Planning and Adorning the Farmstead and School Grounds

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INTRODUCTION.

The Department of Public Instruction has issued agricultural bulletins for the last two years. During this time a demand has developed for information concerning the planning and adorning of school grounds, homes and farms. When this need became apparent the Department of Public Instruction planned to give the general public a bulletin entitled "Planning and Adorning the Farmstead and School Grounds." This bulletin should be placed at the disposal of the pupils of the seventh and eighth grades and high school pupils of all village and rural schools of the State of Ohio, and in the public libraries where such bulletins are used by people interested in farm and school improvements. The illustrations used in the bulletin are drawn from the best and most practical plans that are available. Also the school plants shown in the bulletin are of different types of the best plants in the state of Ohio at the present time. Many of the illustrations are from original designs and prepared especially for this bulletin. The Department feels especially indebted to Doctor W. J. Green, State Horticulturist, Wooster; and W. E. Bontrager, Foreman of Grounds, Wooster Experiment Station, Wooster, Ohio. Also to all others who have given suggestions and offered criticisms of this work.

FRANK W. MILLER,
Superintendent of Public Instruction.

"The tree planter and teacher united in one shall be declared the best benefactor of modern times,—the chief provider for posterity."

J. STERLING MORTON,
Founder of Arbor Day.

THE SCHOOL GARDEN.

After animals, plants are the objects of greatest interest to children in nature study. The average school environments make it possible to study plants to greater advantage than animals.

The facilities and conveniences for the study of plants are within reach of nearly all schools. The necessary requirements can be easily secured, in most instances, without very great expense.

The increasing interest in agricultural education is making the study of plants a matter of growing importance, and the demand is becoming urgent for definite and practical plans for the establishment of school gardens.

In rural communities where there are no consolidated or centralized schools, it is advisable to encourage the work of making experiments or tests in plats on the home farm.

In the city, village or in the rural community where there is a high school or a consolidated school with sufficient space for lawns, playgrounds, and gardens, there should be a plan for growing shrubs, trees, vines and flowers, in an artistic manner. This should be done in such a way that it will serve a useful purpose in instruction. The school grounds should be an object of beauty, study and inspiration.

1. The primary object of the school is instruction.
2. The work of adorning should be planned and carried out with the two-fold purpose of securing beauty and utility. Trees and shrubbery attract birds and insects and facilitate the study of economic zoology.
3. The school garden may serve a number of purposes, as study, beauty, recreation, practical utility.
4. The school ground should be planned, and the work of planting and beautifying so executed, and the grounds so kept that they will serve as a model for study by the residents of the community.
5. The grounds should be the pride of the school and they should be the outward manifestation of the inner spirit of the school.
6. Artistic beauty will help to win a better school spirit and a closer sympathy among teachers, pupils, parents, and taxpayers.

From the above points we should therefore easily reach the conclusion that this work should not be planned in a haphazard way by inex-

perienced and untrained minds. Every school board should be impressed with the fact that in selecting a school site and planning buildings and grounds, they are dealing with that which may be farreaching in its consequences. It is to become a familiar scene; it will become a landmark; it will form lasting impressions and the pictures of memory. The work of beautifying the grounds should have a plan.

There should be as much care in the selection of the landscape artist and in the execution of his plans as in the selection of an architect and competent workmen for the construction of a school building. No building should ever be placed where there is no room for large and commodious grounds. The grounds are a part of the complete school. A school without grounds is a lame school, and it will make crippled minds.

LOCATION OF BUILDINGS.

School buildings should not be located near the street, nor on busy, noisy thoroughfares. They should be away from smoke and the noise of factories and railroads, as far as possible and practicable.

The primary consideration in the organization of new schools should be location of grounds. Second, the location of the building. The proper order for this work should be:

1. Selection of a proper site.
2. Selection of an area of sufficient size.
3. Planning the school grounds.
4. Plans and location of building.

It is very evident from the many undesirable conditions that may be seen in visiting schools, that the order above given has not been headed. Too often the reverse plan has been followed.

Often the so-called economy of some former school board has added heavy burdens of taxation on those who must abandon undesirable buildings and locations.

Walks and drives of over one hundred feet in length should have curves, so that trees and shrubs along the borders will show better naturalistic effects.

A view from the doors and windows of the school buildings will help to decide the location of the trees. Sights in the distance or in the environment of the building can be retained or obstructed as desired.

There should be a wide variety of the most useful trees that grow in the locality of the school and as many varieties from other parts of the country or other countries as can be grown.

The following list is made up of trees that are found in the public parks and grounds of Ohio.

DECIDUOUS TREES.

White Oak,
Red Oak,
Pin Oak,
Golden Oak,
Chestnut Oak,
Willow Oak,
White Ash,

Japan Catalpa,
White Elm,
Red Elm,
Cottonwood,
Poplar,
Lombardy Poplar,
Sycamore,

Hickory,
Buckeye,
Box Alder,
Locust,
Black Cherry,
Cornelian Cherry,
Purple Birch,

FIGURE NO. 1.

Represents a school ground containing 10 acres. It is in the form of a square and shows an ideal arrangement for trees, shrubs, flowers, lawns, play-grounds and school gardens.

Black Ash,
Prickly Ash,
Mountain Ash,
Mulberry,
Kentucky Coffee Tree,
Ginkgo Tree (Japan),
Tree of Heaven (China),
Japan Varnish Tree,

European Sycamore,
Purple Sycamore,
Catalpa,
Sassafras,
Horse Chestnut,
Walnut (black),
Japanese Walnut,
White Walnut,

Silver Birch,
Red Birch,
Paper Birch,
Larch,
Liquid Amber Tree.
Sugar Maple,
Norway Maple,
Silver Maple,

Beech,	Am. Linden (basswood),	Osage Orange,
Purple Beech,	Willow,	Magnolia,
Weeping Beech,	Persimmon,	Tulip.
European Linden,	Aspen,	

EVERGREEN TREES.

Austrian Pine,	Norway Spruce,	White Fir (Concolor),
White Pine,	Holly (American),	Douglas Fir,
American Hemlock,	Juniper,	Blue-tinted Red Cedar,
Colorado Blue Spruce,		Cypress.

Where there is plenty of space for trees the list of trees may include many other well known varieties. A school ground with a great variety of trees will afford great advantages for teacher and pupil. They will afford an opportunity to study the characteristics of all the trees with which children ought to be familiar.

Among the groups of flowers, vines, shrubs, and trees, there should be some fruit bearing varieties for the attraction of birds.

There is nothing that adds more beauty and charm to the scene than cardinals, jays, robins, woodpeckers, and humming birds flitting about among the gorgeous hues of the landscape.

FIGURE NO. 2.

A home for the birds.

THE NURSERY.

A plat of ground of a fourth of an acre should be reserved in a suitable locality for the nursery. The trees are to be transplanted and may therefore be planted in the plats in rows. The seedlings should be about one foot apart in the row and the rows about two feet apart, running crosswise of the plat.

By this method of planting there may be at least five thousand trees started. The care of these trees can be given to the children in the first three grades. In three years most of these trees can be removed by the children for transplanting on the home grounds.

The following figure will show the arrangement of seedlings in the plat:

This plat may be made four rods wide so that the length of the rows will be 66 feet; and by planting the seedlings 12 inches apart, each row will provide room for 66 trees. If the plat is ten rods long and the rows are placed 2 feet apart, there will be room for 82 rows. The size of the plat may be increased to suit the size of the schools.

Each row of trees should contain fruit trees of the following numbers and kinds:

1. 10 Apple.
2. 10 Cherry.
3. 10 Peach.
4. 10 Plum.
5. 5 Pear.
6. 5 Quince.
7. 2 Mulberry.
8. 2 Crabapple.
9. 2 Sweet Cherry.
10. 10 trees for shade (forest trees).

Of course, this list is only suggestive and only such trees should be started as are adapted to the region.

The school gardens that have been established, have for the most part been devoted to the growing of common vegetables and flowering plants.

It is already evident that a school garden that is planned for the only purpose of growing a few annual plants for the immediate use of the home will encounter certain difficulties, that will make the work unsatisfactory, for the following reasons:

1. Most plants of the vegetable type for table use mature or reach the most interesting stage of their career at a time when schools are closed.
2. After the plants have been removed there is nothing left in tangible form for study.
3. The instruction given and the knowledge of plant life will be limited to about the same routine of work and study from year to year.

There is one study however which may be added to the study of the kitchen garden plants that will present an entirely different aspect for a guide to the true lover of nature, and that is the tree for forestry or for fruit.

The advantages afforded by tree study are:

1. Permanency.
2. Different stages of growth covering a long period of years.
3. Seed, germination, seedlings, budded or grafted stalk, the flowering stage, the fruit bearing trees.

FIGURE No. 4.

A good illustration of what can be accomplished in a few years.

4. A different stage for study for each year of the child in school.
5. A contemporaneous development of child and tree life.
6. The trees in the lawns and parks and yards are living monuments and lasting tributes to philanthropy, to science, to the school and to the individual boy or girl.

DETAILED WORK.

The details of the work of starting the school nursery must be left largely to the judgment of the teacher.

According to the plans suggested, the nursery will not require any more if as much attention as the vegetable garden.

BEGINNING THE WORK.

1. Begin in Autumn.
2. Plow, prepare and fertilize the plat of ground.
3. Collect the seeds of fruit and forest trees and store them through the winter.
4. Co-operate with other schools in exchange of seeds.
5. Most tree seeds mature in the fall.
6. Gather seeds as soon as they are ripe.
7. Some seeds should be picked from the trees; others can be collected after they have fallen.
8. Most tree seeds should be dried a few weeks before storing.
9. Do not allow them to become too dry nor to become moldy.
10. Seeds of mulberry, catalpa, osage orange, and a few others may be kept in sacks hung in a dry, cool place.
11. Seeds with thick hulls like walnuts, hickory nuts, peach seeds, plum seeds, and some others may be buried in the yard or garden or in sand pits during winter.
12. The ground should be well drained. Ordinary freezing will help to open the shells and facilitate germination.
13. Test seeds before planting in the spring. (Class Study.)
14. Keep all kernels that are plump and firm and discard those that are withered or diseased or wormy.
15. Use more seeds in the germination test than are required for the plats.
16. When seeds are sprouted by the different methods, blotters, sand, etc., the pupils may take the seeds and plant them at home in a small plat, and care for them until they are large enough to transplant to the nursery bed.

A few of the trees named in the nursery table may be selected for shading purposes, but the best results will undoubtedly come from the raising of fruit trees. (See table page 8.)

Apple, pear, peach, cherry and plum seeds can be easily started at home, and very often young trees may be secured from fruit orchards.

When the trees have arrived at the proper age and growth they should be grafted by the pupils. This should be done in connection with a careful study of the text.

Study the childhood of fruit trees. Let it be the history of their propagation and development in the nursery from the planting of the seed, through the various operations of budding, grafting, sprouting, trimming, and fertilizing until the trees are ready to transplant and begin their new cycle of life amid the surroundings of the orchard.

It must be remembered that the study will also involve the study of the insect enemies and fungus diseases which are incident to forestry and fruit tree life.

The study of trees is to be continued after they are transplanted to the home orchard, lawn or garden. Thus the work commenced in the school and transferred to the home, will bring about more of the spirit of co-operation between home and school.

This will all aid to develop a love of study of nature. It will help to bring up the child in harmony with nature instead of out of joint with the world.

It is not wise to attempt to teach scientific forestry and fruit growing in any of the elementary grades.

In the primary grades tree study with an occasional glimpse of the forest should form the basis of the work.

In the grammar grades there should be a study of trees as correlated with geography and agriculture.

In the high school tree study becomes a part of botany and the high school course in agriculture.

Suggestive outlines will be found in Forest Service Circular 130 "Forestry in the Public Schools," U. S. Dept. of Agriculture.

A course of study for the first three or Primary grades, and a course of study for the three intermediate grades can be found in Farmer's Bulletin No. 488 "Forestry in Nature Study," U. S. Dept. of Agriculture.

THE VEGETABLE GARDEN.

The following plans are offered as suggestions:

The following figure represents a plat of ground eight feet, three inches wide, and sixteen feet, six inches long, or half a square rod.

The first twelve rows of vegetables are twelve inches apart. Rows 13, 14, 15 are 20 inches apart.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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The rows in the above plat are planted as follows:

Rows 1 and 2 are planted to radishes 2 inches apart.

Rows 3 and 4 are planted to lettuce 6 inches apart.

Rows 5, 6, 7, 8 are planted to beans 6 inches apart.

Rows 9, 10, 11, 12 are planted to beets 4 inches apart.

Rows 13, 14, 15 are planted to tomatoes 20 inches apart.

Rows 1, 2, 3, 4 may be followed by beans.

Rows 5, 6, 7, 8, 9, 10, 11, 12 may be followed by spinach, turnips, winter radishes.

Figure No. 2 represents a combination vegetable and flower garden.

Radish 3 inches apart.
Radish.
Lettuce 6 inches apart.
Lettuce.
Beans 6 inches apart.
Beans.
Beans.
Beets 4 inches apart.
Beets.
Zinnia 8 to 10 inches apart.
Zinnia.
Nasturtium 6 inches apart.
Nasturtium.
Ageratum 8 inches apart.
California Poppy 6 inches.
California Poppy.
Petunia 6 inches apart.
Petunia.

The radish and lettuce rows are to be followed by tomatoes.

The beans are to be followed by turnips.

The plants are grouped according to height of growth.

The tall growing plants are in the centre of the garden.

The low growing and decumbent plants are at the ends.

These plats are only suggestive and may be made much larger so as to include a much greater variety of products.

Each pupil should have an individual garden of the above size or larger, even, up to 1x4 rods.

FLOWER BEDS.

The school grounds with shade trees, shrubbery, and a beautiful lawn can be made still more beautiful with the right kind of flowers artistically arranged.

FIGURE NO. 5.

Flowers for ornamental beds in front of shrubbery.

Flower beds may be in the form of crescents, stars, letters and names, or in beds of irregular shapes, but the shapes of these adornments should not be the leading features of the place.

The curved pathway is made especially attractive by being bordered at intervals with clusters of flowers.

In arranging a round or star shaped bed it may be made attractive by having rings of various colors.

HARDY PERENNIAL PLANTS.

The list of perennial flowering plants is so long that it is only possible to give a very limited list in this bulletin. But from the vast

realm of excellent hardy perennials it is possible to select a list that will be in bloom from early spring till late in the fall. It is possible to obtain a stock of hardy plants that will continue to beautify the lawn for many years.

Space forbids that anything but general directions be given for the use of the plants named in the list. A few general suggestions are given as follows:

1. The most appropriate place for these flowers is on village lots, country lawns or in public parks.
2. They may be banked along the boundaries of the lawn, at the base of buildings, along garden fences, drives and walks.
3. The beds should not be too wide.
4. They may be grown in front of masses of shrubbery, in nooks, or in front of evergreen or deciduous hedges.
5. Placed in irregular clumps, or beds at the base of a thicket of evergreens for a background, the flowers will produce an ideal effect.
6. Do not plant flowers as a rule in formal plats of ground such as squares, circles and similar geometrical shapes in the center of an open piece of ground.
7. Do not plant large areas of a single kind of plants except in instances where there are large tracts to be devoted to flowers, shrubbery and trees.
8. Let there be an aggregation of many species, that there may be new pictures unfolding from time to time.

FIGURE NO. 6.

Flowers along the borders of walks and buildings.

A LIST OF PERENNIALS.

<i>Name.</i>	<i>Colors.</i>	<i>Height.</i>	<i>Time of Flowering.</i>
Hardy Feverfew.....	White, pink and red.	27 inches...	May 20 to July 1.
Foxglove	White, pink and red.	43 "	June 5 to Aug. 11.
Gas Plant.....	White and pink....	24 "	May 29 to June 18.
Iris	Variegated	30 "	June 11 to July 1.
Hardy Larkspur.....	Variegated	60 "	June 5 to Aug. 18.
Upright Virgin's Bower...	White and purple...	18 "	June 9 to June 27.
Young's Evening Primrose.	Golden Yellow.....	30 "	June 11 to July 1.
Baby's Breath.....		48 "	June 25 to July 22.
Hollyhock	Variegated	8 feet....	June 25 to Aug. 1.
Chinese Bell-flower.....	Dark blue and white.	51 inches...	June 27 to Aug. 11.
Butterfly Weed.....	Orange yellow.....		
Plume Poppy.....	White	6 to 8 ft..	

Among the common are the following:

The Peony,	False Indigo,	Japan Anemone,
The Columbine,	Perennial Peas,	Purple Cone-flower.
American Senna,	Leadwort,	

USES OF SOME OF THE POPULAR FLOWERS.

Among the most beautiful and popular flowers are the following:

- The Ageratum for strengthening the garden's color forces in blue.
- The Alyssum for borders, edgings, baskets, pots, etc.
- The Aster for tall growing, herbaceous borders, late bloom and careless effect.
- The Balsam used at the margin of groups to crown a terrace.
- The Pot Marigold for use in mass or in borders.
- California Poppy, most effective when grown in beds of considerable size.
- Calliopsis for bouquets, the living room, the greenhouse and hotbed.
- Campanula for the decoration of a house, or for growing in large quantities.
- Candytufts for edging beds in white, for massing or for belts.
- The Castor Bean for a central object in a group, for striking effect with cannas, caladiums, doelus, etc.
- Chrysanthemums, for gorgeous shows.
- The Clarkia for hanging baskets, vases, and edging plants, and low massing, or borders.
- Cobea Scandens for rapid growth and climbing.
- The Cockscomb for the odd and picturesque decorative feature of the garden.
- The Columbine for a border plant.
- The Cone flower for a border to a bed of delphiniums.
- Corn flowers for planting in the open.
- Cosmos for tall broad masses in background bordering against evergreens or fences.
- Evening primrose for solid beds, border lines, for pots, and for shrubby borders.
- Forget-me-nots for close border.
- Four O'clock used as a screen.
- The Foxglove for among shrubbery or along walks and drives.
- Gaillardia for mixed borders.
- The Hollyhock for growing against evergreen hedges or shrubbery, or as a background for other flowers of lower growth.
- Morning Glory for climbing.

The Larkspur for among shrubbery or as a background.
Lobelia for beds, edgings, baskets and pots.
Marigold for beds and shrubbery borders.
Mignonette for every garden.
Nasturtiums for beds.
Nemophila for borders and beds.
Pansy for beds.
Petunia for beds and borders, and masses and window boxes.
Phlox for masses and ribbon beds of contrasting colors.
Pinks for borders, bouquets, and table decorations.
Poppy for beds and borders with a background of green.
Potulaca Beds, edgings, rockwork, for filling up irregular places in flower beds.
Scarlet Sage for hedge, border, boxes, pots, etc.
The Snapdragon for borders.
Stocks Bedding, edgings, pot culture, house or conservatory use, for cutting for bouquets and for floral work.
Sweet Peas for bouquets and table decoration.

VINES.

Vines properly grown on the school grounds will also help to make the entourage beautiful and attractive. Walls, arbors, trellises, verandas and porticos covered with vines may be made useful and artistic. A

FIGURE NO. 7.

A beautiful effect in the arrangement of flowers, shrubbery and trees.

few vines such as the following will serve well for purposes of ornamentation:

<i>Hardy Vines.</i>	<i>Hardy Vines.</i>	<i>Annuals.</i>
Boston Ivy,	Clematis Jackmanii,	Scarlet Runner Bean,
Bitter Sweet,	Clematis Paniculata,	Wild Cucumber,
Honeysuckle,	Wisteria,	Morning Glory,
Dutchman's Pipe Vine,	Crimson Rambler,	Moon Flower,
Virginia Creeper or		Sweet Peas,
American Ivy,		Climbing Nasturtium,
Cinnamon Vine (Chinese).		Gourds.

SHRUBBERY.

Shrubs should be arranged in groups.

Shrubs that bloom about the same time should not all be placed together in some part of the group; they should be distributed in different parts among shrubs blooming at different times.

Highest shrubs should be placed near the center of the group.

The lowest or decumbent plants should be in the outer row.

To assist in the arraignment of shrubs according to height and time of flowering, the following list is given:

<i>Name.</i>	<i>Time of Blooming.</i>	<i>Height.</i>
Althea	August and September...	
California Privet.....		Any height, 1 to 15 feet.
Lilac	May	5 to 10 feet.
Japanese Tree Lilac.....	July	Full growth, 30 feet.
Flowering Tree Lilac.....	Flowers in early spring...	2 to 4 feet.
Japanese Quince.....	Flowers in early spring...	5 to 6 feet.
Spirea (Van Houtte).....	July	Dwarf shrub.
Viburnum (Snowball).....	May and June.....	10 to 15 feet.
Berberis Thunbergi.....	Red.....	3 to 4 feet.
Rhododendron (Rose Bay).	May and June.....	5 to 6 feet.
Syringa (Mock orange)...	May and June.....	5 to 7 feet.
Hydrangea Paniculata.....	July	3 to 4 feet.
Wolfberry	White berries last till winter	Low branching.
Weigelia	July	Dwarf shrub.
Flowering Currant.....	May	4 to 5 feet.

SHRUBS AND THEIR ARRANGEMENT.

The arrangement of shrubs should be made according to effects desired. If the group is to be viewed from all sides the arrangement should be different than if it is to be seen only from one side.

The following plan is for a group to be seen from different parts of a large lawn:

FIGURE No. 8.

DETAIL OF SHRUBBERY GROUP.

- J. Q. Japan Quince.
- J. T. L.—Japanese Tree Lilac.
- V.—Viburnum.
- L.—Lilac.
- S.—Syringa.
- A.—Althea.
- R.—Rhododendron.
- H.—Hydrangea.
- W.—Wisteria.
- B.—Berberis.

Shrubbery with a background of large trees may begin with low branching or dwarf shrubs in the foreground and be increased in size to the higher shrubs; for instance in the following order: berberis, currant, quince, lilac, viburnum, Cornelian cherry, Japanese lilac, Fir, evergreen.

This arrangement will present an ideal scene in winter as well as in summer. If the landscape is extensive, in front of this scene there may be a large bed of flowers of striking type to give the effect of gorgeous sheets of color in the distance.

FIGURE No. 9.

A windbrake laden with frost and snow.

THE HOTBED.

It will probably be of considerable advantage to every school having a school garden to have a number of hotbeds.

These will enable the school to get an early start in growing certain plants. This is of especial importance to those schools that close early for the summer vacation.

With the gardener it is an important matter of business and for that reason it is practical instruction that ought to be within the reach of all.

A permanent hotbed may be made so that it may be heated either by radiating pipes from the heating plant or by fermenting manure. A hotbed may be made as shown in Figure 10.

FIGURE NO. 10.

Cross section of a permanent hotbed or pit.

A pit should be dug from 2 to $2\frac{1}{2}$ feet in depth, according to the climate. The pit should have plank, brick or cement walls on all sides. Standard hotbed sash are 3 by 6 feet. The pit should therefore be built in the proper proportion so that the frames may be used.

The pit should be filled with manure to within $\frac{4}{5}$ of the depth and then covered with about 6 inches of soil.

The following table is given by the U. S. Department of Agriculture:

NURSERY PLANTING TABLE FOR FOREST TREES.

No.	Species.	When to collect seeds.	How to store seeds.	Per cent which should germinate.	When to plant seeds.	Depth to plant seeds.	Spacing of seeds in rows.	Height of 1-year old seedlings.	Forest Service publication for reference.
						Inches.		Inches.	
1	Ash, Green	October	Bury in sand.	35-50	Spring	1	Scatter thickly.	6-9	Circular 92.
2	Ash, White	do	do	35-50	do	1	do	6-10	Circular 84.
3	Basswood	September or October.	Show at once.	5-50	Fall	1	do	6-12	Circular 63.
4	Beech	Fall	Bury in sand.	70-80	Early Spring	1	2 inches apart.	3-6	
5	Butternut ^a	September or October.	do	75-80	do	1	3 to 6 inches apart.	10-13	
6	Boxelder	do	do	46-60	Spring	1	Touching in rows.	10-14	Circular 86.
7	Catalpa, Hardy	October or November.	Cool, dry place.	40-75	do	1	do	14-30	Circular 82.
8	Cherry, Black	August or September.	Bury in sand.	75-80	do	1	2 to 3 inches apart.	4-6	Circular 94.
9	Coffeetree, Kentucky.	September or October.	Cool, dry place, or bury in sand.	70-75	do	1	do	3-6	Circular 91.
10	Cottonwood ^b	June or July.	Show at once.	75-95	Summer	1	1 inch apart.	20-30	Circular 77.
11	Elm, Slippery	May or June.	do	50-75	Late Spring	1	Scatter thickly.	15-35	Circular 85.
12	Elm, White	do	do	50-75	do	1	do	5-10	Circular 66.
13	Hackberry	October	Bury in sand.	70-80	Spring	1-2	1 to 2 inches apart.	6-12	Circular 75.
14	Hickory, Pignut ^a	September or October.	do	50-75	do	1-2	3 to 6 inches apart.	2-6	Silvical leaf.
15	Hickory, Shagbark ^a	do	do	50-75	do	1-2	do	2-6	let 48.
16	Hickory, Shellbark ^a	do	do	50-75	do	1-2	do	2-6	Circular 62.
17	Locust, Black	October	Cool, dry place, or bury in sand.	50-75	do	1	do	15-20	Silvical leaf.
18	Locust, Honey	do	do	50-75	Fall or spring.	1	2 to 3 inches apart.	6-14	Circular 64.
19	Maple, Red	May or June.	Show at once.	25-60	Late spring	1	1 inch apart.	6-10	Circular 74.
20	Maple, Silver	do	do	25-50	do	1	do	12-20	Circular 76.
21	Maple, Sugar	October	Show at once or bury in sand.	30-50	do	1	do	6-12	Circular 95.
22	Mulberry, Russian	July or August.	Cool, dry place.	75-95	Fall or spring.	1	do	8-10	Circular 85.
23	Oak, Bur ^a	September or October.	Show at once or bury in sand.	75-95	Spring	1	Scatter thickly.	5-9	Circular 56.
24	Oak, Red ^a	do	do	75-95	Fall or spring.	1	3 to 6 inches apart.	6-20	Circular 58.
25	Oak, White ^a	do	do	75-95	do	1	do	5-9	Circular 106.
26	Osage Orange	do	Cool, dry place.	60-95	do	1	1 inch apart.	10-15	Circular 90.
27	Poplar, Yellow	do	Show at once.	5-10	Fall	1	Scatter thickly.	4-6	Circular 93.
28	Walnut, Black ^a	do	Bury in sand.	75-80	Spring	1	3 to 6 inches apart.	10-18	Circular 88.

^a Difficult to transplant on account of tap root. Advisable to sow seeds in permanent sites in field whenever possible.

^b Easily grown from cuttings. Not necessary or advisable to attempt growing from seed.

Plans for reforestation of grounds for The Lima, O., State Hospital.—Ohio Experiment Station.

In many states there are state foresters or forestry commissions, who may be able to advise and aid the schools. You may be able to secure seedlings from your state experiment station. Some of the stations are offering such help to schools. You can also make application direct to the Forest Service of the U. S. Dept. of Ag., Washington, D. C. They will put schools desiring to exchange supplies of tree seeds into communication with each other.

PLANNING AND ADORNING THE FARMSTEAD AND RURAL SCHOOL GROUNDS.

The Farmstead is the general area occupied by the farm buildings, the yards, lawns and walks; the entrances and driveways; the trees, vines and flowers, and shrubs.

FIGURE NO. 11.

An ideal plan for the farmstead.

Figure 11 represents a farmstead 20 rods square. The distance from the dwelling to the barn is 200 feet. The distance from the dwelling to the pig pen is 250 feet. This figure shows a plan for the north side of the public highway.

As the farmstead is the center of activity on the farm and the place where the farmer must spend the best part of his life, the consideration of this subject ought to be full of interest and concern.

Home-making should be carried into effect systematically in conformity to some well-defined plan, looking not only to the present but also to future needs and comforts. This is an important agricultural problem, because:

1. It will help in the appearance and value of the farm.
2. It will add to the comfort and happiness of the occupants.
3. It will facilitate changes and improvements.
4. It will help to keep people on the farms.

In making plans for new buildings, there is no general plan suited to all localities; in readjusting arrangements where there has been want of definite plans; and in the location and grouping of buildings, each farm presents its own peculiar conditions and difficulties.

There are a few general rules that apply to certain conditions. Some of these rules are given here to assist the young farmer, in selecting a site and making plans:

1. Select a site with the best possible drainage.
2. Give the house the greatest prominence.
3. A dwelling on a south or east slope is better than on a north slope.
4. The house should be built to front the public highway.
5. All other buildings should be back of the house.
6. There should be a lawn of good stretch in front of dwelling.
7. Buildings should not be separated by a public highway.

In planning the farmstead it is of the greatest importance to consider the factors of economy and convenience. The important points are.

1. To save time in traveling to and from chores.
2. To save time in convenient arrangement for handling stock and feed.
3. The corn crib should be near the place to feed the corn.
4. The silo should be near the place to feed the cattle.
5. The watering place should be near the stables, or centrally located.
6. A stable should have a convenient yard for stock.

The buildings and their arrangement on a farm will depend upon the particular kind of farming to be pursued.

If it is to be general farming it will require some if not all of the following:

1. A farmhouse.	10. A wood or coal shed.
2. A barn.	11. A smoke house.
3. A henhouse.	12. Stables for stock.
4. A hog pen.	13. Tanks and windmill.
5. A corn crib.	14. A shop.
6. A silo.	15. Garage.
7. A milk house.	16. A colony house for bees.
8. A tool shed.	17. Farm scale.
9. A granary.	18. Ice house.

Any special industry of the farm such as dairying, trucking, fruit growing, poultry raising, etc., will of course demand an arrangement of buildings suited to the special line of work done.

The landscape should be so planned as to show the orderly arrangement of the buildings.

The order of arrangement should be to have all buildings within view of the dwelling and public highway and all front sides to the front and all back sides to the rear.

Locate buildings so as to avoid unpleasant odors being carried by the usual direction of the winds blowing toward the house in your locality.

Stables and manure should be at least 200 feet away from dwellings.

Every state should have a law permitting the registration of farm names. A farm named and registered should have legal protection.

No farmer should permit his buildings to be painted for advertising purposes except his own. Patent medicine, tobacco, and similar signs on buildings are in bad taste and cheapening in effect.

A bulletin board may serve a useful purpose. Some name such as the following adds dignity and gives reputation to the farm:

Cloverdale Farm. Rocky Ridge Farm. Oak Shade Farm. Fair View Farm. Evergreen Farm. Elm Grove Farm. River Side Farm. Lake View Farm. Glendale Farm. Woodland Farm. Maple Grove Stock Farm. Scioto Valley Dairy Farm. Glen Hill Poultry Farm.

FIGURE NO. 12.

Arborvitae, Japan Cypress and Irish Juniper grouped against deciduous shrubs and trees.

To encourage interest in this work, prizes may be offered for the best plans in adorning parks, school yards and other public grounds.

If this work is taken up by the schools its effects on the homes of the future and the country in general will be wonderful and farreaching in its results.

There are hundreds of deserted homesteads, that, if they were properly adorned would become inviting places for people to live.

THE ORNAMENTAL, PRACTICAL AND USEFUL ADORNMENT OF THE FARM.

There is nothing that adds so much to the beauty of the landscape as the proper arrangement and variety of trees and other plants about the farmstead. This will depend to a very great extent upon the following points:

1. The number and location of the trees.
2. The kinds and sizes of trees at maturity.
3. Trees in clumps or groups as in nature's plan.
4. Tall trees at rear of house.
5. A well kept stretch of open lawn.
6. Trees in curved rather than in straight lines.
7. Shrubs about the borders and in front of back yard.
8. Shrubs at base and corners of porches and walls.
9. Tallest shrubs at the back with lower kinds in front.
10. Flowers for ornamental beds in front of shrubbery.
11. Flowers along the borders of walks and buildings.
12. Flowers in beds of star, oval or crescent shapes.
13. Vines that climb the walls or porches.
14. Vines on arbors or trellis work.
15. Vines on trees and walls.

TREES TO PLANT FOR SHADE.

<i>Deciduous.</i>	<i>Deciduous.</i>	<i>Evergreen.</i>
White Elm,	Wild Cherry,	White Pine,
Hard Maple,	Chestnut,	Norway Spruce,
Soft Maple,	Poplar,	The best tree for a wind-
Catalpa,	Golden Willow.	brake is Austrian pine.
Buckeye,		
Black Walnut,

FIGURE No. 13.

A winter scene on the farm.

An ideal plan for a suburban place.

In the diagram the signs used signify the following:

:	:	:	:	:	Currants.
=	=	=	=	=	Gooseberries
.	.	.	.	.	Raspberries.
—	—	—	—	—	Blackberries.
°					Dwarf Pears.
+					Plums.
×					Peaches.
*					Cherries.
@					Apples.
—					Grapes.
‡					Maple trees.

The grapes are arranged on each side of the gravel, brick, or cement walk for the purpose of constructing a grape arbor over the walk. Varieties, 10 Concord, 10 Brighton, 10 Niagara.

One row, of currants, 60 feet long will furnish space for 20 bushes planted 3 feet apart. If a variety is desired, plant 5 Victoria, 5 White Grape, 5 Cherry and 5 Black Champion.

One row of gooseberries, bushes 3 feet apart in a row 60 feet long will require 20 bushes. A good variety would be 5 Downing, 5 Industry, 5 Columbus, and 5 Red Jacket.

One row of raspberries of 20 bushes 3 feet apart may consist of the following varieties: 5 Gregg, 5 Marlboro, 5 King, 5 Golden Queen.

One row of blackberries, 20 bushes, of a good variety, may consist of 5 Taylor's Prolific, 5 Agawam, 5 Early King, and 5 Rathburn.

One row of six dwarf pears, 2 Bartlett, 2 Duchess, 2 Kieffer.

One row of six plums, 2 Wilder, 2 Lombard, and 2 Burbank.

One row of six peach, 2 Early Crawford, 2 Elberta, 2 Late Crawford.

Eight cherry trees, 3 Early Richmond, 3 Montmorency, 2 Allen.

Five apple trees, as follows: 1 Red Astrachan, 1 Golden Sweet, 1 Baldwin, 1 Grimes Golden, 1 Rhode Island Greening.

Four Maple for shade in front of premises.

SUPPLEMENTARY READING BOOKS.

Classic Stories for Little Ones — McMurray.

Nature Myths — Cooke.

Book of Nature Myths — Holbrook.

Classic Myths — Judd.

The Sandman and His Farm Stories — Hopkins.

Buds, Stems and Roots — Chase.

Kindergarten Stories and Morning Talks — Wiltse.

In the Child's World — Poulsson.

Nature's Byways — Ford.

Trees in Poetry and Prose—Stone and Fickett.
 Ten Common Trees—Stokes.
 Nature in Verse—Lovejoy.
 Days and Deeds—Stevenson.
 In God's Out of Doors—Quayle.
 Little Flower Folk—Pratt.
 Plants and Their Children—Dana.
 Stories of Country Life—Bradish.
 The Lovers of the Woods—Boardman.
 Arbor Day—Schauffler.
 A Little Book of Profitable Tales—Field.
 The Land We Live In—Price.

REFERENCE BOOKS FOR NATURE STUDY TEACHERS.

Handbook of Nature Study for Teachers and Parents—Comstock.
 Practical Nature Study—Coulter and Patterson.
 Nature Study for Primary Grades—Cummings.
 Nature Study for Lower Grammar Grades—Cummings.
 Nature Study—Holtz.
 Nature Study and Life—Hodge.
 Real Things in Nature—Holden.
 Nature Study for Grammar Grades—Jackman.
 Special Method in Elementary Science—McMurray.
 Nature Study—Overton and Hill.
 Nature Study and the Child—Scott.

SUPPLEMENTARY READING.

Write to the United States Department of Agriculture for the following bulletins:

Circular 19. Publications of the Department of Agriculture classified for the use of teachers.

Circular 18. Publications of the Bureau of Plant Industry

Farmer's Bulletin, No. 218. The School Garden.
 " " " 154. The Home Fruit Garden.
 " " " 134. Tree Planting on Rural School Grounds.
 " " " 408. School Exercises in Plant Production.
 " " " 423. Forest Nurseries for Schools.
 " " " 157. The Propagation of Plants.
 " " " 468. Forestry in Nature Study.
 " " " 428. Testing Farm Seeds in the Home and in the Rural School.
 " " " 460. Frames as a Factor in Truck Growing.
 " " " 185. Beautifying the Home Grounds.
 " " " 195. Annual Flowering Plants.
 " " " 248. The Lawn.
 " " " 255. The Home Vegetable Garden.
 " " " 242. An Example of Model Farming.

The following Bulletins should be secured from the Ohio Agricultural Experiment Station, Wooster, Ohio.

- No. 214. Handbook of Diseases of Cultivated Plants.
- No. 190. Evergreens; Their Uses and Culture.
- No. 240. The Rejuvenation of Orchards.
- No. 189. Forestry Suggestions.
- No. 175. The Wood Manual.

FRUIT CULTURE.

BOOKS.

Cyclopedia of American Horticulture, Bailey, 4 volumes.....	\$20.00
American Horticultural Manual, Budd and Hanser.....	3.00
American Apple Orchard, Waugh.....	1.00
American Fruit Culturist, Thomas.....	2.50
Barry's Fruit Garden, Barry.....	1.50
Biggle Berry Book.....	.50
Dwarf Fruit Trees.....	.50
Fruits and Fruit Trees of America, Downing.....	5.00
How to make a Fruit Garden, Fletcher.....	2.00
Orchard and Fruit Garden, Powel.....	1.10
Plum and Plum Culture, Waugh.....	1.50
Principles of Fruit Growing, Bailey.....	1.50
The Pruning Book, Bailey.....	11.00
Practical Orchardng on Rough Lands, Moore.....	1.50

PERIODICALS.

The Western Fruit Grower (Monthly Magazine) per year.....	1.00
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OHIO EXPERIMENT STATION PUBLICATIONS.

Apple Culture, Nos. 137, 217, 224, 171.	Strawberries, Notes on, Nos. 146, 154,
Spraying, Nos. 191, 169, 199, 216, 232.	166, 178, 186, 236.
Renewal of old Orchards, No. 180.	Plums, Comparison of varieties, No.
Protection of Fruit Trees from Ro- dents, No. 208.	113.
Dependable Fruit, Circular No. 55.	Plums for Home and Market, No. 170.
Raspberries, Notes on, Nos. 98, 146.	Currants, Notes on varieties, No. 98.

FARMERS' BULLETINS, U. S. DEPARTMENT OF AGRICULTURE.

Apples and How to Grow Them, No. 113.	Home Vineyard, The, No. 156. Pruning, No. 181.
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VEGETABLE CULTURE.

BOOKS.

A B C of Potato Culture, Terry..	\$0.45	New Rhubarb Culture, Morse and Fiske	.50
Asparagus Culture, Hexamer....	.50	Principles of Vegetable Gardening, Bailey	1.50
Cabbage, Cauliflower and Allied Vegetables, Allen.....	.50	Tomato Culture, Tracy.....	.50
Celery Culture, Beattie.....	1.50	Vegetable Gardening, Watts....	1.75
Gardening for Profit, Henderson.	1.50	Success in Market Gardening, Rawson	1.10
Garden Making, Bailey.....	.75	Sweet Potato Culture, Fitz.....	.50
How to Make the Garden Pay, Greiner	1.00	Insects Injurious to Vegetables, Chittenden	1.50
Mushrooms, How to Grow, Falconer	1.00	Vegetable Gardening, Watts....	1.75
Melon Culture, Troop.....	.50		
New Onion Culture, Greiner....	.50		

PERIODICALS.

The Market Growers' Weekly Journal, Louisville, Ky., per year	1.00	The Vegetable Grower, Chicago, Ill., per year.....	1.00
		The Garden Magazine, Garden City, N. Y., per year.....	\$1.50

OHIO EXPERIMENT STATION PUBLICATIONS.

Cucumbers, Diseases of, Nos. 89, 105.	Potato, Rosette disease of, Nos. 139, 145.
Melons, Diseases of, No. 105.	Tomato, Diseases of, Nos. 89, 105.
Onions, Smut of, Nos. 122, 131.	Cabbage, Two Diseases in Ohio of, No. 228.
Peas, Blighting of, No. 173.	Potatoes, Fusarium Blight and Dry Rot of, No. 229.
Potatoes, Cultural Notes on, Nos. 65, 76, 133, 174, 218.	

FARMERS' BULLETINS, U. S. DEPARTMENT OF AGRICULTURE.

Asparagus, No. 61.	Onion Culture, No. 354.
Beans, No. 289.	Sweet Potatoes, No. 324.
Cabbage, No. 433.	Tomatoes, No. 220.
Celery, No. 282.	Cucumbers, No. 254.
Mushroom, Culture of, No. 204.	

GREENHOUSE MANAGEMENT AND FLORICULTURE.

Commercial Violet Culture, Gal- loway	\$1.50	Greenhouse Management, Taft...	1.50
Practical Horticulture, Henderson	\$1.50	Carnation, The American, Ward.	3.50
Forcing Book, The, Bailey.....	\$1.25	Chrysanthemum, The, Herrington	.50
Greenhouse Construction, Taft..	1.50	Rose, The, Ellwanger.....	1.25

HORTICULTURAL INFORMATION.

PERIODICALS.

The Florists Exchange, New York City, per year.....	\$1.00	The American Florist, Chicago, Illinois, per year.....	1.00
The Florists Review, Chicago, Illinois, per year.....	1.00		

OHIO EXPERIMENT STATION PUBLICATIONS.

Tomato Culture in Greenhouse, No. 153.	Manure as a Summer Mulch in Forcing House, Circular No. 69.
Soil Treatment for Forcing Houses, Circular No. 57.	

LANDSCAPE GARDENING.

BOOKS.

Hedges, Windbreaks, Shelters, etc	\$0.50	Lawns and How to Make Them, Barron	1.17
Landscape Gardening, Parsons...	3.50	What England Can Teach Us About Gardening, Miller.....	4.32
Landscape Gardening, Waugh...	.50		

PERIODICALS.

Country Life in America, New York City, per year.....	\$4.00	Park and Cemetery, Chicago; Illinois, per year.....	\$1.00
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TREE BOOKS.

Apgar: Trees of the Northern United States.
 Brisbin: Trees and Tree Planting.
 Britton: Trees.
 Chase: Cone-Bearing Trees of the California Mountains.
 Collins and Preston: Key to New England Trees.
 Dame and Brooks: Handbook of Trees of New England.
 Emerson and Weed: Our Trees and How to Know Them.
 Flag: A Year Among Trees.
 Going: With the Trees.
 Hough: Handbook of the Trees of the Northern United States and Canada.
 Huntington: A Study of Trees in Winter.
 Jepson: Trees of California.
 Keeler: Our Native Trees.
 Lounsberry: A Guide to the Trees.
 MacFarland: Getting Acquainted With the Trees.
 Mathews: Familiar Trees and Their Leaves.
 Maury: The Native Trees of Kentucky.
 Mosher: Fruit and Nut Trees.
 Mosher: Our Cone-Bearing Trees.
 Mosher: Oaks and Maples.
 Newhall: Trees of Northeastern America.

- Rogers: Among Green Trees.
 Rogers: The Tree Book.
 Rogers: Trees Every Child Should Know.
 Sargent: A Manual of Trees of North America
 Schwartz: Forest Trees and Forest Scenery.

PARK AND STREET TREES.

- Fernow: The Care of Trees in Lawn, Street, and Park.
 Solotaroff: Shade Trees in Towns and Cities.

GENERAL FORESTRY.

- Bruncken: North American Forests and Forestry.
 Fernow: Economics of Forestry.
 Fernow: A Brief History of Forestry.
 Gifford: Practical Forestry.
 Graves: The Principles of Handling Woodlands.
 Green: Principles of American Forestry.
 Roth: A First Book of Forestry.

WOOD STRUCTURE AND WOODWORKING.

- Boulger: Wood.
 Foster: Elementary Woodworking.
 Hough: American Woods (containing thin sections of various species of woods.)

Snow: Principal Species of Wood.

NOTE. The above list is recommended by the National Department of Agriculture.

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These lists are necessarily brief. Many other excellent books and periodicals* are issued. Obtain lists of bulletins available from Federal and State Stations. Write for magazine and book catalogs.

Book and Magazine Publishers:

- Ginn & Co., Chicago, New York City.
 American Book Co., New York City, Chicago.
 Orange Judd Co., 439 Lafayette St., New York City
 Macmillan & Co., 64 Fifth Ave., New York City.
 Doubleday, Page & Co., Garden City, New York
 Webb Publishing Co., St. Paul, Minnesota.
 A. I. Root Co., Medina, Ohio.

State and Government Institutions from which Horticultural Information may be obtained:

Ohio State University, Columbus, Ohio—The College of Agriculture maintains a Department of Horticulture. Four-year, two-year and special short course of instruction are provided. A monthly bulletin of general information and instruction is issued.

* Only those periodicals are named that are devoted mainly to some horticultural subject. Many others maintain horticultural departments.

Ohio State Board of Agriculture, Columbus, Ohio—Information regarding fertilizers sold in state, orchard inspection and general statistics can be obtained. An official Monthly Bulletin is issued.

Ohio State Library, Columbus, Ohio—Horticultural books are loaned to granges, clubs and under some circumstances to individuals.

Department of Agriculture, Washington, D. C.—In the Bureau of Plant Industry are employed many experts in various horticultural lines. For bulletins and information address expert in charge of following or other investigations.

Crop Acclimatization.

Horticultural Investigations.

Diseases of Fruits.

Pomological Investigations.

Foreign Seed and Plant Introduction.

Farmers' Bulletins—These are issued by the Division of Publications and new ones containing Horticultural information are issued occasionally. The Bureau of Statistics furnishes crop reports, etc. The Office of Experiment Stations publishes a monthly record of Experiment Station work but does not control the distribution of bulletins of the various state institutions.

State Experiment Stations—Every state and territory in the Union maintains one or more Experiment Stations. Most of these will send their bulletins without charge to requests from residents of other states. Address, Experiment Station, naming state and postoffice.

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