NEWER VARIETIES OF STRAWBERRIES,
AND CULTURAL DIRECTIONS.

O. M. TAYLOR.
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Address all correspondence, not to individual members of the staff, but to the New York Agricultural Experiment Station, Geneva, N. Y.

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BULLETIN No. 336.

NEWER VARIETIES OF STRAWBERIES, AND CULTURAL DIRECTIONS.

O. M. TAYLOR.

SUMMARY.

This bulletin gives a report on fifty varieties of strawberries, many of them recent introductions, which fruited on the Station grounds in 1909 and 1910. During each year the local climatic condition of rainfall was decidedly unfavorable during the fruiting season. This must be borne in mind in interpreting the results. The value of a variety for any locality can be determined only by actual trial under the conditions existing in that place.

The yield of all varieties was much smaller than in previous years owing to drought, which affected both the number of plants produced and quantity of the fruit. Relative differences, however, were very marked. Among the thirteen varieties producing plants in great numbers were Bessie and Nonsuch, while Battenburg and First Quality are good examples of the eighteen kinds producing few plants. Thirty-six varieties were intermediate in yield, with the remainder, fourteen in number, distributed equally between the most and least productive kinds.

Owing to the two seasons being unfavorable to the development of strawberry diseases no records of value could be made concerning resistance to disease. The health of a plant bears a close relationship to its productiveness. Selection of varieties practically immune to fungus or insect troubles is a phase of plant-breeding receiving considerable attention at the present time with both tree and small-fruits.

Knowledge regarding the sex of a variety is important. Failure of crop would undoubtedly result through the planting of
any of the eleven imperfect-flowering kinds if set by themselves with none of the perfect-flowering varieties nearby to fertilize the blossoms.

Late spring frosts frequently cause the destruction of many blossoms of the early blooming varieties and in some parts of the State it is impossible to grow those kinds with much profit. Three of the earliest blooming varieties described, however, Mascot, Parcell Early and Superior are of sufficient merit in other characters to make them desirable for a test even in the colder sections of the State.

In previous tests of varieties there has been a dearth of promising early kinds. This condition is reversed in the test under discussion, however, and among the ten early varieties described are Early Ozark, Highland, Mascot, Monroe and Parcell Early which appear worthy of more extended trial.

Severe drought during the ripening season decreased both yield and size of fruit. There were marked differences, however, between the varieties, especially in size. Eight of the twelve promising kinds produced fruit of good size throughout the season.

As is usually the case the number of promising kinds was comparatively small. Thirty-eight of the fifty varieties were discarded and twelve appeared to be worthy of more extended trial. Of these twelve kinds, Highland, Kittie Rice and Sherman are imperfect-flowering; Early Ozark and Battenburg were unusually productive; Deacon is a perfect-flowering mid-season variety of high quality; Mascot, a tart berry, although not of largest size, appears productive for an early kind and the glossy surface is attractive when the numerous, raised seeds are not too conspicuous. Parcell Early, the first to ripen in 1910, is worthy of test on account of its early season and productiveness, but it requires a good supply of nitrogen to secure best results; Stall No. 1 appears to be a seedling of merit, with good plant habits and of high quality for a mild berry.

The cultural directions which follow description of varieties are not intended to contain full detailed instruction on this subject but rather are suggestive of some methods worthy of consideration. The operations must necessarily vary in different places to meet the local conditions.
INTRODUCTION.

Two seasons have passed since the last bulletin (No. 309) of this Station on Varieties of Strawberries was issued. Since then, in 1909 and again in 1910, a number of the newer varieties have fruited, also a few seedlings sent to this Station for testing. The object of this bulletin is to report on these varieties, grown on rather heavy clay loam at Geneva.

The plants were spring-set, at a distance of one and one-half feet in rows three feet apart, on heavily manured, well drained clay loam. Clean culture was given during the summer, the first runners were encouraged to root as quickly as possible, and the blossom-clusters were kept picked off the first season up to the middle of July. As soon as the ground was frozen, the plants were covered with a mulch of coarse stable manure through which the plants grew the following spring. The cultural treatment was the same in every detail for all varieties.

In the description of varieties the source of the plants received is first given followed by brief notes in regard to their history, characteristics of plant and fruit and the apparent value as shown under the conditions at this Station. These results do not determine the value of any variety for the State at large or for nearby localities which have different environments. They indicate what may be expected of such varieties when fruited under similar conditions.

Of all the small-fruits the strawberry appears to be one of the most susceptible to changes of environment not only due to a different locality but also to widely varying climatic changes. This condition is probably due in large part to the comparatively small root-system of the plant, which is quickly affected at times by unfavorable weather, especially as the ripening season approaches. The seasons of 1909 and 1910 were not only dissimilar, but also the widest variations existed during the same season in different parts of the State.

It is probable that of all the problems confronting the strawberry grower, the question of the water supply is of greatest im-
portance. In 100 pounds of the ripe fruit there may be from 87 to 94 pounds of water\(^1\). There appear to be no reliable data at hand showing the amount of water used by the plant especially during the ripening season; the amount must be large owing to the rapid transpiration from the extensive leaf-surface and if not available the lack is quickly indicated in a decreased yield. The table which follows shows clearly that at Geneva at least, there must have been, during the years 1909 and 1910 a great lack of moisture during the strawberry season from June 15 to July 15 as the average monthly rainfall for that time was only 1.42 inches as compared with a similar average of 4.8 inches for the same month of the preceding five years.


<table>
<thead>
<tr>
<th>DATE</th>
<th>1904</th>
<th>1905</th>
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<th>1907</th>
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<th>1909</th>
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<tr>
<td>June 15 to July 15 . . . .</td>
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<td>5.37</td>
<td>8.43</td>
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**NOTES ON VARIETIES.**

*Productiveness.*—On account of the small amount of rainfall at fruiting time the yield of all varieties was much less than in previous years. Relative differences, however, were observed and the rating is given in the description of each variety. Of the fifty varieties tested, seven were very productive and seven were unproductive. The following varieties include only the extremes in productiveness.

**Very Productive**
- Battenburg
- Clifton
- Early Ozark
- Iowa
- Paul Jones
- *Rockhill No. 10*
- Swedenberg

**Unproductive**
- Americus
- Glastonbury
- Goree
- Irena
- Red Bird
- *Rockhill No. 7*
- *Rockhill No. 9*

Resistance to disease.— As might be expected, plants of nearly all varieties were unusually healthy. Mildew and leaf-blight develop slowly, if at all, under unfavorable conditions and the prolonged period of dry weather retarded the rapid spread of these diseases. On this account a large proportion of varieties, forty-three in number, showed no indication of fungus trouble while only seven appeared susceptible to such attacks. During seasons of more frequent rainfall, these results would doubtless be materially changed.

Vigor of plants.— Productiveness and resistance to disease are closely associated with vigor, yet the most vigorous plants are not always the most productive. Of seven varieties, Clifton, Dixon, Early Ozark, Kevitt Wonder, Manhattan, Matthew Crawford and Rockhill No. 6, all characterized by a comparatively low-growing habit, the first and third were among the most productive varieties under test. Two of the most vigorous varieties, Bessie and Nonsuch, were very productive, while Highland, ranking with them in vigor, proved considerably less productive. The fact must not be lost sight of that the amount of nitrogenous fertilizer in the soil affects the character of plant-growth. In the tests under discussion, however, the amount and kind of plant food supplied was the same for all varieties.

Plant-makers.— There are wide differences in the ability of varieties to reproduce themselves through the development of new plants from runners. With some kinds the plants are produced in such large numbers that a most serious condition of overcrowding results unless the original plants be given more room or those considered unnecessary be cut out. Some kinds, however, produce few runners and the distance of planting should be closer to avoid loss from unoccupied ground. Last season a single plant at the Station developed forty-seven plants while an equally vigorous one of another variety produced but one plant. Thirteen varieties described in this bulletin produced plants in great numbers while eighteen kinds developed but few runners.
Sex of flowers.— In the planting of perfect-flowering varieties, those in which the stamens, as well as the pistils, are present, no thought need be given to pollinating varieties, but the imperfect-flowering kinds, those with no stamens in the blossoms, must have plants of perfect-flowering varieties growing nearby to provide for fertilization of their blossoms. The following varieties were imperfect-flowering:

<table>
<thead>
<tr>
<th>Varieties Having Imperfect Flowers</th>
</tr>
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<tbody>
<tr>
<td>Highland</td>
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<tr>
<td>July</td>
</tr>
<tr>
<td>Kittie Rice</td>
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<tr>
<td>Labell</td>
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<tr>
<td>Moyer</td>
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<td>Orphan</td>
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Blooming season.— In the colder sections of this State and in exposed locations some of the early blooming varieties may be severely injured by late spring frosts. Some protection may be secured by holding back the growing season somewhat by a covering of mulch as indicated under cultural directions. Occasionally it may be desirable, however, to select varieties that bloom later than others. The season of bloom is given in the description of varieties. Four varieties, Mascot, Parcell Early, Riehl No. 10 and Superior were very early bloomers while Dixon, July, Orphan and Outlander were among the varieties which opened their blossoms latest in the season.

Season of ripening.— The market to be supplied has an important bearing on the selection of varieties with regard to time of ripening. In one location an early market is most profitable while in another place late varieties may be most in demand. Weather conditions materially change the date of ripening in different years and also lengthen or shorten the season during which profitable pickings may be made. There can be no marked line of division between some varieties as they blend one into another. The divisions must therefore be arbitrary and the varieties may not follow the same order each season. Those described have been
grouped into early, mid-season, or late, the two extremes being listed as follows:

\begin{align*}
\text{SEASON EARLY} & \quad \text{SEASON LATE} \\
\text{Early Ozark} & \quad \text{Americus} \\
\text{Highland} & \quad \text{Greenwood} \\
\text{Irena} & \quad \text{Heritage} \\
\text{Mascot} & \quad \text{Labell} \\
\text{Monroe} & \quad \text{Manhattan} \\
\text{Parcell Early} & \quad \text{Matthew Crawford} \\
\text{Red Bird} & \quad \text{Nonsuch} \\
\text{Rockhill No. 9.} & \quad \text{Orem} \\
\text{Swedenberg} & \quad \text{Orphan} \\
\text{Wooster} & \quad \text{Outlander} \\
\end{align*}

\textit{Size of fruit.}—One of the requirements of varieties for commercial purposes is fairly good size. It is not sufficient that the fruit ship well and be of attractive color. A wide range exists among the different varieties in regard to size. Some kinds uniformly run small; others produce large fruit at first but rapidly drop in size as the season progresses; still others retain their size fairly well throughout the season. Fruit averaging above medium usually ships better than berries of largest size. At each picking the berries were rated and the following is a list of those varieties retaining good size fairly well throughout the season.

\textbf{FRUIT OF GOOD SIZE THROUGHOUT THE SEASON.}

\begin{align*}
\text{Battenburg} & \quad \text{Nonsuch} \\
\text{Deacon} & \quad \text{Orem} \\
\text{Dicky} & \quad \text{Orphan} \\
\text{Early Ozark} & \quad \text{Outlander} \\
\text{Fendall} & \quad \text{Parcell Early} \\
\text{First Quality} & \quad \text{Paul Jones} \\
\text{Glastonbury} & \quad \text{Rockhill No. 11} \\
\text{Gray Dollar} & \quad \text{Sherman} \\
\text{Monroe} & \quad \text{Stall No. 1} \\
\text{Myer} & \quad \text{Wooster} \\
\end{align*}

\textit{Desirable kinds.}—The final selection of the best varieties to grow is one of the most important and most difficult of all the
subjects connected with strawberry growing. Habits of both plant and fruit must receive careful scrutiny not only once but at different times during the season. Even then we know that some of these characters are not constant in different environment, and the safest method to follow is the trial under the conditions existing in the locality in which the plants are to be grown. The following list of varieties is therefore only suggestive. It includes the most promising of the kinds fruited in 1909 and 1910 under but one set of conditions. It is not expected that they will do equally well in all localities. They, however, appear to combine most fully, although not perfectly, the various requirements that go to make a desirable berry. It will be noted that the list includes those of highest quality. A variety may be productive, of good size and color, but if poor in quality, it is undesirable.

**Varieties Having Many Desirable Characters.**

<table>
<thead>
<tr>
<th>Battenburg</th>
<th>Mascot</th>
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<tbody>
<tr>
<td>Deacon</td>
<td>Monroe</td>
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<tr>
<td>Early Ozark</td>
<td>Parcell Early</td>
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<tr>
<td>First Quality</td>
<td>Sherman</td>
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<tr>
<td>Highland</td>
<td>Stall No. 1</td>
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<tr>
<td>Kittie Rice</td>
<td>Superior</td>
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**DESCRIPTION OF VARIETIES.**

**Americus.**—Rockhill No. 2. (Harlow Rockhill, Conrad, Ia.) A seedling of Louis Ganthier crossed with Pan-American, originating in 1905 with Mr. Rockhill. Introduced in the fall of 1910 by several nurserymen and individual growers.

Plants few, below medium in size, of average vigor, healthy, unproductive. Leaves of medium size, thick, dark green; leaf-stems short, of average thickness. Flowers perfect. Calyx small, flattened or slightly depressed. Seeds raised. Fruit ripening late; of medium size, roundish, light red, somewhat glossy; apex obtuse; flesh medium in juiciness, firm, mild subacid; of fair quality.

The plants lack in vigor and productiveness and the fruit, although a good shipper, is inferior in size, color and flavor.


Plants few, of medium size and vigor, healthy, very productive. Leaves blunt at the apex, of average size, dark green; leaf-stems intermediate in length and thickness. Flowers perfect, medium in season of bloom; petals
obovate, usually 5 to 8 in number; stamens numerous. Calyx large, flattened or depressed, leafy. Seeds raised, conspicuous. Fruit maturing in mid-season; large, wedge-shape varying to roundish-conic, the surface furrowed and irregularly roughened, rather attractive light red, glossy; apex obtuse; flesh well colored, juicy, firm, sprightly, somewhat tart; of good quality.

Plants although very productive make but few runners and should be set closer than most varieties; fruit furrowed and variable in shape in the first pickings, improving later, retaining large size fairly well throughout the season; worthy of more extended trial.

**Bessie.—** (D. B. Boommhower, Greenville, N. Y.) A chance seedling found on the farm of Mr. Boommhower in 1899, not yet introduced to the trade. Thought to be cross between Haverland and Bert.

Plants very numerous and vigorous, large, somewhat subject to attacks of mildew and leaf-blight, productive. Leaves large, of medium thickness and color; leaf-stems long, of average thickness. Flowers perfect, unusually large, often 1½ inches across; petals obovate, tapering to short, narrow claws, 7 to 8 in number; stamens numerous, long. Calyx of medium size, flattened, reflexed. Seeds small, numerous, sunken. Fruit maturing in mid-season; above medium size but variable, irregular in shape ranging from conic to wedge, light red, dull and rather unattractive; apex obtuse; flesh light colored toward the center, very juicy, not very firm, mild, sweet, slightly aromatic; of good quality.

The large flowers are characteristically conspicuous above the foliage at blooming time; plant-habits good but color of fruit too dull and unattractive; a poor shipper; does not retain size in later pickings.

**Clifton.—** (J. K. Losee, Elnora, N. Y.) Found in a trial bed of several varieties by Mr. Losee in 1905 and introduced by him in 1908. Parentage unknown.

Plants of medium number and size, low-growing in habit, healthy, very productive. Leaves of medium size and thickness, dark green, with heavy pubescence; leaf-stems short, of average thickness. Flowers perfect, nearly 1½ inches across; petals roundish, 5 to 6 in number; stamens numerous of medium length. Calyx above medium in size, depressed, somewhat reflexed. Seeds small, variable in position. Fruit maturing in mid-season; variable in size averaging above medium, conic or wedge-shape, medium scarlet, dull; apex obtuse; flesh of good color, juicy, firm, with rather hard core, aromatic, tart; good in quality.

Not promising as the fruit does not pick easily, is variable in size, and color is too dull.

**Deacon.—** (C. S. Pratt, Reading Mass.) Thought to be a seedling of Abington and Sample originating in Massachusetts. Introduced by Mr. Pratt in 1909.

Plants intermediate in number, size and vigor, healthy, moderately productive. Leaves large, thick, rather light green, with considerable pubescence; leaf-stems of average length, thick, covered with abundant pubescence. Flowers perfect, medium in season of bloom, 1½ inches across; petals somewhat
roundish, 6 to 7 in number; stamens numerous, of average length. Calyx large, flattened or slightly raised, leafy. Seeds sunken. Fruit maturing in mid-season; large, conic or wedge-shape, sometimes slightly necked, medium scarlet, glossy, attractive; apex pointed or obtuse. Flesh well colored, juicy, firm, mild, sweet, aromatic; very good in quality.

Foliage characteristically pubescent. In the earlier pickings one of the best varieties in size, shape and color of fruit but later the color becomes duller and less attractive; retains size well throughout the season; on account of high quality worthy of further trial.

Dicky.—(C. S. Pratt, Reading, Mass.) A seedling of Marshall and Sample said to have originated with J. D. Gowin, North Reading, Mass., and introduced by Mr. Pratt in 1908.

Plants intermediate in number, size and vigor, healthy, medium in productiveness. Leaves large, medium green, rugose; leaf-stems of average length and thickness. Flowers perfect, intermediate in season of bloom, 1½ inches across; petals nearly oval, usually 7 in number; stamens numerous, short. Calyx medium in size, flattened. Seeds numerous, variable in position, detracting somewhat from appearance. Fruit maturing in mid-season; rather large, conic or wedge-shape, glossy, attractive medium scarlet; apex pointed, often green-tipped; flesh well colored, juicy, firm, tart, not pleasant in flavor; of poor quality.

A fairly good plant-maker but lacking somewhat in productiveness. Retains size well but is too seedy in appearance and too sour; inferior in quality.

Dixon.—(T. C. Kevitt, Athena, N. J.) Probably a seedling of Wm. Belt originated by Emil Grafe, Rossville, Staten Island, N. Y.

Plants very few in number, small, weak, somewhat subject to attacks of leaf-blight. Leaves rather small, thick, medium green; leaf-stems short, of average thickness, covered with abundant pubescence. Flowers perfect, opening late 1 5/16 inches across; petals roundish, 6 to 7 in number; stamens numerous, short. Calyx large, leafy, depressed. Seeds raised. Fruit maturing in mid-season; medium to large, wedge-shape, dull, unattractive medium scarlet; apex obtuse, often green-tipped; flesh well colored, medium in juiciness, firm, tart, not pleasant in flavor, poor in quality.

Plants inferior in habit of growth, developing but few runners. Fruit does not retain size well in late pickings; a good shipper; unattractive in color and inferior in quality.

Early Ozark.—(Chas. Shull, Sarcoxie, Mo., and M. Crawford Company, Cuyahoga Falls, O.) A seedling of Aroma and Excelsior originated by Mr. Shull in 1902 and introduced by him in 1908.

Plants numerous, medium in vigor, healthy, very productive. Leaves small, of average thickness, medium green; leaf-stems intermediate in length, slender, characteristically tinged red. Flowers perfect, blooming rather early, nearly 1 3/16 inches across; petals roundish, 6 to 8 in number; stamens numerous, variable in length; pistil-clusters rather large. Calyx small, reflexed, depressed. Seeds intermediate in size, inconspicuous, sunken. Fruit maturing very early; above medium to medium in size, roundish-conic, glossy, attractive
dark scarlet; apex obtuse or indented; flesh well colored, very juicy, firm, subacid or pleasantly tart, high-flavored, very good to best.

Plants although somewhat low-growing are very productive and make a fairly good growth; leaf-stems characteristically tinged red. Fruit ripens very early and for a berry of its season is above the average in size and ranks high in quality. One of the most promising of the early kinds and worthy of more extended trial.

Fendall.— (Chas. E. Fendall & Son, Towson, Md.) A seedling of William Belt originating with Fendall & Son in 1905 and introduced by them in 1907 and 1908.

Plants few, intermediate in size and vigor, healthy, productive. Leaves of average size and thickness, medium green, covered with considerable pubescence; leaf-stems medium in length, stout. Flowers perfect, about 1 1/16 inches across; petals heart-shaped, 6 to 7 in number; stamens variable in number, rather short. Calyx large, leafy, raised, reflexed. Seeds large, variable in position. Fruit maturing in mid-season; large, characteristically oblong-conic, necked, attractive light scarlet; apex pointed; flesh rather light toward the center, medium in juiciness, intermediate in firmness, mild subacid; of good quality.

Plants although healthy and productive lack somewhat in vigor. Fruit characteristically elongated, retains size well throughout the season, some berries too light in color; of good quality for a mild berry. The greatest fault appears to be in shape.

First Quality.— (C. S. Pratt, Reading, Mass.) A seedling of Gandy and Sample originating with J. D. Gowing, North Reading, Mass., and introduced by Mr. Pratt in 1909.

Plants few, large, vigorous, healthy, medium in productiveness. Leaves, large, thick, dark green, rugose; leaf-stems above medium in length, thick, with abundant pubescence. Flowers perfect, intermediate in season of bloom. Calyx of average size, leafy, flattened. Seeds sunken. Fruit picks easily, maturing in mid-season; very large to large, distinctly conic, attractive, glossy, medium scarlet; apex pointed; flesh medium in juiciness, firm, mild, sweet; very good for mild berry.

A poor plant-maker and although vigorous should be set closer than most varieties. Fruit characteristically conic, picks easily, retains good size fairly well throughout the season. Attractive in color. Quality above the average for a mild, sweet berry, although lacking slightly in juiciness. Worthy of further trial.

Glastonbury.— (J. H. Hale, South Glastonbury, Conn.) A seedling of Haverland pollinated by Great Scott. Originated at Glastonbury, Conn., in 1901 or 1902 and introduced in 1907 by Mr. Hale.

Plants few in number, intermediate in size and vigor, healthy, unproductive. Leaves large, of average thickness, variable in color, rugose; leaf-stems above medium in length, of average thickness. Flowers semi-perfect, intermediate in season of bloom, 1 ½ inches across; petals broad-oval, 6 or 7 in number; stamens few, rather short; anthers somewhat shrivelled. Calyx of medium
size, flattened. Seeds variable in position. Fruit maturing in mid-season; large, conic, glossy, attractive medium scarlet; apex pointed; flesh rather light colored, very juicy, firm, tart and sprightly; of good quality.

A poor plant-maker and unproductive although healthy. Berries of good size and color but coarse in appearance and rather too tart for dessert purposes. Surpassed by other varieties.


Plants few, medium in size and vigor, healthy, unproductive. Leaves large, of average thickness, dark green, not pubescent; leaf-stems long, slender. Flowers perfect, medium in season of bloom, one inch or more across; petals roundish, usually 5 in number; stamens numerous, long. Calyx of medium size, slightly raised or flattened, not reflexed. Seeds medium in size, somewhat sunken. Fruit maturing in mid-season; medium to small, conic, sometimes slightly necked, dark crimson, glossy and attractive; apex obtuse; flesh light colored, very juicy, firm, subacid, rather high flavored; of good quality.

Plants although healthy lack somewhat in vigor, develop but few runners and are unproductive. Fruit attractive dark red, a fine shipper but too small as fruited on the Station grounds.

**Granger.**—(E. H. Ekey, Steubenville, O.) A seedling of unknown parentage originated in 1908 by Mr. Ekey. Not yet introduced.

Not enough plants lived to secure a good test. Appears to be a mid-season variety, fruit of which is large, conic, with pointed apex, attractive, glossy scarlet, well colored to the center, juicy, firm, pleasant subacid; of high quality. Requires further testing to determine its value.

**Gray Dollar.**—(M. Crawford Company, Cuyahoga Falls, O.) Originated by A. G. Gray, Pekin, Ind., and introduced by him about 1908.

Plants numerous, large, vigorous, healthy, moderately productive. Leaves rather large, thick, medium green, rugose; leaf-stems long, of average thickness, greenish. Flowers perfect, intermediate in season of bloom, 1½ inches across; petals roundish-oval, 6 to 7 in number yellowish at the base; stamens numerous, rather short. Calyx large, flattened, leafy. Seeds variable in size and position. Fruit ripening in mid-season; large, thick, wedge-shape, medium scarlet, dull; apex obtuse; flesh well colored, juicy, firm, subacid or tart, sprightly, high-flavored; very good in quality.

Except in productiveness the plant-characters are unusually good. The fruit, which matures in mid-season, is of good size and much above the average in quality but the large, leafy calyx and dull color of the berries detract from the appearance.

**Greenwood.**—(C. S. Pratt, Reading, Mass.) Said to have originated with Mr. S. Hill, Greenwood, Mass. Introduced by Mr. Pratt in 1909.

Plants few, above medium in size and vigor, healthy, rather unproductive. Leaves large, of average thickness, medium green, not pubescent; leaf-stems
above medium in length, thick, greenish. Flower-stalks characteristically long and slender-branching. Flowers perfect, intermediate in season of bloom, 1½ inches across; petals roundish; stamens numerous, of medium length. Calyx of average size, flattened or raised. Seeds sunken. Fruit maturing rather late; above medium in size, conic or wedge-shaped, sometimes slightly necked, light red, medium in glossiness; apex pointed; flesh rather light colored, medium in juiciness, firm, very mild, not high-flavored, sweet; inferior quality.

Plants develop but few runners, unproductive although not lacking in vigor or health. Flower-stalks characteristically long and slender-branching. Fruit inferior in size and in desirable flesh-characters.


Plants few, of medium size, vigorous, healthy, productive. Leaves intermediate in size, of average thickness, light green; leaf-stems medium in length and thickness. Flowers large, perfect, 1½ inches to 1¼ inches across; petals broadly ovate, 7 to 9 in number; stamens very numerous, long; pistil-center large. Calyx large, raised, leafy. Seeds numerous, sunken. Fruit maturing late; large, irregular oblong or wedge-shape, medium scarlet, glossy and attractive; apex pointed; flesh lighter than the surface, medium in juiciness, firm, subacid, high-flavored; very good in quality.

Habit of growth good; tendency to develop but few runners; fruit does not retain size in later pickings; inferior in shape, color and shipping quality; well flavored.

**Highland.**—(M. Crawford Company, Cuyahoga Falls, O.) An accidental seedling discovered by T. B. Carlisle, near Lisbon, Ohio, about 1898 and introduced by the M. Crawford Company in 1908.

Plants numerous, large, very vigorous, healthy, productive. Leaves large, of average thickness, dark green, with very scant pubescence; leaf-stems long, of medium thickness. Flowers small, imperfect, nearly 1 inch across; petals broad-ovate, 7 or 8 in number; pistil-center large; fruit-stems prostrate, branching freely. Calyx of medium size, flattened. Seeds small, deeply sunken. Fruit very early; large, conic, slightly furrowed, light scarlet, glossy and attractive; apex obtuse; flesh well colored to the center, very juicy, tender, very tart, sprightly, good for a sour berry.

Plant-characters unusually good; plants should not be crowded as they are markedly vigorous in habit of growth; unusually promising for an extra-early variety. Fruit of good size in the early pickings; well-shaped and of good quality. Worthy of test where a rather tart, very juicy, light scarlet, early berry is desired.

**Iowa.**—Rockhill No. 8. (Harlow Rockhill, Conrad, Ia.) A seedling of Senator Dunlap pollinated with Pan-American originating in 1906 with Mr. Rockhill. Introduced in the spring of 1911 by M. Crawford, Cuyahoga Falls, O.

Plants characteristically few in number, large, vigorous, healthy, very productive. Leaves intermediate in size and thickness, dark green, rugose; leaf-
stems medium in length, slender. Flowers perfect, blooming rather early. Calyx of average size, flattened or depressed. Seeds sunken. Fruit maturing in mid-season; rather large, roundish-conic, glossy, attractive light red, colors unevenly; apex obtuse; flesh well colored, not juicy, rather tender, mild, not high-flavored, subacid; of fair quality.

Plants characteristically few in number, of good vigor and unusually productive. Fruit of excellent size in the early pickings dropping rapidly as the season advances. Attractive in appearance but disappointing in flesh-characters. Not juicy nor a good shipper and low in flavor.

Irena.—(W. S. Todd, Greenwood, Dela.) Said to be a cross between Jessie and Warfield originating in Wisconsin and introduced about 1896 by W. S. Butler, Chetek, Wis.

Plants characteristically tall, light green and with rather small leaves, medium in number, healthy, unproductive. Leaves smallish, of medium thickness, not pubescent; leaf-stems long, slender. Flowers perfect, blooming medium early, 1 3/4 inches across; petals roundish, variable in number usually 5 or 7; stamens numerous, short. Calyx small, variable in position. Seeds large, numerous, raised or sunken. Fruit maturing very early; above medium to medium in size, wedge-shape to conic, the surface irregular and roughish, light or dark red, dull, unattractive; apex somewhat pointed, inclined to green tips; flesh light colored toward the center, medium in juiciness, firm, mild subacid; fair in quality.

Plant-characters good except in productiveness. The tall, light green foliage is characteristic of the variety. A very early sort, fruit of which is inferior in size, coarse and unattractive in appearance and of second rate quality.


Plants of medium number and size, healthy, productive. Leaves smallish, thick, light green, nearly glabrous; leaf-stems medium in length, slender, greenish. Flowers and the first fruits which set showing distinctly above the foliage, imperfect, blooming late, 1 3/4 inches across; petals oval, usually 5 in number. Calyx large, flattened, leafy. Seeds raised. Fruit maturing in mid-season; above medium in size, conic, light red; apex pointed; flesh well colored, very juicy, medium firm, tart; fair in quality.

Plants intermediate in habit of growth but productive. The flowers and first fruits set show distinctly above the foliage; a very light colored tart berry, easily bruised, dropping rapidly in size and inferior in quality.

Kevitt Wonder.—(T. C. Kevitt, Athenia, N. J.) A seedling of Bismarck crossed with Parker Earle originating in 1906 with Mr. Kevitt and introduced by him in 1908.

Plants few, smallish, healthy, productive. Leaves of medium size, thick, dark green, slightly rugose; leaf-stems short, thick. Flowers perfect, intermediate in season of bloom, 1 3/16 inches across; petals roundish, 5 or 6 in number; stamens numerous, medium in length. Calyx rather small. Seeds
slightly raised. Fruit maturing in mid-season; above medium in size, characteristically elongated averaging oblong-conic, slightly necked, medium scarlet, glossy and attractive; apex pointed; flesh not very juicy, medium in firmness, mild, not high-flavored; inferior in quality.

Plants productive, make few runners and although healthy lack somewhat in vigor. Fruit characteristically elongated, well colored, lacking somewhat in juiciness, surpassed in quality by other varieties.

**Kitty Rice.**—(M. Crawford Company, Cuyahoga Falls, O.) Originated by John F. Beaver, Dayton, O., about 1890. The M. Crawford Company gave it as a premium in 1896 under the name Downing Bride and again as a premium in 1899. The name was changed to Kitty Rice in 1903.

Plants of medium number, above medium in size, healthy, productive. Leaves of average size and thickness, medium green, not pubescent; leaf-stems rather long, of average thickness. Flowers imperfect, averaging 1½ inches across; petals obovate tapering at the base, 6 or 7 in number; pistil-center small. Calyx large, flattened, reflexed, leafy. Seeds medium in size and number, slightly raised. Fruit maturing in mid-season; above medium in size, conic or inclined to wedge-shape, medium scarlet, glossy and attractive; apex medium pointed; flesh light colored toward the center, very juicy, of medium firmness, high-flavored, tart unless fully ripe, when it becomes sweet; very good to best.

Habits of growth desirable. A mild mid-season variety unusually high in quality, dropping in size as the season advances, well shaped and colored; the large, leafy, pale calyx detracts slightly from appearance. Somewhat tart unless fully mature. Worthy of testing on account of high quality.

**Labell.**—(E. H. Ekey, Steubenville, O.) A seedling of unknown parentage originating about 1899 with Mr. Ekey. Not yet introduced.

Plants few, of average size and vigor, healthy, productive. Leaves medium in size and thickness, light green, not pubescent; leaf-stems below medium in length, of average thickness. Flowers imperfect, intermediate in season of bloom, 1½ inches across; petals roundish-oval, 5 to 7 in number. Calyx of medium size, raised. Seeds sunken. Fruit maturing late; large, long wedge-shaped or conic, necked, variable in color averaging dark red, not glossy; apex pointed or obtuse; flesh well colored, very juicy, firm, tart; fair in quality.

The productive plants develop but few runners and are intermediate in habit of growth. Flowers imperfect, maturing late. Fruit of good size only in the first pickings. Somewhat coarse in appearance, variable in color and, although very juicy, inferior in flavor and quality.

**Manhattan.**—(Kenridge Fruit Farm, Cliffwood, N. J.) A seedling of unknown parentage found in the farm of J. E. Kuhns, Cliffwood, N. J., in 1907 and introduced by him the spring of 1910.

Plants characteristically few in number, small, healthy, moderately productive. Leaves of average size, thick, dark green; leaf-stems short, thick. Flowers perfect, intermediate in season of bloom, 1¼ inches across; petals roundish, often 9 in number; stamens numerous, medium in length. Calyx small,
flattened. Seeds very conspicuous, raised, often hairy. Fruit maturing rather late; above medium to below in size, conic or wedge, light scarlet, dull; apex pointed or obtuse; flesh juicy, firm, tart, not pleasant; inferior in quality.

An unusually poor plant-maker and inferior in habits of growth. Not adapted to the Station soil as the fruit is surpassed by many varieties in size, color, flavor and quality.

Mascot.—(W. F. Allen, Salisbury, Md.) A variety said to have originated in Virginia.

Plants intermediate in number and size, healthy, productive. Leaves of average size and thickness, intermediate in color; leaf-stems medium in length, slender. Flowers perfect, blooming very early, 1¼ inches across; petals roundish-oval, 5 or 6 in number; stamens numerous, long. Calyx medium to large, flattened. Seeds large, prominent, numerous, raised. Fruit maturing very early; above medium in size, elongated-conic, light scarlet, unusually glossy and attractive; apex pointed or indented; flesh well colored, very juicy, medium in firmness, subacid or tart, pleasant flavored; of good quality.

Plant-habits good except in the very early opening of the flowers which are liable to be caught by late spring frosts. One of the first to ripen. Fruit of fairly good size in the earlier pickings becoming small later; quite productive for an early kind. Often characteristically glossy and with conspicuous, raised seeds. Not as sweet as some varieties, yet agreeable; worthy of testing for an early variety, although not as large as might be desired.

Matthew Crawford.—(M. Crawford Company, Cuyahoga Falls, O.) Originated by J. R. Peck, Breeckenridge, Mo.; given as a premium in 1908 by the Crawford Company.

Plants numerous, characterized by an extremely dwarfish habit of growth, healthy, moderately productive. Leaves small, of average thickness, light-green; leaf-stems very short, medium in thickness. Flowers perfect, blooming very late, 1 3/16 inches to 1½ inches across; petals roundish to obovate, 6 or 8 in number; stamens numerous, rather long. Calyx of medium size, flattened. Seeds small, inconspicuous, sunken. Fruit maturing very late; large, symmetrical, conic, light scarlet, glossy and attractive; apex medium-pointed; flesh light colored toward the center, juicy, medium in firmness, mild subacid, not highly flavored; fair to good.

Plants are produced in goodly numbers, extremely dwarfish in habit of growth, lacking somewhat in productiveness. Blooms and ripens very late. Fruit makes a good showing in the first pickings but too mild in flavor and too variable later both in size and color.

Monroe.—(J. A. Morgan, Scottsville, N. Y.) A seedling of Sample which grew near plants of Rough Rider and Parker Earle, originating in 1905 with Mr. Morgan who intends to introduce it the spring of 1911.

Plants numerous, of medium size and vigor, somewhat susceptible to attacks of leaf-blight, medium in productiveness. Leaves above average size, thick, dark green; leaf-stems intermediate in length and thickness, greenish. Flowers perfect, blooming rather early, 1½ inches across; petals roundish, 5 or 6 in number; stamens numerous, rather long. Calyx large, flattened,
leafy. Seeds sunken. Fruit maturing early; large, roundish to roundish-conic, variable in color averaging light red, rather attractive; flesh juicy, medium in firmness, sweet or subacid, mild; good in quality.

Plants somewhat subject to disease, fairly good in habits of growth. Fruit retains size well in later pickings and although somewhat coarse in general appearance appears worthy of test on account of earliness and good size especially in the first pickings. Later some berries color unevenly.

Myer.—(Slaymaker & Son, Dover, Dela.) A seedling of unknown parentage found by Myer & Son, Bridgeville, Dela., in 1906 in a bed of about 25 varieties. Introduced by Myer & Son in 1908.

Plants intermediate in number and size, healthy, very productive. Leaves medium in size, thin; leaf-stems of average length and thickness. Flowers imperfect, blooming fairly early, 1 inch to 1¼ inches across; petals broadly ovate, 6 to 9 in number. Calyx large, leafy, depressed. Seeds sunken. Fruit maturing in mid-season; above medium in size, regular, conic, medium scarlet, glossy and attractive, inclined to color unevenly; flesh light colored toward the center, characteristically not juicy, medium in firmness, mild, sweet; good in quality for a mild berry.

Plant-habits good. Fruit rather dry, not a very good shipper; good quality for a mild berry.

Nonsuch.—(J. S. Berry, Logansport, Ind.) Found growing wild in a fence corner by Peter A. Berry, Logansport, Ind., in 1895, and sent to this Station for testing by his brother. Not yet introduced. Thought to be a seedling of Sharpless as that variety was growing near the place of origin. Mr. Berry states that it is a valuable late variety in his neighborhood, known locally as "Nonsuch" and that it should always be grown in the narrow row or in hills and that it is more productive the second and third year than the first season of fruiting.

Plants very numerous and vigorous, large, slightly subject to attacks of mildew and leaf-blight, very productive. Leaves of medium size, light green; leaf-stems long, slender. Flowers perfect, season of bloom late, 1¼ inches across; petals 8 to 10 in number; stamens numerous, rather long. Calyx of average size, flattened or slightly depressed, reflexed. Seeds medium in size, prominent, variable in position. Fruit maturing very late; variable in size averaging above medium, irregular in shape, oblong, wedge or sometimes conic, light red, rather unattractive, coloring unevenly; apex obtuse, often green-tipped; flesh light colored toward the center, juicy, firm, subacid, slightly aromatic; of good quality.

At blooming time the blossoms are characteristic, appearing in masses above the foliage; although the plant-growth is good and the fruit retains its size well, it is too light in color, and too variable in shape; subject to green tips; unpromising.


Plants numerous, of average size and vigor, healthy, productive. Leaves intermediate in size, thick, dark green; leaf-stems of average length and
thickness. Flowers perfect, intermediate in-season of bloom. 1 5/16 inches across; petals roundish-oval, 5 to 7 in number; stamens numerous, rather long. Calyx large, flattened, leafy. Seeds variable in position. Fruit maturing late; very large, roundish-conic or wedge, medium scarlet, attractive; apex very obtuse, often green-tipped and sometimes forming a nubbin; flesh well colored, medium juicy, firm, tart; good in quality.

Plant-habits good; fruit unusually large, retains size well but inclined to green tips and with a somewhat tough core. Rather promising in the first pickings but somewhat disappointing later. Requires further testing to determine its value.

Orphan.—(J. A. Morgan, Scottsville, N. Y.) Found growing alone in a clover sod in the spring of 1904 by Mr. Morgan and named by him.

Plants intermediate in number and size; healthy, productive. Leaves large, thick, medium green, rugose; leaf-stems long, thick. Flowers imperfect, blooming late, 1 1/8 inches across; petals roundish, 5 to 7 in number. Calyx large, flattened, leafy. Seeds sunken. Fruit maturing late; large, wedge-shape or conic, medium to light red, dull, rather unattractive, colors unevenly; apex, obtuse; flesh well colored, juicy, medium in firmness, subacid, not high-flavored, poor in quality.

A late blooming imperfect-flowering variety of good plant-habits but the fruit, although rather large throughout the season, is unattractive in color and inferior in quality.


Not enough plants for a good test. Appears to be a late blooming and very late ripening variety, of good size, wedge to roundish-conic, attractive medium scarlet; flesh rather firm, light colored at the center, sweet; of very good quality. Requires further test to determine its value.

Parcell Early.—(G. A. Parcell, Pine City, N. Y.) Mr. Parcell describes its origin as follows: "In 1902 I fruited on new land, Haverland fertilized on one side by Excelsior and on the other by Lovett. These were plowed under and in 1903 this variety was saved from among other self-sown seedlings. It is probably a seedling of Haverland and Excelsior. Will be introduced by W. F. Allen, Salisbury, Md., in 1912."

Plants intermediate in number and vigor, healthy, rather productive. Leaves rather small, medium thick, moderately light green; leaf-stems short, slender. Flowers perfect, opening very early, 1 1/8 inches across; petals roundish, 5 or 6 in number; stamens medium in number, short. Calyx small, raised. Seeds of medium size, variable in position. Fruit maturing very early; above medium in size, conic, somewhat necked, attractive light scarlet; apex pointed or obtuse; flesh well colored, juicy rather firm, tart, sprightly; of good quality.

The first variety to ripen in 1910. Somewhat of the type of Senator Dunlap but blooming and ripening earlier. The writer observed this variety fruiting in 1910 on the grounds of Mr. Parcell where is it unusually promising and
where its habits of growth are much superior to those on the Station soil which is a cold, heavy, clay loam; worthy of testing on warmer and lighter soils which contain an abundance of nitrogenous plant food.


Plants numerous, above medium in size and vigor, healthy, very productive. Leaves small, thin, medium green, pubescent; leaf-stems long, very slender. Flowers imperfect, nearly 1½ inches across; petals ovate, 7 or 8 in number. Calyx large, flattened. Seeds large, numerous, sunken, hairy. Fruit maturing in early mid-season, above medium in size, unattractive in shape, long-conic varying to wedge, dull, unattractive light scarlet, colors unevenly; apex often strongly pointed and green-tipped; flesh light colored toward the center, medium in juiciness, intermediate in firmness, subacid, inferior in flavor; poor in quality.

Plants unusually productive, of good habits of growth. Fruit characteristically long-conic, a good shipper, retains size fairly well throughout the season, inferior in flavor, low in quality.

Red Bird.—(M. Crawford Company, Cuyahoga Falls, O.) A seedling of Murray crossed with Hoffman originating in 1902 with S. Wherry & Sons, Durant, Miss., and introduced by them in 1907.

Plants intermediate in number and size, healthy, unproductive. Leaves of medium size and thickness, nearly smooth; leaf-stems of average length, slender; flower-stems long, branched. Flowers imperfect, season of bloom medium early, ⅝ inch across; petals oval, 5 in number. Calyx rather small, flattened or slightly raised. Seeds numerous, much sunken. Fruit maturing early; large to above medium, roundish-conic or wedge, sometimes necked, attractive, glossy, light scarlet; apex obtuse; flesh well colored, not very juicy, tender, sprightly subacid or tart, high-flavored; good to very good.

Plants intermediate in habit of growth, healthy, unproductive. Flower-stems long, slender, much branched; a high quality early berry, too tart for most purposes. Surpassed by other varieties.

Rockhill No. 6. (Harlow Rockhill, Conrad, Ia.) A seedling of Senator Dunlap pollinated with Pan-American, originating in 1906 with Mr. Rockhill.

Plants characteristically few in number, below medium in size and vigor, healthy, productive. Leaves of medium size and thickness, dark green; leaf-stems short, slender. Flowers perfect, blooming rather early. Calyx small, depressed. Seed sunken. Fruit ripening in mid-season; above medium to medium in size, conic or wedge, glossy, attractive medium scarlet, colors unevenly; apex usually obtuse; flesh well colored, not very juicy, firm, mild, not high-flavored, subacid; fair in quality.

Plants markedly few in number, inferior in vigor but productive. Fruit averages too small, variable in color, ships well, surpassed by other varieties in quality.
Rockhill No. 7. (Harlow Rockhill, Conrad, Ia.) A seedling of Senator Dunlap pollinated with Pan-American, originated in 1906 by Mr. Rockhill.

Plants very few, intermediate in size and vigor, healthy, unproductive. Leaves of average size and thickness, dark green, rugose; leaf-stems of medium length, slender. Flowers perfect, blooming rather early. Calyx of average size, flattened or raised. Seeds raised. Fruit maturing in mid-season; above medium to below in size, conic, sometimes slightly necked, rather attractive dark scarlet; apex pointed; flesh well colored, juicy, firm, aromatic, high-flavored, sweet; very good.

Plants moderately vigorous, healthy, unproductive, developing but few runners. A dark berry of high quality lacking in size.

Rockhill No. 9. (Harlow Rockhill, Conrad, Ia.) A seedling of Senator Dunlap pollinated with Pan-American originating with Mr. Rockhill in 1906.

Plants medium in number, large, vigorous, healthy, unproductive. Leaves of medium size, thick, the margins broadly serrate tipped with red, dark green, rugose; leaf-stems long, slender. Flowers perfect, intermediate in season of bloom. Calyx medium in size, flattened. Seeds large, conspicuous, raised. Fruit maturing early; above medium to medium in size, conic, glossy, attractive medium scarlet; apex somewhat pointed; flesh well colored, juicy, firm, mild subacid; fair to good.

Plant-characters desirable except in productiveness. An early ripening variety attractive in color but deficient in size and surpassed in quality by other varieties; has a marked tendency to produce fruit in the fall.

Rockhill No. 10. (Harlow Rockhill, Conrad, Ia.) A seedling of Laxton Commander crossed with Pan-American originating in 1906 with Mr. Rockhill.

Plants rather few, medium in size and vigor, healthy, very productive. Leaves of average size and thickness, medium green, slightly rugose; leaf-stems medium in length and thickness. Flowers perfect, blooming very early. Calyx large, leafy. Seeds sunken. Fruit maturing in mid-season; variable in size, averaging above to below medium, irregular conic, the surface deeply furrowed, dull, unattractive dark scarlet; apex variable in shape; flesh light colored toward the center, not very juicy, mild subacid; fair in quality.

Plants from the few runners are very productive and of fairly good vigor. The chief faults appear in the fruit which runs too small, is unattractive in color and shape and low in flavor and quality.

Rockhill No. 11. (Harlow Rockhill, Conrad, Ia.) A seedling of Brandywine crossed with Pan-American originating in 1906 with Mr. Rockhill.

Plants numerous, above medium in size and vigor, somewhat susceptible to attacks of leaf-blight, moderately productive. Leaves above medium in size, thick, medium green; leaf-stems of average length and thickness. Flowers perfect, intermediate in season of bloom. Calyx of average size, flattened. Seeds large, conspicuous, numerous, raised. Fruit maturing in mid-season; above medium in size, roundish-conic, glossy, attractive light scarlet; apex obtuse; flesh light colored toward the center, juicy, firm, mild, aromatic, sweet; very good in quality.
A good plant-maker and desirable in other plant-habits but somewhat susceptible to attacks of leaf-blight. Fruit of good color and shape; retains size fairly well although not large, very good for a mild, sweet berry. One of the best of Mr. Rockhill's seedlings described in this bulletin. Lack of size appears to be its greatest fault.

Rockhill No. 12. (Harlow Rockhill, Conrad, Ia.) A seedling of Brandywine crossed with Pan-American originating in 1906 with Mr. Rockhill.

Plants few, medium in size and vigor, healthy, productive. Leaves large, thick, dark green, rugose; leaf-stems medium in length, rather thick. Flowers perfect, blooming medium early. Calyx of average size, flattened or slightly raised. Seeds conspicuous, raised. Fruit maturing in mid-season; above medium to medium in size, blunt wedge-shape to roundish-conic, sometimes slightly necked, rather dull, dark scarlet; flesh well colored, juicy, medium firm, mild, pleasant flavored, sweet; very good in quality.

A poor plant-maker but productive and free from disease. Fruit of very good quality, variable in color and principally deficient in size.


Plants few, intermediate in size and vigor, healthy, moderately productive. Leaves of average size and thickness, medium green, slightly rugose; leaf-stems medium in length, slender. Flowers imperfect, intermediate in season of bloom, 1 inch across; petals small, roundish, 5 in number. Calyx small, flattened or depressed. Seeds variable in position. Fruit maturing late; large to medium, wedge-shape or conic, dull, unattractive light scarlet; flesh very juicy, tender, subacid; inferior in quality.

A poor plant-maker, intermediate in vigor and productiveness. Fruit late, drops rapidly in size, inferior in color, firmness and flavor and somewhat subject to sun-scald; color a lighter scarlet than most varieties.

Sherman.—(Samuel Cooper, Delevan, N. Y.) A seedling of Pan-American originated by Mr. Cooper in 1903. Not yet introduced.

Plants numerous, above medium in size and vigor, healthy, productive. Leaves large, of average thickness, characteristically dark green, rugose; leaf-stems above medium in length, thick. Flowers imperfect, intermediate in season of bloom, 1 inch across; petals roundish-oblate, 6 or 7 in number. Calyx large, flattened or depressed, leafy. Seeds sunken. Fruit maturing in mid-season; large, conical or roundish-conic, glossy, attractive medium scarlet, coloring unevenly; apex pointed or obtuse; flesh well colored, very juicy, firm, tart; good for an acid berry.

Plant-characters unusually good. Foliage markedly dark green. Fruit of good size which is well retained throughout the season, somewhat variable in shape, very juicy, of good quality for a tart berry. Worthy of more extended trial.

Plants medium in number, size and vigor, healthy, moderately productive. Leaves large, of average thickness, dark green, rugose; leaf-stems of medium length and thickness. Flowers perfect, intermediate in season of bloom, 1½ inches across; petals roundish, 6 or 7 in number; stamens numerous, rather long. Calyx of average size, flattened or depressed. Seeds small, raised. Fruit ripening late; above medium in size, roundish-conic, dull, light scarlet; apex obtuse; flesh well colored, very juicy, tender, not pleasant in flavor, subacid; fair in quality.

Plant-characters fairly good in all respects. Fruit inferior in color, firmness and flavor and inclined to sun-scall. Surpassed by other varieties.

Stall No. 1. (F. A. Stall, Lockport, N. Y.) A seedling of Sample originating with Mr. Stall in 1906. Not yet introduced.

Plants intermediate in number, large, vigorous, healthy, productive. Leaves of average thickness, medium green; leaf-stems of medium length and thickness. Flowers large, perfect, nearly 1½ inches across; petals broad-ovate, 6 or 7 in number; stamens numerous, rather long. Calyx medium in size, depressed. Seeds numerous, sunken. Fruit maturing in mid-season; unusually good in size, conic, glossy, attractive dark scarlet; flesh light colored toward the center, juicy, moderately firm, aromatic, high-flavored, sweet; very good to best for a mild berry.

A large-flowered, productive variety with desirable habits of plant-growth. Fruit unusually promising in size, color and quality. Worthy of testing for a mild, mid-season variety of high quality.

Stevens Great American.—(S. D. Stevens & Son, Bridgeton, N. J.)

Plants intermediate in number, size and vigor, healthy, moderately productive. Leaves large, of average thickness, slightly darker green than Stevens Late Champion, rugose; leaf-stems long, medium thick. Flowers perfect, intermediate in season of bloom, 1½ inches across; petals roundish-oval, yellowish at the base, usually 7 in number; stamens numerous, medium in length. Calyx large, flattened or slightly raised. Seeds sunken. Fruit maturing in mid-season; large, conic, sometimes slightly necked, glossy, attractive medium scarlet; apex pointed or obtuse; flesh well colored, very juicy, firm, tart, sprightly; good in quality.

A perfect-flowering variety ripening in mid-season several days earlier than Stevens Late Champion. Plant-characters much like those of that variety but slightly less productive. A tart berry of good quality; more promising in the earlier pickings than later.

Superior.—(E. W. Townsend & Company, Salisbury, Md.) Said to have been introduced from Delaware.

Plants numerous, large, vigorous, healthy, productive. Leaves above average size and thickness, medium green; leaf-stems long, slender. Flowers perfect or semi-perfect, blooming very early, ¾-inch across; petals small, roundish, usually 5 in number; stamens medium in number. Calyx of average size, flattened, leafy. Seeds conspicuous, raised. Fruit maturing in mid-season; large to medium, conic or wedge, glossy, attractive bright scarlet; apex variable in shape; flesh well colored, juicy, firm, aromatic, high-flavored, subacid or sweet; very good in quality.
Habits of growth unusually good. A very early blooming variety the flowers of which may be injured some years by late frosts. Of good size at first, dropping to rather small later in the season; berries bright scarlet, of very good quality, somewhat seedy in appearance. Worthy of testing further.

Swedenberg.—(David Knight & Son, Sawyer, Mich.) Parentage unknown but thought to be a chance seedling of Beder Wood found in the hills near Sawyer, Mich., about 1907, by Chas. Schwichtenberg (pronounced Swedenberg). Distributed as a premium in 1910 by Knight & Son.

Plants intermediate in number, size and vigor, somewhat subject to attacks of leaf-blight, very productive. Leaves medium in size and thickness, dark green; leaf-stems medium in length, slender. Flowers perfect, blooming medium early, \( \frac{3}{4} \)-inch across; petals small, roundish-oval, 5 or 6 in number; stamens numerous, rather long. Calyx of medium size, flattened. Seeds raised, slightly hairy. Fruit maturing early; large, roundish-conic, broad at the base, light scarlet; apex obtuse; flesh light colored toward the center, moderately juicy, rather tender, not high-flavored, subacid; poor to fair.

A very productive variety with fairly good plant-habits but somewhat subject to injury from attacks of leaf-blight. Fruit characteristically light red and broad at the base of the roundish-conic berries. Flesh lacks good color, is a poor shipper and is inferior in flavor and quality.

Taft.—(A. T. Goldsborough, Wesley Heights, Washington, D. C.) A seedling of Goldsborough crossed with Royal Straight Flush, originating with Mr. Goldsborough and introduced by him in 1906. This variety must not be confused with the variety named "W. H. Taft" nor with the variety introduced under the name "Taft" in 1909.

Plants intermediate in number, vigorous, healthy, productive. Leaves large, medium green; leaf-stems of average length, rather slender. Flowers imperfect, intermediate in season of bloom, nearly 1 3/16 inches across; petals roundish-ovate, 5 to 8 in number. Calyx inclined to detach readily from the fruit. Seeds prominent. Fruit maturing in early mid-season; large, retains size well throughout the season, blunt wedge to roundish-conic, with somewhat roughish surface, attractive dark scarlet; apex pointed; flesh well colored, aromatic, high-flavored, juicy, sweet; good to very good in quality.

Plant habits good; fruit desirable in size and color; in later pickings slightly coarse in appearance.

Wooster.—(J. H. Hale, South Glastonbury, Conn.) Thought to be a seedling of Sample crossed with Clyde; originated on the farm of E. W. Wooster, South Hancock, Me., in 1904, and introduced by Mr. Wooster in 1908.

Plants medium in number, above medium in size and vigor, healthy, unproductive. Leaves large, thick, dark green, rugose; leaf-stems above medium in length, of average thickness. Flowers imperfect, intermediate in season of bloom, \( \frac{3}{4} \)-inch across; petals small, tinged with yellowish-green, roundish, usually 5 in number. Calyx of average size, flattened. Seeds sunken. Fruit maturing early; large, roundish-conic, rather attractive, medium to light scarlet; apex obtuse; flesh rather light colored, medium in juiciness, of average firmness, mild, pleasant, sweet; fair in quality.
An imperfect-flowering variety, plants of which possess fairly good qualities. Fruit matures early, retains size well throughout the season but the color of both surface and flesh is too unattractive; quality inferior.

STATION SEEDLINGS.

In the spring of 1908 three seedlings, the most promising of 544 plants, were sent out for testing from this Station under the names Prolific, Magnus and Quality. A large number of reports have been received concerning them, and the varieties have also been under observation at the Station. Quality has not continued to make a good record and has been discarded. The reports on Magnus indicate that this variety may have more value for home use than for commercial purposes as was predicted in Bulletin No. 298 issued at the time of its introduction. Prolific has made a good record in most places and many growers are planning to test this variety on a larger scale for commercial purposes. The Station has no more plants of these varieties for distribution.

CULTURE OF STRAWBERRIES.

*Location and selection of soil.*—Strawberries do well under widely different soils and climate. A majority of varieties reach a better development, however, on the lighter, sandy loams than on the colder and more compact clay soils. Suitable varieties may be found for almost any location. The amount of profit is often measured by a few days difference in the ripening season where the earliest or the latest varieties are demanded. A quick soil, a sandy loam well stocked with plant food, and a southern slope favor early crops. The heavier clay loams and a northern exposure are preferable for the late crops. All soils for strawberries as well as for other fruits should have thorough natural or artificial drainage. Soils retentive of moisture are usually preferable to those that dry out too quickly, and if there is much danger from late spring frosts an elevation may be safer than bottom lands. The heavier soils also tend to produce berries that ship long distances better than when grown on the lighter soils.
Preparation of soil.— Weedy soils increase the expense of growing the crop and decrease the yield. Hoed crops such as potatoes, beans, cabbage or corn preceding strawberries will leave the land much freer from weeds; and the soil will be in better tilth if manure be applied heavily for the preceding crop. For most soils deep plowing will cause the plants to root more deeply and will conserve moisture. It may be done in the fall or spring, preferably in the fall, plowing again in the spring, following with thorough cultivation to make the soil fine and mellow. Too little attention is given to thoroughly pulverizing the soil before setting the plants. A clover sod plowed under is of great value but a grass sod should be avoided as it usually harbors insects destructive to the roots of the strawberry plants.

Manure and fertilizer.— There is usually but little danger of making the soil too rich for strawberries. Available plant food should be present to meet the requirements of the plants, and the soil should be liberally fertilized to secure maximum yields. Well rotted manure thoroughly worked into the soil is one of the best fertilizers. Coarse manure will give good results if turned under early enough to become well decomposed before setting the plants, as will also cover-crops or clover sod as previously indicated. These foods are largely valuable because of their humus, which improves the physical condition of the soil and also its ability to withstand drought. The presence of humus is necessary to secure best results and its absence often accounts for low yields, especially in dry seasons. Weed seeds from the compost heap may at times cause trouble.

Additional applications of plant food in the form of commercial fertilizers may be necessary. The kind and amount to use, the time and manner of application depend on conditions. These differ as to methods of growing the crop, character of soil, of season, and of the variety of strawberry grown. Soils may lack nitrogen, potash or phosphoric acid. Applications of nitrogen in the form of nitrate of soda using from two hundred to three hundred pounds per acre or dried blood at the rate of from three hundred
to six hundred pounds per acre will stimulate growth. Too much nitrogen sometimes causes a rank growth at the expense of the fruit. Potash may be supplied by using wood ashes, two thousand pounds per acre, or muriate of potash, using from two to three hundred pounds per acre. A lack of phosphoric acid may be supplied in the form of acid phosphate, six hundred to seven hundred pounds per acre. Other fertilizers might be named. If the soil is well supplied with any form of plant food it is useless to make additional applications of that kind. The aim should be to find the actual need of each soil. To this end it is desirable to make tests of different fertilizers leaving check rows for comparison. It must be understood that these fertilizers will not take the place of humus, nor of a good physical condition of the soil.

No rule can be given regarding the proper application of fertilizers. Soils differ in all their properties, and the condition should govern the application. Each grower must use his own judgment based on observation or experience to determine what to apply. For new beds the fertilizer may be applied broad-cast in the spring before setting the plants, harrowing it in, or scat-
tered along the plant rows after setting, cultivating until well mixed with the soil. Sometimes applications of nitrate of soda may be given the fruiting beds before blossoming time, broadcasting directly over the plant rows. For beds held over for a second crop apply the fertilizer or rotted stable manure along the rows after they have been cleaned out following fruitage.

Selection of varieties.—Under different environments, and under unlike surroundings, the same variety may be most profitable or become worthless. It may succeed admirably in one place and yet be a failure elsewhere. In no two localities are the same varieties equally valuable. Adaptation should be determined by a test of a few plants before an extensive use in the commercial plantation. In this way the few kinds best suited to a location may be found. The character of the market may affect the selection; it may require early or late kinds; or firm varieties capable of being shipped long distances; sometimes the demands of canneries must be considered. It is safe to say that no kind has all of the qualities equally developed that go to make perfection. The newer, most promising kinds should be tested in a small way and their merits determined before making extensive plantings. This is especially true of the fall-bearing varieties which are being sold at the present time.

Sex of plants.—The sex of the variety should be known. Some

![Fig. 2.—Imperfect, or Pistil-Late Flower.](image1)

![Fig. 3.—Perfect Flower.](image2)
varieties have perfect blossoms, also called hermaphrodite, stamine, bi-sexual or male. Such kinds bear flowers containing both stamens and pistils. All such varieties bear fruit when planted alone. Other varieties have imperfect blossoms, also called pistillate or female. These varieties will not bear fruit if grown by themselves, with none of the other kind in the neighborhood. To insure fertilization of the blossoms they should be set in rows of from one to three alternating with rows of the perfect-flowering varieties, which bloom at the same time.

Bees and other insects in visiting the perfect flowers, become more or less covered with the sticky pollen which adheres to them and is carried to other blossoms and left on the pistils which are thus fertilized. Incomplete fertilization is usually indicated by the presence of nubbins, berries with hard, greenish, undeveloped apex. Too much rain, frost or cool temperatures, or the absence of pollen-distributing insects at blooming time may greatly decrease the setting of fruit.

Time of planting.—Periods of drought usually occur during the fall months and when plants are set under such conditions, there may be considerable loss. Fall-set plants require winter protection and the usual cultural care during the ensuing summer followed by a second winter’s protection before a full crop of fruit may be secured. Plants obtained by rooting the first runners in small pots plunged in the soil along the row are sometimes set in the fall with the ball of earth adhering to the roots but this method is more expensive although it permits the taking of an early crop from the land before setting the strawberries. But few runners develop from fall set plants before growth ceases.

Spring-setting is usually preferable as it shortens the time from planting to fruitage and at the same time secures better weather and soil conditions and it may be begun early in the spring as soon as the soil and plants are in good condition for this work, extending well through May. There is also opportunity if necessary to reduce the number of weeds greatly by thorough cultivation after growth begins and before setting the plants.
Selection of plants.— The best stock obtainable should be used. Plants from old beds are usually weakened in vitality and may be infested by insects or diseases. Vigorous, healthy plants should be selected from well-cared-for beds which have not yet fruited. Careful selection and continued propagation should result after a few years in an improved strain with fixedness of character. If the so-called “pedigree” plants are superior to others it is because of the character of the parentage, the family traits having become permanent through long years of careful and intelligent breeding; not all of the “pedigree” plants on the market have this fixedness of character.

Preparation of plants.— After the plants have been dug, they are trimmed for setting by removing all dead leaves and runners and all except one or two of the green leaves. The roots are usually shortened back about one-third their length. They should never be allowed to dry out.

Distance of planting.— At fruiting time strawberry plants are usually badly crowded. Sufficient moisture is essential to good size and yield, and is not available under crowded conditions. The distance apart of rows and plants should vary depending on richness of soil, ability of the variety to make runners, methods of culture, and season of planting. Plants may be set and treated to make wide or narrow matted rows, or they may be kept in hills. The narrow matted row is generally preferable for commercial purposes, the rows from three to four feet apart, and the plants usually from eighteen to thirty inches apart depending on the character of the variety as a plant-maker. The chief difference between the narrow and wide matted row is that the former is about one foot in width while the latter is about double that distance. The “hill” system consists in both rows and plants being slightly closer together and in growing each plant by itself in a hill, removing all runners that develop. Fruit from such plants is usually larger and makes a better appearance but the labor item is increased. The matted row requires less labor and the yield is usually greater.
Setting the plants.— Previous to setting, the land should be marked both ways; or the ground may be marked crossways to the direction of the rows, setting along a line stretched from end to end of the row. The roots of the plants should be kept moist, and a pail containing a little water or damp moss will be found convenient. A trowel, flat dibber, or narrow well-scoured spade may be used to open the soil for the plants, the latter being most convenient for large plantings. Insert the spade and by pressing forward make a wedge-shaped opening. The roots, spread fan-shape, may be inserted in this space which should then be closed and the soil pressed firmly against the roots. The two most important points to observe in planting are to place the roots at the right depth and to press the soil firmly about them. The crown of the plant should not be so deep as to be covered with earth nor should it be set so high as to expose the roots. It should be level with the surface. If too deep the crown is liable to rot and if too shallow the roots dry out.

Treatment the first summer.— Cultivation should begin as soon as the plants are set and be continued throughout the summer and fall when necessary to keep the ground free from weeds which rob the soil of both moisture and plant food, to retain a mellow soil condition, to assist in breaking down plant food, to conserve moisture, or to maintain a steady, normal growth. If the distance apart of plants is sufficient the cultivation should be both ways until the runners begin to make plants. The tillage or hoeing should never be deep enough to disturb the shallow root system, especially in hot, dry weather.

Fruitage lessens plant growth. Flower-clusters should therefore be removed as soon as they appear, to secure stronger plants from which the runners will develop later. The first runners that start should not be cut off but be encouraged to root as soon as possible by “bedding in” or placing in a position where they will root readily and will not be disturbed by the cultivator. This gives a long season for the young plants to develop in size and
maturity. They, however, should not become crowded and it may be necessary to thin out some of the later ones before the season of growth ends.

In the fall, some growers stop cultivation early, sowing among the plants oats or barley which die down after the first frosts. This gives a slight protection as a cover-crop or mulch over winter and helps somewhat to keep the ground from baking in the spring and to keep the berries clean. It is doubtful, however, if this practice although a cheap one, is as desirable as the method suggested under "winter treatment" owing to the large amount of water removed by the oats or barley which in a dry fall must result in a decreased vigor of the strawberry plants, and also because of insufficient winter protection.

Winter treatment.—Repeated freezing and thawing weaken the plants and tend to reduce the yield. Winter protection of some form should be given. The most desirable covering is one which is free from weed seeds, spreads evenly, is not blown off by heavy winds and does not smother the plants. The objects to be secured are; to protect against the bad effects of freezing and thawing; to keep the soil more moist the following spring; to prevent the ground from baking; to retard the time of blooming thus diminishing danger from late spring frosts; to keep the berries clean; to improve conditions at picking time. Various materials may be used for mulching, that most easily obtained at minimum prices ordinarily being selected, such as coarse, strawy, horse manure, marsh hay, clean wheat or oat straw, swale grass, leaves for covering small beds, or even corn stalks if nothing else is available. Oat straw smothers plants more quickly than does wheat straw and stable manure frequently introduces grass and weed seeds. The covering should be applied to the entire surface of the ground, as soon as it is sufficiently frozen to bear a wagon. A heavy mulch is unnecessary and undesirable for if too thick the plants may be smothered. A light coating an inch or two deep that covers the plants out of sight is preferable to one of greater depth.
Treatment during fruiting season.—The mulch should remain over the plants as long as possible in the spring. As warm weather approaches it may be necessary to shake up the covering to prevent the plants from smothering; if need be, remove part of the material, where too thick, to the space between the rows. The vines will grow up through the mulch left on the ground. No further treatment is generally necessary except to hand-pull the larger weeds after a soaking rain. In extreme conditions it may be necessary to remove the mulch and give thorough cultivation, replacing it before the berries ripen.

Renewing old beds.—Usually it is better to set new beds each year than to continue the old ones. The advisability of removing more than one crop of fruit depends largely on the condition of the bed. If the plants are numerous, vigorous and healthy, and the ground not too weedy they may be left for a second crop. Two and even three profitable crops may sometimes be harvested before making a change. The berries ripen slightly earlier but average somewhat smaller on the older beds, and the plants are more liable to trouble from insects and diseases. The cost of cleaning out and caring for an old bed is usually greater than for setting a new one. Under some conditions a quick growing crop maturing before winter may be grown upon the same soil if the strawberry vines be plowed under as soon as the crop has been harvested, or it may be advantageous to sow the ground to a clover cover-crop to be plowed under the following spring.

If the bed be retained for a second crop it will be necessary to clean out, fertilize and cultivate the rows. Some growers go over the bed with a mowing machine and as soon as the leaves are sufficiently dry burn over the entire field during a wind blowing in the direction of the rows. This must be carefully done or injury may result to the crowns of the plants. Such a treatment tends to lessen insect and fungus troubles. The majority of growers who retain their beds narrow down the old rows with plow, disc-harrow or cultivator to a width of from six to twelve inches depending on the stand of plants, and cultivate thoroughly to
loosen the ground which has become hard and compact from the
tread of the pickers. The weeds and surplus plants should be cut
out from the rows remaining and a heavy application of plant
food, preferably in the form of well rotted stable manure, should
be broadcast lengthwise of the rows and directly over the plants.
If this work is done after the first rain following fruitage, the
plants will quickly start into new growth.

Insects and diseases.—It is not the intention at this time to
discuss in detail strawberry insects and fungi, although some of
them may attack either leaves, crowns, roots or the fruit. They
are not so numerous nor so destructive as with the other small-
fruits. Reference has already been made to the danger of using
sod ground on account of the white grubs, the larvae of June bugs.
Among fungus diseases, leaf-blight is most destructive to foliage,
its presence being indicated by circular, light colored spots
bordered with red. Good air and soil drainage, with selection of
good resistant varieties aid greatly in reducing the amount of
injury. In severe cases it may be necessary to spray thoroughly
with bordeaux mixture using the 3–3–50 formula as growth begins
in the spring and again just before blossoming time; or if an old
bed, spray as soon as the rows have been cleaned out after fruiting.
The best preventive of both insects and fungi in addition to the
measures already suggested, is a quick rotation of crops.

Conclusion.—It must be kept in mind that the suggestions
given above are not full specific directions. Details vary widely
in different places and must be worked out by each grower to meet
his own conditions. The subjects have been treated in a general
way, indicating some of the methods pursued by a large number
of successful growers.