

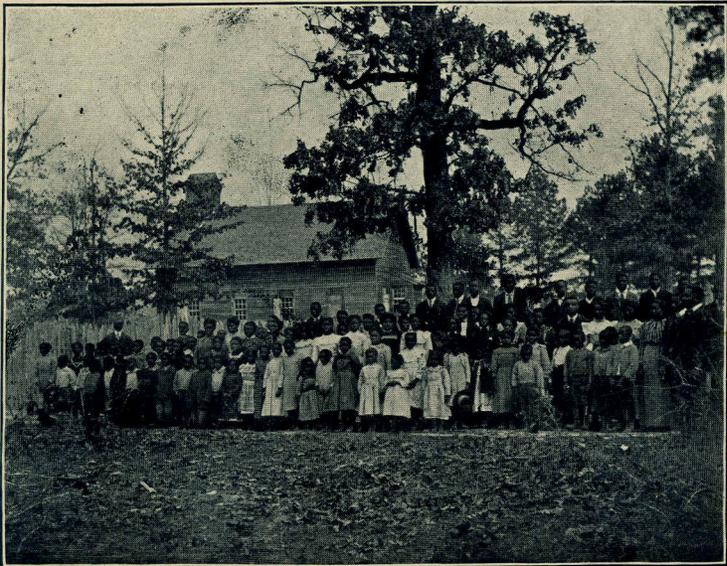
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BULLETIN NO. 18 EXPERIMENT STATION, 1910
TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE
TUSKEGEE INSTITUTE, ALABAMA

Nature Study and Gardening for Rural Schools



Boys and Girls Eager to Learn

By GEO. W. CARVER

EXPERIMENTAL STATION REPORT

NO. 1000

DATE

BY

FOR

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REVISIONS

(REVISED TEACHER'S LEAFLET NO. 2)

EXPERIMENT STATION BULLETIN

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NUMBER 18

JUNE, 1910

Nature Study and Gardening for Rural Schools

By GEO. W. CARVER, M. S. Agr.

Tuskegee Normal and Industrial
Institute, Tuskegee, Alabama

The Tuskegee Experiment Station

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The Tuskegee Agricultural Experiment Station

Bulletin No. 18

June, 1910

Nature Study and Gardening for Rural Schools

G. W. CARVER, M. S., Agr. Director

Since the publication of Teachers' Leaflet No. 2, Nature Study and Children's Gardens, the work has not only grown in a satisfactory manner, but has advanced far beyond the most sanguine hopes of its promoters—indeed the 1,500 copies of this leaflet which was published in 1904 have been exhausted without satisfying the increasing demand.

The above facts in connection with a careful study of the needs of the rural teacher, we have thought wise to revise and amplify it, bringing the same more up to date.

The chief mission of this little booklet is that of emphasizing the following points:

1. The awakening of a greater interest in practical nature lessons in the public schools of our section.

The thoughtful educator realizes that a very large part of the child's education must be gotten outside of the four walls designated as class room. He also understands that the most effective and lasting education is the one that makes the pupil handle, discuss and familiarize himself with the real things about him, of which the majority are surprisingly ignorant.

2. To bring before our young people in an attractive way a few of the cardinal principles of agriculture, with which nature study is synonymous.

If properly taught the practical Nature study method cannot fail to both entertain and instruct.

It is the only true method that leads up to a clear understanding of the fundamental principles which surround every branch of business in which we may engage. It also stimulates thought, investigation, and encourages originality.

Who has not watched with delight the wee tots with their toy set of garden tools and faces all aglow with happiness and the yearning expectations of the coming harvest as they dug up the earth and dropped in a few seed or illy set an equal number of plants --with what joy and satisfaction they called it their garden, or with what enthusiasm they hailed the first warm days of spring with their refreshing showers which bespoke emphatically the opening of the mud pie and doughnut season, and how, even though they were water-soaked and mud-bespattered from top to toe, how very happy they were at the close of such a day's work. So on through the whole list of childish amusements. Instinctively, they prefer to deal



Little Gardeners

with natural objects and real things. It is the abnormal child that will feel just as happy with a piece of mud from which to make its cooky or pie crust as a piece of real dough. Neither is there the same instructive interest in a lifeless, irresponsive bundle of cotton cloth, ribbon and what not in shape of a kitten, puppy, etc., as there would be in the real, live, beautiful little animal which responds to every caress and which mutually seems to share in their joys and sorrows, successes or failures.

Thanks to the kindergarten method of education for coming to our rescue and the polytechnic and industrial schools which are supplementing it.

When to Begin

The age to begin teaching or interesting the child in the growing of plants for himself has puzzled many, but my observation and personal contact with the work proves that with a well-equipped teacher the wee tots, the kindergarteners are none too small. Figure 12 represents a group in a flower garden. Their faces portray the happiness within the heart. I am sure the value of such instructive interest and development could not be questioned.



Mud Pie Makers

In connection with the above many are the lessons which may be taught in:—

Correlation

Nature study as it comes from the child's enthusiastic endeavor to make a success in the garden furnishes abundance of subject matter for use in the composition, spelling, reading, arithmetic, geography, and history classes. A real bug found eating on the child's cabbage plant in his own little garden will be taken up with a vengeance in the composition class. He would much prefer to spell the real, living radish in the garden than the lifeless radish in the book. Likewise he would prefer to figure on the profit of

the onions sold from his garden than those sold by some John Jones of Philadelphia.

Partnership

It has been the experience of many teachers that it works well to have two, three or four children form a partnership, under written contract, who will be assigned by the teacher to one of the



The Wee Tots

little plots set apart as an individual garden. The contract is made very simple, written somewhat as follows:

Contract

Tuskegee, Ala., Sept. 1, 19....

We agree to

1. Raise vegetables on one of the plots set apart to us for a garden.
2. Follow as best we can the direction of our teacher.
3. Share equally in the expense, labor and profits of the garden.

Witnesses {(L. S.)
(L. S.)
(L. S.)
(L. S.)

The contract will prove valuable only so far as the teacher

makes the children understand just what a contract means, its binding effect in the business operations of the garden and the suffering or loss, regardless of excuses, to the person or persons who fail to come up to the stipulations.

The co-operation plan can also be taught by having one child responsible for a garden plot, but as concerns walks, borders, etc., equally responsible for the corresponding straightness and cleanliness throughout.



Clearing the Land

How to Begin Gardening

In response to many inquiries as to the best way to begin, we beg to say that there are many—all possessing some merit, but the following has proven most satisfactory with us:

1. As an introduction, a fifteen-minute lecture or general discussion on garden work should be given, defining the following kinds. (Stress should be laid upon those of the greatest importance, and with which the children are most familiar.)

- | | |
|----------------------|------------------------|
| (a) Kitchen Garden | (g) Balcony Garden |
| (b) Market Garden | (h) Hanging Garden |
| (c) Window Garden | (i) Botanical Garden |
| (d) Flower Garden | (j) Grass Garden |
| (e) Hot House Garden | (k) Children's Gardens |

(f) Roof Garden

(l) Hanging Gardens

(m) Sunken Gardens

Selection of the Site and Why

The out-door garden should be a plot of land near the school building. The garden should be used as any other class room. Hence, the closer it can be brought to the other places of recitation the better.

Note

On the selection of the site for the garden choose as nearly as possible a level, well-drained piece of ground, so there may be as

**Laying off the garden**

little washing as possible, and one easy to keep in a high state of tilth.

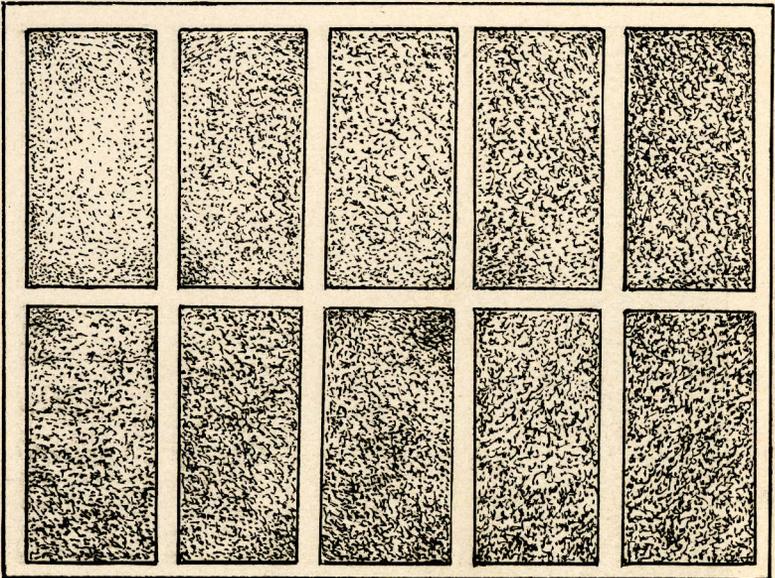
A southern slope is the most favorable for a late fall or early spring garden, as it is slightly protected from frost by the rays of the sun striking it earlier in the morning and later in the evening.

Laying off the Individual Plots

The plots or individual gardens should represent an easy fractional part of an acre, e. g., one-twentieth, one-fortieth, one-fiftieth, etc. A walk two feet wide should surround the entire plot. The individual gardens should be separated by paths not exceeding two feet.

Selection and Care of Tools

A hoe, rake and spade are essential. A hand weeder (which can be easily made by bending a piece of hoop-iron triangular or any other shape desired, fitting a handle to it and sharpening the edge) could be used. A line to insure straight rows and dibber for making holes to set plants will be found inexpensive, convenient and useful. A set of tools for each child is ideal and desirable, but fewer can be made to answer by arranging the work so that some will be using a hoe while others are raking, spading, laying off their plots, etc. Tools should be carefully cleaned and dried each time they are used and put in the place set apart for



Outline of Plots

them. This should be an essential part of the exercises in the garden.

Preparation of Soil

After the land has been cleared of objectionable things, such as stumps, stones, etc., it is ready to be spaded or plowed up deeply and thoroughly. Turn every furrow or spadeful of earth upside down, following this process with a thorough chopping over with a hoe or harrow until all of the large clods are broken. Finish with the rake.

If coarse fertilizers are to be used, such as stable manure, leaves, straw, etc., they should be scattered first, then spaded or plowed in.

Selection and Testing of Seeds

Some time should be given to the study of garden seeds. The child should be taught how to select large, plump and well developed seeds and plant them in a dish of fresh sand, moistened with clean water and kept in a warm place as a test for vitality, or germinating powers. A box of moistened earth kept in a warm place may also serve for the same purpose. A number of interesting and valuable mathematical exercises can be developed by planting a definite number of seeds and calculating the percentage of loss or failures. That is, if sixteen seeds are planted and eight germinate the per cent. is one-half or fifty. If only four sprout the



A Good Beginning

loss or failure is three-fourths or seventy-five per cent., etc. Of the first lot of seed one would have to plant twice the normal amount if a stand was expected; of the second three times the normal amount should be planted.

An important thing is to note the vitality or the vigor with which they sprout. Many seed will come up (get out of the ground) but an experienced gardener or farmer would know that they would continue to die through all stages of their development from growth to maturity, and even if some did live through, not a full crop of grain, fruit, etc., would be produced.

Planting

Many interesting and valuable lessons can be brought out relating to the size of seed, ease of germination and the depth to plant. The last depending largely upon the character of soils and the weather conditions. It should be kept in mind that seeds should be planted more shallow in heavy clay loam than sandy; and deeper in dry weather than in wet. This especially applies to seeds that germinate quickly.

This is an old rule but a very good general one: Plant all seeds to a depth of three times their greatest diameter. A number of seeds of



Harvesting and Marketing

different kinds should be measured by the pupils until the principle is thoroughly understood.

Cultivation

The following simple reasons for this operation should be enlarged and dwelt upon until it is made clear to every pupil.

- (a) How cultivation destroys weeds and why destroy them.
- (b) Lets water into the soil and prevents washing; how, and why this is desirable.
- (c) Permits the roots to go deep into the earth and to reach

out long distances in every direction. (NOTE—For what are they seeking?) (Teacher explain.)

(d) Lets air and sunlight into the soil. (NOTE—For what reason?) (Teacher explain.)

Harvesting

Reaping the result of any well directed effort is more or less interesting and many are the good wholesome lessons which can be taught as to

- (a) When things are ready.
- (b) The manner and quality of the product.
- (c) The proper weather conditions.
- (d) Saving the crop under adverse conditions, etc.

Marketing

While the harvest is full of interest from beginning to end, nothing inspires and encourages like the beginning or swelling of a bank account or the prompt payment of any debt which becomes due as a consequence of our business operations. With what enthusiasm the child watches the growth of the credit side of its garden business! The garden account should run somewhat as follows:

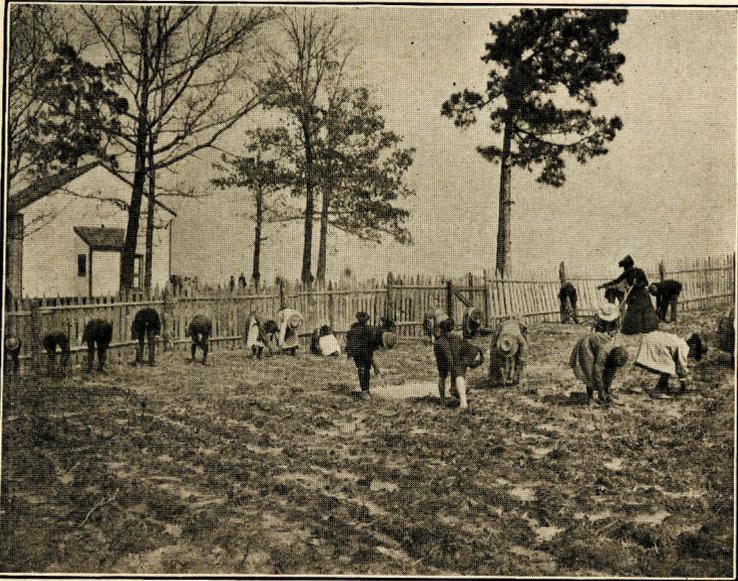
1904		Debit Put in	Credit Taken out	Remarks	
Jan..	1	Paid for manure... \$	20	\$	
	1	Paid for one hoe...	40		
	1	Paid for one rake	25		
	2	Paid for one spade	40		
	3	1 hour's labor lay- ing off garden.....	03		
	4	1 hour's laborspad- ing garden.....	03		
	4	1 hour's labor pre- paring and plant- ing	03		Weather being cold seeds were slow about sprouting out of doors
	4	Lettuce seed pl'td	01		Sprouted Jan. 12th
	4	Radish seed pl'td	01		Sprouted Jan. 10th
	4	Onion sets planted	02		Began to grow Jan. 16th
	6	Repairing da m- ages done by neighbors' chick- ens	05		Chickens scratched up some of the seed sown
Mar..	12	Sold 4 doz. Rad. at 10 cts.....		40	Jan. 17th: Plants are growing well
	14	Sold 5 doz. Rad. at 10 cts.....		50	Jan. 21st: Cold weather. Plants are looking very weak
	15	Sold 10 heads Let. at 5 cts.....		50	Feb. 25th: In two weeks plants will be ready for market
	18	Sold 3 doz. onions at 10 cts.....		30	\$1.70—\$1.43 \$.27 March 18th, 27 cents ahead. Besides tools paid for
			1 34	1 70	

These accounts should start with the beginning of the garden.

Money Value of Different Garden Crops

As the child markets his produce he will have the opportunity to compare the money value of his garden crops. For instance, he may find by comparison that the quicker his crop is grown and off the greater will be the amount made on his small area of land. Comparisons may be made with slower maturing crops that are grown in the fields.

In this connection some valuable lessons may be taught, as to how, vegetables, grains, fruits, etc. (for which there is no paying



Carrying Out the Idea

market) can be made to pay by feeding them to chickens, hogs, cattle, etc., etc., or, in other words, turning them into pork, milk, butter, beef, eggs, etc., for which there is always a market.

Climate

During the year many important climatic changes can be noted as follows:

(a) The washing of the soil by heavy rains and how it impacts certain kinds and how it effects the growth of plants.

(b) The effect of excessive heat and cold upon plant growth.

(c) How some of these conditions can be greatly modified and overcome by tillage, and other soil manipulations.

A few Insects of the Year

During the entire year insects can be profitably studied. Some of the most prominent are these:

Spring

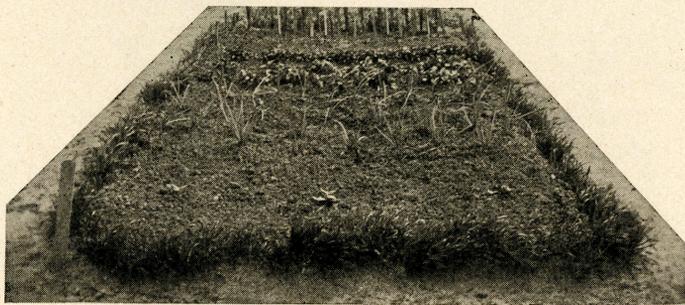
Cutworms, spotted cucumber beetles, flea beetles, harlequin cabbage bug, plant lice, earth worms, potato bugs, caterpillars larvae and a number of eggs of different kinds.

Summer

Cabbage butter-fly, eggs and worms, bean worms, squash worms and bugs, corn worms, melon bugs and worms, plant lice, scale insects, butterflies and numerous eggs.

Autumn

In addition to many in the two preceding groups, chrysalis,



A Model Garden

pupae, cocoons, eggs, etc., can be found in abundance.

How to Classify Insects

Practically insects are divided into two great classes:

(a) Those that eat the leaves and other parts of the plant upon which they feed.

(b) Those that simply suck the juices from the plants upon which they feed.

The following remedies (which are poisons and must be used with reasonable care as to keeping it away from the children, etc.,) will exterminate or hold in check those insects which are most troublesome in our gardens, such as the potato bug, cabbage worms, the turnip, mustard, rutabaga, kale, rape and beet worms, tomato worms, etc. Also the terrapin beetles, cotton worms, flea beetles, army worms, blister beetles, caterpillars, grasshoppers, tobacco worms, etc.

Remedies

Paris Green, this is the universal remedy for all kinds of biting or chewing insects. It comes in a fine dusty green powder and may be used in that way or mixed with water. If used as a dry

powder, mix with flour, road dust, coal ashes or air-slacked lime. To every pound of Paris Green add ten pounds of flour or about the same of the other substances, put into a thin bag and dust over the plants while the dew is on. If a spray is desired use a pound of poison to 150 to 200 gallons of water, apply with a spray pump or whisk broom.

All insects that suck must be killed by contact remedies, i. e., remedies when applied to the insect's body shuts up its breathing pores and smothers it to death. The favorite remedy here is kerosene emulsion. It is made thus, bring one gallon of soft water to a boil, dissolve half pound of hard soap or whale oil soap, remove from the fire and add at once 2 gallons of kerosene. Whip or churn vigorously until the whole mass assumes a creamy appearance and will stick to the sides of the dish instead of slipping off like oil.

This is the stock or standard solution, and must be diluted from 12 to 15 times with soft water. Before using, dilute according to the ease with which the foliage burns, at all times use it just as strong as the foliage will stand. This can only be ascertained by trial. Put on the plants the same as recommended for Paris Green spray. The above spray should be used on all plant lice, pumpkin and squash bugs when young. Chinch bugs, cabbage and collard lice, etc. Hand picking is the most effective for the striped cabbage beetle, squash bug, etc.

Very often a simple application of soot, lime, plaster, road dust, ashes, cotton seed meal, etc., will completely drive away the potato beetle, flea beetles, and leaf hoppers.

Stored Grain

The pea, bean and grain weevil of all kinds may be destroyed by bisulphide of carbon, a vile smelling liquid, which is very volatile (going into gas readily), it is very explosive, and must be kept away from fire.

The seed or grain to be treated is put into a tight bin, can or box, the liquid poured into a saucer or any shallow vessel and set upon top of the grain, the lid is now closed and kept so for several days. 1 pound of bisulphide is sufficient for 100 bushels of grain.

Trap Crops

All insects love young tender, juicy plants, and will feed upon them in preference to old ones, many planters take advantage of this fact and plant patches alongside or rows in between the old crop. Most of the insects will attack the young crop. They can here be easily destroyed by spraying with pure kerosene or boiling hot water.

Turnips, mustard, rape, radishes, etc., are the trap crops most commonly used.

Plowing

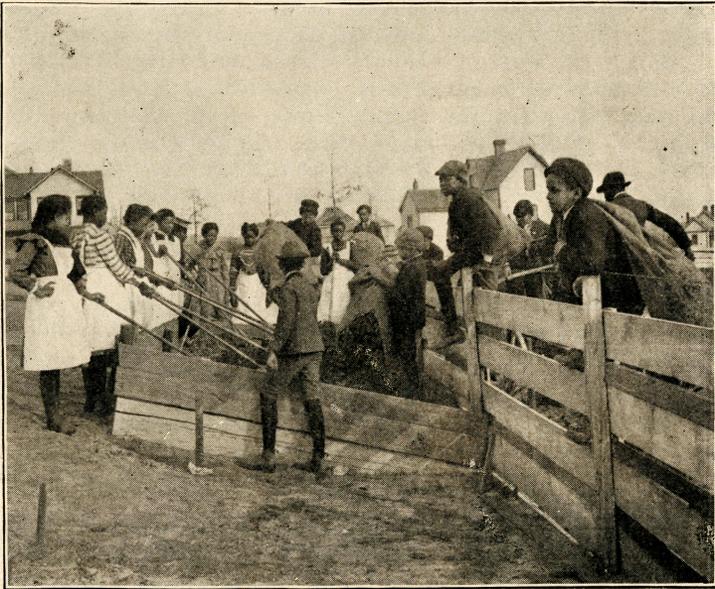
On the destruction of insects the time and manner play no small part.

As to the time, plow just as early in the fall as the crop can be gotten off, the earlier the better, many white grubs, wire worms, harlequin cabbage beetles, corn worms, army worms, pupae, grub worms, and other insects will be destroyed.

As to the manner, deep (9-inch) plowing is preferable at all times, the soil should be turned completely upside down.

Winter

Many of the insects mentioned already may be found hidden away under logs, stones, in stems of weeds and trash, in the earth where they await the return of warm weather. As a rule hand picking and the frequent stirring of soil is the most effective way for



Making Fertilizer

beginners to get rid of insects. If this is done frequently many will leave to seek more congenial quarters, as most insects do not like to be disturbed.

An ideal garden will have all these pests reduced to the minimum.

Making Fertilizers

Too much stress cannot be laid upon this important item. All the weeds, grass, leaves, pine tag, wood ashes, old plaster, lime, old clothing, shoes broken up bones, feathers, hair, horns and hoofs of animals, swamp muck, etc., should go into the compost heap.

Select a convenient place for the heap. Hollow out the ground

into a sort of pit or basin to prevent the heap from leaching and therefore wasting more or less of its valuable fertilizing constituents. Put down a layer of leaves, etc., say from 6 to 8 inches deep. On top of this a layer of swamp-muck to the same depth. Let this alternating process continue until your heap is as high as you desire. After covering with a rough shed or shaping the top somewhat like a potato hill to turn the bulk of water, let all remain until thoroughly rotted. Barn-yard manure, cotton seed, etc., may be mixed in.

Application of Fertilizers

As has been said before, one of the most essential things in the production of good crops of any kind is the deep and thorough preparation of the soil—after this comes the proper fertilization.

For convenience I have used the physical divisions made by the Alabama Experiment Station, which seems most admirable.

For the Calcareous Clay Loams of North Alabama

From 10 to 12 tons of barnyard manure per acre will be sufficient, this may be supplemented with 100 pounds acid phosphate forty pounds kainit and eighty pounds cotton seed meal.

For the Sandy Soils of the Eastern and Central Part of the State

From eighteen to twenty tons of barnyard manure per acre can be advantageously applied, this to be supplemented with 100 pounds acid phosphate, fifty pounds kainit and 100 pounds cotton seed meal.

For the Level Lands of the Southern Long Leaf Pine Region

Use from 16 to 18 tons of barnyard manure, supplemented with 75 pounds acid phosphate, eighty pounds kainit and 120 pounds cotton seed meal.

For Any Well-Drained Soil in Any Part of the State

Use from 18 to 20 tons of barnyard manure, per acre, supplemented with eighty pounds phosphoric acid, eighty pounds kainit and from eighty to one hundred pounds of cotton seed meal.

To obtain the best results, the barnyard manure should be well rotted, and the commercial fertilizer thoroughly mixed with it before applying to the land.

Fungus Diseases

In the spring look for the downy mildew on the underside of the young cabbage plants, especially in the hot bed.

Remedy—Thin out and give plenty of air, also pull off the affected leaves. The damping off or rotting of young plants in the hot bed, boxes or cold frames, is a very troublesome disease which comes about mainly from over-crowding, over-heating and over-watering the plants. Remedy—thin out, do not water so freely, give plenty of air and sprinkle dry sand amongst the plants.

In the summer, look for the leaf spot of the beet, beans, melons, squash, cucumbers, peas, etc. The simplest and most effective remedy is to keep the plants growing fast by good fertilization and tillage, so as to enable them to resist these diseases.

In the fall look for the cabbage, rutabaga, turnip, and collard rot. Remedy—Get good seed or plants from some one else and move the crop to another place where none of these things have been grown before.

There are many other diseases but their description and treatment is too technical to be treated here.

Planting Calendar

The following suggestions as to what, when and how to plant may prove helpful to many. It applies to nearly all of the Southern States, varying more or less with the locality and severity of the climate. In some months certain farm operations are mentioned which it is hoped will prove helpful to the teacher in his community work.

January

If you have not already done so you should begin in this month to prepare for the spring gardening by breaking the ground very deeply and thoroughly, clearing off and destroying all trash which would seem to prove a hiding place or wintering quarters of noxious insects. Before breaking, it would pay to put upon the garden a heavy coating of barnyard manure. Carrots, lettuce and turnips should be sown in open ground. Early Jersey Wakefield Winingstadt and Early York cabbage in cold frames or well protected places, such as the south side of buildings, embankments, etc. Grape vines, fruit trees, hedges and ornamental trees should receive attention as to pruning, fertilizing, etc. Both root and top grafting of trees should be done. Onion sets and shallots may be planted.

Continue sowing in hot beds all the seed recommended in December, and in addition sow tomatoes, egg plants; sow in open ground parsnips, parsley, radish, kale, rape, kohlrabi, carrots, rutabagas; set onion slips and asparagus roots.

February

Irish (white) potatoes should be planted. Put in more cabbage, cauliflower and turnips, in variety.

Plant a few parsnips, carrots, radish, lettuce, beet, spinach, mustard and parsley. English peas, onion sets and shallots may be put in. About the 15th of the month early corn may be planted.

Egg plants, tomatoes and pepper may be sown in the hot bed. Plant vegetable oyster seed and artichokes.

The asparagus bed should have a good dressing of well-rotted

stable manure. This should be spread over the bed and spaded or forked in.

Note

In extremely cold winters some of these things recommended for open ground winterkill, but these instances are rare and it pays to plant, even though, occasionally, we lose a part or all of the crop.

March

English peas, onion sets, shallots, cabbage, collards; cauliflower corn, cowpeas, peanuts, okra, squash, cushaw, pumpkins, cantaloupes, cucumbers, watermelons, parsnips, carrots, radish, lettuce, and parsley, may be planted. Snap and lima beans, may be planted the latter part of the month. Another sowing of tomatoes and egg plants may be made in the hot bed. Begin at once to fight the noxious insects. Sweet potatoes may be bedded.

April

If the seed planted last month has made a poor stand re-plant at once.

Cabbage, pepper, egg-plants, and tomatoes may be set in open ground. If frost should make its appearance the tomato plants must be covered with tin cans, boxes or paper folded into a hood. In this way very early tomatoes can be had. Another planting of cucumber, squash, cushaws, pumpkins, watermelons, corn, snap and lima beans, cowpeas and okra may be made. Cotton seed may be planted.

May

Set sweet potato slips, more tomatoes, egg-plants, and continue to plant pumpkins, squash, cushaws, melons, snap and lima beans, corn, okra, etc.

June

Continue the work of May and in addition prepare a spot of ground for turnips, rape, mustard, etc. Begin to set winter collards and cabbage. Save all good seed as they ripen.

July

Prepare the land and plant a late crop of corn. Set winter cabbage and collards, sow turnips, rutabagas, rape, mustard and kohlrabi. Plant beets, cushaws and snap beans for fall crop. Sweet potato vines may be planted.

August

Plant cucumbers for pickling. Set a patch of tomatoes for late crop. Continue to set collards and cabbage plants. Sow lettuce, radishes, beets, turnips, rutabagas, rape, mustard and a late patch of cowpeas. Snap beans may be planted for a fall crop. Be sure to harvest the grasses suitable for hay.

September

Strawberry beds should be prepared and the plants set out.

Continue to sow turnips, rutabagas, lettuce, and radishes. Onion seeds should be sown and onion sets and shallots planted. Sow crimson clover, hairy vetch, oats, rye, barley and wheat; collards, parsnips, parsley, English peas, cabbage seed, snap beans, (of the bunch varieties) tomato cuttings, asparagus roots, kale-carrots, rape and kohlrabi.

October

Continue to set strawberries, and the sowing of turnips, rape, mustard, lettuce, radishes, beets, rutabagas, parsnips, Swiss chard, salsify, cauliflower, brussel sprouts, spinach, onion sets, leeks; and transplant collards and cabbage. See that all the garden and farm tools are repaired and made ready for spring work. Look well after the manure heaps and see that they are not heating too much or the elements of fertility washed out by the heavy rains. Begin digging sweet potatoes. Save seed. Sow oats, rye, barley, wheat, hairy vetch and crimson clover.

November

Continue to look after the manure. Rake up leaves, grass, straw, muck, etc., and put into the compost heap; lime, ashes, plaster, oyster shells, and bones beaten up are all valuable for this heap and under no circumstances should they be allowed to go to waste. Gather, sort and bank or house the sweet potatoes. Begin to prune fruit trees, shrubs and vines. Prepare good warm places for the poultry and stock of all kinds. Many dollars worth of feed will be saved by having these shelters, besides, exposure endangers the animal's life and renders it unfit for the work expected of it in the spring. Begin turning the unoccupied land with a two-horse plow. Sow the following seed in cold frames: lettuce, spinach, beets, cauliflower, and brussell sprouts.

December

Look over your stock of garden seeds. Test them by planting a few in the house in a box of damp sand. Make out a list of those to be purchased. Continue to break land. Set hens. Build and repair fences, terraces, etc. Transplant cabbage to open ground. Continue sowing all of the seed recommended in November, in cold frames.

How to Dig and Set Trees

The first essential in getting a tree to live is to dig it properly, which means the getting of just as many of the roots as possible, the more earth you can save clinging to the roots in lifting, the better.

A hole from 16 to 18 inches larger than the ball of earth or the longest mass of roots on the tree should be dug out from 2 to 3 feet deep, fill with well rooted barnyard manure and leaf mould, to the desired depth, chop it into the other earth well with a spade, set the tree and firm the earth well around it, water thoroughly and

fill with earth nearly to the top. The same method recommended for the digging and setting of trees applies equally well to shrubs and vines.

The best time to set the majority of trees, shrubs and vines is in early spring just before growth begins, say January, February and March, in this locality. They may also be set in September October and November, and even in December, but personally I prefer the spring planting.

How to make a Lawn

Since the Bermuda grass is the best one in this section for lawn making, I shall confine my suggestion almost, if not wholly, to it.

The site for the lawn should first be gotten in order by removing stumps, stones, filling washes and making the contour you wish, then plow, improve and prepare exactly the same as for the garden.

If a quick effect is desired lay the sods close together, if not run light furrows from 1 to 2 feet apart, drop in pieces of sod and cover lightly with earth. Excellent lawns can be made from early spring to midsummer in this way.

Flower Beds

In addition to splendid trees, and lovely grass, a few well arranged flower beds will add much to the beauty of the surroundings. These in number, size, shape, etc., may be just what fancy dictates. The ground should be made very rich, in fact, just as recommended for the garden.

The following plants and seed will be found most desirable:

Seeds

Vinca, Marigolds, Touch-me-nots, Morning Glories (vines) moon flowers (vines), Cypress (vines), Pansies, Cosmos, Zinnia, Petuna, Salvia or scarlet sage, Sweet peas, Phlox, Sweet Alyssum, Pansies, Candy tuft, Verbenas, Sunflowers, Castor oil beans, Black-eyed susans, Poppies, Bachelor's buttons, Ragged robbins, Coxcomb.

Plants

Cannas, Chrysanthemums, Dahlias, Violets, Lantanas, Coleus (in variety).

Bulbs

Tulips, Narcissus, Crocus, Hyacinth, Amaryllis, Lillies in variety, Gladiolus.

Neighboring Schools

Fig. 13 represents the tendency of the idea of the school garden to grow. The teachers of neighboring schools have taken up the work with success. They claim that it helps them to keep in closer touch with the parents of the children. In many cases

new life or interest in school work has been infused in this way into the whole community.

Window and Veranda Boxes

There is nothing that adds so much of real beauty, cheerfulness, and instructive inspiration, for the small outlay as a few pots or boxes of well grown plants.

Even though the schoolhouse be of logs, "clapboards" or what not, it can be transformed into a bright and cheery spot, with a little whitewash inside and out and a nice pot of wandering Jew, Kennelworth ivy, sweet potato vines, morning glories, etc., as hanging baskets in the window, on the veranda or especially prepared shelves, which the children will delight to make.

Where it is too cold to have tender plants, some of the garden vegetables are very ornamental, and make beautiful pot plants, such as curled parsley, curled mustard, curled kale, cauliflower, red and green leaved beets, cabbage, collards, kohlrabi, okra etc., wheat, rye, oats, barley, crimson and red clover, and the vetches all make lovely pot and vase plants and are not seriously injured by the cold.

Beautifying the School Grounds

No place can be called a school in the highest sense that has no pictures on the wall, no paint or whitewash on the buildings, either inside or outside, no trees, shrubs, vines, grasses or properly laid out walks and paths, which appeal to the child's aesthetic nature and sets before him the most important of all secular lessons—order and system. With this end in view a few suggestions are here offered with the hope that every teacher will put forth strenuous efforts to see that his school grounds are made just as attractive as possible with the native trees, shrubs, vines, etc., about you.

The following list of native decorative plants is by no means complete. I am giving just a few of the most desirable in each group.

Trees

Magnolia.	Holly, in three varieties.
Oak, in four varieties.	Elm, two varieties.
Cedar.	Cypress.
Wild Cherry, two varieties.	Poplar, two varieties.
Ash.	Pine, two varieties.
Willow.	Gum, two varieties.
Birch.	Sycamore.
Bay.	Mulberry.
Walnut.	Catalpa.
Honey Locust.	Beech.

Shrubs

Wild Crab Apple.	Wild Olive.
French Mulberry.	Azalea.
Bladder nut.	Hydrangea.
Callico Bush.	Wild Hop.
Huckleberry, three varieties.	Elder.
Wild Plum.	Bar Grass, three varieties.
Sweet Shrub, two varieties.	Grancy grey beard.

Vines

Trumpet Creeper.	Virginia Creeper.
Roses, in two varieties.	Wild Smilax, four varieties.
Honey Suckle, in two varieties.	Supple Jack.
Yellow Jessamine.	Wild Grape, in two varieties.
Cross Vine.	False Grape.

NOTE—See Bulletin 16 of the Tuskegee Experiment Station for a more complete list of the ornamental plants of Macon County, Alabama.

