Maggots.** (Small, dirty, whitish maggots which infest the roots of cabbage, cauliflower, radishes and turnips.) Prepare a powder, sulphur 5 parts, tobacco dust 1 part. Treat seed trench with this powder when sowing radish and turnip seed. Treating surface soil about growing radishes and turnips with a lime carbolic solution will repel many of the maggots. This solution is prepared as follows: Slack rock lime and dilute to the consistency of whitewash. To 1 gal. of water add 3 pints of this whitewash, and 1 tablespoonful of crude carbolic acid. Mix well, and apply to the surface soil with a sprinkler. Repeat the treatment every 10 days. When cabbage or cauliflower are set out, cut little tarred paper disks measuring 2½ inches in diameter with a slit running through the center. Bend these disks to open slit, and slip over the stem of the young plant, working them down flush with the surface soil. Where plants are already infested use carbolic acid emulsion. This is prepared as follows: 1 pint crude carbolic acid, 1 lb. whale oil soap, 1 gal. water. Dissolve soap in boiling water, remove from fire and add crude carbolic acid with vigorous stirring. Stir vigorously until a perfect emulsion is formed. For use, dilute to 1 part of stock solution to 38 parts of water. Pour about infested plants.

**Garden Slugs.** (Soft, slimy, snail-like creatures which attack practically all garden crops.) Use poison bran mash described under cut worms. Use dust recommended for leaf-eating insects. To 1 quart of bacon grease, add 1 level teaspoonful of arsenate of lead. Dip lettuce or cabbage leaves in this material and place about the garden. Place shingles, or bits of burlap about the field. Visit in the early morning and destroy all slugs.

**Corn Ear Worms.** (Large, greasy, hairless cutworms, which feed in the tip of the ear of corn.) Spray the silks of the corn with lead arsenate.
paste, 3 ounces to 3 gallons of water. Repeat the treatment in 10 days. This treatment must be given as soon as the silk is out well to be effective.

BIRD VISITORS TO OUR GARDENS.

The following information on birds is contributed by Professor G. F. Sykes, of the department of Zoology, Oregon Agricultural College, for the purpose of giving young gardeners an idea of the many different kinds of birds which visit the garden. By studying carefully the following descriptions of appearances and habits, many birds may be identified. All birds described in the following list are more beneficial than harmful to the garden.

The Birds.

Western Robin. Medium; blackish-gray bird, with reddish breast. Song, a melodious trill; call, cheery chirp.

Western Blue Bird. Medium; bright blue bird, with reddish brown belly. Song, "Purity, Purity." Nests in hole of tree or post.

Audubon Warbler. Small; bluish-gray with yellow throat, crown and rump. Song, clear warble, "Chwee, chwee, chwee-ah, chwee." Nests in fir and shade trees.

Their Food.

Cut-worms, earth-worms, canker-worms, moths, leaf-beetles.

Coddling moths, beetles of many sorts.

Plant lice, bugs, apple scales, leaf caterpillars.
Yellow Warbler. Small, olive yellow, with greyish wings. Song, strong lyric warble. Nests in shrubbery and shade trees.

Western Meadow Lark. Medium to large; streaked grey and brown, yellow breast with black crescent. Song, loud bubbling carol. Call note, plaintive "pieu." Nests under tufts of grass.

Rusty Song Sparrow. Small; rusty brown bird streaked with grey. Song, "phee, phee, phee, phou," "fi, fi, fi, phee."

Aphis, inch worms, scales.

Cut-worms, grasshoppers, butterflies, weed seeds.

Tent caterpillars, brown aphis, weed seed.

Fig. 16. Shaver School Garden 44 x 100. Good type for lot 50 x 100 ft. Uniform planting system. Beds 8 x 17 ft. divide into 2 or 4 plots.

Fig. 17. Kerns School Garden 50 x 100 ft. Good type where crowded for space. Outside beds 10 x 20 ft. Inside beds 8 x 20 ft. Each bed provides for 4 pupils. Paths 3 ft. and 2 ft.
Oregon Towhee. Medium; black hood and beak; white belly; reddish sides. Call, "to-wh-e-e." Perches on top of tree; nests in shrubbery or on the ground.


Red Shafted Flicker. Large. Brown barred with white; breast with black crescent; under wings and tail red. Song, "flicker, flicker, flicker."


Rufous Hummingbird. Tiny; scarlet ruff around the neck. Nests in shrubs and vines.

Red Tail Hawk. Very large. Dark brown and barred.

Leaf beetles, grubs, weed seed.

Beetles, weevils, and flies.

Moths, gnats, flies.

Ants, cut-worms, grasshoppers.

Gnats, grasshoppers, moths, ants.

Aphis, small beetles, ants.

Rats, mice, gophers.
Fig. 20. Hudson School Garden 120 x 125 ft. Plan for square area of any size. 9 front rows of beds 8 x 20 ft. Primary annex in rear beds 6 x 20 separated from front part by flower beds 3 ft. wide.

Fig. 21. Buckman School Garden 100 x 100. Plan for square area of any size. Uniform planting system. Beds 7 x 22 ft. providing 2 plots each 7 x 11 ft. Paths 2 ft. wide.

Fig. 22. Davis School Garden 90 x 206 ft. Plan for long narrow garden. Beds 12 x 16 ft. providing 2 or 4 plots each. Double row flower beds 3 x 12 ft.