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BULLETIN

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OF THE

AGRICULTURAL EXPERIMENT STATION

OF THE

UNIVERSITY OF TENNESSEE,

STATE AGRICULTURAL AND MECHANICAL COLLEGE.

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FRUIT TREES, AND EXPERIMENTS WITH VEGETABLES.

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These Bulletins will be sent, upon application, free of charge, to any  
Farmer in the State.

KNOXVILLE, TENNESSEE, U. S. A.

# THE AGRICULTURAL EXPERIMENT STATION

OF THE

UNIVERSITY OF TENNESSEE.

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The Station has facilities for analyzing and testing fertilizers, cattle foods, milk and dairy products; seeds, with reference to their purity or germinating power; for identifying grasses and weeds, and studying forage plants; for investigating the diseases of fruits and fruit trees, grains and other useful plants; for making reports on injurious insects, and the best means of combating them.

The Bulletins and Reports will be sent, free of charge, to any farmer within the State.

Packages by express, to receive attention, should be *prepaid*.

All communications should be addressed to the

DIRECTOR OF THE

AGRICULTURAL EXPERIMENT STATION,

KNOXVILLE, TENN.

 The Experiment Station building, containing its offices, laboratories and museum, and the plant-house and horticultural department, are located on the University grounds, fifteen minutes walk from the Custom House in Knoxville. The Experiment farm, stables, milk laboratory, etc., are located one mile west of the University, on the Kingston pike. Farmers are cordially invited to visit the buildings and experimental grounds.

# DIVISION OF BOTANY and HORTICULTURE.

## FRUIT TREES, and EXPERIMENTS WITH VEGETABLES.

By R. L. WATTS.

### I—FRUIT TREES.

In Bulletin No. 5, Vol. III, published in December, 1890, we gave a full list of all the stock in the orchard at the Station, describing the condition of our trees, and the characters of the fruits which they represent. It is four years since the plantation was made, and only a small number of trees have borne fruit and these in very limited quantities, hence we are not yet able to report upon their productiveness. We expect great results from this orchard of over two hundred trees, and everything possible is being done which will induce a healthy growth.

When the ground was first ploughed, in order to receive the young trees, the soil was greatly deficient in plant food; and to supply this want, organic matter, chiefly farm-yard manure, was added in large quantities. Very little manure, if any, had been applied from the time the trees were set until November, 1890. With some cultivation the trees made a fair growth, and most of them presented a good appearance one year ago; yet there was not the vigor about them that young trees should possess at three years from the nursery.

After investigation, three things were found necessary in order to get this plantation into proper condition, and these same three things will prove beneficial in nearly every orchard.

The first in importance is fertilization. So rotten manure was freely distributed about the trees, scattering it from the trunks out somewhat beyond the circumference of the tops. Nothing appreciates nutritious food more than fruit trees, and few plants, if any, make larger returns for the amount used.

Next in importance to the enrichment of the soil is cultivation. It is just as essential to cultivate the orchard as it is the corn-field. Good corn cannot be produced without good tillage; neither can you grow choice apples without thorough cultivation.

The implements we used for this purpose were a one-horse Oliver

chilled plough and a spring tooth harrow. The soil should be kept free from weeds and in a mellow, friable condition at all times. When the ground becomes dry and hard the plough is used, care being taken not to injure the trunk or main roots. The harrow is then used at intervals of about two weeks during the earlier part of summer and three or four weeks later in the season when weeds do not grow so rapidly. A small patch, immediately around each tree, is thus left uncultivated, and this we manure and then cover with a mulch of old hay or straw. The mulch serves four purposes: keeps the weeds down, shades the soil and thereby diminishes the loss of water by evaporation, protects the roots from intense heat in warm weather, and finally acts as a fertilizer.

The third operation is pruning. This is absolutely necessary if we would secure healthy, well formed and productive trees. Bulletin No. 1, Vol. IV, describes the method of pruning young fruit trees.

With the foregoing treatment of manuring, cultivating and pruning, all of the trees made a fine growth the past season.

The peach tree borer has been the most destructive insect enemy to our orchard. A careful examination of the trees was made during November, 1890, and at least two hundred worms were found. Our method of procedure was to scrape the soil away from the trunk and trace the grub to the end of its hole with a sharp knife. After killing all that could be discovered, fresh soil was thrown about the trees, heaping it up a few inches above the surface of the ground. Early in the spring a mound of leached wood ashes was placed around the trees, thus preventing the adult insects from depositing their eggs. This method proved very satisfactory. A few weeks ago we made an examination and found twenty trees to be entirely free from borers. Several trees contained one and two worms, and in two trees about which no ashes had been placed we killed fifteen larvæ. This is conclusive that ashes are an effectual remedy.

The following figures represent the growth the apple trees have made since transplanting four years ago, the measurements being taken after the leading shoots were cut back to the proper length:

| NAME.                        | Diameter of trunk<br>1 ft. above ground. | Diameter of top. | Height of tree. |
|------------------------------|------------------------------------------|------------------|-----------------|
|                              | Inches.                                  | Feet.            | Feet.           |
| Baldwin.....                 | 3                                        | 7                | 12              |
| Ben Davis.....               | 2½                                       | 6½               | 9               |
| Bonum.....                   | 2                                        | 5                | 8               |
| Cooper's Market.....         | 2¾                                       | 8                | 10              |
| Carolina Red June.....       | 2½                                       | 4                | 9               |
| Dominie.....                 | 2½                                       | 8                | 11              |
| Duchesse of Oldenburg.....   | 1¾                                       | 3                | 8               |
| Early Harvest.....           | 1¾                                       | 5                | 6½              |
| Early Strawberry.....        | 2½                                       | 5                | 8½              |
| Esopus Spitzenburg.....      | 2                                        | 6                | 9               |
| Fallawater.....              | 2½                                       | 7                | 10              |
| Fall Pippin.....             | 3½                                       | 8                | 10              |
| Golden Sweet.....            | 2¾                                       | 7                | 10              |
| Grime's Golden.....          | 2¾                                       | 6½               | 9               |
| Jersey Sweet.....            | 2½                                       | 6                | 8               |
| Keswick Codlin.....          | 2½                                       | 5                | 8½              |
| King of Tompkins County..... | 3¼                                       | 8                | 10              |
| Lady Apple.....              | 2                                        | 4                | 9               |
| Lady's Sweet.....            | 1¾                                       | 6                | 8               |
| Maiden's Blush.....          | 3                                        | 8                | 11½             |
| Monmouth Pippin.....         | 2¼                                       | 6                | 8               |
| Munson's Sweet.....          | 2¾                                       | 7                | 9               |
| Newtown Pippin.....          | 1¾                                       | 5                | 9½              |
| Northern Spy.....            | 3                                        | 5                | 10½             |
| Pewaukee.....                | 2½                                       | 7                | 8½              |
| Primate.....                 | 2¼                                       | 6                | 6½              |
| Rambo.....                   | 2¾                                       | 6½               | 11              |
| Rawles Janet.....            | 2                                        | 5½               | 8               |
| Red Astrachan.....           | 1½                                       | 3½               | 6               |
| Red Canada.....              | 3                                        | 5                | 9               |
| Rhode Island Greening.....   | 3¼                                       | 9                | 10              |
| Rome Beauty.....             | 2¼                                       | 6½               | 10              |
| Roxbury Russet.....          | 3                                        | 10½              | 10              |
| St. Lawrence.....            | 3                                        | 6                | 9               |
| Stump.....                   | 2½                                       | 4½               | 9               |
| Summer Rose.....             | 1                                        | 2½               | 4½              |
| Sutton Beauty.....           | 2½                                       | 4½               | 8               |
| Sweet Bough.....             | 2                                        | 5                | 8               |
| Wagner.....                  | 2                                        | 4                | 7               |
| Wealthy.....                 | 2                                        | 4                | 7               |
| Winesap.....                 | 1¾                                       | 3                | 7               |
| White Pippin.....            | 1½                                       | 2½               | 6               |
| Yellow Bellflower.....       | 2½                                       | 7                | 8               |

The peach trees range from nine to fourteen feet in height, with about the same diameter of top. The pears, cherries and plums vary greatly in size, which is due to so many different varieties that possess distinct characteristics as to growth, form and size.

#### VINEYARD.

So many of the soils and locations of Tennessee are well adapted to

the successful cultivation of the grape, and the industry is becoming one of such great importance in many districts, that we have thought the establishment of an experimental vineyard on the Station grounds would be entirely proper and perhaps assist in the advancement of this pleasant and profitable enterprise. Our vineyard is located east of and adjoining the orchard. It has a southeast exposure, with a soil well suited to the vine. Before planting, the plat was prepared by making two applications of good manure, one in the fall and the other the next spring, which were plowed under each time. Large holes were then dug at intervals of eight feet, allowing six feet between the rows. Bone meal, leaf mould, and rotten manure were placed in the holes and thoroughly mixed with good soil. The first planting of 126 vines was made last spring, on the 16th of March. All of these grew finely during the summer. Over 200 vines were added in November and December, and we now have a vineyard of 311 vines, including 76 varieties. The stock was purchased of Ellwanger & Barry, Rochester, N. Y.; Storrs & Harrison, Painesville, Ohio; T. V. Munson, Denison, Texas, and P. J. Berckmans, Augusta, Ga.

The main objects in view are to determine the varieties best suited to this State, to make a comparative test of stock from northern and southern climates, to illustrate the different methods of pruning and training, and to study the best means of combating the various insect and fungous foes that attack the vine.

## II—THE BEST VARIETIES OF FRUITS FOR TENNESSEE.

A question of vital importance to our southern fruit growers is the proper selection of varieties. Many mistakes are annually made by setting stock which is not at all adapted to the soil or location in which the trees are planted. That this practice incurs great losses of both time and money cannot be doubted. The Station is experimenting with over 200 varieties of orchard fruits. This is important work, for no plantation can be a thorough success unless it is set with good stock. It is necessary to plant trees of superior bearing qualities, and which under the proper management, will produce fruits of fine appearance and of good edible qualities.

The range of soil and climatic conditions of Tennessee is so broad that the Station cannot decide upon the fruits best adapted to each section. Some varieties succeed admirably in this section but are worthless in Middle and West Tennessee. Hence co-operation was sought, and the following questions were sent to prominent fruit growers throughout the State:

What are the three best winter apples for your locality? The three best summer apples? Autumn apples? Pears? Peaches? Grapes? Plums? Cherries?

Tennessee has been divided into eleven districts. Each district is composed of a number of counties which are quite uniform in climatic and geological conditions. The following varieties are reported as being the best for the districts under which they are named:—

A.—Alluvial plain of the Mississippi River and plateau of West Tennessee. Includes Lake, Obion, Dyer, Lauderdale, Tipton and Shelby counties:

Winter apples—Royal Limber Twig, Red Limber Twig, Yellow Limber Twig, Winesap and Ben Davis.

Summer apples—Early Harvest, Red June, Striped June and Horse.

Autumn apples—Fall Queen, Rome Beauty, Buckingham, White Bellflower, Pennsylvania Red Streak.

Pears—Bartlett, Bell, Vicar of Winkfield, Clapp's Favorite, Duchesse d'Angouleme.

Peaches—Alexander, Crawford's Early.

Grapes—Concord, Scuppernong, Hartford Prolific and Martha.

Plums—Wild Goose, Chickasaw and Damson.

Cherries—Yellow Spanish, Governor Wood and Reine Hortense.

B.—Brown loam table-lands, midland counties of West Tennessee. Counties are Weakley, Gibson, Crockett, Madison, Haywood, Hardeman and Fayette:

Winter apples—Royal Red, Winesap, Jeniton, Winter Green.

Summer apples—Red June, Yellow June, Early Harvest, Maiden's Blush.

Autumn apples—Red Pryor, Yellow Pryor, New York Pippin, Kentucky Streak, Ben Davis, Belmont, Fall Pippin.

Pears—Buffum, Tyson, Bartlett, Clapp's Favorite, Le Conte, Sugar.

Peaches—Crawford's Early, Heath, Hale's Early, Chinese Cling, Hampton, Lemon.

Grapes—Concord, Catawba, Hartford Prolific, Brighton, Rogers No. 4, Scuppernong.

Plums—Wild Goose, Damson.

Cherries—Early May, Dixon, Ox Heart, Morello.

C.—Summit region of Water-shed, West Tennessee. Counties: Henry, Carroll, Henderson, Chester, McNairy:

Winter apples—Ben Davis, Winesap, Shockley, Limber Twig, Rome Beauty, Kentucky Streak, Royal Red, Hall's Seedling, New York Pippin.

Summer apples—Horse, Summer Queen, Red June, Yellow Sweet, May, Early Harvest, Summer Rose.

Autumn apples—Leather Coat, Maiden's Blush, Crank, Fall Red.

Pears—Sugar, Le Conte, Keiffer, Pound, Bartlett.

Peaches—Crawford's Early, Heath, Cling.

Grapes—Concord, Moore's Diamond, Scuppernong, Martha.

Plums—Wild Goose, Deep Creek, Spaulding, May, Damson.

Cherries—Early May, Black Heart.

D.—Valley of Tennessee River. West and Middle Tennessee. Stewart, Benton, Houston, Humphreys, Decatur, Perry, Hardin counties :

Winter apples—Winesap, Winter Pearmain, Limber Twig, Ben Davis, Kinnard's Choice, Hall's Seedling, Rusty Coat.

Summer apples—Early Harvest, Red June, Horse, Striped June, Yellow June.

Autumn apples—Fall Pippin, Maiden's Blush, Vandevere, Smokehouse, Fallawater.

Pears—Seckel, Bartlett, Le Conte, Clapp's Favorite, Deyey's Premium, Bell.

Peaches—Cling, Lemon, Stump the World, Waterloo, Elberta.

Grapes—Delaware, Catawba, Concord, Martha.

Plums—Wild Goose.

Cherries—Black Tartarian, Early Dyehouse, Florence, Black Heart.

E.—Highland Rim of Middle Tennessee, Western Sub-division. Counties are Montgomery, Robertson, Cheatham, Dickson, Hickman, Lewis, Wayne, Lawrence :

Winter apples—Winesap, Pearmain, Ben Davis, Shockley.

Summer apples—Summer Queen, Red June, Summer Rose.

Autumn apples—Bidwell's Favorite, Vandevere.

Pears—Sugar, Bartlett.

Peaches—White Heath, Stump the World, Great Western.

Grapes—Catawba, Concord, Ives.

Plums—Wild Goose, Northern Beauty.

Cherries—Governor Wood, Black Heart, Early May.

F.—Highland Rim of Middle Tennessee, Eastern Sub-division. Macon, Clay, Pickett, Overton, Jackson, Putnam, De Kalb, White, Warren, Coffee, Franklin counties :

Winter apples—Winesap, Kinnard's Choice, Limber Twig, Yates, Hall's Seedling, Ben Davis, Green Crank, Rusty Coat.

Summer apples—Early Harvest, Red June, Pearmain, Horse, Yellow June, Red Astrachan, White Sweet.

Autumn apples—Shockley, Pearmain, Kinnard's Choice, Poplar Block, Buckingham, Smokehouse, Maiden's Blush, Fallawater, Fall Queen.

Pears—Bartlett, Seckel, Duchesse, Comet, Idaho, Le Conte.

Peaches—Hale's Early, Mountain Rose, Finley's October, Wonderful, Early Golden, Early York.

Grapes—Concord, Delaware, Norton's Virginia, Ives, Green Mountain, Moore's Diamond, Moore's Early.

Plums—Wild Goose, Amber, Deep Creek, Dane Star.

Cherries—Early May, Black Heart, Morello, Yellow Spanish, Centennial, Late Duke.

G.—Central Basin. Counties are Sumner, Trousdale, Smith, Davidson, Wilson, Williamson, Rutherford, Cannon, Maury, Marshall, Bedford, Giles, Lincoln, Moore :

Winter apples—Winesap, Limber Twig, Ben Davis, Winter Pearmain, Hall's Seedling, Barker's Liner, Lady, Kinnard's Choice, Paragon, Shockley, Rome Beauty, McMurray's Favorite.

Summer apples—Early Harvest, Red June, Summer Rose, Horse, Summer Queen, May, Summer Pearmain.

Autumn apples—Maiden's Blush, New York Pippin, Fall Red, Baltimore, Lady Twig, Poorhouse, Poplar Block, Bellflower.

Pears—Bartlett, Seckel, Le Conte, Sugar Bell, Flemish Beauty, Louise Bonne de Jersey.

Peaches—White Plum, Indian, September Fall Stone, Heath, McEwen, White Cling, Snow, Crawford's Early, Briggs, May, Harriett, Alexander.

Grapes—Norton's Virginia, Ives, Lutie, Concord, Catawba.

Plums—Wild Goose, Chickasaw, Yellow.

Cherries—Early May, Morello, Sanford, Early Richmond, Ox Heart.

H.—Cumberland Table-land. Scott, Fentress, Morgan, Cumberland, Van Buren, Grundy counties :

Winter apples—Jeniton, Limber Twig, Winesap, Long Limb, Never-fail, Black Apple, Royal Limber Twig.

Summer apples—Red June, Yellow June, Early Harvest, Sweet Bough, Summer Queen.

Autumn apples—Lady Finger, Bellflower, Maiden's Blush, Kinnard's Choice, Virginia Seedling, Fallawater, Nashville Mammoth.

Pears—Sugar, Flemish Beauty, Bartlett.

Peaches—Stump the World, Snowflake, Indian, Tennessee Mammoth, Hale's Early.

Grapes—Concord, Ives, Delaware.

J.—Cumberland Table-land and Valley of East Tennessee. Counties : Claiborne, Campbell, Anderson, Rhea, Bledsoe, Sequatchie, Marion, Hamilton :

Winter apples—Limmer Twig, Green Crank, Pippin, Murfreesborough, Winesap, Mitchell, Rusty Coat, Volunteer.

Summer apples—Early Harvest, Red June, Benoni, Lady Finger.

Autumn apples—Buckingham, Vandevere, Fall Queen, Maiden's Blush, Gravenstein, Grimes' Golden, Ben Davis.

Pears—Sugar, Bartlett, Wilder, Idaho, Flemish Beauty, Sheldon.

Peaches—Red Plum, White Plum, Indian, Bidwell's, Old Mixon, Chinese Seedling, Stump the World.

Grapes—Concord, Catawba, Brilliant, Bebecca, Moore's Early.

Plums—Wild Goose, Chickasaw.

Cherries—Morello, Early May.

K.—East Tennessee Valley. Sullivan, Hawkins, Hancock, Washington, Hamblen, Grainger, Union, Knox, Roane, Loudon, McMinn, Meigs, Bradley and James counties:

Winter apples—Winesap, Limber Twig, Ben Davis, Shockley, Robinson, Hall's Seedling.

Summer apples—Early Harvest, Red June, Red Astrachan, Horse, Summer Queen, Sweet Scent, Early Ripe, Lady's Delight.

Autumn apples—Buckingham, Maiden's Blush, New York Pippin, Graves' Red, Yellow Bellflower, Golden Pippin, Fallawater, Neverfail, Kinnard's Choice, Smoky Twig, Rhode Island Greening.

Pears—Bartlett, Clapp's Favorite, Duchesse, Seckel, Osborne's Summer, Duchesse d'Angouleme, Bell.

Peaches—Stump the World, Indian, Old Mixon, Snow, Early Rivers, Mountain Rose, Foster, Early June, Beatrice.

Grapes—Concord, Moore's Early, Brighton, Niagara, Martha, Pocklington, Roger's No. 4.

Plums—Wild Goose, Smith's Orleans, Albright's Damson, Chickasaw.

Cherries—May Duke, Black Morello, Early Richmond, Early May.

L.—Valley of East Tennessee and Unaka Region. Johnson, Carter, Unicoi, Greene, Cocke, Sevier, Blount, Monroe, Polk counties:

Winter apples—Green Pippin, Luster, Dominie, Limber Twig, Winesap, Pioneer, Morgan, Shockley, Howard, Red Pippin, Neverfail.

Summer apples—Early Rose, Early Harvest, Early Summer, Maiden's Blush, Golden Pippin, Horse, Yellow Crank.

Autumn apples—Northern Spy, Red Pippin, Virginia Beauty, Fallawater, Pennsylvania Pippin, Crawford's Fall, Fall Pippin, Bellflower.

Pears—Le Conte, Keiffer, Bartlett, Clapp's Favorite, Margarette, Sugar.

Peaches—Eaton's Cling, Heath, Grand Admirable, Amsden, Crawford's Early, Crawford's Late, Old Mixon, Alexander.

Grapes—Concord, Ives, Moore's Early, Delaware, Martha, Eumelan.

Plums—Wild Goose, Green Gage, Golden Beauty, Golden Drop, English Blue, Imperial Gage, Richland.

Cherries—Early May, Governor Wood, Ohio Red, Morello, Early Richmond, Black Tartarian.

#### NOTES FROM REPORTERS.

C. E. Fuller, M. D., Morristown—Osborne's Summer Pear is the only variety out of forty, planted in 1883, that has not blighted. This is an excellent variety. The Seckel is equally as good. The Le Conte

is not to be recommended for East Tennessee as the leaves emerge too soon in the spring and are killed by late frosts. I have twenty varieties of grapes. The best and most profitable are Niagara and Perkins. The next best Martha, Catawba, Hartford Prolific and Delaware. I do not advise planting Concord, Moore's Early, Pocklington and Highland Triumph.

J. C. Hodges, Morristown—All the fruits ought to be sprayed for ten days after blooming with a weak solution of Paris green. It pays immensely. Black rot renders the grape crop worthless unless it is successfully combated. Paper bagging is by all odds the sure way to combat it. All of our East Tennessee lands need potash to secure the best results in fruit culture.

Robert Gallagher, Shelbyville—For the past two or three years our pear trees have been almost ruined by blight. Two-thirds of the bearing trees in this locality have been killed, and the remainder are doing but little good. Decidedly the most valuable grape for Middle Tennessee is the Lutie. It was originated in Maury County and has been entirely free from black rot ever since I have been growing it. It is a showy red grape, good for table use, the flavor being equal or superior to that of the Delaware. The growth closely resembles that of the Concord. It is almost useless to plant the Concord here on account of the rot which attacks it so severely.

### CONCLUSIONS.

1. The best apples for Tennessee are usually of southern origin.
2. The number of apples grown in Tennessee originated farther north is comparatively small.
3. The two most extensively grown and perhaps the finest winter apples are Limber Twig and Winesap.
4. Early Harvest, Red June, Horse and Summer Rose are the most popular summer varieties.
5. Fall Queen, Ben Davis, Maiden's Blush, Kinnard's Choice, Shockley and Buckingham are the best for autumn use in most localities.
6. There are many seedling fruits in Tennessee, the names of which are unknown, that are good varieties and should be largely disseminated.
7. The number of pears in cultivation is limited to Le Conte, Keiffer, Bartlett, Seckel, Clapp's Favorite, Bell, Duchesse, Flemish Beauty, Duchesse d'Angouleme, and a few others.
8. The native seedling peaches receive the most attention. Good cultivated varieties are Crawford's Early and Late, Heath, Indian, Snow, Stump the World and Mountain Rose.

9. The Concord grape is adapted to most localities. Other varieties reported as doing well are Ives, Moore's Early, Diamond, Scuppernong, Catawba, Delaware, Lutie, Norton's Virginia and Martha.

10. The Wild Goose plum is superior in all parts of the State.

11. Early May is the most popular cherry. Governor Wood, Black Heart, Early Richmond, and May Duke, reported as good varieties.

### III—EXPERIMENTS WITH VEGETABLES.

Vegetables are indispensable. The cost of production is small and the profits large. If grown for market, the money profits may not be great, but they are usually more than those of the staple farm crops. It is difficult to find a more profitable business than gardening, if the proper care and knowledge is exercised in the cultivating and marketing.

In view of the above facts, that so many are engaged in the production of vegetables either for profit or pleasure, and these plants occupy such an important place in the horticultural world, a portion of our time has been devoted to their cultivation. Variety testing was the main object in view.

Our vegetable garden is located on the college farm, one mile west of the Station. The soil is a clayey loam, with a southern exposure, sloping gradually towards the river. Over two hundred varieties were grown, side by side, with practically the same soil, treatment, and atmospheric conditions. The old and well known kinds were tested, with a few of more recent introduction. Full and complete notes have been kept upon the date of planting, germination, first blossom, first ripe fruit, productiveness, size, color, form, flavor, etc. Before planting, the germinating power of most of the seeds was determined, and a few words here, upon the method and importance of seed testing, may be of some value.

#### SEED TESTING.

We deem this important and essential work which should be done, not only by the Experiment Station, but every farmer and vegetable gardener should determine the germinating capacity of his seeds before planting. There are many causes which tend to diminish the vitality of seeds. Immaturity at time of gathering, fungous diseases that attack them under favorable conditions of temperature and moisture, the numerous insect enemies that ravage them, and old age, which is sometimes the fault; all of these may have an effect upon their vitality. The Station cannot perform this work for the hundreds of farmers in Tennessee, but every farmer and gardener may secure a testing apparatus and manipulate the work with his own hands. Competition has become so strong among seedmen that they cannot afford to sell

poor seed, but many of the conditions affecting them are beyond their control, and in spite of careful treatment, inferior seeds are sometimes thrown upon the market, which, if sown, will fail to germinate, or produce plants feeble in growth. Great losses are incurred by spending time and money in preparing and manuring soils for seeds which give poor results. A little time spent in the winter, when you are not very busy, will remedy this evil, and when the planting season arrives, you can rest assured that good seed is being used.

The germinator or tester that we use is very simple and convenient in management. It has been in use at the New York Station for several years, and is commonly called the Geneva Tester. The apparatus consists of a copper box fourteen inches long by nine inches wide, and three and one-half inches deep, with a narrow copper shelf on each long side one-half inch below the top. On these shelves slide brass wires, which serve as supports for as many pockets or folds of cotton flannel cloth. In the bottom of the box is one-half inch of water, but it does not touch the pockets, all the moisture reaching the seeds by a gradual absorption. The ends of the cloth dip into the water and carry moisture throughout its entire length by capillary action. A pane of glass covers the box, which is kept in a temperature of from seventy degrees to eighty degrees Fahrenheit. A box of the above size will hold fifty pockets. Fifty or one hundred seeds should be tested of each variety, running duplicates if possible. It is best to examine the seeds daily, remove, count, and record all that have sprouted. With cabbage, tomatoes, lettuce, and turnips, over half of the seeds will usually germinate in six days; but it is necessary to continue the test for two or three weeks in order to determine the exact percentage.

### BEANS.

The seeds of fourteen varieties were sown April 17, in drills thirty feet long, or in hills four feet apart. Nearly all the varieties had vegetated by the 26th of April. Soon after they sprouted, we received a good rain, which pushed them forward very rapidly, so the first flower appeared on the Mohawk May 24th, followed on the 25th and 26th by Burpee's Saddle Back, Early Six Weeks, and Boston Market. The varieties that matured fruit first were Golden Wax and Blue Improved Butter. These were marketable June 10th, or fifty-four days from date of planting. Most of the varieties were marketable by the 20th of June, except pole beans that did not ripen until August, and these continued through October. Earliness is an important factor, as early varieties usually command better prices. The most productive bean we tried was King of the Garden, six hills of which yielded fifty-five pounds. Of the pole beans, Golden Cluster Wax made the best showing, from which we picked forty-six pounds. Taking all the favorable

points into consideration, we would recommend the following bush varieties: Improved Early Red Valentine, Extra Early, Wardwell's Wax, and Golden Wax. Pole beans: King of the Garden, and Dreer's Improved.

Dreer's Improved Lima—Very productive. An early Lima variety, bearing pods seven inches long. Beans roundish, almost as large as the Large White Lima. Good for market or family use.

Extra Early—Pole. One of the most productive varieties tried. Pods large, six inches long, one and three-fourths inches broad. Fruit ripened a week earlier than Dreer's Improved. Fifty pods weighed thirty-two ounces.

Golden Cluster Wax—Pole. Good for market or family use. Marketable in sixty-five days from planting. Pods seven inches in length.

Golden Wax—Bush. An excellent variety; strong in growth, bearing yellow pods, five inches long; pods tender, stringless; good for market. Very early, marketable in fifty-four days.

Improved Early Valentine—Bush. Early and very productive. The pods are round, fleshy, and tender. Marketable in fifty-nine days from planting.

King of the Garden—Lima. Our most productive bean. A vigorous grower, bearing pods varying in length from five to eight inches. Marketable August 7th.

Mohawk—Bush. A valuable variety for early market. Pods five to eight inches long. Bush fourteen inches high.

Wardwell's Kidney Wax. Bush. Early, productive, with pods five inches in length. Marketable in fifty-four days. One of the best wax beans.

### BEETS.

Sixteen varieties were sown in drills April 16th. When the plants became large enough they were thinned out to about five inches. The following varieties gave the best results.

Bastian's Early Turnip—A red beet, of vigorous growth, early and productive. Ten roots weighed nine pounds.

Bastian's Half-long Blood—Of bright red color, and excellent quality. Very early, medium size, and fairly productive.

Eclipse—One of the earliest, rounding in form, smooth, with skin and flesh of deep red. Roots medium in size. An excellent forcing variety.

Egyptian—Roots large, with a rich crimson color. Tops very small. Valuable for forcing.

Extra Early Bassano—This is a very early flat variety, tender and juicy. Roots red, with a white flesh, measuring four inches in diameter. Marketable June 10th.

Improved Long Blood—This beet averaged ten inches in length. Red in color and quite productive. A good late variety for fall and winter use.

Pineapple—A half-long, productive variety, with red roots weighing nearly two pounds.

### CABBAGE.

Seeds of twenty varieties of cabbage were sown in shallow boxes February 7th, and then placed in the hot bed. The seedlings from these were transplanted in the same kind of boxes March 12th, and set in the cold frame, which gave plants large enough for the garden by the 15th of April. Twenty plants of each variety were used, making rows three feet apart, allowing two and one-half feet between the plants. The weather was unusually dry after transplanting, hence we were compelled to water a few times until they became established. In spite of the dry weather the plants grew rapidly, and by the 9th of June they were ready for market.

The Early Jersey Wakefield was the first to mature. One day later we cut a head of Landreth's Earliest, and by the 11th the large variety of Wakefield gave another head. Henderson's Early Summer was not far behind, for we cut a head from this on the 13th. Seven other varieties produced marketable specimens by the 20th of June. It is especially important for market gardeners to have early cabbages, for they are usually very much more profitable than later ones.

Another important factor is large heads. The true way to sell cabbage is by weight, a method which is coming into practice more every year. The variety that produced most abundantly was one called Worldbeater, and we believe the name is well applied, since it exceeded all others in weight. We do not recommend this variety, however, because the heads are not firm. Other very productive varieties were: Nonsuch, Early Summer, Surehead, All Seasons, Burpee's All-head, Improved Flat Brunswick and Etampes. We recommend the following for early market: Early Wakefield, Large Early Wakefield, Early Flat Dutch, Early Summer, and Landreth's Earliest. For later cuttings, Etampes, Burpee's All-head, Nonsuch, and All Seasons. Many of the more common late varieties were not tested, some of which, very likely, are better adapted to our soils than those just mentioned.

All Seasons—This is a very satisfactory cabbage. One of the most productive varieties. Heads large, firm, and measure eight inches in diameter. Rather late in maturing; first marketable June 23rd.

Burpee's All-head—An excellent second early cabbage. First ripe specimen July 2nd. Heads large, eight inches in diameter, and very firm.

Early Jersey Wakefield—This is an old, well known and justly esteemed variety. It matured heads sooner than any other variety,

June 9th, hence it is very valuable as an early market sort. The heads are pyramidal in form and always very firm.

Early Winningstadt—A variety that is considered valuable. It gave us poor satisfaction, the heads being very small.

Early Red Dutch Erfurt—A good pickling variety, but not to be recommended for other purposes. Heads very small.

Early Improved Flat Brunswick—Medium in earliness, and very productive. Heads not firm.

Early York—A medium early sort. Marketable June 15th. Heads firm, weighing two and one-half pounds.

Etampes—Heads large, pyramidal in shape, and moderately firm. A very productive and excellent variety.

Henderson's Early Summer—The Early Summer heads about a week later than the Wakefield, but being very much larger and equally good in quality, it ranks as our best large early variety. The heads when mature frequently weigh eight to ten pounds.

Large Early Jersey Wakefield—A large variety of Early Wakefield, but for some reason there was little difference in size in our patch.

Nonsuch—Ripe June 15th. Large, firm, rather flat in shape. Second in productiveness of those that we tried. An excellent second early variety.

Newark, or Flat Dutch—Large, flat, firm heads. Quite early, productive, and good for market or home use.

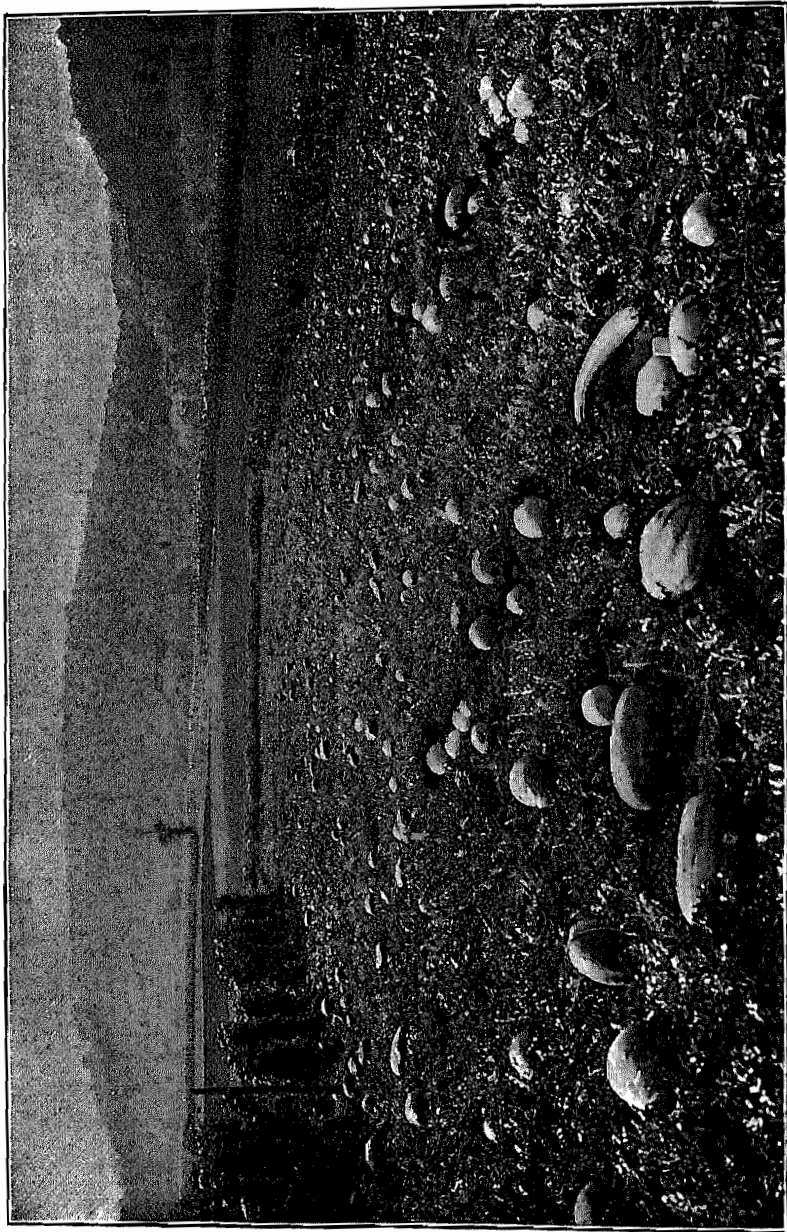
Surehead—Produces large, round, flattened heads. Late in maturing, and satisfactory for late cuttings.

Worldbeater—Yielded the largest of any we tried. Heads very large, but not firm.

### CAULIFLOWER.

Cauliflower is treated in the same general manner as cabbage. We succeeded in growing fine plants which were transplanted in the garden April 23rd. About the time they commenced to head, an insect enemy, the Harlequin cabbage bug, *Murgantia histrionica*, attacked them, and in a few days it had spread over the entire patch. This insect feeds upon cruciferous plants, as cabbage, turnips, radishes and cauliflower. The beetle measures about one-quarter inch in length, and is very easily recognized as it possesses distinct markings of yellow, orange or red. In the adult stage it winters among refuse leaves, manure, or other material left in the field, and emerges early the next spring when the eggs are deposited on the young plants. They soon hatch and the young commence their destructive work of sucking the sap from the leaves.

This insect spread over the entire patch in a few days. It is a most difficult enemy to combat, and no effectual remedy is known. The only insecticide that has any effect is kerosene emulsion. We



VARIETY TEST WITH MELONS.

applied this solution in different proportions, but with little success. The picking of the first brood that appears is the most effectual means. Its presence was not discovered in our patch, however, until several generations had been hatched; hence we were unable to check its depredations. Nearly all the plants were completely destroyed.

### LETTUCE.

We tested sixteen varieties of lettuce. The young plants received the same treatment and care as was given the cabbage and cauliflower, except they were not taken to the garden until the 29th of April. Black-seeded Simson made the best showing. It produced heads thirteen inches in diameter, averaging about one pound each. This is a very easily grown variety, forming large, loose heads. Grand Rapids, a new variety, originated in Michigan, is quite productive, and possesses very fine, tender foliage. It is especially desirable for forcing purposes. The following kinds gave the best results: Black-seeded Simson, Early Curled Simson, Early Curled Silesia, Hanson, Sugar Loaf and Grand Rapids.

Grand Rapids—This new variety originated in Grand Rapids, Michigan. The heads are loose, large, measuring ten inches in diameter and weighing nearly a pound. Foliage is beautiful in appearance. It ranked second in productiveness. The upright nature of the leaves with their fine appearance, makes this variety one of the best for forcing.

Early Curled Simson—A much cultivated variety, being valuable both for garden and forcing. It does not produce a true head, but forms a close compact mass of leaves having a curling habit. Very early, and extensively used for forcing.

Black-seeded Simson—Quite similar in appearance to Early Curled Simson, but the heads are fully one-third larger. Good for market or forcing.

Early Curled Silesia—A fine early curled variety. Leaves large and tender. Very productive.

Hanson—A true heading variety, very crisp and tender. Productive, heads large, and good for forcing or summer use.

Sugar Loaf—Of dark foliage and very attractive in appearance. Heads large and very compact.

### MUSKMELONS.

Few vegetables are more easily grown in this locality than muskmelons. The refreshing character which the fruit always possesses renders them very desirable for table use. They thrive best in a light, rich soil, but will do well in a heavy soil, provided it is not too wet. Ours were planted in quite a heavy clay, but in spite of this fact they grew vigorously and made a good yield. Plate I shows the musk

melons on the right. The seeds of fourteen varieties were planted in hills six feet apart on the 17th of April. Previous to sowing, a few shovelfuls of well-rotted manure were mixed in each hill with a small quantity of commercial fertilizer. Five hundred and forty-one melons, weighing 1,438 pounds, were picked from 126 vines. Green Citron netted was the first to ripen, July 18th.

Earliness is of paramount importance if the crop is designed for market, as early varieties are invariably much more remunerative than later ones. It is difficult to determine which ones deserve the highest recommendation, there are so many points to take into consideration. Flavor, perhaps, is the most important element. Netted Pineapple. Montreal Market, Hackensack and Golden Jenny were finely flavored. New Giant produced the largest specimen, which weighed 12 $\frac{1}{2}$  pounds. Thirty melons cut from this variety averaged five pounds each. Other good varieties are Miller's Cream, Emerald Gem, Bay View, Montreal Market and Baltimore.

Bay View—This is a large oval melon, weighing from five to ten pounds. The rind is thin, flesh green, firm, and of medium flavor. First fruit picked July 25th.

Baltimore—An oval, green-fleshed variety, of excellent shipping qualities, and grown extensively for this purpose. Fruit medium in size, of excellent flavor, very productive.

Casaba or Persian—Only one seed germinated, the vine of which bore seven melons, weighing thirty-eight pounds. Medium in flavor.

Emerald Gem—Too much cannot be said of the flavor of this melon. Our most prolific one, 67 specimens that weighed 146 pounds, being produced on nine vines. Rind thin, green in color. Worthy of general cultivation and especially for home use.

Florida Alligator—Fruit measures twenty-four inches long and four inches in diameter. A specimen, shown to the right in Plate I, measured thirty-eight inches in length. Flavor poor.

Golden Jenny—A small, very prolific, early variety. Flavor superior to all others. Nine vines yielded seventy-eight ripe specimens. Valuable for early market.

Green Citron Netted—The total number of melons from this variety weighed more than those of any other kind. Flesh green and of a fine flavor. Fruit six to eight inches in diameter.

Hackensack—One of the most popular varieties grown for market in this locality. It attains a large size and is attractive in appearance. Skin green and thickly netted. Flavor excellent.

Montreal Market—Very prolific and large. Form round and deeply ribbed. Highly esteemed by many as a market variety.

Netted Pineapple—A good melon, small in size. Flesh green, firm, juicy and sweet. Very prolific.

New Giant—Ordinary in flavor, but very large. We cut one that was twelve inches long, eight inches in diameter, that weighed  $12\frac{3}{4}$  pounds.

### WATERMELONS.

The watermelon is the richest and most highly valued fruit of any plant in the family to which it belongs. Large quantities are grown on the sandy soils of New Jersey, and in the vicinity of our more southern cities. It is becoming a most important crop for both family and market use in Tennessee. The melon thrives best in a light soil with a warm climate. No difficulty is encountered in finding the proper soil in a State with so many different soils as Tennessee, and the climatic conditions could scarcely be better. Our farmers and market gardeners seem to be well informed as to the ease with which melons may be grown, for immense quantities are supplied the city markets through the entire season. In fact melons can scarcely be called a garden product, for field culture is generally practiced, cultivating in the same general manner as is customary with corn or potatoes. The price received is not always large, but productiveness counterbalances the low prices and renders them a very profitable and satisfactory vegetable for the market gardeners.

Plate I is reproduced from a photograph of our patch, taken about the time the melons commenced to ripen. The seed was planted in hills, seven by eight feet apart, on the 17th of April. The soil was thoroughly enriched with rotten manure, a small quantity of a nitrogenous commercial fertilizer being added. A great many seeds failed to vegetate, but the stand was nearly sufficient to cover the ground with vines. From 165 vines we harvested 400 melons, weighing 5,039 pounds. The largest melon, a forty pound one, was cut from a variety called Boss. Striped Gypsey and Ironclad each produced one that weighed thirty-nine pounds. All of these melons possess good flavors and are excellent market varieties. The best flavored ones were Mountain Sweet, Green and Gold, and Dark Icing. Pride of Georgia, Cuban Queen, Striped Gypsey, Boss, and Scaly Bark are all standard melons.

The following statement gives the productiveness, flavor and when first marketable of the melons from five vines of each variety :

| NAME.                   | First marketable. | Number of melons from five vines. | Weight of melons from five vines. | Flavor.         |
|-------------------------|-------------------|-----------------------------------|-----------------------------------|-----------------|
| Black Spanish.....      | August 11         | 11                                | 85                                | Very good.      |
| Boss.....               | August 10         | 10                                | 153                               | Very good.      |
| Burpee's White Gem..... | August 11         | 7                                 | 71                                | Good.           |
| Citron.....             | August 20         | 37                                | 267                               | For preserving. |
| City of Mexico.....     | August 5          | 10                                | 148                               | Poor.           |
| Cuban Queen.....        | August 7.         | 9                                 | 163                               | Very good.      |
| Dark Icing.....         | July 25           | 9                                 | 80                                | Very superior.  |
| Florida Favorite.....   | August 5.         | 6                                 | 67                                | Very good.      |
| Fordhook Early.....     | July 27...        | 8                                 | 67                                | Good.           |
| Green and Gold.....     | July 31...        | 14                                | 150                               | Very superior.  |
| Ironclad.....           | August 7.         | 14                                | 168                               | Good.           |
| Kolb Gem.....           | August 5.         | 11                                | 146                               | Very good.      |
| Mountain Sweet.....     | August 6.         | 7                                 | 80                                | Superior.       |
| Orange.....             | July 30...        | 12                                | 102                               | Very good.      |
| Pride of Georgia.....   | August 4          | 10                                | 140                               | Good.           |
| Scaly Bark.....         | August 14         | 10                                | 197                               | Good.           |
| Seminole.....           | August 6.         | 8                                 | 75                                | Medium.         |
| Striped Gypsey.....     | August 4.         | 20                                | 280                               | Excellent.      |
| Volga.....              | August 10         | 15                                | 135                               | Medium.         |

**Boss**—The largest melon, a forty pound one, measuring twenty-one inches in length with a diameter of thirteen inches, was produced on this variety. Rind dark green and very brittle. Flesh bright red, firm, tender, of a superior flavor. An excellent variety.

**Citron**—For preserving only. Small, round, very productive. Should be grown more for preserving.

**Cuban Queen**—A very large melon, averaging about twenty pounds in weight. Rind light green, striped, very thick. Flesh red, tender, superior flavor. A good shipper.

**Dark Icing**—Very superior in flavor. Not productive. The first to ripen, which was on July 25th.

**Green and Gold**—With beautiful golden flesh. Very uniform in size and shape. Rind thin. Early, productive, and superior in many respects.

**Ironclad**—Of large size, and very solid. Rind green, striped. Flesh tender and finely flavored. A splendid late melon.

**Kolb Gem**—Melons large, uniform in size. Rind green, striped, rather thin. Bright red flesh, solid. A good variety.

**Pride of Georgia**—Medium in earliness, quite productive. Averaged fourteen pounds in weight. Rind thick, green, striped. Flesh bright red, tender, of a good flavor.

Scaly Bark—Very late, and among the largest. Third in yield. Uniform in shape, green, spotted. Flesh firm, tender, good flavor. A splendid variety for late market.

Striped Gypsey or Rattlesnake—Ripe August 4th. Fruit long, quite large, and very numerous. Twenty melons were picked from five vines, weighing 210 pounds. Our most productive and prolific variety. Rind dark green, striped, of medium thickness. Flesh bright red, tender, and of a delicious flavor. Should be generally grown.

### PEAS.

Seed sown in drills April 11th, vegetated by the 24th. Extra Early Pioneer and Improved Daniel O'Rourke, gave edible peas June 1st, or forty-six days from date of planting. These were followed a few days later by Tom Thumb, Lightning, Stratagem, Dreer's Eureka, Extra Early, and a few others. The largest yield was from Dwarf Blue Imperial, which had pods three inches long, and three-quarters of an inch broad. We would recommend for early picking all of the above varieties, and McLean's Advance, and Dwarf Blue Imperial for later use.

American Wonder—Dwarf, vines ten inches high. Matures early. Not productive.

Dreer's Eureka Extra Early—Gave good results. First picking June 4th, or forty-nine days from planting. Plants twenty-four inches high, and very productive.

Dreer's Extra Early Pioneer—Ready for use June 2nd. One of the earliest varieties. Pods of medium size, containing four to six large peas. Excellent for market or table use.

Dwarf Blue Imperial—Vines thirty inches high, bearing large, blue pods. The most prolific variety we tried.

Everbearing—Matured with Stratagem June 1st, and continued to bear until 21st, which was longer than any other variety. Vines thirty inches high. Ranked fourth in productiveness.

Improved Daniel O'Rourke—A valuable sort for market gardeners. Vines vigorous, bearing medium-sized pods. Quite early and productive.

Telephone—Edible June 20th. Pods long, measuring three and one-half inches. Medium in productiveness.

### RADISHES.

Radishes are very easily grown, and become of edible size in less than thirty days, being ready for the table several weeks before any other garden product. Because of this fact radishes usually command a good price in the city markets, and gardeners consider them one of their most profitable crops. Forcing in hot beds or greenhouses is practiced when they are desired for very early market. Some varieties

adapted to forcing attain salable size in from twenty to twenty-five days, making it possible to grow several crops in one season under the same glass.

We tested twenty-seven varieties. The seed was sown April 15th, and nine varieties were of marketable size by the 15th of May. Wood's Early Frame, a favorite variety with market gardeners, gave roots large enough for market on May 12th. Round White Forcing and a number of others were about two days later. All of the following varieties are very early and good for forcing purposes: Wood's Early Frame, Round White Forcing, Round Red Forcing, Cardinal Globe, White Box, Salzer's Twenty Day Forcing, and Early French Breakfast.

### SWEET CORN.

Eight varieties of sweet corn were sown April 18th. All had fully vegetated by the 28th, and one sort, Crosby's Extra Early, furnished marketable ears on the 4th of July, followed in about a week later by Egyptian, Little Gem, Triumph, and Roslyn Hybrid. Stowell's Evergreen and Marblehead may be mentioned as doing well.

Crosby's Extra Early—Early and valuable as a market variety. Ears rather small, but of excellent quality. Marketable July 4th.

Egyptian—This is one of our best late varieties. It gave marketable ears by the 15th of July, and continued until August 2nd. Ranked second in productiveness, forty-five ears being produced on stalks in thirty feet of drill. Ears very large.

Little Gem—The most prolific variety tested. Forty-eight ears attained marketable size. Ripe July 16th. Well adapted to both family and market use.

Marblehead—Very early, ripened July 6th. Ears measure eight inches in length. Medium in productiveness.

Stowell's Evergreen—An excellent variety for late use. First saleable July 16th, last marketable August 1st. Ears numerous and very large.

Triumph—Ears eleven inches in length, larger than any other variety. Marketable June 16th. Medium in productiveness.

### TOMATOES.

This vegetable is one of the most important, desirable, and profitable of all garden products. The soil and climate of East Tennessee seem unusually well adapted to its growth. Large quantities are grown in all sections of the State, and especially in the vicinity of our cities. They generally command from twenty to fifty cents per bushel. This price seems small, but the yield is so large that even such a limited sum makes the crop more remunerative than the grain or cereal products of the farm. Four hundred bushels per acre is not an uncom-

mon yield. As a result of the easy culture, the city markets are quite well stocked early in the season, hence the low prices. This might be remedied by establishing canning factories. Several such factories are located in the State, all of which, we believe, are doing a profitable business. The northern markets should be entirely supplied with tomatoes grown and canned in southern states.

Our tomato tests were most satisfactory in every respect. We tried twenty-five varieties. The seed was sown February 23rd in shallow boxes placed in the hot bed, seedlings from which were transplanted March 24th in the same kind of boxes, allowing two and five-eighth inches between the rows. The plants made a vigorous and healthy growth, and on the 24th of April we set them in the field, planting four feet apart. 35,330 sound tomatoes were picked from 327 vines, making a total weight of 3,557 pounds, or about seventy bushels. This yield is at the rate of 560 bushels per acre. A large percentage decayed before maturity, but these are not included in the above figures.

The Golden Queen was the most productive variety. From ten plants we harvested 810 specimens, weighing 170 pounds. We deem this one of the best varieties. It is smooth, seldom cracks, early to ripen, productive, and of a superior flavor. Ten vines of Yellow Pear yielded 5,950 tomatoes, weighing 138 pounds. Most of the common varieties gave good results, and it is impossible to say which ones deserve the highest recommendation. All of the following are good: Golden Queen, Yellow and Red Pear, Dwarf Champion, Livingston's Favorite, Cardinal, Livingston's Perfection, Optimus, Ignatum, Paragon, and others.

Complete notes were kept on ten plants of each variety. Earliness and productiveness are the two most important factors with tomatoes, perhaps, and the following statement will show the relative merits in these respects:

| NAME.                        | First ripe fruit. | No. of sound fruit from ten vines. | Wt. of sound fruit from ten vines. |
|------------------------------|-------------------|------------------------------------|------------------------------------|
|                              |                   |                                    | Lbs.                               |
| Acme.....                    | July 8.           | 720                                | 160                                |
| Cardinal.....                | " 12.             | 570                                | 115                                |
| Dreer's Selected.....        | " 10.             | 320                                | 98                                 |
| Dwarf Champion.....          | " 6.              | 310                                | 71                                 |
| Early Acme.....              | " 9.              | 364                                | 100                                |
| Early Paragon.....           | " 15.             | 355                                | 88                                 |
| Golden Queen.....            | " 11.             | 810                                | 170                                |
| Ignotum.....                 | " 9.              | 480                                | 99                                 |
| King Humbert.....            | " 6.              | 472                                | 124                                |
| Livingston's Beauty.....     | " 9.              | 361                                | 105                                |
| Livingston's Favorite.....   | " 16.             | 406                                | 110                                |
| Livingston's Perfection..... | " 6.              | 539                                | 110                                |
| Lorillard.....               | " 14.             | 373                                | 79                                 |
| Matchless.....               | " 8.              | 498                                | 113                                |
| Mayflower.....               | " 23.             | 362                                | 100                                |
| McCullom's Hybrid.....       | " 22.             | 480                                | 122                                |
| Mikado.....                  | " 22.             | 260                                | 127                                |
| Optimus.....                 | " 11.             | 287                                | 72                                 |
| Peach.....                   | " 16.             | 1015                               | 76                                 |
| Red Mikado.....              | " 6.              | 420                                | 110                                |
| Red Pear.....                | " 10.             | 3750                               | 105                                |
| Ringleader.....              | " 21.             | 339                                | 138                                |
| Yellow Pear.....             | " 6.              | 5950                               | 138                                |
| Volunteer.....               | " 7.              | 586                                | 133                                |

Acme—This variety ranked third in productiveness. Fruit very small, handsome, smooth, and finely flavored. Very superior in solidity, which adapts it to shipping.

Cardinal—Possesses a brilliant cardinal red. Medium in flavor and solidity. Quite productive; smooth.

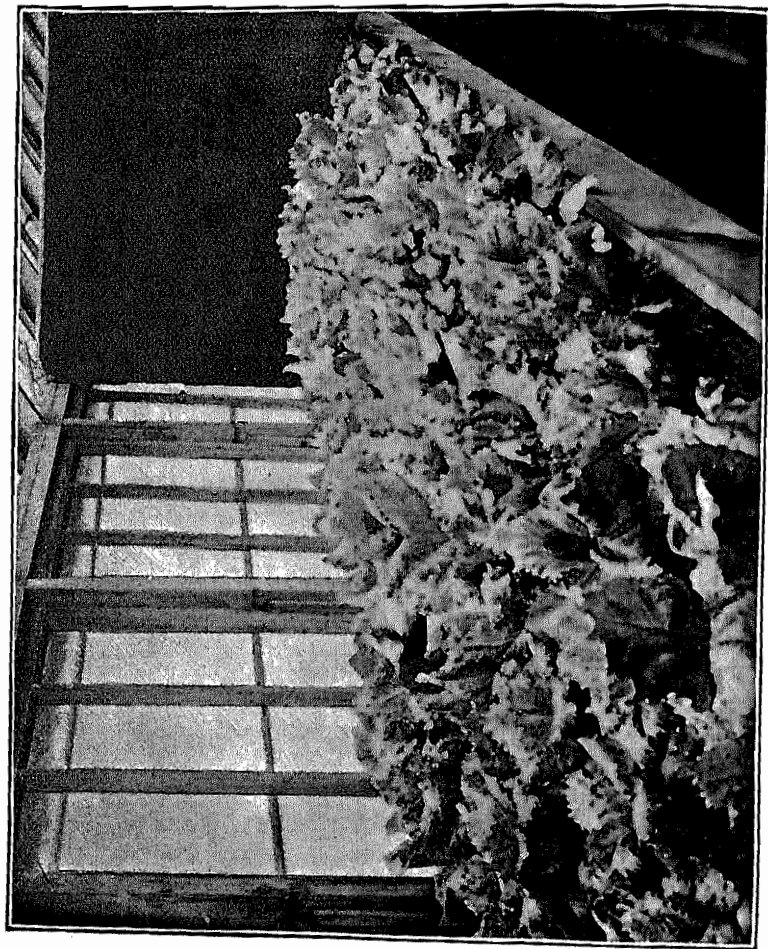
Dwarf Champion—The plant of this variety has an upright tree-like form. May be planted closer than any other variety, and requires little if any staking. A very desirable variety, bearing solid tomatoes of good size. Cracks some.

Early Paragon—Not very productive, but the fruit was exceptionally smooth and possessed a good flavor. Considered an excellent sort.

Golden Queen—The most productive variety we tested. Fruit very smooth, seldom cracks, almost free from rot, and of a superior sweet flavor. The only objection to the tomato is its yellow color. Should be grown extensively for table use.

King Humbert—Among the earliest. Ripened July 6th. Productive, medium in flavor. Fruit smooth, but not very solid.

Livingston's Beauty, Perfection and Favorite gave good results. Worthy of general cultivation.



Lorillard—Not desirable as a field tomato, but for forcing purposes it is not surpassed by any. Smooth and very solid.

Matchless—Productive, very early, and of a good flavor, but cracks more than is desirable.

McCullom's Hybrid—This sort is quite productive, smooth, and possesses a good flavor, but is inferior in solidity.

Mikado—Fruit large, averaging nearly one-half pound. Foliage very coarse. Not a first class tomato on account of irregularity in form, and cracking.

Red and Yellow Pear—These small Tomatoes are valuable for pickling and preserving. Fruit always smooth and finely flavored.

Ringleader—A remarkably large tomato. We picked one specimen that weighed a pound and a half. The fruit is medium in flavor, solid, but very rough and irregular. Not to be recommended.

Volunteer—Very superior in solidity. Smooth and of a good flavor. An excellent tomato.

#### IV—THE FORCING OF LETTUCE.

The forcing of lettuce for winter and early spring use has become an industry of no little importance, and especially is this true in the vicinity of large cities. Acres of glass are employed in its culture near our larger cities, as New York and Philadelphia, and the industry is growing rapidly even in the locality of small towns and cities. Lettuce forcing is one of the most satisfactory and profitable enterprises for the winter months. The work is performed during a season when the weather will not allow us to accomplish much in the field or garden, hence the labor consumed in its culture is nearly clear gain.

The forcing of lettuce is well understood by most gardeners. There is nothing difficult or complex about the operation. We have thought, however, that a brief description here of the methods employed in its forcing may be of value or service to some who have not had so much experience with this vegetable.

A very common practice is to grow lettuce in hot beds or cold frames. This method is very simple, and one that should be used in producing small quantities for home consumption. Market gardeners frequently resort to this process, but it is not the most economical nor satisfactory way, when large quantities are desired.

Figure II shows a bench of Black-seeded Simson Lettuce that we had in the greenhouse last winter. The seed was sown December 11th in boxes 17 x 21 inches by 2½ inches deep. The soil used for this purpose was thoroughly pulverized and put through a fine sieve. After filling the boxes and sowing either broadcast or in rows, fine soil was sieved over the seeds, burying them about one-fourth inch, and firmed

with a small block. Most of the seeds had vegetated by the 13th and 14th of December. Water was applied very sparingly until the young plants were pricked out into the same kind of boxes January 13th, setting them in rows one and one-half inches apart. At this transplanting, about one inch of old manure was placed in the bottom of each case, and then filled with good leaf-mould. The plants grew rapidly, and by the 5th of February we had good sized specimens for the bench. The greenhouse bench is three feet in width, and by erecting side boards we made it nine inches deep. A layer of rotten manure, measuring about three inches in depth, was placed in the bottom, and filled with good soil mixed with one-third its bulk of rotten manure. The plants were set seven inches apart. Our photograph was taken April 1st, and April 9th we cut the crop for market. Lettuce nearly always commands a good price in the Knoxville market, and is seldom less than one dollar per bushel.

Great care must be exercised in watering and regulating the temperature. Lettuce mildew, a very destructive fungous disease under favorable circumstances, may be produced or encouraged by improper watering or unsuitable temperature. This disease attacked our crop very slightly. No very effective remedy is known. Evaporated sulphur is recommended.

We had some trouble with the aphid or green fly. A weak solution of tobacco emulsion, made by soaking refuse tobacco stems in water, proved effectual, but this remedy is destructive to the foliage. Tobacco powder strewn over the soil before planting will act as a good preventive.

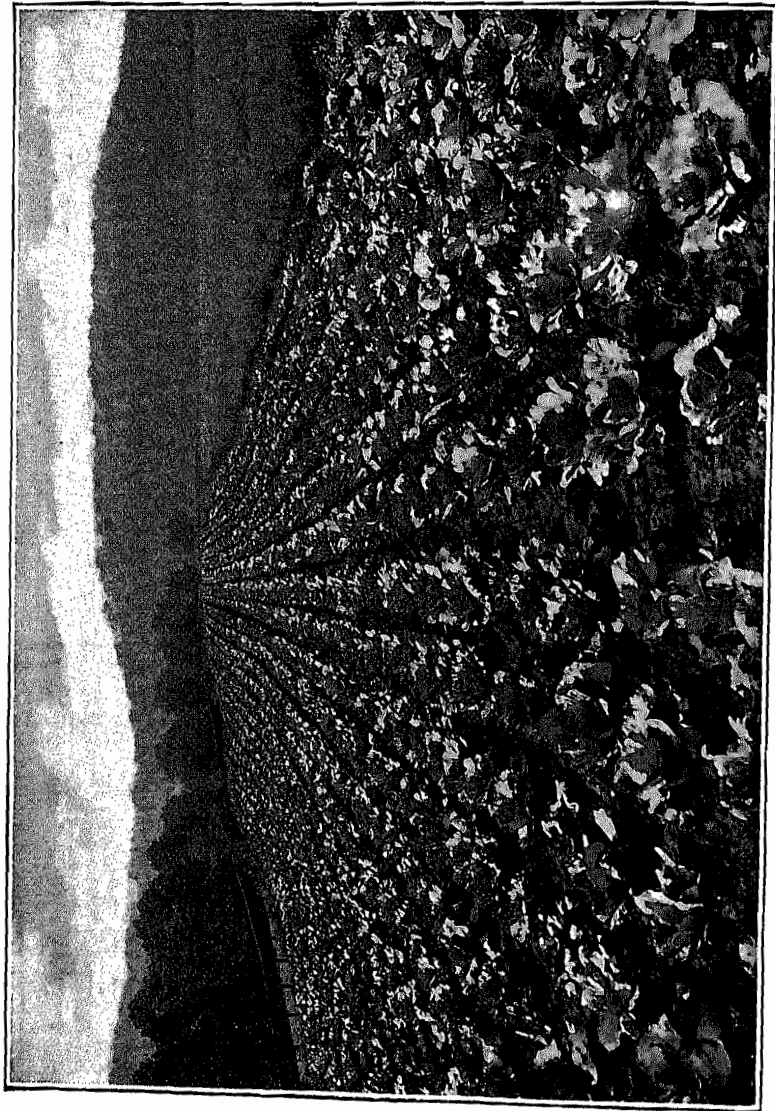
Our greenhouse is not adapted to the forcing of lettuce, as the glass is too far from the plants. Houses for forcing purposes should be twenty or twenty-two feet wide, constructed with the glass very close to the benches, so that the plants will receive a large amount of sunlight, which is essential for a healthy and rapid growth.

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#### V—THE CULTURE OF EARLY CABBAGE.

Perhaps no vegetable receives so much attention from both farmers and gardeners in Tennessee as cabbage. This vegetable may be found abundantly in the city markets from early spring until late in the fall. Its culture is so simple that any one with some study and a little care can make the industry a success. The profits are generally large. Earliness is the main element, so the gardener that produces the earliest cabbage and places it upon the market first is the one that reaps the largest remuneration.

Every market gardener is familiar with the methods employed in the production of early cabbage. There are several good methods in use, and every gardener has his own special way, which he considers



A FIELD OF EARLY CABBAGE.

superior to all others. We practiced a method the past season that proved very successful and satisfactory, a brief description of which may be of general interest. The method is not by any means new, but has been used for many years by a large number of gardeners. The literature on this subject cannot be repeated too frequently.

Figure III shows the appearance of our patch just before we commenced cutting for market. The two varieties used were Early Jersey Wakefield and Henderson's Early Summer. The seed was sown January 10th, in shallow boxes 17 x 21 inches by 2½ inches deep and placed in the hot bed. We used a light rich soil for the seed bed and sowed enough to produce 1,000 plants in each box. The hot bed was made by excavating a cavity two feet deep, one-half foot larger in length and width than the frame to be used, and then filled it with fresh stable manure. A good frame may be made of one inch boards, twelve inches wide, with cross pieces two by three inches in dimensions on which the sash is supported. The most desirable sized sash is three by six feet, which should not cost more than two dollars apiece. After the bed has been completed, cover with the sash for a few days until the steam escapes and the temperature subsides, before placing the boxes in position. Great care must be taken to maintain the proper temperature and degree of moisture. Thorough ventilation is absolutely essential. Too high a temperature will cause the plants to spindle and become weak.

February 4th the seedlings were of good size for transplanting. The same kind of boxes were employed for this purpose. These boxes may be made from any cheap half-inch lumber. Peter Henderson makes them by cutting soap boxes into three sections. Before transplanting place one inch of thoroughly decayed manure in the bottom of each case, and then fill with a rich loamy soil or leaf mould. We set eighty plants in each box, being careful to get the rows straight. They were placed in the cold frame at once, which was constructed in the same manner as the hot bed except that no excavation was dug and no manure employed. Too much moisture is injurious and causes the plants to slough off or decay. During cold nights the frames were covered with light boards.

The soil designed for our plantation was so wet that it could not be gotten in proper condition before April 18th, when the plants were taken to the field. A good handful of guano was mixed in each hill. Concentrated nitrogenous fertilizers are of great value in growing cabbage, and guano seems to be the most effectual one at command. The plants were set in rows running at right angles to each other. This is more space than necessary, but it allowed a better opportunity for horse cultivation, hoes not being used at all. We did not have rain for three weeks after transplanting, but only twenty-five out of 2,784 plants died from the effects of dry weather. This small loss was

attributed to the large amount of soil left on the roots in cutting from the boxes. The first marketing was made June 8th. Quite a large number of heads decayed before maturity, hence only 2,335 heads were sold, making a total weight of 8,994 pounds. This is an average of nearly four pounds to the head.

A cent and a half and even two cents per pound is no uncommon price to receive for cabbage; but we had to be satisfied with very much less the past season. Ours commanded one cent during the first week's sale, after which we were glad to get only one-half cent per pound. With this small price it was impossible to derive a profit, but nothing was lost in the operation. If suitable locations are selected, the crop can be matured early in May, when the price is always good.

The only insect enemy that attacked the plants was the cabbage worm or butterfly (*pieris rapae*.) Little difficulty was met in combating this pest. Insect powder or pyrethrum, applied with a small bellows about five times during the season, was sufficient and proved most satisfactory.