The Fruitgrower's Guide
Lane's Prince Albert.

Allen's Everlasting.

Chelmsford Wonder.
Alpine Strawberries.

VOL. III.

J. S. VIRTUE & CO., LIMITED.
Doyenné du Comice.

Souvenir du Congrès.
PLUMS AND DAMSONS—SELECTIONS OF VARIETIES.

Twelve for south walls.
* Early Favourite.
* Denniston’s Superb.
De Montfort.
Early Transparent Gage.
* Goldaert’s Green Gage.
† Jefferson.
* Purple Gage.
Transparent Gage.
* Kirke’s.
Bryanston Gage.
* Coe’s Golden Drop.
Ickworth Impératrice.

Twelve for dessert as pyramids.
* Oullins Golden.
* Denniston’s Superb.
Early Transparent.
* McLaughlin.
Gage Green.
Purple Gage.
* Jefferson.
Decaisné.
* Kirke’s.
Bryanston Green Gage
* Reine Claude de Bavay.
Ickworth Impératrice.

Twelve for culinary as pyramids.
* Early Prolific.
Czar.
* Belgian Purple.
Belle de Louvain.
Prince of Wales.
† Victoria.
Prince Engelbert.
† Pond’s Seeding.
* White Magnum Bonum.
Washington.
† Monarch.
Blue Impératrice.
Grand Duke.

Twelve for east or west walls.
* Czar.
† Belgian Purple.
Belle de Louvain.
Prince of Wales.
† Victoria.
Prince Engelbert.
† Pond’s Seeding.
* White Magnum Bonum.
Washington.
† Monarch.
Blue Impératrice.
Grand Duke.

Twelve for north walls.
† Early Prolific.
Czar.
† Belgian Purple.
Belle de Louvain.
† Victoria.
Prince Engelbert.
* White Magnum Bonum.
Washington.
* Diamond.
Belle de Septembre.
* Monarch.
Archduke.
Grand Duke.

Twelve for standards in gravelly or calcareous soils.
† Early Prolific.
Early Orleáns.
Goliath.
Prince of Wales.
† Gisborne’s.
Denbigh.
† Victoria.
Mitchelson’s.
Jefferson.
* Winesour.
White Magnum Bonum.
* Wyedale.

Twelve for standards in strong soil.
† Czar.
Heron.
Perdrigon Violet Hâtif.
† Denniston’s Superb.
† Belgian Purple.
Sultan.
Belle de Louvain.
† Prince Engelbert.
* Diamond.
* Monarch.
Archduke.
Grand Duke.

Twelve for standards in the north.
† Czar.
Denniston’s Superb.
Belgian Purple.
Sultan.
† Gisborne’s.
† Mitchelson’s.
Prince Engelbert.
* Victoria.
Diamond.
* Winesour.
Monarch.
* Wyedale.

Six of preceding twelve.
† Three of preceding twelve.

Six damsons.
Rivers’ Early.
Frogmore.
† Crittenden.
White.
* Prune.
† Bradley’s King.

* Three of preceding six.
† Two of preceding six.

Propagation.

This is effected by seeds, suckers, layers, budding, and grafting.

Seed.—It is not desirable to raise trees from stones for perpetuating varieties. Mr. Knight raised Ickworth Impératrice from the Impératrice Violette, pollenised with Coe’s Golden Drop, and Mr. Rivers originated Czar from Prince Engelbert, crossed with
PLUMS AND DAMSONS—SELECTIONS OF VARIETIES.

Twelve for south walls.

* Early Favourite.
* Dennistoun's Superb.
* De Montfort.
* Early Transparent Gage.
* Boldaert's Green Gage.
* Jewel.
* Purple Gage.
* Transparent Gage.
* Kirkle's.
* Exmouth.
* Dennistoun's Superb.

Twelve for east or west walls.

* Czar.
* Belgian Purple.
* Belle de Louvain.
* Prince of Wales.
* Victoria.
* Prince Engelbert.
* Pond's Seedling.
* White Magnum Bonum.
* Washington.
* Monarch.
* Blue Impératrice.
* Grand Duke.

Twelve for north walls.

* Early Prolific.
* Czar.
* Victorian.
* Prince Engelbert.
* Pond's Seedling.
* Monarch.

Twelve for dessert as pyramids.

* Oullins Golden.
* Dennistoun's Superb.
* Early Transparent.
* McLaughlin.
* Gage Green.
* Purple Gage.
* Jefferson.
* Decaisne.
* Kirkle's.
* Bryanston Green Gage.
* Raine Claude de Bavay.
* Ickworth Impératrice.

Twelve for culinary as pyramids.

* Early Prolific.
* Czar.
* Belgian Purple.
* Belle de Louvain.
* Victoria.
* Prince Engelbert.
* Washington.
* Diamond.
* Belle de Septembre.
* Monarch.
* Archduke.
* Grand Duke.

Twelve for standards in gravelly or calcareous soils.

* Early Prolific.
* Czar.
* Belgian Purple.
* Prince of Wales.
* Gisborne's.
* Prince Engelbert.
* Washington.
* Diamond.
* Belle de Septembre.
* Monarch.
* Archduke.
* Grand Duke.

Twelve for standards in strong soil.

* Czar.
* Heron.
* Perdrigon Violet Hâtif.
* Dennistoun's Superb.
* Belgian Purple.
* Sultan.
* Belle de Louvain.
* Prince Engelbert.
* Diamond.
* Monarch.
* Archduke.
* Grand Duke.

Twelve for standards in the north.

* Czar.
* Dennistoun's Superb.
* Belgian Purple.
* Sultan.
* Gisborne's.
* Prince Engelbert.
* Victoria.
* Diamond.
* Winesour.
* Monarch.
* Wyedale.

* Six of preceding twelve.

* Three of preceding twelve.

Six damsons.

Rivers' Early.
* Frogmore.
* Crittenden.
* White.
* Prune.
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* Three of preceding six.

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PROPAGATION.

This is effected by seeds, suckers, layers, budding, and grafting.

Seed.—It is not desirable to raise trees from stones for perpetuating varieties. Mr. Knight raised Ickworth Impératrice from the Impératrice Violette, pollenised with Coe's Golden Drop, and Mr. Rivers originated Czar from Prince Engelbert, crossed with
Early Prolific, a seedling from Précoce de Tours. These are instances of artificial cross-breeding having good results, and this method should be practised for raising superior varieties. Care must be taken to prevent self-fertilisation, by enveloping the flowers in gauze bags. Remove all the stamens before the pollen is ripe and apply the farina of the desired variety carefully to the stigmas.

Propagation by seeds is the ordinary method followed to provide stocks for budding and grafting. The Mussel is generally employed for standards; St. Julien and White Pear plum for other forms of trees, and these are raised by layers or suckers from stools, but those raised from seed are less liable to produce suckers. The Myrobalan plum also is used as a stock (see page 112, Vol. I.). The stones may be sown when taken from the fruit, or stratified in sand till early in the spring, sowing them in rich sandy soil in drills 3 inches deep, allowing an inch between the stones, and the drills 9 inches apart. The seedlings will be ready for transplanting by the following autumn and strong enough to bud or graft in the third year.

Suckers.—Plum trees, as a rule, produce too many of these, and it is not advisable encourage them by employing suckers of the common kinds for stocks from the predisposition of such to produce them. It is, however, an easy way of obtaining stocks.

Layers.—Trees raised by this method produce fibrous roots, and have been recommended for pot culture. It is only necessary to bend a branch down to the ground, partially cut it through on the under side below a bud, peg it about 3 inches in the ground, keep moist, and detach the following autumn, afterwards treating as separate trees. To prevent the pushing of suckers the buds on the part placed in the soil must be carefully cut out.

Budding.—July is the best season for performing this most desirable method of perpetuating and increasing esteemed varieties. Care must be taken to use well-developed buds, and to operate when the bark parts freely from the wood; also to insert wood buds only. Shield budding is the most approved mode (see Vol. I., pages 115—120). The buds are best inserted about 6 inches from the ground, and even for standards the scion should be allowed to make its own stem.

Grafting.—The scions must contain wood buds and be taken off in December or January, keeping them in earth behind a north wall or fence until the sap rises in the stocks, as will generally be the case early in March, sooner or later according to season. At that time the stocks should be headed down near to where the scions are to be attached. Either whip or cleft grafting may be practised, but there is less danger of gum
ensuing by the former method (see Vol. I., pages 120—128). Except for special purposes, grafting plums is not generally advisable.

**Situation and Soil.**

*Situation.*—Wherever cereal crops are capable of successful cultivation, it is practicable to utilise sites not fitted for tillage with the harder varieties of plums. The site must be open to every ray of light. Shelter, such as that of hills or woods at a distance, aids the cultivator immensely in the production of the choicest plums, slopes being better than flat ground, and ridges superior to hollows, but the chief consideration is the free access of light and air. Provided the atmosphere is dry, plum blossom and the tender fruit suffers little from spring frosts, but in low damp sites the crops are ruined by night dews congealing in spring on the blossom and foliage, causing the former to fall and the latter to “silverleaf.” Plenty of light, abundant air, with shelter from bleak points, are the essentials of a site for plums.

*Soil.*—The success of one kind of plum in one district and its comparative failure in another points to the cultivator having strict regard to the soil as well as to the climate. Damsons seem to be at home everywhere. Gisborne’s plum succeeds in a strong chalky clay, and it is equally at home in light soil. Pershore seems to like a “holding” staple as it hardly fruits in sandy soil. Winesour is of little use without limestone. Wyedale delights in the semi-vegetable loams and irony soils of Cleveland; this plum is a step from the damsons to the plums. Orleans and its descendants—Cox’s Emperor, Prince of Wales, and Goliath like warm soils. The Czar and Sultan are equally at home in any ordinarily good medium, and the Victoria appears thoroughly cosmopolitan, thriving almost everywhere, yet best on a chalky strong loam or clay. Early Prolific loves calcareous clay interspersed with gravel. Belgian Purple and Prince Engelbert, with Coe’s Golden Drop, are less fastidious as to soil; also Pond’s Seedling, Diamond, and Monarch—these, with Jefferson, Kirke’s, and White Magnum Bonum, thriving in light loams as well as those verging on clay. Gages prefer a calcareous loam—the blending of brick-earth and limestone (Kentish Rag).

Twelve to 15 inches’ depth of good soil, incumbent on a calcareous clay, and well drained, is the soil *par excellence* for plums, for it is of a sustaining nature, and holds the manures applied for the benefit of the trees. This is important, for they carry at times such enormous crops as to require more support than other fruit trees to prevent exhaustion. A deep and rich soil is prolific of wood rather than fruit, and favours
gumming or damage to the young growths from frost. Firming loose rich soils answers better than stirring them. Clayey marl mixed with light soil renders it unctuous and with top-dressings of manure, good plums follow. It is not desirable to add manure to the ground at first and in stirring or trenching, the good soil should be kept on the top. In breaking up grass land for plum trees it is not advisable to bury the turf at the bottom of the trench; it should not be covered deeper than is necessary to destroy the herbage and insure clean cultivation.

Aspect.—The finest plums require the best aspect. South walls facilitate the ripening and enhance the quality of the fruits, and, therefore, such should be utilised for early supplies of the choicer varieties. On west aspects the fruit is more liable to crack than on east walls; consequently varieties not liable to be influenced prejudicially by prolonged wet should be chosen, such as the Czar, Sultan, Prince Engelbert, Pond's Seedling, White Magnum Bonum, Victoria, Monarch, Autumn Compôte, and Blue Impératrice. East walls suit all the gages, and the richly flavoured Jefferson, Kirke's, and Coe's Golden Drop. North walls answer for free-bearing plums, for supplying fruit for culinary purposes. Similar remarks apply to trees trained to fences.

Arrangement of Trees.

Orchards.—The plum does not make a large and lofty tree. For orchards in grass, where calves, poultry, and sheep are kept with mutual benefit, the free-growing varieties, such as the Czar, Green Gage, Gisborne's, Victoria, Jefferson, Monarch, and damsons, should be planted 21 feet apart. In good soils the distance may be increased; in firm and shallow mediums it may be lessened. Orchard standards should have clear stems of 6 feet. For fruit plantations where the soil is firm the trees may be arranged in lines 15 feet apart for the moderate growers, and 18 for the more robust. In low standard form (4-feet stems), with gooseberries and currants in the intervening spaces, the trees may be planted 12 feet apart in rows 15 feet asunder. Low standards are convenient and easily managed.

Bushes and Pyramids.—These are excellent for fruit plantations; 10 feet every way is not too great a distance to allow in good soil; in a firm medium 9 feet from tree to tree answers well. If only free bearers are grown, and root-pruning is practised on unruly trees, they may be 6 feet apart in rows 9 feet asunder. Pyramidal trees are prodigies of fruitfulness under the lifting treatment; they may be planted in borders
of the same width the trees are apart—6 feet. Vigorous growers require 9 feet, and at 12-feet distance they make large handsome trees.

_Cordon, Espalier, and Wall Trees._—Upright cordon: plant 15 inches, diagonal 18 inches apart. These forms must have firm soil and be lifted to keep them fruitful. Espaliers: strong-growing kinds plant 21 feet apart, moderately vigorous 15 feet from tree to tree. Excessive vigour must be checked by root-pruning, and it is advisable to thin out the crowded spurs. Against walls 12 feet high plant the trees 15 feet apart; walls 10 feet, trees 18 feet; walls 8 feet, trees 21 to 24 feet apart. Plum trees succeed admirably against low walls or fences, when the soil is firm and the roots are not mutilated by digging.

**PLANTING AND TRAINING.**

_Planting_—November is the best time for planting, as the trees then immediately commence re-establishing themselves. Young trees move more safely and break far more freely and strongly than those of several seasons' growth, but old trees will bear removal provided they have been frequently transplanted previously. Spring planting answers very well if the roots are not dried and the work is done during mild weather, with the ground in good working order.

In planting, keep the trees slightly above the ground level, as the soil is sure to settle down. Stake securely, and mulch from the stem to a little farther all round than the roots extend with partially decayed manure. Cut the heads closely back before the buds break in the spring, only leaving three or four buds on the young shoots. In the summer some of the small shoots must be removed to keep the trees open, the best growths being so disposed as to form a well-balanced head, sun and air having free access to every part. Under good management on the lines indicated the trees will bear fruit abundantly the third year.

_Training._—The fan method (present volume, page 135) is the best for walls, as, should any of the branches die, others can be trained in their places.

If the tree is a maiden, it should be cut down in the autumn or early spring to 12 inches from the ground, and three to seven shoots trained in from the upper 6 inches of the stem, equidistant on opposite sides, and disposed regularly, like the spokes of a wheel, over the wall surface. The growths must be secured as they advance, leaving sufficient room in the ligatures to prevent contraction. If laterals push, they may be pinched at every leaf. The inclination of the shoots should be such that, when they have grown 3 feet, they will be 9 to 12 inches apart, the lowest shoots being 1 foot from the
ground. By the procedure represented in Fig. 35, Q, R, present volume, page 135, the tree will cover a large extent of wall surface by the third year, and commence bearing fruit.

Cordon.—This form, whether against walls or for espaliers, is carried out in the same manner as detailed for apricots (Vol. II., pages 60—62), as regards upright and diagonal. horizontal cordon training being treated on pages 21—23, Vol. II. This only applies to the leading growths or branches, for the mode of bearing in plums is somewhat different from that of apricots and apples and will be treated under “Pruning.”

Espaliers—The trees may be in fan form or oblique cordons. Horizontal training, as applied to the apple and pear, is not suitable for plums, and cordon training often necessitates root-pruning to check excessive growth. With proper attention to lifting, keeping the soil firm and the surface mulched, the trees are very fertile.

Bushes and Pyramids.—These very desirable forms for gardens may be shaped from the maiden by the methods described under “Pyramid Training,” Vol. II., pages 1—10; “Bush Training,” Vol. II., pages 10—15; or that detailed under “Apricots,” Vol. II., pages 79—80. These forms answer for gardens with the essential pruning for plums. Growers for market do not practise close pruning after shortening to secure the necessary number of branches, but the trees are allowed to assume their natural form and the branches are thinned when necessary, to prevent overcrowding.

Pruning.

To operate successfully it is essential to have a right knowledge of the mode of bearing. The fruit is produced on the shoots of the preceding year, and on spurs. Characteristic summer growths are represented in the illustrations, Fig. 47, M—R.

Summer Pruning.—It may be a wise saying that the less pruning the better for bearing. Terse advice, however, may lose force through its exclusiveness, and not to prune at all can only apply to trees which have passed the vigour of youth. When a tree has its growths confined to short stubby shoots, pruning would practically mean cutting off the following season’s crop more or less. A tree bearing as in Fig. 47, M, does not admit of the use of the knife. The fruit of such tree may, however, be improved by a judicious thinning of the spurs and the removal of weak parts immediately the crop is gathered—by far the best time for the work.

When a tree makes vigorous summer growth, O n, it is at the expense of fruit production, and by shortening such shoots at the winter pruning wood formation is still further augmented. By leaving the shoot O n its full length it will usually form
References.—M, bearing at the point of the branch; f, stubby shoot; g, spur. N, bearing on one-year-old wood:
b, continuation branch growth; i, secondary growth from the extremity of previous year's shoot; j, stubby shoot;
k, spurs. O, summer growths from one-year-old wood: l, natural spur; m, artificial spur; n, vigorous extension shoot;
o, point of shortening at the winter pruning to originate growths for training in. P, result of leaving a vigorous shoot
its full length: q, bearing on one-year-old spur; r, bearing on an artificially-formed one-year-old spur; s, spurs:
a, growth of the current year. Q, result of shortening a vigorous shoot at the winter pruning: t, natural spurs;
u, shoots pinched to form spurs; v, subsidiary growths for forming branches to cover the space; w, continuation shoot
of main branch. R, shoot pinched at the third leaf (x), not counting the basal leaves (y); z, laterals pinched to one
leaf; a, sub-laterals pinched to one leaf; b, part desirable to be pinched off; c, point of winter pruning.
spurs $P_r$ as shown, but the extension shoot $P_s$ will be of a more fruitful character, forming some blossom buds and semi-spurs. That is the way to secure the most fruit, and is the practice generally followed with wall and other trees. It is sometimes necessary to shorten a vigorous extension shoot to originate growths at certain places for the proper furnishing of the tree with branches and the profitable occupation of the space. If the shoot $O_n$ be shortened to about half its length $o$, at the winter pruning, wood growth will follow, as shown in $Q$, a strong shoot ($w$) from the extremity, two subsidiary shoots ($v$), of nearly equal vigour, while the growths ($u$) would have extended to about the length shown by the outlines, had they been let grow instead of being pinched to form spurs.

Such are the principles upon which pruning plum trees must be carried out. Prune closely for the production of wood, or to multiply the growths and secure vigorous shoots at the right place; then shorten little or not at all, as in $P_s$. Repressing vigour by pinching is a useful aid to fruit production, but stopping strong shoots too closely causes the basal buds to start, and the result is a quantity of soft useless spray. Instead of this hard pinching to a certain number of leaves, it is better to omit counting the small bract-like basal leaves $R_y$, and pinch off the point of the shoot above the third good leaf $z$. If the growth be only moderately vigorous, laterals may not push; then there will be a profusion of blossom buds formed in the axils of the leaves, but if vigorous laterals issue from the uppermost buds, pinching them to one leaf $z$. Sub-laterals ($a$) should be pinched to one leaf as made. At the winter pruning the shoot may be shortened to firm wood immediately below the laterals $c$, thereby keeping the spur short.

Disbudding must not be overlooked in plum trees. Strong young shoots often spring from various parts of the tree. If not required for laying-in, these may be rubbed off when quite small, while some of the less robust may be pinched. In the case of old trees it is desirable to remove some of the older branches to make way for younger wood. The best time to remove such as are weakly or undesirable growths is from June to September, as the wounds heal quickly then and the sap is diverted into other channels before the fall of the leaves.

When a tree becomes enfeebled by any cause, it frequently pushes a number of erratic growths, which accelerate the destruction of the weaker branches. To prevent this it is necessary to cut out many weakly and some over-strong shoots. The safest plan is to remove some of the weaker and rub off those likely to be over-vigorous while they are small; also the vigour of the young shoots retained may be subdued by the removal of part of each leaf. This weakens the growth, while not hindering the formation of the
buds, but the practice must not be too freely indulged in and cultural judgment should be exercised in the matter.

Winter Pruning.—Where the growths have been properly manipulated in summer,

Fig. 48. Shoots and Spurs of the Plum—Winter Pruning.

References:—S, natural one year's spur. T, stubby shoot, or long natural spur. U, short shoot: d, point of shortening. V, one-year shoot: e, blossom buds; f, point of shortening to originate growths. W, one and two-year wood: g, blossom buds on spurs; h, point of shortening a spur; i, extension shoot, left entire or shortened to originate growths; j, subsidiary shoot, left entire or cut out. X, three-year wood: k, point of shortening a long spur. Y, elongated spur: l, point of shortening. Z, result of shortening an elongated spur: m, point of shortening a pinched growth.

the autumn or winter pruning will be confined to finishing anything then overlooked, and to do this in the right way it is necessary to have a certain knowledge of the

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different growths. Those on one to three years old wood are shown in Fig. 48. The natural spur $S$ has blossom buds, also terminal and basal wood buds; it must not be shortened, for to prune at the outline would be to cut off the prospect of fruit. For the same reason the long spur $T$ may not be shortened to the outline, but left entire. The shoot $U$, overlooked at the summer pruning or purposely then left to prevent the lower buds starting, should be cut back to a wood bud above or on a level with a blossom bud, as at $d$. An extension shoot $(V)$, or one trained in to form a subsidiary branch may be left entire, and fruiting spurs will push from the buds $e$ in the following year. If more branches are needed for covering the space regularly, the shoot must be shortened to $f$, or at the basal outline above the wood buds, according to the place the branch requires to be divided. In the case of a branch extending, $W$, the extension $i$ may be left its full length, also the subsidiary shoot $j$; but if more growths are needed at a certain place shortening can be done at any point, as all the buds are wood buds. If the subsidiary shoot is not required it should be cut clean out, instead of being shortened to the outline, which would result in spray difficult to restrain, while its entire removal concentrates the vigour on the main branch. When there is a reciprocal action between the roots and branches and the extensions are left their full length, say $i$, spur growth will issue from every wood bud the following year and resemble the promising condition shown on the two-years' wood at $g$. Only long spurs may be shortened, as at $h$; if the stubby fruitful spurs $(g)$ were shortened to the wood buds near the base, fruit would be prevented, and wood growth incited. The spurs should be kept close to the branches as represented in the three-years' wood $X$. To prevent the undue elongation of spurs, shorten any having that tendency at $k$. If this is neglected the spur will become impoverished at its base, as shown at $Y$. This should not be allowed and if it occur cut boldly off at $l$; this will impart vigour to the spurs left and enable them to form blossom buds as at $Z$. When an elongated spur is shortened in the way described, some of the growths may push strongly; these should be pinched in summer and shortened in autumn as at $m$. These principles apply to all forms of trained trees. The object is to maintain equal vigour in the branches and admit light and air freely to every part of the tree; then it will be brought into the best condition for bearing full crops of fruit.

Bush, pyramid, and low standard trees need very little pruning after they are shaped and have arrived at a bearing age, for with firm soil, surface feeding and judicious cropping, they bear enormously. The removal of enfeebled parts and cross branches
before the leaves fall, for the admission of light to those remaining, is about all the pruning required. If it be thought a little subsequent pruning is desirable, the sooner it is done after the leaves fall the better (page 165, Vol. I).

Root Pruning.—This method, if practised for checking exuberance, must be carried out with great care and judgment. Severe root pruning may cause the loss of a considerable part of the branches. When the shortening of strong roots is necessary, let it be done early in the autumn. Be careful to cut the ends smoothly, and not to bruise or damage other parts of the roots, or a profuse crop of suckers may follow.

Routine Operations.

Manuring.—Manures applied from the fall of the leaf in autumn to the swelling of the buds in the spring should be of a durable nature.

1. Chemical manures best suited for the plum are ground bones or coprolites, and kainit; say three parts bone meal and two parts kainit, by weight, mixed and applied in the autumn as soon as the leaves have fallen and the pruning is completed. After the prunings have been burned and the ashes sprinkled on the ground, the mixture may be applied at the rate of 5 hundredweights per acre, 3½ pounds per rod, 2 ounces per square yard, pointing in very lightly. The mixture accelerates root formation, and sustains the crops, for it lasts more than one year.

2. Stable or farmyard manure, reduced to a workable condition, but not to a close soapy mass, may be applied in the autumn, or before the end of February, at the rate of 20 tons per acre, 2½ hundredweights per rod, 9 pounds per square yard. It should be distributed evenly and left on the surface where the roots are matted, otherwise pointing in lightly early in the spring. These manures supply nutrient elements, and encourage surface roots.

3. Liquid manure from cesspools that receive the drainings of stables and cow-houses enriches the soil when applied in the winter, at which season the liquid may be used stronger than in summer. It should be well stirred. If thick and strong it may require twice its bulk of water, that is, one part thick liquid and two parts water. If applied to an orchard during the winter it makes a difference in the growth and crop of the trees the following summer. About 3 gallons may be applied to each square yard.

Although it is often convenient to apply manures in the winter season, it is more economical to afford the needful nourishment when the trees can make the best use of the elements for building up their structures, and in the swelling of their crops.
Where bone meal and kainit have been supplied in the autumn or late winter, and the
trees promise well for fruit, nitrogenous manure must be given in the spring, say nitrate
of soda, 2½ hundredweight per acre, 1¾ pound per rod, 1 ounce per square yard. Instead
of giving this dressing all at one time it is better to divide it into three, one when the
buds are sufficiently advanced to show what the crop is likely to be, another when the
fruit commences swelling after setting and the third when about half its full size.

Protecting the Blossoms.—Trees against south and west walls have the blossoming
accelerated and may require protection from frost; also those in the open in warm
situations and early seasons. Various methods of affording the needful shelter will be
found on pages 193–197, Vol. I. The plum, being the hardiest of stone fruits, does
not require so much protection as the apricot and peach and the materials casting the
least shade, also admitting the most air, are the best, fish nets generally affording the
needful shelter. Opaque material may only be used when the weather is so cold as to
threaten the safety of the blossom or young fruit and it must be withdrawn immediately
the frosts are gone.

Dryness at the roots hinders the swelling of the fruit and prejudicially affects
the health of the trees; therefore regard must be had to the proper maintenance of
moisture, affording the needful supplies to trees in dry positions. Feeding with liquid
manure or sewage, properly diluted, is an absolute necessity for trees carrying heavy
crops in dry seasons and sites. It is most important to supply liquid nourishment
before the trees become distressed, and if the surface is covered with short manure the
moisture will be conserved for some time.

Syringing.—A forcible washing of the foliage occasionally with a hose or garden-
engine is valuable in freeing it of insects and cleansing it from dust. It is best done in
the evening. For dislodging insects the force of the water must be directed against the
under side of the leaves; for removing dust the water should be distributed over the
tree. An occasional syringing in the evening of hot days greatly refreshes the trees and
keeps red spider in check, but it must cease before the fruit changes colour for ripening.

Thinning the Fruit.—The set of fruit in some years is several times greater than the
trees can possibly bring to full size, high quality and profitableness. Some varieties
are far more prolific than others, but most kinds bear excessively in what are called plum
seasons—about every third year. This is mainly due to indulging in over-burdening
crops and the result is temporary exhaustion—sterility for one or two years, often
accompanied by loss of health and sometimes the collapse of the trees. Thinning the
fruit freely secures the best results in the current crop and favours regular bearing. Thinning should commence about a fortnight after the flowers fade and be completed as soon as the fruits commence swelling, say a month or six weeks after setting. This is decidedly advantageous, for it is the stoning that taxes the energies of the trees. Cultivators must exercise judgment in thinning, always reducing the crop to what the tree appears able to bring to maturity.

**Perfecting the Fruit.**—To secure fruit of the largest size, highest colour and best quality, it must, after being well thinned in the early stages of swelling, be duly exposed to light and air. Trees against walls often suffer from drought. Liquid nourishment must be supplied to the roots, followed by a good mulching, and the fruits must not be shaded by superfluous growths. Jefferson plums are green when ripened in the shade and Victorias pale red, whereas the first is mottled with pink on a rich yellow ground and the latter is brilliant red when exposed to the sun. Hexagon netting affixed to exclude bluebottle flies and wasps is necessary when choice plums are ripening, and in wet weather a light waterproof covering will prevent the fruits cracking.

**Gathering.**—Plums for dessert must be evenly ripe, gathered by and with the stalk, then placed carefully in a shallow basket or tray to preserve the bloom and present the fruit at table without bruise or blemish. It should be gathered dry, but when this cannot be done the fruit may be placed after gathering in a winery of ripe grapes or a sweet room, with a gentle circulation of air.

Culinary plums cannot be too carefully handled nor be gathered too dry. Careless gathering means ruin to the trees by breaking off the spurs, and bruised fruits become partially or wholly decomposed after a few hours. They are not profitably disposed of, nor are they wholesome as food.

**Storing.**—With careful handling and storing, some plums, such as the Golden Drop and Ickworth Impératrice, will keep sound and excellent in quality a long time. They should be gathered before they are dead ripe, exposing them to dry air for a few days till they shrivel slightly; then they may be laid singly on clean paper in boxes. They will keep for several weeks in a dry frost-proof room.

**Cultivation under Glass.**

Plums are more impatient of a forcing atmosphere than are any other stone fruit, yet with properly constructed and well-managed houses, they may be grown successfully under glass.
Cool Houses.—Simple lean-to houses against south-east, south, or south-west walls answer admirably. The main points to attend to are thorough ventilation, well-drained borders, and adequate supplies of water. The roof lights should be moveable, and the front and top lights open the whole length of the house. What are termed wall cases, 6 feet in width, accommodate trees on the wall, and others on a low trellis in front, say to the extent of one-third the distance up the sloping roof. These may be cordons and if properly restricted at the roots, they bear satisfactorily. It is better, however, to have trees with stems the height of the front lights or side of the house, and train the bearing parts to a trellis fixed 9 to 12 inches from the glass. This gives less space, but the fruit is much finer than that produced by trees trained to the wall. When the house is 10 feet or more in width, bush, pyramid, or low-stemmed trees with round heads may be grown with great advantage, either planted out, or in pots or tubs at the front, and so arranged as not to deprive the trees on the back wall of too much light.

Span-roofed houses, with the ends north and south, or between north-east and south-west, are unquestionably the best for trees in standard form, a row of tall trees being disposed up the centre, and dwarfer on each side of the house. If grown in pots, it matters little what form the trees are in, nor what height or width the house, provided it is light and airy in the broadest sense; the chief objects of growing plums under glass are to ensure crops independent of the weather, and to have a prolonged supply of superior fruit.

A simple orchard house, with boarded sides, hinged boards opening the full length of the house, and the roof glazed with large panes of glass answers admirably for growing plum trees in pots.

Varieties.—With a proper selection of varieties, a supply of fruit may be had from an unheated house from the beginning of July to November. Some of the culinary plums attain to a great size under glass, and are useful for dessert, exhibition, or kitchen use. A dozen varieties of each class, named in their order of ripening, are:—Dessert: Early Favourite, Oullins Golden, De Montfort, Denniston’s Superb, Early Transparent Gage, Jefferson, Green Gage, Purple Gage, Transparent Gage, Kirke’s, Coe’s Golden Drop, and Ickworth Impératrice. Kitchen: Early Prolific, Czar, Heron, Belgian Purple, Prince Engelbert, Washington, Victoria, Pond’s Seedling, White Magnum Bonum, Monarch, Archduke, and Grand Duke.

Culture.—Whether the trees are planted out or grown in pots, they require similar general management. The soil should be rather stiffer and richer for pots than for
borders. Strong calcareous loam, interspersed with flints or stones, needs no admixture for borders. Efficient drainage is necessary. Three parts of stiff maiden loam and one part of decayed manure, with a 9-inch potful of bone meal and a quart of soot added to every 3 bushels of the mixture, make a suitable compost for potting. If the soil is deficient both in grit and lime, add a fifth part of sifted mortar rubbish; if turfy, use Thomas’ phosphate instead of bone dust. Drain the pots thoroughly with crocks or oyster-shells. Pot firmly and allow sufficient room above the soil for the large quantity of water required in the summer. Place the trees on a bed of rough ashes in a sheltered situation outdoors, surrounding the pots up to their rims with finer ashes. After a year’s growth outside they may be placed under glass for fruiting. When trees two or three years from the bud or graft can be had established in pots it is better to purchase such than to rear them, as they will fruit the first year. Trees of that age, carefully lifted and placed in 10- or 12-inch pots early in the autumn, will produce some fruit the first season, but they are better established a year or more in pots.

Trees that are wintered outdoors should be returned to the house before the buds are so far advanced as to show colour, allowing each plenty of room for development. Each pot may stand on two bricks on the flat, with a little space between them, so that the roots will not pass into the soil, whilst there will be a free escape for water. When trees are kept under glass constantly the ventilators should be wide open during the winter, whenever the temperature is above the freezing point.

The trees should start naturally in the spring and a circulation of air, except in severe weather, must always be maintained by leaving the ventilators open, more or less, day and night. Abundance of air and a dry atmosphere are essential to secure a proper set of fruit. By the time the fruits are swelling the sun will have considerable power and may be taken advantage of to accelerate growth by reducing the ventilation in the afternoon, airing early each fine morning on the sheltered side, when the wind is sharp and cold. In the summer the ventilators should be left open day and night, wire netting being placed over the openings to exclude birds.

The trees must never suffer by lack of water. Flagging of the leaves ruins the crops. The soil should always be kept moist—trees in pots require water twice, sometimes three times a day in the summer; also surface dressings of rich compost, pieces of turf preferably, to encourage surface roots plentifully, which can be fed to any extent by liquid and sprinklings of chemical manures occasionally. Trees in borders require water less frequently, but there must be no deficiency; yet over-watering should be
avoided, the plum being impatient of extremes. As the fruit advances in ripening lessen the supplies of water and withhold liquid manure, but the foliage must not be allowed to become limp through lack of moisture at the roots.

From the time the fruit is set, the trees should be syringed morning and afternoon until it changes for ripening, except on dull, cold days, when a genial atmosphere may be secured by damping the paths and borders as they become dry. Syringing the trees must cease when the colouring of the fruit commences, and the atmospheric moisture be gradually reduced, but moderate humidity is necessary for the health of the trees. Hexagon netting is necessary to exclude wasps. After the fruit is removed recourse must be had to syringing, watering, and proper supplies of nourishment for the perfecting of the wood and buds for next year's crop. The trees should be placed outside as soon as the fruit is gathered, assigning them a sunny position, and duly attending to them in watering and syringing.

Re-potting or top-dressing is best done before the leaves fall. The object of these operations is to secure fresh roots in new material; therefore, remove as much old soil as possible without excessive root disturbance—not carrying the reduction too far, and ram the soil firmly. In top-dressing trees in borders the old mulching should be removed, and fresh supplied after loosening the surface. If the trees are growing too freely, a few of the stronger roots may be severed and removed; if exuberantly, they should be carefully lifted and root-pruned, re-planting with the roots near the surface and well firming the soil. If the trees are weakly or unsatisfactory, lift them, remove the old soil and re-plant in fresh over good drainage.

As to the training and pruning of the trees, there is no material difference between those under glass and outdoors. Bush, pyramid, and round-headed trees on stems are the best both for pots and planting out on the natural system. A pyramid is easily formed by pinching the side shoots and topping the leader to secure the requisite branches, and the side shoots from these should be stopped at three leaves, taking care to avoid overcrowding. Pruning may be done in the spring, as the buds are then better distinguished by the inexperienced, but as soon as the fruit is gathered is the best time.

Trees on trellises or walls require the pruning advised for fan-trained outside. The trellises, as before advised, must be near the glass, for on back walls the trees are not very satisfactory, unless the house be a mere wall case—narrow and light. Those on trellises 18 inches from the glass are best treated on the alternative system.
It may be carried out very successfully on the "U" system, and as it is applicable to pears as well as to plums, an object lesson (Fig. 49) will be useful to beginners.

The principles upon which this system is carried out differ only from long-pruning in the peach in that the bearing branches are triennial instead of biennial.

Fig. 49. Alternative System of Bearing in the Plum.

References:—A, current year's shoots: n, point of stopping; o, unpinched shoot. B, one-year-old shoots or branches: p, point of shortening. C, growths and fruit from one-year-old branches. D, two-years' branches: q, point of shortening laterals. E, two-years' branch in bearing: r, point of cutting off after the fruit is gathered. F, three-years' branch after bearing: s, point of shortening to a dormant basal bud; dotted outline—growth from basal bud. G, alternate system on short-pruning: t, one-year branches; u, two-years' branches—cut out after bearing; v, spurs.

The branches are originated about 1 foot apart on opposite sides of the main stem and are trained in their full length unless likely to exceed the limit, when they may be pinched as at U n, say at 14 inches' length, the laterals being stopped as already advised. These must be cut back at the winter pruning (V p). In the following
year the branch produces some fruit and forms spurs, either naturally or by pinching, the latter giving rise to a shoot from the base, as shown in W. At three summers' growth the branch is in full bearing (Y), and, being cut away to a basal growth or bud after the fruit is gathered, it will push a shoot the following spring to take its place and bear a full crop in the third year. The system can also be adopted on short-pruning principles, the shoots being stopped and blossom buds or spurs formed by close pinching, and after bearing these are cut to make room for others originated from their bases. This is applicable to all formal trees, including bushes and pyramids. The principle is shown in A, and may be defined "bearing on young wood instead of old weak spurs." It can be modified according to circumstances.

Plum trees in pots are effective from a decorative point of view, when laden with showy fruits. Those with red fruit tell the best by artificial light, but yellow plums are very beautiful. Pyramids in 9- or 10-inch pots and carrying five dozen fruits, are also useful. One of the best for this purpose is the Czar, its bluish hue rendering the fruit singularly attractive (Fig. 50).

Forcing.—Plums are impatient of artificial heat, yet they may be accelerated so as to ripen in May or June. Three good dessert varieties for forcing are: Early Favourite, De Montfort and Early Transparent; the Czar, Belgian Purple and Victoria also being useful. These afford a succession of fruit over six weeks. Instead of long successional supplies from one house it is better to divide the varieties into sections and plant each in separate houses or compartments, say (1) Early Forcing: Early Favourite, Oullins Golden, Czar, Belgian Purple; (2) Midseason: Early Transparent, Jefferson, Prince Engelbert, Victoria; (3) Late: Transparent, Coe's Golden Drop, Kirke's, and Monarch. These naturally afford a supply of fruit from the end of July to the close of September. By forcing, the season can be accelerated two months; by retarding, excellent fruit can be had in November; by storing, fruit can be had till the end of the year.

Temperatures.—In forcing to time, about five months are required from starting to the fruit being ripe, but the early varieties need less time than the midseason and those ripen several days before the late varieties under the same conditions. These matters must have due consideration. One example of the forcing routine will suffice, namely, a house containing early varieties started at the new year to afford ripe fruit in May and June. If the trees have not been forced before, the house should be closed by the middle of December, air being freely admitted, only employing fire heat to exclude frost; on January 1 maintain a night temperature of 40°, 40° to 45° by day, artifi-
pecially, $50^\circ$ in mild weather, ventilating and closing at that temperature. In a fortnight increase the day temperature a few degrees, with a little air, $55^\circ$, closing at $50^\circ$, and maintain $40^\circ$ at night by artificial means. Continue this treatment, bringing the trees into flower gradually, with a night temperature of $40^\circ$ to $45^\circ$, increasing $5^\circ$ by day, admitting air at $50^\circ$, more at $55^\circ$, not allowing $65^\circ$ to be reached without full ventilation, closing at $55^\circ$. When the flowers are expanded, allow $5^\circ$ more all round in mild weather; otherwise adhere to the temperatures named. This is sufficient and safe till the plums have set and commence their first swelling, when the temperature may be raised to

Fig. 50. CZAR PLUM TREE IN A POT. (From the Journal of Horticulture, March 16th, 1893, page 215.)
50° at night, 55° by day, and 65° from sun heat, it being better to enhance the growth of the foliage and fruit by a comparatively high temperature from sun heat than to increase the artificial heat until the stoning is completed. When the plums have stoned the temperature may be gradually raised to 60° at night, 65° on dull days, and 70° to 75° from sun heat, with a free circulation of air from 65°. After the fruit is ripe gradually lower the temperature, admit air freely, yet maintain a minimum of 50°. Trees in pots answer well for very early forcing, but the same trees should not be forced year after year as it is an exhausting process.

**Diseases and Enemies.**

*Diseases.—* Numerous fungi infest plums, but few do much injury to any part of the tree, except in seasons and localities favourable to their growth.

*Bladder Plums.—* These are marked by the abnormal size of the young fruits, their pointed elongated form, greyish bloom or coat on the surface and by their being hollow (bladder-like). This condition is produced by a fungus named *Exoascus pruni,* the mycelium of which lives all the year round in the twigs, and from these it extends into the flowers, spreads through and lies immediately below the skin of the ovaries, through which the stalk-cells burst and stand erect. Each long cell is an ascus, containing eight globular spores, which are set free about the time the affected fruits turn a dirty yellow colour and wither. The spores are scattered by the wind and, falling on young twigs, reproduce the fungus under favourable conditions. Twigs showing traces of the disease and the infested fruits should be cut off and burned.

*Gum.—* Winter and spring pruning have a tendency to induce exudation from the wounds and chronic gumming frequently follows, for which there is no cure but the removal of the branch or tree. Gummosis, however, is sometimes common and fatal in orchard trees. Cutting out the affected parts and dressing the wounds with an anti-fungal and wet-excluding composition is the only available remedy. (See "Gum," Vol. I., page 234.) Inducements to gumming—too rich soil, overfeeding, low sites, loose deep soils, and stagnant water at the roots; these, with everything tending to exuberance, late growth, and immature wood, must be avoided. Thorough drainage, good firm soil, careful planting, judicious pruning and skilful management all round are the best means of preventing gum.

*Mildew.—* The flowers and young leaves of plum trees are sometimes thinly coated with whitish powder, composed of the filaments and conidia of an early stage (*Oidium*)
of a fungus named Podospheera tridactyla, and occasionally also by Podospheera oxyacanthæ. It is the Oidium or mildew stage of these fungi which proves hurtful to the fruit setting, and cripples the young growths. The best remedy is to dust the affected parts with flowers of sulphur, or syringe them with potassium sulphide, \( \frac{1}{2} \) ounce to a gallon of water. (See "Mildew," Vol. I., page 245.)

**Orange Fungus.**—This parasite produces thickened, fleshy, orange-red spots, of irregularly rounded outline, on the leaves, as shown in the upper figure of the illustration (Fig. 51). A section of the leaf (lower left-hand figure) passing through these spots shows the flask-shaped spaces, each containing eight oval spores, which escape from the apex, as shown enlarged, and, falling on a suitable nidus, reproduce the fungus in the summer. It is the mycelium of the fungus (Polystigma rubrum) that take nourishment from the leaves and cause them to fall prematurely, sometimes before the crop is perfected, when the fruit shrivels, becomes discoloured, and unwholesome. Spraying the trees with a 1 per cent. Bordeaux mixture when the leaves are fairly formed is the only effectual preventive. It is recommended to collect the diseased leaves, also those which have fallen, and burn them. The ground should be dug early in spring, before the young leaves appear, to prevent them being infested.

**Rot.**—One of the worst fungoid diseases in plums is caused by Oidium fructigena, and is figured and described under "Apple Diseases," Vol. II., page 36. Happily its attacks are not common in this country, but at times the diseased patches spread over a large portion of the fruits and cause them to become almost entirely whitish yellow. It is most prevalent while the fruit is ripening, but it has been noticed on half-grown fruit. The tufts of yellowish white, however, do not usually appear until the fruits are ripe or nearly so. The mycelium appears to have the property of causing the flesh to shrivel and render the fruits unfit for use. There is no cure, and preventives have not
proved effective, probably from their being applied too late, the fungus having gained access to the internal tissue. It is recommended to spray the trees before the fruit is half grown, with Bordeaux mixture, first ascertaining a safe strength at which to apply it, removing and burning the affected fruits, as the disease is almost certain to re-appear where the infected fruits are left.

Enemies.—Though the plum is infested by many insects they are not particularly hurtful, except in peculiar climatic conditions and seasons.

Aphides.—Various species of green flies infest the growing points and young leaves of plum trees, causing the tips of the twigs to become fleshy, wrinkled and distorted, large colonies of the insects living on the under-sides of the leaves. Aphis pruni is one of the most destructive, and A. (Myzus) persicæ sometimes cause considerable distortion of the young growths and clog the foliage and fruit with their secretions. The Hop Aphis (Phorodon humuli, var. Mahaleb) also infests plum and damson trees in the spring—as late as May and June—and returns to them in the autumn for egg-laying on the terminal twigs, from which the parthenogenetic generations are produced on the plum in the spring and early summer. The life history of aphides is given, with means for their destruction, on pages 257—262, Vol. I. As a preventive it is recommended to spray the trees in the autumn with the petroleum mixture described on page 261, Vol. I. Some growers have found dusting the trees with quicklime in the winter, as advised for the destruction of lichen and moss, to act beneficially against the recurrence of aphid attacks. The caustic soda and potash solution named on the same page (251, Vol. I.) has been found very effectual as a preventive of insect infections.

Caterpillars.—The larvae of a number of moths feed on the young growths, foliage and tender fruit of the plum, especially those of the March, Mottled Umber and Winter Moths. These are fully treated on pages 283—297, Vol. I. Paris-green mixture, same volume, page 293, has been found an effectual remedy.

Mites.—Two or three forms of mite galls are produced on the leaves of the plum. The most noticeable are the irregular patches of closely-set hairs, white at first, but turning rusty on the lower surface of the leaf; there soon appear on the upper surface little club-shaped galls about the size of hempseed, first pale green, then red, later brown, and inside these live the mites (Phytoptus pruni). The mites also attack the leaves near the margins, causing them to thicken, crippling their development. The greatest mischief is done to the young shoots by the small galls produced in the bark, which singularly do not induce gum, but a dry gangrene, and the growth suffers in conse-
PLUMS AND DAMSONS—ENEMIES OF.

quence. Early spraying with Paris-green mixture, 1 ounce to 20 gallons of water, is the best preventive; removing the affected leaves and burning them is the only effectual remedy.

Red Grubs.—These are the larvæ of the plum Tortricina (Tortrix nigricana and Carpocapsa funebrana). The moths are seldom seen, as they are only about 1/2 inch in expanse of wings. When the fruit is nearly half grown the females lay eggs on it, and the larvæ eat their way into the flesh. The grubs are reddish above, with a few soft hairs on the body, paler beneath and a brownish-black head. The attacked fruits ripen prematurely and fall, when the larvæ crawl out, spin cocoons in selected places in crevices of the bark, pass into the pupa stage, and the moths emerge in May and June. Spraying with Paris-green when the fruit is about a quarter grown is advised in case of frequent recurrence of the attack, but it suffices in most cases to collect the prematurely fallen fruits promptly and burn them.

Red Spider.—These pests attack plum trees in hot and dry seasons. Though watering and feeding at the roots are the best preventives, with occasional washings, it is necessary at times to apply an insecticide in good time, otherwise the current crop will be seriously impaired and the succeeding one imperilled. For an account of these mites see "Red Spider," Vol. I., pages 269—272.

Sawfly.—The female sawfly (Tenthredo morio) appears to deposit its eggs in the blossom; as soon as hatched the larvæ eat their way to the centre of the fruit, causing it to swell rapidly; then suddenly turning yellow, it falls from the tree, the larvæ crawl out, burrow into the ground, become pupæ and emerge as sawflies the following spring. The attack of these insects is one of the causes of plums falling in their early stages. Remedies must be directed to destroying the larvæ, collecting the fallen fruit promptly and burning it; also removing the soil, as advised for "Slug-worms," Vol. II., page 150, so as to destroy the pupæ.

Slug-worm.—Considerable damage is sometimes done to plum trees by the larvæ (slug-worms) of Selandra atra, described and figured, with remedial measures, on pages 148—150, Vol. II. The larvæ feed on the leaves.

Thrips.—These insects are similar in their attacks to red spider, and do not infest plum trees except when the atmosphere and the soil are too dry. For description and remedies see pages 274—276, Vol. I.

Weberian Moth.—This insect and its larvæ are described on page 44, Vol. II. It is alleged that the larvæ cause gumming by penetrating the inner bark, but this is
far from being proved; boring insects or their larvae neither cause sap to exude nor gum to form. Nevertheless, considerable damage is done by their tunnels and it is desirable to prevent the moths depositing their eggs in the crevices of the bark, by spraying the trees in May and September with petroleum emulsion (Vol. I., page 261).

Weevils.—A number of weevils feed on the young buds and leaves. Rhynchites alliariae injures the young shoots by the female laying her eggs on the buds near the end of the young shoots, gnawing the part a little below, causing it to hang down and wither, the larvae feeding on the pith. R. cupreus deposits its eggs in the young fruit and the larvae burrow into it, its early fall being accelerated by the weevil gnawing the footstalk partly through. The only remedies are to catch the weevils, and to collect and burn the fallen fruit, as described under "Apple Weevil," Vol. II., page 40. Some weevils feed as larvae in winding galleries below the bark, especially of weakly trees, but the greatest mischief is done by the Scolytidae or Bark Beetles; Magdalinus pruni, a beetle about \( \frac{1}{2} \) to \( \frac{1}{2} \) inch long, black, with reddish antennae, being the most partial to the plum. Xyleborus dispar also attacks the stems and limbs of plum trees. See "Borers," Vol. I., pages 262—265, for description and remedies.

White Scale.—A small scale, probably Diaspis rosea, occasionally attacks the twigs and stems and may be destroyed by the means given on pages 272—274, Vol. I.

Woodlice and other enemies.—Earwigs (Vol. I., page 267), beetles, and woodlice (Vol. I., page 262) are fond of ripe plums, but the worst pests of all are the wasps (Vol. I., page 279), aided by hornets and bluebottle flies. Preventive and remedial measures against these depredators are given on the pages quoted. Mice and rats (Vol. I., page 298) sometimes take to feasting on plums; squirrels are partial to gages and all richly flavoured plums, carrying them off wholesale (see Vol. I., page 300).
QUINCES.

The quince (Cydonia vulgaris) is a low-spreading deciduous tree, and is said to have been introduced from the ancient town of Cydon, in Crete, to the other parts of Europe. It is a native of Northern Persia, but is naturalised in the Mediterranean region. As a fruit tree, it is cultivated throughout Europe, in many parts of America, and at the Antipodes. The leaves are alternate and entire, flowers large, white, sometimes with a blush of rose; the fruit is somewhat pear-shaped, yellowish, and cottony, internally containing five cartilaginous cells, in each of which the seeds are arranged in two series to the number of eight and upwards, covered with a mucilaginous substance. The fruit emits a powerful and rather peculiar perfume when ripe; it is hard and austere in a raw state, but becomes excellent when boiled and eaten with sugar, or preserved in syrup, or made into marmalade or jelly. When mixed with other fruits, especially apples, in cookery, quinces communicate a pleasant flavour, and a wine may be made from them, adding a pound of sugar to a quart of juice, and fermenting.

**SELECT VARIETIES.**

**Apple-shaped or Orange.**—Fruit large, roundish; skin fine golden yellow; flesh excellent when cooked; ripe in August and September; tree a free bearer. Rea's Mammoth is said to be a very large and fine variety of the Orange (or Apple-shaped); a strong grower and very productive. West's Mammoth is also stated to be “of the Orange quince family; round, clear yellow, very large, fine flavour, and for the class a very good keeper.” Both are American varieties.

**Champion.**—Fruit very large, round (apple-shaped); skin bright yellow, handsome; flesh cooks as tender as the apple, and without hard spots or cores; flavour delicate, imparting an exquisite quince taste and odour to any fruit with which it is cooked; tree very productive, and bears abundantly when young. An American variety, which is highly recommended.

**Pear-shaped.**—Fruit large, pyriform; skin yellow and somewhat woolly; flesh dry, and fairly good; ripe in September; tree hardy, and a good bearer, most commonly grown, and the best for most situations.

**Portugal.**—Fruit very large, pyriform, but widest in the middle; skin golden yellow, covered with grey wool; flesh tender when cooked, juicy, and with a fine delicate flavour; turns purple or crimson in cooking; ripe in October; tree larger and less hardy than the other varieties, and requires a warm situation.

**Propagation and Management.**

Seeds of the quince seldom ripen in this country and seedlings are only used for stocks on which pears are to be established. Seedlings are raised similar to those from
apple or pear pips. Cuttings of the current year's wood, with a heel of two-year-old, inserted in the open ground early in the autumn, soon root. This and layering are the usual methods of increasing quinces. Layers are generally made from an old stool—that is, a tree cut down to the ground and the young shoots springing therefrom pegged into the soil in autumn, detached and planted in nursery rows the following autumn. Grafting may be performed in March or April, and budding in July.

The quince seldom perfects its fruit in the extreme north, but it succeeds in an open, sunny, sheltered situation as far as York and thrives as standards in the southern counties. In gardens it may be grown as a bush or low standard, and in orchards as a standard. Low standards on a clean ground are the best for commercial purposes. The quince thrives in soil which can be easily worked—a light, free, moist alluvial soil. It does not succeed in heavy clays nor in dry sandy soils. The chief consideration is a warm sunny site; then, with the trees standing above the line of stagnant water, as on the bank of a pond or rivulet—high and dry, they produce charming flowers and useful fruit.

Autumn is the best time to plant quinces. Bushes and pyramids may be planted 6 to 9 feet apart and they can be kept compact by lifting. Low standards—3 to 4½-feet stemmed trees are accommodated at 12 feet apart; tall standards with 6-feet stems may be planted 15 feet asunder.

After the principal branches have been originated very little pruning is required. Summer pruning, however, may be practised on garden trees, after the manner described for pears. Standard trees only need over-luxuriant shoots, which start up in different parts, cut out at an early period of their growth and an occasional removal of any overcrowded or weakly growths—all best done in the summer. Undue vigour is counteracted by root-pruning, sturdy and well-ripened growths producing the most and best quinces in this country. The fruits ripen in October and November, according to variety. They should be gathered dry before they are frozen, or as soon as they give off a powerful aroma. In a cool yet frost-proof place they will keep six to twelve weeks, but should not be stored with other fruits, as quinces impart to them a flavour not their own. Many quinces are imported, and a few English growers find the crops profitable.
RASPBERRIES.

THE Raspberry (Rubus Ideus) is found wild in Great Britain and most European countries. It is a deciduous shrub, with a creeping perennial rootstock and a biennial stem—that is, it produces shoots one year, which bear fruit the following season and then die. The fruit is valued for dessert and in great demand for cooking and preserving. It is used in various ways, fresh or preserved in ices, extensively in jellies, and confections, imparting its pleasing flavour and peculiar perfume to spirits and liqueurs. A capital wine is made from the fruit, from which a strong spirit may be distilled. Vinegar is also made from the fruit, and considered a wholesome and refreshing summer beverage.

SELECT VARIETIES.

I.—SUMMER BEARERS.

BARNET.—Fruit large, roundish ovate, bright purplish red; flavour good; canes sturdy, moderately vigorous, bearing freely. It is larger than Red Antwerp, and a popular variety for market purposes.

BAUMFORTH’S SEEDLING.—Fruit large, roundish, inclined to conical, dark crimson; flavour excellent; canes vigorous producing fruit abundantly. One of the best for general culture.

CARTER’S PROLIFIC.—Fruit large, round or roundish ovate, deep red; flesh firm and preserves well; canes stout, very productive; hardy, and one of the best of all for general cultivation.

FASTOLF.—Fruit large, roundish conical, bright purplish red; flesh moderately firm, flavour excellent; canes sturdy and vigorous, bearing abundantly. An old but still useful variety.

HORNET (Rivers’).—Fruit large, roundish ovate, deep red or crimson; flesh firm, rich, well flavoured; canes very sturdy; a great bearer. Awarded first-class certificate by the Royal Horticultural Society in 1889.

LORD BEACONSFIELD.—Fruit large, roundish ovate, handsome, purplish red; rather firm, but juicy and well flavoured, with a fine perfume; canes robust and long, very free-bearing; excellent for espaliers. A new variety, of promise.

McLAREN’S PROLIFIC.—Fruit large, roundish conical, deep crimson; flesh thick, juicy, brisk, and of excellent flavour; canes strong, bearing abundantly, often freely, on the young shoots during late summer.

NORTHUMBERLAND FILLBASKET.—Fruit large, roundish ovate, deep red or crimson; flesh rather firm, juicy, and well flavoured; canes vigorous, healthy, hardy, even in cold districts, and an abundant bearer; a popular variety in the north, where it succeeds well.

RED ANTWERP.—Fruit large, roundish conical, deep crimson; juicy, briskly and richly flavoured, with a fine bouquet; canes sturdy, very productive. Of this old favourite variety there are several forms: the best is that with strong smooth canes and large trusses of fruit; excellent for dessert.

SEMPER FIDELIS.—Fruit large, roundish conical, bright deep red; flesh firm, briskly flavoured, useful for preserving, the fruits being said to retain their shape; canes vigorous, and producing fruit over a long period.

SUPERLATIVE.—Fruit large, conical, deep red; flesh firm, juicy, rich, sprightly flavour; canes stout, self-supporting, free in growth, and a heavy cropper; excellent either for preserving or dessert.
WHITE MAGNUM BONUM.—Fruit large, roundish conical, pale yellow; flesh juicy, sweet, and pleasantly flavoured; canes moderately vigorous, spiny, and free-bearing; useful for variety at dessert.

YELLOW ANTWERP.—Fruit large, conical, pale yellow; flesh juicy, sweet, and well flavoured; canes moderately vigorous, spiny, productive; useful for dessert and jellies.

II.—AUTUMN BEARERS.

BELLE DE FONTENAY.—Fruit large, round, deep red; well flavoured; canes sturdy, and free-bearing.

CATAWISSA (Veitch).—Fruit large, round, very dark red; borne in very large clusters. Supposed to be of American origin.

NOIRE D’AUTOMNE.—Fruit large, deep purplish crimson; almost black; flesh firm, juicy, and excellently flavoured, with a smack of blackberry; canes stout and prolific.

OCTOBER RED.—Fruit medium to large, bright red; flesh firm, brisk and well flavoured; canes vigorous, bearing in spikes often 12 to 18 inches long.


SITUATION AND SOIL.

Though the raspberry thrives in sheltered and partially shaded places in woods, it produces the most abundant crops, also the finest and best-flavoured fruits, in open positions. In hot gravelly soils partial shade is unquestionably beneficial.

The finest natural plantations of raspberries we have seen, the produce rivalling that of varieties grown in gardens, were located in the open parts of a wood in north Yorkshire, 500 feet above sea-level. The soil was light, deep, damp, peaty and incumbent on a ferruginous gravelly clay, through which superfusious water passed away into the freestone rock beneath. This is mentioned as there are many sheltered spots in hilly districts that might be profitably utilised for raspberries.

The raspberry has two sets of roots: 1, those of a fibrous nature running near the surface and benefited by the débris of fallen leaves in nature and by mulching in cultivation; 2, the anchor roots, which are much stronger, more woody, and strike much more deeply into the soil. Therefore, alluvial, sandy earth is the best, because it meets the claims of the raspberry for deep rooting, and admits of free rooting to a depth of 2 to 2½ feet. Yet it does not greatly matter whether the soil be
peaty, loamy, or calcareous, for good crops of this native fruit may be grown on most soils if deeply stirred and liberally enriched during the operations with stable, farm-yard manure, vegetable refuse, leaf-mould, compost, or other humus-forming substances. A deep sound loam on a clayey subsoil is, however, more substantial and economical in labour and manures, needing little beyond draining, cleaning and digging or trenching.

Strong calcareous loams, especially those interspersed with flints or gravel on a gravelly clay, free from stagnant water, are also suitable, the canes growing sturdily and producing fruit abundantly. Even clays, with a foot or more in depth of ameliorated soil, will grow excellent crops of this popular and wholesome fruit. In shallow, sandy, gravelly soils it is only a matter of loosening, deepening, adding and mixing manure or compost of an enriching, cooling, moisture-holding nature to fit them for the production of raspberries.

Arrangement.—This depends upon the mode of culture and the varieties. 1. If grown without stakes, as in field culture, dwarf varieties must be chosen, such as Carter's Prolific, Fastolf, and Red Antwerp, disposing the plants in rows about 5 feet apart and 2 feet asunder in the rows, which should run from north to south. This is the continuous row system, but some growers prefer the stool method, that is, arranging the plants in rows 5 feet asunder, three together in what is termed a "hill" at every 4 feet in the rows, the plants being set in a triangle about 6 inches apart. Both the continuous row and the stool methods answer for large cultures.

2. In the upright staking plan the plants are sometimes placed in squares 4 to 5 feet apart every way, and occasionally in stools, three plants together; but the usual method is to arrange the plants in rows varying from 4 to 6 feet asunder and from 3 to 4 feet from plant to plant. A fair average and usually a sufficient distance, is 5 feet between the rows and the plants 3 feet apart. Strong-growing varieties require 6 feet from row to row and 4 feet from plant to plant in rich deep soils.

3. Where it is intended to arch the canes from stool to stool, they should be planted in rows $4\frac{1}{2}$ to 6 feet asunder and 4 to 5 feet apart in the rows. Some growers prefer planting in squares at the distances last named according to the variety and in hot situations have the line of arched canes running north and south, so that the young screen the bearing-canes from the midday sun. In cold localities the arches should run east and west.

4. For espaliers, the rows of plants running north and south, 4 feet distance should
be allowed between the rows for the dwarf-growing varieties, 5 feet for the vigorous, and 6 feet for the robust. Some cultivators have the rows farther apart, and intercrop with vegetables. It is better to utilise the whole of the ground, allowing the raspberries sufficient space and no more than is needed for the perfecting of the crops and for facilitating cultural operations. Plants for espaliers may be placed 1 to 2 feet apart, but it is generally preferable to arrange them at the distances before named.

**Propagating and Planting.**

*Propagation.*—This is effected by seeds, cuttings, and offsets or suckers. Seeds germinate readily, and the plants bear fruit in the second or third year. The seedlings are very sportive: a few may equal the parents, while occasionally a variety may prove superior to them, but the majority bear small worthless fruits. There is, however, a chance of securing an improved variety by sowing carefully selected seeds from the choicest fruits. The seeds should be washed to separate them from the pulp, afterwards drying a little, and either sown at once in shallow drills 1 foot apart in light rich soil in an open situation, or kept until the spring, when they will germinate, and the seedlings be fit for transplanting the following autumn.

The rows may be 2½ feet apart, and the plants 18 inches asunder in them. If kept clean, mulched, and moist at the roots, they will make vigorous canes the first season. If they do not, cut the seedlings down to the ground in the autumn, reduce the growths in the following spring to one or two on each plant; then stout well-matured canes will be made that will produce characteristic fruit in the third year. A selection can be made and promising seedlings improved by cultivation.

Cuttings may be made of the well-ripened canes, about 9 inches in length, severing them transversely below a joint, inserting nearly their whole length in light rich soil, also moist and shaded from the midday sun. Most of the cuttings will root, but it is a mode of propagation only had recourse to for increasing scarce varieties. Root cuttings—underground stems—especially those running near the surface, cut into 3-inch lengths, and placed in pans of sandy soil in the autumn, wintered in a cold frame, develop one or more growths in the spring, and as soon as these can be handled they may be planted in rows as advised for seedlings. In suitable soil, each root cutting will form a good cane the first season.

Offsets or suckers are produced freely from the creeping root in some varieties, others expend their forces on a few canes springing from the base of the rootstock.
Those issuing from the creeping roots, and at a distance from the rootstock, are the best, as they lift with abundance of fibres, and are well furnished with buds on the underground part of the stem for pushing stout suckers the following season. These are the kind of offsets sold by nurserymen, who strive more after a number of well-rooted, moderately vigorous than strong and sparsely rooted canes.

Offsets or suckers springing at such distance from the parent plant as to admit of their being detached at the proper time, with abundance of fibrous roots, are the only canes likely to transplant well and come into early and profitable bearing. These, carefully lifted and planted early in the autumn, will produce some fruit the following year, but the canes must be shortened, the strong to 2 feet and the medium 12 to 18 inches. Those too small to bear, though well rooted, should be cut down to the ground. When the canes have to be sent a distance, the roots must be exposed as little as possible to the air and be packed in damp material.

Planting.—This should be done as soon as possible after the leaves have fallen, for the soil is then warm and the plants commence rooting at once. It may, however, be carried out in mild weather during the winter, and until the plants commence growth in the spring. Cut away any damaged roots to sound parts, and let them be spread out to their full length. Place good soil under and above them, firming it well. As the tendency of the crown is to rise, the rootstock buds should be covered about 3 inches deep and never less than they were before removal. Where the soil is heavy or thin, the plants may be placed on the surface, and good soil taken from the intervening spaces used for covering the roots, forming a flat-topped low mound. This will give the plants a start; the stubborn soil can be ameliorated by exposure to the weather, and permanently improved by adding opening materials. Fine soil or compost should be used for planting in, as rough is not favourable to root formation, and a mulch of short manure around every plant or stool is highly desirable. Stake the canes after planting to prevent their swaying about, for this moves the roots and hinders them from getting established. Short canes will not need stakes, and in large cultures long canes are shortened at planting.

Pruning and Training.

It is not advisable to prune immediately after planting, but defer it until February. If the weather has been moderately mild, and the planting is completed early, root action will by that time have commenced and the buds be moving; then, or soon after,
the pruning may be done with safety. The chief object of shortening is to get strong young shoots from the base instead of fruiting the old canes the first season. The extent of the pruning must accord with the vigour of the canes and the condition of the roots. This will be made clear by the illustrations \((B-K, \text{Fig. 52})\).

A short well-rooted cane \((B)\) cut down to the ground \((w)\) and only the strongest of the spring growths retained, will produce a sturdy, well-ripened cane, which \((G)\), with the top cut off, \((b)\), will afford fruit the following year, also two or three vigorous suckers for bearing in the succeeding season. When the cane is poorly rooted \((C)\), though of medium size, it also is best cut down to the ground \((x)\) to secure a strong cane \((H)\); if not so shortened, feeble canes only would be produced, as shown in outline in \(C\), and a year wasted. Fibrous-rooted medium-sized canes push suckers much more freely when shortened to from 6 to 12 inches \((D)\), and may give a "taste" of fruit the first year, the extra growth strengthening the rootstock; the young cane is encouraged correspondingly by cutting away the old parts in its favour when the fruit is gathered. This is shown in \(I\): \(d-D\) shortened to \(y\) in the spring; \(e\), young cane. A
bearing or fruiting cane (E), with abundance of fibry roots, should be shortened half its length (x), the result (J) being some growths and a little fruit on the old cane (f), to be cut away at the bar after bearing, or towards the end of the summer; then one or two vigorous young canes (g) will follow for producing fruit the following year, after being shortened in the winter in proportion to their strength (k). If a strong well-rooted fruiting cane (F) is left nearly its full length the first year, merely cutting off a few inches of the tip (a), a number of fruits may be produced, and the consequences are exhaustion (K): i, old cane to be cut out at the bar when the fruit is gathered; j, weak canes, which must be cut hard back (k).

Canes allowed to bear heavily the first year after planting rarely push others strong enough to afford fruit in the second season. Shortening newly-planted canes is, therefore, imperative. Weak and badly rooted plants should be cut down to the ground or near thereto, and all shortened at least half their length early in the spring. This will encourage the production of strong sucker growths the next summer. It is necessary to reduce these suckers to two of the strongest when more push from the base in the first year. This must be done carefully so as not to disturb the rootstock. Offsets springing a foot or more from the rootstock may be pulled up, placing one foot firmly on the ground just clear of the offset on the side next the parent. One or two vigorous canes being secured the first year for bearing in the second, the only pruning required is to cut off the portion of two-year-old at the ground and shorten the young according to their vigour. Sturdy canes will only need 4 to 6 inches of their weak curved tips removed; those moderately vigorous may be shortened one-third to half their length, and the short, also weak, should be cut down to the ground, with a view to their pushing vigorous canes from the base the following summer.

Assuming that all has gone well in the first year, the canes then produced will bear fruit from the side branchlets in the second year and suckers will proceed from the base, forming the canes for fruiting in the third season; about three or four of the strongest and best placed will be sufficient to leave on each plant, removing the remainder early or as soon after as they can be grasped by a gloved hand. The pruning for the year consists in removing the old canes after fruiting and shortening the new ones in the autumn.

In the third season a good crop of fine fruit should be produced, also strong suckers from the base; about four or six of the strongest are sufficient to leave on each plant, removing the remainder. That number of young growths is ample in this and succeeding
seasons. Grand stools of bearing canes and a corresponding number of successional young ones will be had in the fourth, if not the third year, and the amount of fruit produced under good management in favourable seasons is enormous. A promising raspberry stool is represented in Fig. 53, such as is produced by the method of culture advised.

Raspberry training is inseparable from pruning. 1. Non-staking System.—This

natural system of growing raspberries is extensively followed on fruit farms and in market and cottage gardens. Varieties with sturdy self-supporting canes should be chosen, such as the Barnet and Carter's Prolific. They may be also grown on the "hill" system—three plants in a triangle (Fig. 54, L), or as single plants in rows. The canes are usually shortened to an average length of 3 feet, but some growers merely remove the weak and

Fig. 53.: Bearing Raspberry Stool and Strong Successional Canes.
unripe tips (dotted bars). The customary extent of the shortening is shown by the full bars in the figure.

Sometimes three or more canes are plaited (M), secured at 3 feet height with tarred string, and cut off just above good buds next the ligature. This imparts more strength, the weight of fruit being borne better; for the demerit of the non-staking system is that the bearing canes are liable to bend down, and the fruit be more or less splashed with dirt in a wet season; staking is then a great advantage.

2. Staking System.—Ash, Spanish chestnut, or larch stakes are the best. They should be driven firmly in the ground 18 inches or more, and stand about 4 feet above it. From three to five of the best canes from each stool are selected, and secured to the stake with tarred string or pliant osiers. The canes are usually cut off a little above the topmost ligature or level with the stake. This is not bad practice when the canes are equally short-jointed, sturdy, long, and well ripened, but they usually vary in these respects and it is a mistake to shorten them irrespective of their vigour. Frequently a third and generally a fourth of their length from the top is weak, full of pith, and unripe. This portion should be removed, so that the canes will be of different lengths. When the plants are a good distance apart, five to seven of the best and
shortest-jointed canes should be selected and instead of cutting them all level above the stake, as shown in $N$, which is certain to result in the fruit being produced from the upper part only, they may be shortened to different lengths ($O$). The two weakest canes may be shortened to 15 or 18 inches, two of the medium to $2\frac{1}{2}$ feet, and the remaining two or three to a plump bud above the top of the stake. The result of this is seen in Fig. 53 (page 210), namely, fruit nearly from the ground to a height of 5 feet—more or less, according to the vigour of the canes and the variety. In hot dry summers the finest fruits will be found towards the bottom, because slightly shaded, and in all cases the practice secures a longer succession of fruit.

3. Arching the bearing canes.—In staking, neatness and cleanliness for the fruit are secured, but many of the fruit buds are crushed, and the young canes come up close to the old, so that many of the lower bearing branchlets are injured by the shade. This is contrary to the natural habit of the raspberry, for bearing canes are depressed by the weight of fruit and the young shoots grow upright. The best mode of training is that which allows the young shoots to grow straight from the rootstock. Arching the canes from stool to stool possesses the merit of giving full advantage alike to the bearing as to the successional canes, and the fruit is kept clean. Three or four of the strongest canes from each stool are bent down and brought together so as to cross midway of the distance between the stools at a height of 2 to 4 feet, according to their vigour, and are there secured with string, the canes being shortened to good buds beyond the crossing. Stakes $2\frac{1}{2}$ to 3 feet in length answer for all but the strong-growing varieties. Some growers form a semicircular arch by overlapping the canes a foot or more and dispense with stakes, but these are a great advantage, as shown in the illustration, $P$, Fig. 55, next page.

By this—in fact every—method it is important to secure strong, well-ripened successional canes, otherwise they will not be of sufficient length for bending over, nor sturdy and well ripened to produce fine fruit. Two suckers from the base of a bearing cane are sufficient, all the others being removed whilst quite small. Correct practice is represented in $Q$: the fruiting cane ($n$) receives abundance of light to its base, while the successional canes ($o$) receive the full forces of the rootstock and become sturdy, consequently capable of bearing fruit abundantly in the following year. When a forest of suckers spring from the rootstock and creeping roots, as shown in $R$, and all are allowed to remain, the bearing branchlets from the fruiting cane ($p$) are deprived of light and air at the lower part and produce little fruit, whilst the successional canes ($q$) only
attain about half the vigour they would have done had the remainder of the suckers been removed early in the season.

4. Bending the fruiting canes over from the roots to a rail or wire.—This method consists in placing stakes about 6 feet apart and 2 feet from and parallel with the row of plants; then, fixing a rail, say of slating laths, 2½ to 3 feet from the ground, to the stakes, the bearing canes are bent over and secured with tarred string, shortening them to from 3 to 6 inches above the rail. Instead of the rail a galvanised-iron wire, No. 8, strained between stayed posts fixed at the ends and supported with stakes at 9-feet intervals, may be employed. By this plan (S) the fruiting canes (r) are kept clear of the successional canes (s).

5. Espalier or fence.—To form this, upright stakes are driven in at intervals of 6 to 9 feet and horizontal lines of slaters’ laths are fixed at heights corresponding to the vigour of the varieties: three rails 1 foot apart, height 3 feet, answer for the dwarf varieties; four for the vigorous; and that number, but 15 inches apart, for the robust. An iron espalier (T) is the most satisfactory. For the robust varieties it should be 5 feet high above ground, with four lines of No. 8, 7-ply galvanised wire, with standards

Fig. 56. Training Raspberries.

References:—P, arching the bearing canes (l): m, young canes. Q, right practice, superfluous suckers removed: n, bearing cane; o, vigorous successional canes. R, wrong practice—result of leaving all the suckers: q, weak successional bearing canes; eight other suckers represent wasted vigour. S, bearing canes (r) trained to wire 2 feet from the row: s, young canes. T, raspberry espalier: t, fruited canes cut out in pruning; u, successional bearing canes pruned; v, unripe, pithy, and lateral-producing extremities of robust young canes.
placed 10 feet apart, and straining pillars at the ends. Raspberries are highly productive on this system, and form admirable screens between the flower and vegetable departments in small gardens. The management is shown in the engraving: \( t \), the fruited canes to be cut away soon after the fruit is gathered; \( u \), young canes shortened to the upper wire. Hedges are sometimes formed by cutting the canes to different lengths, some at the first wire, others at the second and third, and the strongest left the full height of the trellis. This secures a fence of fruit-bearing branchlets from the ground, and the succession of fruit is extended considerably in a hot, dry season, while strong canes are secured for succession.

The chief points in raspberry training are the securing of sturdy, short-jointed, well-ripened canes. These can only be had by thinning the suckers, pulling up the superfluous when 6 inches in height, and removing the old canes after the crops are gathered, instead of leaving them to the winter pruning, taking care not to break the leaves of the current year's canes. This admits additional sun and air, greatly enhancing the ripening of the wood, which is seen in the canes being less damaged by severe frost, and their increased productiveness as compared with those badly matured. Another point of importance is the shortening of the canes and the time. This has already been alluded to, but it may be reiterated that it is a mistake to have the bearing canes too long, for a considerable part of their length from the top is full of pith and is better removed. If the canes are well ripened they may be shortened in the autumn; strong pithy canes are better left at their full length till February, for the severe frosts and rains of the winter are apt to injure such when pruned in the autumn.

**Pruning Autumn-bearing Raspberries.**—These are not permitted to bear, like the summer-fruited kinds, on the previous year's wood, but all the canes are cut down level with the ground when leafless, usually in February. This causes vigorous growths to push from the base in the spring. It is necessary to thin these whilst small, reserving the sturdiest and best-placed at about 1 foot apart. These summer canes must not be topped, as it is on the crown of the current year's shoots that the finest raspberries are produced in the late summer and autumn. The canes are self-supporting, and give an immense crop of fruits in October and onwards in favourable seasons.

**Routine Operations.**

**Summer Treatment.**—This consists primarily in preventing the appearance of weeds by timely hoeings, which conserve the moisture and nutrient elements in the soil for
the raspberries. Deep hoing, however, does more harm than good by chopping off the surface roots; therefore, hoe early and lightly, not allowing the weeds to grow. Do not chop off suckers, but pull them up or remove those springing from the rootstock with a suckering iron or a chisel. Always reserve six or seven from a stool on established plants, the best in strength and position, and secure the growths loosely with matting to prevent their being broken by strong winds; also keep them clear of the fruiting canes. Towards the end of August the soft tips of the summer shoots may be nipped off. This strengthens the canes and plumps the buds, but it requires to be practised carefully or the main buds will be started, and should always be several joints beyond the pruning buds. Remove the fruited canes when the crops are gathered.

Mulching.—In light shallow soils it is necessary to cover the ground between the rows with short littery manure, not later than the appearance of the flowers, to secure finely developed fruit. Rains wash the enriching salts into the soil and moisture is conserved for the roots. In heavy soils a mulch of strawy manure is desirable to prevent the soil cracking. The decay of these substances is valuable to raspberry plantations, for humus in some form is essential to successful cultivation. Top-dressings of leaf soil, and even grass mowings, are beneficial early in the summer.

Watering.—A few copious waterings in dry weather will accelerate growth in young plants and sustain those carrying crops of fruit. During drought the plants and crops are greatly improved by thorough soakings with liquid manure or sewage properly diluted. To be of advantage they should be given in advance of the fruit swelling and discontinued after the commencement of ripening. In ordinary seasons, watering is not necessary, especially in deep rich soils.

Winter Treatment.—This usually commences by cutting out the old canes, as soon as the leaves have fallen, thinning the new for next year’s bearing, pruning and adjusting to the stakes, or training in the most approved manner. After the rubbish is raked off, the ground is ready for the winter dressing. This should consist of good stable or farm-yard manure, spreading it evenly from 1 to 2 inches thick over the ground, or at least as far from the stool as the roots extend. The débris of the rubbish heap, with the woody portions charred, and a tenth part of quicklime incorporated, is equally valuable as a top-dressing. The dressing may be lightly pointed in, taking care not to disturb the surface roots. Weeds of a perennial nature must be forked out. Small annual weeds may be buried in the spaces between the rows, where 3 or 4 inches’ depth of soil can often be turned over with advantage, for the winter’s frost will mellow it, and the
surface be in fine order in the spring, that is, in good tilth, rich, and full of young vigorous roots, which will draw up nourishment for the plants during the summer.

Manures.—As before stated, the raspberry is a moisture-loving plant, and liquid manure may be applied with advantage during mild weather in the winter. Solid manures cannot always be had, and in some cases the cost of carriage practically precludes their use. Recourse must then be had to chemicals, such as a mixture of three parts superphosphate and two parts kainit, 3\(\frac{1}{2}\) pounds per rod, spreading it over the ground and forking in during the autumn following. When growth begins in the spring, follow with nitrate of soda, 2\(\frac{1}{2}\) pounds per rod on light dry soil, 1\(\frac{1}{2}\) pound on medium, and 1 pound on strong land. This will generally suffice to produce good crops annually.

Growing Large Fruit.—When the finest possible fruit is required for dessert or exhibition, only a few bearing shoots should be allowed, and these of the strongest, suppressing all other growths, including suckers, to throw all the support into the fruiting branchlets. The fruits also must be thinned as soon as set, reserving only the best formed and most promising. With liberal feeding, very large fruit will then be secured. If the weather prove wet at the ripening period, place a transparent waterproof covering over the plants, but so elevated as to admit abundance of air. The method described prevents the development of canes for the succeeding year; therefore, a few stools only may be devoted for the special purpose indicated.

Protecting the Fruit.—Birds are very fond of raspberries. The netting to exclude them should be small enough in the mesh to keep at bay bullfinches, blackcaps, warblers and white-throats. If the young canes are vigorous they will be sufficiently high by the time protection is required to support the netting clear of the fruit; otherwise means must be adopted to secure this either by laths or stout string supported by stakes.

Gathering the Fruit.—For dessert, raspberries should be carefully gathered with the stalk and husk intact, scrutinising each berry for ripeness and freedom from insects. The fruit has the finest flavour when picked dry and not over-ripe, yet ripe enough to part readily from the core. If gathered wet, raspberries should be laid thinly on a clean wood shelf in an airy room for a few hours, so that the superfluous water may be dissipated. Raspberries for cooking or preserving are gathered without the core. The fruit should be ripe, though over-ripeness is less desirable than a shade the other way, especially for packing. No fruit is sooner spoiled by wet weather than the raspberry and enormous losses fall on market growers in bad seasons, but the returns in good years are as oppositely favourable.
**Duration of Plantations.**—This depends greatly on the soil, its preparation, and cultivation. On the poorest soils, the plants mostly remain on the ground for five years; on deeply stirred and well-manured land raspberries may last a dozen or even twenty years under good management. The chief points are to make sure of the establishment of the plants before allowing them to bear heavily, sustain them well, and when they show signs of failing make another plantation to continue the supply of fruit. A new plantation should be made two years in advance of discarding the old one.

**Diseases and Enemies.**

**Diseases.**—Many fungi are found on raspberry canes, but they usually grow on dead parts. One, however, preys on the growing leaves, causing their premature fall. The fungus (Phragmidium rubi—Idæi) appears on the lower surface in the form of small dots, usually very numerous. These are at first yellow, changing to dark brown, and the spores reproduce the fungus another year. It is the mycelium that penetrates and feeds on the tissues of the leaves, and the only safe remedy is to pick off those affected and burn them. Poisonous solutions must never be used, as the raspberry is more susceptible of injury from them than any other fruit-bearing plant. The black dots often seen on the upper surface of the leaves are produced by the fungus Stimatea Chetomium. The leaves first attacked should be gathered and burned.

**Enemies.**—Several insects in their perfect or larval forms feed on the raspberry and their attacks are becoming more frequent and serious.

The Raspberry Beetle (Byturus tomentosus) is found in most gardens in June, feeding on the pollen and stamens of the flowers and hindering fructification. The larvae bore into and eat the white fleshy cover upon which the fruit is formed and spoil the crop. The beetle is about \( \frac{3}{4} \) inch long, yellowish brown, with a thick down; male rather smaller than the female and slightly greenish. Though provided with large wings the beetle prefers to lie still, often feigning death when disturbed. Eggs are deposited between the stamens of the flowers and hatch in about a week. The larva is about \( \frac{3}{4} \) inch long, yellowish brown, with a dark head. It feeds about a fortnight on the receptacle of the fruitlet, then gets under the loose skin of the canes or in the crevices of the stakes, spins a cocoon in which it changes to a pupa, from which the beetle emerges the following spring. Preventive measures consist in cutting away the old canes as soon as the fruit is gathered, removing every particle of old wood from the stools in the autumn and clearing off all rubbish for burning. The soil should be scraped
away from the stools, taking care not to injure the sucker buds, supplying fresh, taken from the spaces between the rows, over a little manure, burying the removed earth deeply where the fresh has been taken from. Then examine the stakes and if there be any crannies likely to harbour pupae wash them with carbolic acid diluted with twelve times the bulk of water, not allowing it to run into the soil. Tarred trays might be employed for catching the beetles before and up to the flowering period.

*Raspberry Mite* (Phytopus rubi).—Quite invisible to the naked eye and only appearing as the merest speck with a pocket magnifier, the eggs (buds) are deposited upon the scales and internal parts of the leaf and blossom buds and the mites appear in a few days. These mites feed upon the tender growths, distorting them and preventing the putting forth of leaves and flowers. The lower buds of the canes are attacked first and the mites move up the stems from bud to bud in the spring. Remedial measures comprise cutting out the attacked buds in the autumn, and dropping them as extracted in a pail containing gas tar. This saves the unattacked buds from molestation in the spring, when they should be scrutinised and any abnormal ones extracted and placed in tar. In bad cases, the canes should be cut off close to the ground and burned at once, as also should canes for planting if the buds are blackened at the tips and abnormally enlarged. The mites live only in the buds.

*Raspberry Moth* (Lampronia rubiella).—This moth is shining light brown, with golden spots upon the forewings, hinder wings paler brown, with lighter fringes; its expanse of wings is \( \frac{7}{8} \) inch, and the length of the body \( \frac{7}{12} \) inch. The moths appear at the close of May and early in June and deposit eggs on the receptacle of the flowers, between the stamens and calyx. The caterpillar emerges in five days and buries itself in the receptacle of the fruit. It soon, however, goes down into the ground, where it remains in larval form during the winter. When the buds move in the spring it crawls up the canes, enters a bud and feeds on it, and passes from one bud to another; but after feeding for about a fortnight it scoops out a hole at the base of the bud last attacked and turns therein to a chrysalis, from which the moth emerges in twelve to fifteen days.

Preventives or remedies must be directed to the larval condition of the insect, which is passed from midsummer until March in the rubbish or earth among and around the stools or rootstocks. This rubbish should be cleared away for a distance of at least a foot all round and buried deeply in the space between the rows, soot and wood ashes in equal proportions being sprinkled among and around the stools and
covered with fresh soil. Early in March a ring about an inch wide may be drawn around each cane with Wilson's Sticky Oil or Davidson's Tree-Protecting Composition, to prevent the ascent of the caterpillars. Extracting the infested buds and burning them is a sure remedy; they are easily detected by not pushing growth. Badly infested canes may be cut away while the caterpillars are in the bud, burning them without delay.

*Raspberry Weevils.*—The Bud Weevil (*Anthonomus rubi*) is about \(\frac{1}{2}\) inch long, black, with grey pubescence, but the colour varies. The female bores a hole in each flower bud, pushing in an egg, and generally gnaws the stalk half through. The larvae feed on the parts of the flower bud, similar to the apple-blossom weevil (see Vol. I., page 282), and the weevils appear from the buds in July, hybernating during the winter. Other kinds of weevils, *Otiorhynchus sulcatus* (see Vol. II., page 335) and *O. picipes*, often do great mischief to raspberry plantations (*O. tenebricosus*, Vol. II., page 90), feeding on the shoots, leaves and buds. All of them are also injurious in their larval state by feeding on the roots. The most effectual means of destroying the weevils is to shake the plants after dark over shallow wooden trays, smeared with gas tar inside. Getting rid of the grubs is somewhat difficult, but skimming off the surface soil and proceeding as advised for larvae of the raspberry moth while in the ground, is recommended; also a dressing of nitrate of soda, 3 hundredweights per acre, 2 pounds per rod, in February—this also acting as a powerful fertiliser.

Sometimes raspberry leaves are tunnelled by the larvae of a sawfly (*Fœnusa pumilio*); squeezing the leaves between the finger and thumb, or picking and burning them as soon as the pest appears, are the best remedies. The larvae of moths and sawflies feeding on the leaves may be destroyed by dressings of hellebore powder (Vol. II., page 224).
STRAWBERRIES.

There are few gardens in which strawberries are not grown. They afford the first ripe fruit of the year, and are esteemed by nearly everybody. Unlike other small fruit, strawberries are seldom used for pies or puddings, yet if gathered before fully ripe they make both these of excellent quality. The fruit, however, is mostly eaten at dessert, either with or without sugar, and strawberries and cream are always held in high esteem. Dr. Hogg says, in his Vegetable Kingdom, that the fruit of the strawberry is particularly safe and wholesome. "It consists almost entirely of matter which is soluble in the stomach, and which, neither when eaten or laid together in a heap, ever undergoes the acetous fermentation; hence it is very nourishing, and may safely be eaten in quantity. In addition to its grateful flavour, the sub-acid juice has a cooling quality, particularly acceptable in the summer. Eaten, either alone or with sugar and cream, there are few constitutions with which strawberries, even when taken in large quantities, do not agree. They dissolve the tartarous incrustations of the teeth, promote perspiration, and persons afflicted with gout have found relief from using them very largely." Besides its consumption in a fresh state, the strawberry is largely used for making jam. A palatable wine and vinegar are also prepared from strawberries; and they are sometimes preserved entire in syrup or wine. Strawberryade and other agreeable and cooling drinks are also made from the fruit, and strawberries are largely used in jellies.

The varieties of strawberries, now cultivated in gardens, originated from several distinct species of Fragaria:—1. Alpine varieties have been derived from the common wild or wood strawberry (F. vesca). 2. Hautbois varieties came from F. elatior, which sprang from F. vesca, but it is much larger and may rarely be found semi-naturalised in the south of England. 3. The scarlet varieties, of which few are now grown, belong to F. virginiana, a native of North America. The Old Scarlet has been in cultivation over two and a half centuries and the Rosebery since 1808, Scone Scarlet was raised in 1813; Grove End Scarlet and Keen's Seedling appeared together in 1820. The last-named variety is, perhaps, the first strawberry, originated by natural or artificial cross-fertilisation, that combined the scarlet with the pine race. 4. The pine varieties
were derived from the pine strawberry (F. chilensis grandiflora), a native of Surinam, introduced in 1759. It was also brought from Carolina and from it sprang the Old Pine or Carolina, British Queen, and other pine-flavoured strawberries. The species (F. chilensis) was introduced in 1727, and furnished several sorts.

SELECT VARIETIES.

LARGE-FRUITED SCARLET AND PINE STRAWBERRIES FOR GARDEN AND FIELD CULTURE.

I.—Early Varieties.

**Alice Maud.**—Fruit medium-sized, ovate or conical, occasionally large and kidney-shaped; skin scarlet, deepening to crimson; flesh scarlet throughout, juicy, and with a brisk flavour; plant a compact grower and a good bearer, largely grown for market and valuable for field culture.

**Auguste Nicaise.**—Fruit very large, ovate, handsome and evenly shaped; skin deep glossy crimson; flesh reddish, tender, juicy, with a rich, brisk flavour; plant sturdy and compact, an excellent bearer, and a good force.

**Competitor.**—Fruit very large, ovate, inclining to cockscomb-shape; skin glossy, pinkish crimson; flesh white, tender, juicy, and briskly flavoured; plant vigorous, healthy and a good bearer.

**Empress of India.**—Fruit large, obtusely conical; skin bright scarlet, flesh firm, solid, juicy, with a rich British Queen flavour; plant healthy, compact growing and free bearing; an excellent second-early variety and good for forcing.

**John Ruskin.**—Fruit medium-sized, obovate; skin glossy dark red; flesh deep orange, brisk and richly flavoured; plant compact and a great bearer, early and well adapted for forcing, but is liable to mildew.

**Keen’s Seedling.**—Fruit medium to large, ovate, inclining to cockscomb shape; skin dark crimson; flesh reddish, rather firm, richly and briskly flavoured; plant healthy and a great bearer. An old and still popular variety; one of the best for forcing.

**King of the Early.**—Fruit small to medium, conical, even and regular, with a glossy neck; skin light crimson; flesh firm, solid, juicy, with a rich pine flavour; plant moderately vigorous, prolific and in some seasons the first to ripen.

**La Grosse Sucrée.**—Fruit large, conical, or cockscomb-shaped, with an uneven surface when overgrown, otherwise handsome; skin glossy dark red; flesh pale red, tender, juicy, with a brisk and excellent flavour; plant a rather sparse grower and a moderate bearer outdoors, but a free setter when early forced, for which purpose it is excellent.

**Marquise.**—Fruit very large, often 3 to 4 ounces in weight, conical, frequently cockscomb-shaped and irregular; skin bright shining red; flesh bright orange, tender, juicy, and briskly flavoured; plant a spare grower with small foliage and prolific; reliable only in good soils and situations.

**Noble.**—Fruit very large, conical or cockscomb-shaped, handsome; skin dull red; flesh red, soft, juicy, and pleasantly flavoured; plant sturdy and very prolific. A very early variety, excellent for large cultures and succeeds well for second early forcing.

**Royal Sovereign.**—Fruit very large, conical or cockscomb-shaped, slightly furrowed; skin bright crimson, deeper on the sun, paler on the shaded side; flesh pink, firm, juicy, with a brisk yet rich and distinct pine flavour; plant healthy and a free bearer.

**Scarlet Queen.**—Fruit medium, ovate, even and symmetrical; skin bright scarlet; flesh pale red throughout, firm, juicy, with a rich and excellent flavour; plant vigorous and a good bearer.

**Sir Harry.**—Fruit large, roundish oblong or cockscomb-shaped; skin dark crimson; flesh red, juicy and richly flavoured; plant free-growing and prolific; excellent treated as a biennial in light soils and good for second early forcing.

**Vicomtesse Héricart de Thury.**—Fruit medium to large, conical; skin bright red, becoming deeper as it ripens; flesh pale red, firm, juicy, brisk and richly flavoured; plant hardy and an abundant bearer. Valuable for general cultivation and well adapted for forcing.
II.—Midseason Varieties.

A. F. BARRON.—Fruit large, conical, handsome; skin bright red or glossy crimson; flesh reddish, juicy and richly flavoured; plant sturdy, healthy and a good bearer; does not succeed on hot soils, but thrives in good loams; rather late.

BICTON PINE.—Fruit large, roundish ovate, even; skin clear yellowish white, faintly tinged with red on the sun side; flesh tender, juicy, sweet, with a brisk pine flavour; plant compact, healthy and a good bearer on rather light soils.

BRITISH QUEEN.—Fruit very large, roundish, flattened, or cockscomb-shaped, the smaller fruit conical; skin pale red, grecnish white at the apex; flesh white, firm, melting, juicy, rich and exquisitely flavoured; plant tender and a moderate bearer; succeeds best in a warm climate on rather strong ferruginous soil. It is the best flavoured of all strawberries and admirable for late forcing.

CAROLINA SUPERBA.—Fruit large, ovate or cockscomb-shaped; skin pale red; flesh white, firm, rich, vinous and deliciously flavoured, with a fine pine aroma; plant sturdy, compact and prolific, often succeeding where the British Queen fails.

COMMANDER.—Fruit large, oval or cockscomb-shaped; skin pale red; flesh white, firm, juicy, vinous and richly flavoured; plant sturdy, hardy and a free bearer.

COMTE DE PARIS.—Fruit large, obtusely heart-shaped; skin deep crimson when fully ripened; flesh pale red, solid and briskly flavoured; plant vigorous and an abundant bearer.

CRIMSON QUEEN.—Fruit very large, cockscomb-shaped; skin deep crimson; flesh red, firm, solid, briskly and well flavoured; plant compact and a good bearer, rather late.

Dr. HOGG.—Fruit often very large, cockscomb-shaped; skin pale red with a greenish white tip; flesh almost white, rather firm, melting, juicy, with a rich British Queen flavour; plant moderately vigorous, fairly hardy and a free bearer; often succeeds where the British Queen fails.

DUC DE MALAKOFF.—Fruit very large, roundish or cockscomb-shaped; skin dull crimson; flesh red, soft, juicy, with a rich mellow flavour; plant compact and prolific; forces well.

DUKE OF EDINBURGH.—Fruit large, cone or cockscomb-shaped; skin deep crimson; flesh dark, rather firm, juicy and pleasantly flavoured; plant vigorous and an excellent bearer.

ECLIPSE.—Fruit large, ovate, inclining to cockscomb-shape; skin bright dark crimson; flesh red, rather firm, juicy and richly flavoured; plant compact and an abundant bearer; it is of the Keen’s Seedling race.

FILDERT PINE.—Fruit medium, conical, sometimes cockscomb-shaped; skin pale red, with a purplish red flush on the sun side; flesh pale pink, firm, solid, juicy, with a rich, brisk flavour and a fine aroma; plant free and compact, hardy and prolific, succeeding in light soils; rather late.

GROVE END SCARLET.—Fruit medium, depressed, roundish; skin bright scarlet; flesh firm, solid, pale scarlet, brisk acid flavour; plant free, compact and an abundant bearer. It is chiefly valuable on account of its fine colour for preserving whole and in jces.

GUNTON PARK.—Fruit sometimes very large, conical, or cockscomb-shaped, handsome; skin bright, dark crimson-scarlet; flesh very firm, juicy, with a rich yet pleasant brisk flavour, similar to British Queen; plant healthy, very prolific and likely to become a favourite for marketing; good for forcing.

JAMES VEITCH.—Fruit very large, ovate, even in outline, handsome; skin pale red or vermilion; flesh rather firm, solid, juicy and well flavoured; plant vigorous, healthy and prolific; good for midseason forcing; somewhat early.

KITLEY’S GOLIATH.—Fruit very large, ovate, wedge-shape, irregular; skin bright red; flesh white, solid, with a brisk and rich flavour; plant vigorous and prolific, bearing successfully in good soil.

LA CONSTANCE.—Fruit large, conical, handsome; skin bright crimson; flesh white tinged with rose, firm, juicy, with a rich sprightly flavour; plant dwarf and prolific, best grown in pots in cool houses; rather late.

LUCAS.—Fruit large, conical, or obovate, and cockscomb-shaped, handsome; skin bright scarlet to deep crimson; flesh pale, firm, juicy, with a rich flavour, excellent; plant compact, healthy and an abundant bearer; one of the best for the garden and for midseason forcing.

MACMAHON.—Fruit very large, conical or cockscomb-shaped; skin glossy vermilion red; flesh pale, solid, juicy, briskly and exquisitely flavoured; plant vigorous, hardy and bears abundantly.

PRESIDENT.—Fruit large, roundish ovate to cockscomb-shaped; skin bright crimson; flesh firm, bright pale red, juicy and well flavoured; plant vigorous, hardy and an excellent bearer; succeeds well in light soils with liberal treatment; one of the best for general cultivation and midseason forcing.

PRESIDENT DELACOUR.—Fruit large, heart-shaped; skin bright orange scarlet; flesh pale, rather firm, solid, juicy, briskly and excellently flavoured; plant vigorous and free bearing; excellent for general crop.
RIVERS' ELIZA.—Fruit medium, ovate or conical, with a glossy neck; skin bright red, with deeper red on the sun side; flesh pale red, firm, solid, juicy, rich and exquisitely flavoured; plant moderately vigorous, healthy and productive, succeeding well in pots.

SIR CHARLES NAPIER.—Fruit large, ovate, flattened, and wedge-shaped, handsome; skin bright shining scarlet; flesh white, firm, solid, briskly flavoured; plant tender, but a heavy cropper; one of the best for midseason and late forcing.

SIR JOSEPH PAXTON.—Fruit large, roundish ovate to cockscomb-shaped, even and handsome; skin bright shining crimson; flesh salmon, firm, solid and richly flavoured; plant vigorous, hardy, and prolific; one of the best for general cultivation, excellent for midseason forcing, but liable to mildew.

Cockscob.—Fruit very large, ovate or cockscomb-shaped, handsome; skin pale red or scarlet; flesh white, with a rosy tinge, rather firm, solid, juicy, and richly flavoured; plant robust, hardy and an excellent bearer, good for late forcing.

DE ROTHSCHILD.—Fruit large, conical or cockscomb-shaped; skin bright scarlet; flesh white streaked with red, solid, melting, well flavoured and perfumed; plant vigorous and a good bearer; one of the finest.

ELEANOR or OXONIAN.—Fruit very large, conical or wedge-shaped, hollow at the core, handsome; skin scarlet, crimson when ripe; flesh red, juicy, with a brisk sub-acid flavour; plant moderately vigorous, healthy and a free bearer, withstanding drought better than any other variety.

ELTON PINE.—Fruit large, ovate or cockscomb-shaped; skin bright crimson, shining; flesh red, firm, solid, with a brisk flavour, esteemed for preserving; plant vigorous, hardy and prolific.

ENCHANTRESS.—Fruit large, conical, with a glossy neck; skin scarlet, changing to crimson; flesh red, solid, juicy, with a fine pine flavour; plant vigorous and very prolific.

FROMORE LATE PINE.—Fruit large, conical or cockscomb-shaped, with a glossy neck; skin bright red, becoming dark red when ripe; flesh red, tender, juicy and richly flavoured; plant vigorous and free-bearing.

HÉLÈNE GLOEDE.—Fruit large, conical or cockscomb-shaped; skin dark red, nearly black when ripe; flesh red, tender and richly flavoured; plant vigorous and an abundant bearer; later than Fromore Late Pine, but subject to mildew in dry seasons and soils.

SOUVENIR DE KIEFF.—Fruit large, flat cone-shaped; skin bright purplish crimson; flesh white, firm, juicy and highly flavoured; plant vigorous, hardy and prolific, continuing to bear a long time.

THE COUNTLESS.—Fruit medium to large, cockscomb-shaped; skin clear deep crimson; flesh firm, juicy, and finely flavoured, with a high perfume; plant compact, healthy and a free bearer.

TRIOMPHE DE PARIS.—Fruit medium, roundish or conical; skin bright glossy orange; flesh pink, juicy and richly flavoured; plant moderately vigorous and a good bearer; one of the best.

WONDERFUL.—Fruit large, conical, sometimes irregular and cockscomb-shaped; skin pale red; flesh white, tender, juicy, brisk and richly flavoured; plant vigorous and a free bearer; forces well.

III.—LATE VARIETIES.

JUBILEE.—Fruit large, conical, flattened cockscomb-shaped; skin crimson; flesh firm, juicy and richly flavoured; plant vigorous, hardy and prolific.

LATEST OF ALL.—Fruit large, cockscomb-shaped, handsome; skin crimson; flesh firm, juicy and highly flavoured; plant vigorous, with good foliage, able to resist drought and a good bearer.

LORD NAPIER.—Fruit large, conical, long, sometimes flattened; skin bright crimson; flesh pinky white, firm, juicy, richly flavoured and highly perfumed; plant sturdy, hardy and a free bearer.

LORD SUFFIELD.—Fruit large, conical, or cockscomb-shaped, handsome; skin dark glossy crimson; flesh very firm, juicy, deliciously sweet and luscious in flavour—one of the most perfect flavoured strawberries; plant healthy, free-bearing, and continues with the latest kinds.

LOXFORD HALL SEEDLING.—Fruit large, conical or flattened; skin bright deep-crimson; flesh red, firm, juicy and highly flavoured; plant vigorous, foliage downy and subject to red spider in dry soils and seasons.

MARIE NICAISE.—Fruit large, conical, sometimes flattened and wedge-shaped; skin bright vermilion; flesh white, solid, juicy, briskly and well flavoured; plant moderately vigorous and a good bearer.

MR. RADclyffe.—Fruit large, obovate or cockscomb-shaped; skin bright red; flesh pale, rather firm, juicy, with a brisk high flavour; plant sturdy, hardy and an excellent bearer; good for late forcing.

SAMUEL BRADLEY.—Fruit large, roundish or heart-shaped; skin bright red; flesh firm, juicy, briskly and highly flavoured; plant vigorous, hardy and a free bearer; an excellent variety.
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Unzer Fritz.—Fruit very large, conical or wedge-shaped, handsome; skin bright glossy crimson; flesh reddish, solid, juicy and richly flavoured; plant vigorous, healthy and an abundant bearer; a fine variety.

Waterloo.—Fruit often very large, roundish or cockscomb-shaped, handsome; skin smooth, dark glossy vermilion or purplish crimson; flesh red, solid, juicy and richly flavoured; one of the best late sorts.

Hautbois and Alpine varieties will be mentioned in the cultural notes.

SELECTIONS IN THEIR ORDER OF RIPENING.

Twenty-four varieties.

John Ruskin.
King of the Earlies.
Scarlet Queen.
Noble.
Keen's Seedling.
*Vicomtesse Héricart de Thury.
*Royal Sovereign.

Twelve useful varieties.

Noble.
Empress of India.
Vicomtesse Héricart de Thury.
Sir Joseph Paxton.
Gunton Park.
Lucas.
Triomphe de Paris.
President Delacour.
Lord Napier.
Waterloo.

Sir Joseph Paxton.
Gunton Park.
Sir Charles Napier.

*Twelve for quality.
†Six for quality and crop.

Twenty-four varieties.

Dr. Hogg.
Lord Napier.
Waterloo.

Varieties for preserving.

Grove End Scarlet.
Eleanor.

Vicomtesse Héricart de Thury.

Varieties for forcing.

Early.

John Ruskin.
La Grosse Sucrée.

Vicomtesse Héricart de Thury.

Early.

Keen's Seedling.
Royal Sovereign.
Noble.

Empress of India.
Anguste Nicaise.
President.

Midseason.

Sir Joseph Paxton.
Gunton Park.

Sir Charles Napier.
Lucas.

Late.

British Queen.
Lord Suffield.

Cockscomb.
Waterloo.

Propagation of Strawberries.

Propagation is effected from seeds, also by division and runners.

Seeds.—These are only had recourse to for raising new varieties, as seedlings cannot be relied upon to reproduce the parent, except the Alpines, and these do best raised from seeds. Mr. Knight was one of the first to experiment by cross-fertilisation in this country, about 1818, and raised several varieties, one, Elton, being still grown. Messrs.
Keen, Myatt and others followed, with gratifying results. Mr. Douglas raised
Loxford Hall Seedling. Mr. Bradley raised several varieties, including the valuable
Sir Joseph Paxton. Subsequently Mr. Laxton produced Noble, Royal Sovereign, Latest
of All and others; while Mr. W. Allan raised Empress of India, Lord Suffield, and
Gunton Park. These are proofs of what may be effected by cross-fertilisation and
selection.

To practise artificial impregnation successfully the stamens of the seed-bearing
flowers must be removed before the pollen is ripe, enclosing the flowers in gauze bags
to prevent natural fertilisation by bees, then applying pollen from the desired variety
to the stigmas with a camels' hair brush. Some hybridists grow the plants under glass
to isolate the seed-bearing plants. Where artificial impregnation is not resorted to, the
finest fruits should be selected for seeds.

When the fruit is thoroughly ripe the seeds may be pared off, spread and dried on
thick paper; or the berries may be crushed and the seeds separated from the pulp by
means of water, reserving those only which sink, and drying them. They may be sown
when taken from the fruit, or in February or March. A seed bed in a sheltered place
outside will answer well, attending carefully to watering. The soil should be light and
rich, say two parts loam and one part leaf mould, covering the seeds lightly. Seeds
may be advisedly sown in pans or boxes in a frame, placing panes of glass on them,
which remove as soon as the seedlings appear. When raised in a gentle hotbed in the
spring the seedlings will be ready to plant by midsummer and will fruit the following
year. Those from seed sown outdoors will bear fruit in the second year. As soon as the
plants have made two or three leaves, prick them out to gain strength and eventually
transfer to the fruiting quarters. If well attended in watering, keeping the beds free
from weeds and removing runners, some interesting results will be forthcoming in the
year of fruiting.

Division.—A plant consists of one crown at first, which increases to many as it
ages, and the stems of each become sufficiently long to be detached separately, some-
times with a small portion of root attached. Each crown that can be so secured will
generally grow if carefully planted in October or February, roots in either case being
emitted at once. It is a slow mode of increase, useful only in the case of scarce varieties
or where runners cannot be had.

Runners.—Most varieties push runners readily, but more freely, earlier and stronger
from young than old plants. Each runner is furnished with a bud which travels clear

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of the parent, pushes leaves, emits roots, then starts to run afresh, producing other plants as it proceeds, and so continues until checked by the weather or the vigour of the parent is spent. Unfruitful plants produce the most runners; such should never be selected for propagation, but only those from fruitful plants.

The runners are best layered in 3-inch pots, half plunged between every other row; this leaves space for gathering the fruit of the parents and watering the runners. Fill the pots to within ½ inch of the rim with rough turfy loam, pressed firmly. Make an indent in the centre of the pot about ½ inch deep, place the first plantlet of the runner therein, securing with a peg. Cut off the point of each runner just beyond the plantlet, unless the variety is a scarce one or the second runner is strong, when it may remain to produce two or more plants. If the soil is kept moist the runners will be well rooted in about three weeks. When the pots are filled with roots and before being closely matted, detach the runner from its parent and stand the pots on ashes in a shady place, but the sooner they are planted (or potted, if for forcing) the better. Another plan is to use pieces of turf cut into 3- or 4-inch squares and placed close together similar to the pots, layering a runner in the centre of each reversed portion of turf. This should be free from the roots of perennial weeds. The runners will root quickly and can be detached and planted at once. A third plan is to stir the soil round the plants, water well if dry, press the plantlets into it about ⅓ inch, securing with pegs or flat stones. With regular attention to watering, well-rooted

Fig. 56. Layering Strawberry Runners.

References:—U, one-year-old plants in fruit; w, first runners of layering size; x, second runners, only to be used when runners are scarce; y, third runners; z, runner wire extending; a, point of cutting off runner wires; b, runner layered in 3-inch pot and secured with a wire peg; c, runner layered in square of turf, pegged and emitting roots; d, chopped straw for keeping the fruit clean; e, soil.
plants will be ready for removal by August, and these, if carefully lifted and planted with soil attached, duly watered, runners and weeds removed, will bear a crop of fruit the following season. They are not equal to plants raised in pots or turves, probably from the latter having the advantage of fresh soil and fibrous root formation. A fourth plan is to place the runners in rows early in the autumn, dividing them into sizes, the largest being placed in rows a foot apart and 6 inches from plant to plant; the middle size about 5 inches apart in rows 9 inches asunder, and the small in rows 6 inches asunder and 4 inches from plant to plant, leaving out every seventh row, so that the plants are in beds. In these nursery beds they remain until March, when they are transferred to their fruiting quarters. The strong plants only will produce fruit the first year; the weaker should have the flower trusses pinched off, so that the plants will become strong and produce a full crop of fruit the following season.

**Soil and Situation.**

*Soil.*—A strong loam is generally the most suitable, especially when of a limestone nature, but any good friable medium liberally manured affords excellent crops of fruit. Light and shallow brashy soils are the worst. They are either too loose or too hot and dry. Such soils are improved by a dressing of clay marl, say 80 cartloads per acre, or half a cartload per rod, applied in the winter, and dug in early in the spring. Gravelly soils require clay, preferably dried and crushed; chalk is also an excellent dressing for light soils. The clay renders the gravel more retentive, chalk is moisture-holding; half a cartload per rod of either is a good dressing. Heavy loams, ditch scourings and pond cleanings are admirable for light soils—anything, in fact, that increases the depth, and is of a humus-forming or moisture-holding nature.

Very heavy soils are not good, but they may be made suitable by burning a portion of the clay, incorporating it with the top soil and a portion of the stubborn pan. Under-draining is necessary in wet land. Throwing up the ground roughly in the winter, also adding charred refuse, old mortar rubbish, crushed brick-bats, anything that assists the percolation of water improves heavy land. In dealing with strong clayey loam, loosen the stubborn subsoil and leave it at the bottom, retaining all the good ameliorated soil at the top, and lose no opportunity of bringing in parings and scrapings of roads. Dustbin manure, freed of extraneous refuse, lightens heavy soils wonderfully by furnishing the gritty matter they are deficient in.

*Situation.*—The strawberry is never found wild where water lodges, but always on
knolls or ground through which it passes freely, the soil being enriched by fallen leaves and decaying vegetation. In cultivation we have to deal with different plants, but there is a similarity in their requirements. Cultivated plants must not have water-logged soil, but a fertile medium in a situation open to every ray of light from sunrise to sunset. Field strawberries are always the most highly flavoured when grown in the sun, those ripened in the shade being indifferent in quality. Shelter is good in bleak exposures to break the violence of winds and prevent injury to the foliage, hedges or lines of espalier fruit trees being better than walls.

Early fruits may be secured by planting in south borders or on warm banks, due regard being had to the supply of water in hot weather. Plants in north borders or inclines supply late fruit, and, in gardens especially, some such provision is desirable to have strawberries over the longest possible period.

**Planting Strawberries.**

The earlier the runners can be planted after they become well rooted, the better chance they have of getting established and forming good crowns for next season’s bearing. From the middle of July to early August is usually the summer planting season. If the ground be light or cloddy, tread it, especially where the rows are to be, but only when the ground is in good working order.

The rows in the rich soils of gardens should be 30 inches apart, and the plants 15 inches asunder in them. In very rich deep loams the rows may be 3 feet apart, and the plants 18 inches asunder the first year, every other plant being taken out after the first year’s crop is gathered. Compact-growing varieties may be planted a little closer. A convenient mode of cultivating strawberries in small gardens is by the side of paths, inserting the plants 12 to 18 inches apart; a continuous marginal line is thus formed, bearing bountiful crops handy for picking.

Some of the smaller-growing varieties, especially Grove End Scarlet, may be grown in beds, planting the runners about 9 inches apart, leaving out every fifth row for an alley, allowing the others to grow into a mass. When thus cultivated, the fruit is kept clean, as the dense leafage prevents the strawberries resting on the ground, and blackbirds do not find them so readily as when the fruit is exposed. Alpines and Hautbois are also best grown in beds about 4 feet wide, but the planting distances should be 12 inches for Alpines, and 15 to 18 inches for Hautbois.

In fields the plants are set at variable distances. At St. Mary Cray and Swanley
in Kent, where the soil is light and more or less mixed with stones and flints, they are placed 16 inches apart in rows 32 inches asunder. In the Sandwich district, where the soil is deeper and the finest British Queens are grown, 36 inches is allowed between the rows and 18 inches from plant to plant. The practice in the Aberdeen and Evesham districts is to plant 30 inches by 18 inches. In Cornwall, Alice Maud is planted 20 inches by 14 inches, and Sir Joseph Paxton 26 inches by 16 inches. The end of September is the usual time of planting when the soil and weather are favourable, otherwise the work is done in March, though in the Aberdeen district it is deferred until April. The plants should be carefully lifted, well and firmly planted, and watered if the weather be dry.

Plant just level with the neck so as to cover the roots, and firm the soil well about them. Plants from runners layered in pots, turves, or in the open ground and lifted with a mass of roots and soil (V, W, and X, Fig. 57), have a decided advantage over those without soil. Plants with good roots but without soil should have them spread out in a natural manner, the heart of the plant not being buried, while the neck is not exposed to the air to become hard and dry. Correct procedure is shown in Y; improper modes of planting are shown in Z, A, B, C. Where it is practicable give each plant a shovelful of fresh soil—say, four parts turfy loam and one of well-pulverised manure, spreading the roots out carefully, and work the compost amongst them. A slight depression may be formed around each plant as a receptacle for water which would be necessary if the season should prove dry. Moist weather is the time to plant. Watering

**Fig. 57. Characteristic Plants. Proper and Improper Methods of Planting.**

References: V, plantlet from a 3-inch pot. W, plant from reversed turf. X, plant lifted from the ground with a ball of soil. Y, plant lifted without soil and properly planted. Z, plant set too deeply. A, plant not deep enough. B, plant the right depth but with the roots in a bundle—bad practice. C, plant with the roots doubled up in a shallow excavation—slovenly work, shown because it exists and is to be condemned.
may not be necessary in the autumn and spring. In summer planting, watering is imperative, as the plants must be kept growing. If the soil is dry it should be well moistened before planting. It is an excellent plan to invert flower-pots over the plants in hot sunny weather, tilting them on the north side with a stone, removing the pots at night and altogether when the plants become well established.

Fresh ground should always be chosen for new plantations, and if a portion of the old plants are destroyed yearly, and a corresponding number of young plants established, a full supply of the best fruit will be secured.

**Routine Work.**

*Summer Treatment.*—July or early August set plants should have all runners cut off as soon as perceived, and the Dutch hoe employed, both to destroy weeds and keep the surface open. By the end of the season the plants will be sturdy, with well-formed crowns. On the eve of winter apply a top-dressing of short, dry, open manure, placing it up to the plants, but not upon the leaves. Avoid heavy coatings of soapy manure, for they have little protective value. The manure should contain straw, which after being well washed by the winter's rains forms a clean bed for the fruit to lie on. Give water copiously in dry weather, not allowing the roots to become dry from the flowering time until the fruit has swelled. This practice can only be well carried out in gardens. In large plantations, and especially when the plants are not sturdy and well rooted, it is desirable to pick off all the flower trusses, also the runners as soon as they have formed a bud or joint. The plants form strong crowns by this method, and they are rendered stout by manuring when the runner propensity is spent in August or September.

*Second or Fruiting Season.*—First runners from young fruitful plants put out as soon as well rooted in pots or turves form a bold crown and some side buds by the close of the summer, and afford large fruit the following season. Plants set in the autumn or spring require a season's growth, and give a full crop of medium-sized fruit the second year. About the time the flower scapes appear, a mulching of stable litter—the strawy portion separated from the fine—should be given, 2 inches thick. In light soils it is advisable to use the finer particles as well as the strawy portion of the litter. If not washed clean by rains add a little fresh straw.

Other methods of keeping the fruit clean have been devised, such as perforated tiles, with 1-inch openings, which neither deprive the soil of air or rain. The fruit trusses
are propped up with forked twigs of birch or hazel thrust into the ground through the tile apertures. The fruit thus exposed ripens evenly all over, and the quality is superb. Wires or crinolines answer well provided a mulch is also given. The fruit is also raised from the ground with forked twigs without tiles. All the plans named, except the litter, are only applicable to gardens or small cultures. In market gardens and fields clean barley straw is used at the rate of about 1 1/2 ton per acre, laid down about the first week in June, earlier or later according to the season and variety. Clean long straw, all points considered, is, perhaps, the best for keeping the fruit clean.

Watering and Feeding.—If, as the plants advance into flower, the weather prove dry, they must receive a thorough watering. Liquid manure, not too strong, may be given at that time, and again after the fruit has set, repeating after it is half swelled. If the mulching has been applied it must be drawn aside when the liquid is applied, or it will be spoiled as a bed for the fruit. Water may be required twice a week when the fruit is swelling, and on light soils every alternate day. Only thorough soakings are serviceable; driblets do little good. In a dry hot season neglected strawberry plantations are almost valueless; with mulching and proper supplies of water they are profitable.

Thinning the Crop.—In ordinary practice the first fruits are the largest, those from subsequent gatherings diminishing in size. The finest strawberries are used for dessert or sent to market, whilst the small are utilised in the kitchen or jam manufactory. When it is desired to have large fruits, sturdy plants of the previous July planting will give them as no others do. Select the strongest flower trusses, leaving sufficient only to afford nine to twelve fruits per plant, cutting the others away, and eventually remove all the smaller secondary flowers as soon as those chosen for the crop are set. These fruits will swell to a good even size. If very large specimens are wanted for exhibition, only the "king" fruit on each peduncle should be retained. The lowest blossoms are always the strongest, and these give the earliest and finest fruits. In wet weather each plant should be covered with a hand-light resting on a brick at each corner, a current of air being necessary to keep the fruit from spotting.

Protecting the Fruits.—Blackbirds and thrushes attack strawberries directly the fruits change colour. Repaired herring nets supported well above the plants foil the birds. This is readily done by driving stakes at about 6 feet apart up every second or third row, the stakes being 3 feet out of the ground, and putting tarred string from each crosswise, as well as in the line of stakes, for holding the nets, which
must be kept down at the sides so that the birds cannot pass under. A gun must be used in large cultures.

Gathering the Crops.—Strawberries for dessert should be gathered with as much of the stalk as is sufficient for holding them. The morning is the best time, when the dew is off, and the fruit is in the best condition when ripe to the tip. Too much care cannot be exercised in gathering strawberries for dessert, one unripe, or over-ripe, or slug-eaten specimen spoiling the dish. For preserving, the fruit is the most quickly and best gathered with the calyx attached, but very much is picked without, and therefore soon melts into a pulpy mass.

Trimming the Plantations.—When the crop is cleared, the runners, also the oldest and most spreading leaves, should be cut away, and the strawy portion of the mulching cleared off along with the old leaves, runners and weeds, leaving the shorter portions of the mulching. If the ground has become very close it may be lightly stirred with a fork, but not so deeply as to disturb the roots. It is a common practice to defer the trimming until a late period. This is most unwise, as the spaces between the plants become a mass of luxuriant runners, which are as exhaustive as a crop of fruit. In fields the runners and spare foliage are removed by hooks, the mulch taken off, the land being then broken between the rows with a hand or horse hoe, and cleared from weeds. Amateurs or specialists never permit the extension of runners on the plants except for propagating purposes, and they only allow a few of the earliest and best to root in pots or turves to secure speedy detachment from the parents.

Manures.—Where there is a difficulty in procuring stable, farmyard, or town manure, recourse must be had to soot, which is used as an auxiliary and as tending to keep slugs down. It is good for all soils, applying in the spring at the rate of 40 bushels per acre, increasing the amount when deemed necessary. On poor land it is desirable to apply a mixture of equal parts bone meal and kainit in the autumn, say 3 pounds per rod, and follow in the spring with 2 pounds per rod of nitrate of soda on dry soil, somewhat less if the ground be damp. Nitrate of soda is peculiarly valuable on light and calcareous soils and is wonderfully efficacious in dry seasons. It should be powdered and kept from the crowns; some growers use a second dressing about the time the flowers open, and thus increase the yield of fruit.

Winter Treatment.—Digging between the rows with a spade is injurious. Some growers, especially in the northern parts of the country, lightly turn over the soil with a fork in the winter to bury annual weeds and secure a good tilth. In fields the plants
are moulded up with a plough on each side to keep the crowns dry in winter. In gardens compost, such as the débris of the rubbish heap mixed with lime, is placed close round the plants as soon as the ground is frozen sufficiently to bear the wheelbarrow. This invigorates those with elongated stems by inducing fresh roots. Plants in beds are much benefited by a surface dressing of compost, leaf mould, or well-decayed manure in February or March, covering the stems, then the embryo roots, finding stimulating material, push freely and contribute to the health and continuance of the plantation.

**Hautbois Strawberries.**—These thrive best on calcareous soil, and it must be firm to prevent a superfluity of leaves. Runners should only be taken from plants that bear fruit freely, having the male and female organs of fructification in the same plant. The sterile plants are the more vigorous and prone to produce leaves and runners. Hautbois strawberries are generally grown in beds and allowed to spread into an entangled mass. To do them justice they require plenty of room and the high cultivation accorded the large-fruited varieties. Fresh beds should be made every season, as the old wear out in three or four years. The varieties generally grown are Aromatic, Royal Hautbois, and Triomphe d'Orléans.

**Alpines.**—Plants of these are best raised from seed saved from the finest fruit and the most prolific plants. Sow as soon as ripe, either in pans or a sheltered spot outside, in drills about 3 inches apart, covering the seeds lightly with fine soil, which keep moist. The plants will appear in about a month. Prick them off about 3 inches apart, shading and keeping moist until established. Transfer them to their permanent quarters when they have made four to six leaves. Plant a foot apart in beds 4 feet wide. Mulch with leaf soil before winter, and they will fruit abundantly the following year. Seeds are, however, mostly sown in February or March under glass, pricking off and growing the seedlings in gentle heat, gradually hardening them for planting out early in June. They will bear freely in the autumn, when the dainty fruits are often much prized, especially at teas and juvenile parties. No runners should be allowed to grow; only the first for stock, if wanted. Runners planted in July or August bear fruit early and freely the following summer. They are often grown on north borders with a view to a late supply of fruit. Mulchings of partially decayed leaves or manure are necessary, and copious supplies of water in dry weather. Plants grown and fruited in pots are attractive for decoration, seedlings from a spring sowing bearing until a late period in a cool house, but are more satisfactory in gentle heat with a free circulation of air Galande and Quatre Saisons are popular varieties.
Forcing Strawberries.

Forced strawberries afford the first-ripe fruit of the year, and fine well-flavoured specimens are much valued. Amateurs can secure good dishes from plants in frames or on the shelves of a greenhouse. Free-cropping varieties must be selected. The fruit should be large, highly coloured, bright and glossy. The handsomer the better, for ill-shapen and dull-coloured fruits find no favour at table or market. The following are approved varieties for affording early and successional crops under glass.

I. Varieties for starting before the new year for the early crops:—La Grosse Sucrée, Vicomtesse Héricart de Thury. Harris’ A1 and Princess Frederick William are also bright and handsome; the first requires time to develop flavour in a cooler house, and the latter yields a strong perfume; both are compact and prolific.

II. For starting with the new year for second early crops:—Keen’s Seedling or Sir Harry, and Noble.

III. For starting by the middle of February for midseason crops:—President, Sir Joseph Paxton, Royal Sovereign, and Sir Charles Napier.

IV. For late crops requiring to be brought forward very gently and not subjected to artificial heat before early March:—British Queen, Dr. Hogg, Cockscomb, and Waterloo. Rivers’ Eliza and Filbert Pine are exquisite in flavour when gently forced.

V. For very large fruit in cool houses or wall cases:—Noble, Competitor, Marguerite, James Veitch, Auguste Nicaise, Royal Sovereign, and Waterloo.

Plants.—Success in forcing strawberries depends greatly on strong and well-matured plants. Two methods of providing them are adopted. 1. Layering in small pots and subsequently transferring the plants to the sizes in which they are to bear. This method has already been described up to the first stage, page 226, the runners being the earliest borne by strong, fruitful plants one year old. 2. Layering the runners on the fruiting pots in the first instance and so avoiding re-potting.

It is important by either method to leave the runners attached to the parents until well rooted. Those layered in the fruiting pots may be left longer than those in 3-inch pots, and some cultivators consider a better plant is secured; but others favour the 3-inch pot system on the ground that by the layering in the fruiting pots the roots pass to the sides of the pot, leaving the central mass unoccupied, while the drainage is liable to get clogged by worms. When the runners layered in 3-inch pots are well rooted, detach them, and stand the pots on ashes on a north border, keeping the soil moist, and
sprinkling the foliage morning and evening in dry weather; then they will be ready for the fruiting pots in about a week.

Growers of forced strawberries for market, who have from 50,000 to 100,000 pots, adopt a different and much quicker method, but do not obtain such fine plants. When plantlets form on the runners and show incipient roots, they are cut off, with an inch or a little more of the wire above and below each plantlet. Pots for fruiting the plants in are previously filled with soil, made very firm, and watered. The portion of runner below the plantlet is pressed down in the centre of the pot till the incipient roots are just within the soil. The pots are stood in the open, frequent sprinklings through hose-pipes follow, and in that way the plants are established.

**Compost and Potting.**—Five-inch pots are employed for plants to be started before and with the new year, 6-inch pots for those to be started afterwards. These are known as 48's and 32's and vary somewhat from different makers, but they must not be less in diameter 1\(\frac{1}{2}\) inch below the rim than the measurements given. The pots should be clean inside and out; if new, soaked in water and drained before use. For drainage place one large crock concave side downwards, so as to cover about one-third of the bottom, with other pieces to form a layer over it, finishing with smaller pieces, the whole to form a depth of 1\(\frac{1}{4}\) inch for 5-inch and 1\(\frac{3}{4}\) inch for 6-inch pots. Broken oyster-shells are excellent for drainage; bones are best avoided as liable to become pasty.

The best material for potting consists of loam from turves cut 2 inches thick where the soil is of friable nature, neither light nor heavy, and stacked for two or three months. To this, torn up roughly, or in pieces of 1 or 2 inches, add a fifth of well-decayed manure free from worms, or sweetened horse-droppings, also a pint each of soot, bone meal, and wood ashes to every bushel of the loam. Incorporate the whole well together, and have the compost moist enough for ramming firmly. Heavy loams are improved by a fifth of burned clay, and light loams by an admixture of marly clay, dried and pounded.

It is important that none of the plants are dry at the time of potting, but water must be given in time to allow the surplus to drain away. Place some of the roughest portions of the compost on the drainage, ram it and add enough so that when the plant is introduced the base of the crown will be 1\(\frac{1}{2}\) inch below the rim of 5-inch, and 1 inch of the 6-inch pots. The soil should be neither wet nor dry, extremes in either direction being objectionable. Let each plant be exactly in the centre of the pot, ram the soil hard, just covering all the roots, and having the whole of the plant to the base of
the leaves above the soil. That is as it should be, the roots in the soil—no part of
the plant, not even its neck, buried, and with the space above named for holding water
in the pots.

Situation.—The site for the plants must be open to the sun and air, but sheltered
from winds, as the leaves are seriously injured when brushed to and fro against the pot
rims. A concrete or cement bottom is best, with some rough ashes or gravel to stand
the pots on. Ashes 6 to 9 inches thick form a good flooring for the plants. The pots
are often stood on garden paths, and worms are kept out of the pots by standing each
on a piece of slate. Gauze wire crocks are also used as worm excluders. Such positions
are suitable. The plants should stand just clear of each other, leaving space for watering.
As the plants increase in size, allow more space between them so that the leaves
do not overlap. The crowns should point to the south to get them stout and well
ripened. Plunging the pots is sometimes practised to save watering, and with the
plants 12 to 15 inches apart the foliage shields the pots sufficiently from the sun. Cut
off all runners as they appear, and remove weeds promptly.

Watering and Feeding.—Supply water carefully at first, just keeping the soil moist,
and on hot days sprinkle the plants in the evening. When they are well established
in the pots copious supplies will be needed. Never allow the leaves to flag, yet do
not give water until the plants need it; then a thorough supply. They should be
looked over in the morning, at mid-day, and late in the afternoon for watering. If in the
course of a month good crowns do not form, weak liquid manure may be given at
every alternate watering. Soot-water, a peck of soot to 60 gallons of water, using
the clear liquid, is excellent. Fresh horse-droppings rubbed through a \( \frac{3}{4} \) -inch sieve
and sprinkled on the soil in the pots encourage surface roots.

Removing Side Crowns.—One crown, a strong well-developed bud, is essential to
ensure fine fruits. As soon, therefore, as side buds become visible, remove them. The
early part of September is the proper time for the removal of side issues, continuing it
to October. Take care in removing the side buds from the axils of the leaves not
to injure the foliage or the central bud. This will then become more highly developed,
and push much stronger flower trusses than plants with many crowns can do when
placed in heat.

Wintering.—From the middle of October to November the earliest plants, which
should have been selected a month previously and given every advantage of place and
room to ripen their growths, must be plunged to the rims of the pots in pits or
frames, with the leaves just clear of the glass. The lights need only be used in the case of heavy rains or snow, then tilted top and bottom. All that is wanted is protection from heavy rains, snow, and severe frost—complete rest without drought. Therefore withdraw the lights whenever the weather is favourable. The site for the frames must receive all the light possible. Plants for second early forcing should be treated similarly. Midseason and late plants may remain outside, placing ashes around the pots and over the rims. In severe weather they can be protected with a little dry soft straw, removing it after the frost has gone.

**Structures.**—These must be light, well-ventilated, and with sufficient hot-water pipes to maintain a temperature of 70° to 75° without hard firing. The plants should be near the glass, yet not touching it. Shelves are provided in vineries, peacheries, and other structures—at the sides, backs, and suspended from the roof over the paths or where convenient for watering. Millions of plants are annually forced by such means, but it is usual in large establishments to devote separate structures to forcing this fruit.
Span \((D, \text{Fig. 58})\) and three-quarters span-roofed \((E)\) cucumber or melon houses are often utilised, and answer well when fitted with movable stages to bring the plants to the light for strawberry forcing. This is imperative in early forcing. Later in the season the plants succeed at 2 or 3 feet or more from the glass, provided they have unobstructed light and abundance of air, but not in sharp currents.

A lean-to house is the best for early forcing. It should face south and be fitted with shelves about 15 inches from the glass, allowing 1 foot horizontal space for each row, and a similar distance between the shelves vertically. This allows of the plants being easily examined, and watered from behind the stage. Three-quarters span-roofed houses facing the south are also excellent for early forcing. Span-roofed houses with the ends east and west only are good also, forcing on the south side. With the ends north and south, span-roofed structures answer admirably for midseason and late forcing.

Starting.—Plants introduced about the middle of November will afford ripe fruit in March, sometimes in February, and to maintain a regular supply, successional plants must follow at intervals of three weeks till May; the latest of these ought to yield splendid fruit till the outdoor crop is ready. The beginning of the year is, as a rule, early enough to commence forcing with a view to full crops; and, to insure an unbroken supply of fruit, some of the second early plants should be introduced at the same time as the first early sorts, and so on with the midseason and late varieties.

Before placing the plants in position remove decayed leaves, but retain all the green foliage. Clear the surface of the soil from any mossy growths; see to the drainage, and rectify it if necessary; also expel worms with lime water. Wash the pots clean, and top-dress with a little fresh loam with a quart each of soot and superphosphate added to every bushel, pressing down moderately and leave enough space for holding water.

Temperature.—Commence forcing with \(40^\circ\) to \(45^\circ\) at night, and from \(45^\circ\) to \(50^\circ\) by day. Continue this for ten days or a fortnight, or if there is no hurry until the crowns push the embryo flower-stalks and leaves, then gradually raise the temperature to \(50^\circ\) at night and \(55^\circ\) by day in mild weather; in cold periods allow the night temperature to fall \(5^\circ\), raising the heat soon after daybreak, or if very dull and cold keep at \(5^\circ\) less through the day. Allow an advance of \(5^\circ\) by day when cloudy, \(10^\circ\) with sun and cloud alternating, and \(15^\circ\) with a clear sky, closing early to advance \(5^\circ\) on the temperatures named. Continue these temperatures until the fruit is set; then raise them \(5^\circ\) in the course of a week, and \(5^\circ\) more in the course of another. This will bring the night
temperature up to 60°, and the day, by artificial means, to 65°. At this stage the plants may be removed to a warmer and moister structure, or if the crop has to be finished in the same house, maintain a night temperature of 60° to 65°, or 70° on warm nights, 70° to 75° by day, artificially, and 80° to 90° through the day from sun heat. In this the fruit will swell rapidly, and when the earliest are coloured, a temperature of 60° to 65° at night and 70° to 75° by day is sufficient, a high day temperature being kept down by admitting air more liberally. The fruit is found to have better flavour than when ripened in a high and moist atmosphere.

Ventilation.—Until growth is commencing ventilation will not be required till the temperature reaches the day limit; then it must be given freely. Leave a little air at the top of the house constantly, except when it is closed in the afternoon. This procedure is to be adopted throughout the whole of the forcing process, admitting a little air before nightfall, and gaining 5° each day on the maximum temperature by early closing. There are two exceptions to the rule: (1) when the plants are flowering, and (2) when the fruit is ripening.

1. The plants must have time to develop and form the organs of fructification. If placed in strong heat and kept close, the flowers may appear perfect, but the stamens turn black, and the pistils, instead of being a lively greenish yellow, become dark and abortive. Gradual development is imperative under early and free ventilation, yet avoid sudden fluctuations of temperature, cold currents of air and a moist atmosphere. Moisture deposited on the flowers browns the corollas, converts the pollen into paste, and destroys the pistils. Genial air in motion is essential to secure a good set, gently rapping the trusses when the pollen is ripe, or brushing the flowers lightly on fine days with a feather, or rabbit’s tail mounted on a stick, and maintaining a moderately dry atmosphere.

2. When the fruit is ripening a circulation of rather dry air must be maintained constantly, ventilating freely when the days are sunny.

Syringing.—Practise this morning and evening until the flowering period, except when the weather is dull and cold and the foliage does not get dry before night. In dull weather damping available surfaces in the morning and afternoon will be sufficient, as the foliage must not be kept dripping with moisture. When the flowers commence opening a slight syringing will not do harm on fine days, but when fully expanded syringing is generally discontinued. After flowering syringing may again be practised morning and early afternoon, ceasing when the fruits give the first indications of ripening.
Watering and Feeding.—The plants should be attended to once a day in the early stages of growth, giving water to those in need of it, and those only, for a sodden condition of the soil is injurious. As the plants advance in growth water will be required more freely, examining them twice or three times a day. Liquid manure is of great advantage while the fruits are swelling. A little chemical manure, say a pinch between the thumb and two forefingers to each pot, sprinkled on the soil once a week is equally efficient, ceasing the supply of both when the fruit changes for ripening. The liquid manure and water should be used in a tepid state. After the earliest fruits are coloured evenly, water must only be given to prevent the foliage flagging.

Thinning the Flowers and Weights of Fruit.—The remarks on page 231 have equal reference here. Cultivators must exercise judgment in thinning the flowers and fruit, remembering that eight to twelve strawberries to a pound represent twice the value of treble the number. If fine dishes are wanted for particular purposes the “king” fruits only must be retained, cutting the others away. Choice specimens may weigh as follows:—La Grosse Sucreé ¾ to 1 ounce, Vicomtesse Héricart de Thury 1¼ ounce, Sir Harry 1½ ounce, President, Sir Joseph Paxton, Sir Charles Napier, and British Queen 1½ to 2 ounces; Noble and Auguste Nicaise 2 to 2½ ounces, and Marguerite 3½ to 4 ounces. Forked twigs of hazel or birch form good supports for the fruit, the lower ends pointed and thrust into the soil at such an angle as will best keep the trusses in the position desired above the foliage. Small stakes, and the fruit stems secured to them with string, are useful in the case of large fruit.

Retarding the Fruit.—This is sometimes necessary in order to maintain the succession or reserve fruit for a particular occasion. It must not be attempted before the fruit is well advanced in colour; then the plants may be removed to a north house, where abundance of air can be admitted, and a temperature of about 60° maintained. The fruit when ripe, or nearly so, will also keep some time on the plants if moved to a cool airy fruit room, admitting light. When the fruit ripens too fast, a single thickness of tiffany shading retards the process, keeping the house cool and airy.

Strawberries in Autumn and Winter.—Forced plants ripening their fruit in March will ripen another crop in late August and September, those fruited in April in October, and the May-fruited plants in November. La Grosse Sucreé, Vicomtesse Héricart de Thury, and Sir Harry give the finest and best-coloured fruits. The plants must be gradually hardened before being placed outdoors. They may be planted in an
open situation in good soil or be kept in pots. If the latter they should be turned out, partially disrooted, removing the old drainage, and returned to the pots, using good soil, and pressing it firmly. Stand the plants on ashes on a north border for a few days, afterwards in a sunny position, and keep them well supplied with water. The earliest forced plants should be potted early in June, the second plants by July, and the third early in August. The first plants will set their fruit outdoors, and they will ripen well in a cool house. The second may be placed in frames in September, with air constantly, and be removed to a house by the middle of October, with a temperature of 50° to 55°, affording abundance of air and a genial atmosphere. A temperature of 60° to 65° is necessary to swell the fruit properly. The latest plants should be in the frames by early October, and in the house with a temperature of 50° to 55° by November. From these fruit may be had in January. With suitable cultural conveniences ripe strawberries can be had every month in the year.

**Strawberry Enemies.**

*Parasitic fungi* produce spots on the leaves, at first brownish-red, surrounded by a brighter margin, after a time white in the centre, and in this area lie embedded various black specks, peritheca, containing spores. When very abundant they injure the leaves and weaken the plants. The most prevalent fungus of this group living on the strawberry is the native *Leptothyrium fragariae*, and the exotic *Sphaerella fragariae*; *Ascochyta fragariae* and *Septoria fragariae* also occasionally infest the leaves, the spots produced by all being much alike. Plants in clay soils are the most liable to attack. Spraying with Bordeaux mixture before the flowers open, and young plants early in August, is the only means likely to prove effective as a preventive, calculating the strength of the mixture at 1 ounce of copper sulphate to 3½ gallons of water.

*Mildew.*—This is peculiar to some varieties, notably Black Prince, John Ruskin, Pioneer, and Sir Joseph Paxton. Drought conduces to attacks outdoors, and a close atmosphere, also sharp currents of air, to infestations under glass. The first is remedied by soakings of water, mulching, and abundance of food; the latter by judicious ventilation. Mildew grows from the spores of the strawberry blight fungus (*Oidium balsami*); they are cleared away outdoors by a thorough rain or heavy watering; indoors by dusting with flowers of sulphur, and afterwards well washing with water from the syringe.

The fruits, when commencing to ripen, are often attacked with "spot," especially
the choicest specimens. It is induced by damp. The only preventive is ample room outdoors, and a free admission of air to plants under glass.

Mice and Millipedes.—Mice will take the fruits and pile them in heaps, then eat the seeds. Small steel spring traps baited with cheese will secure the depredators. Slugs are very troublesome. Nitrate of soda is a good remedy and beneficial to the coming crop; so also is soot. Millipedes are destructive to the fruit. Pieces of mangold-wurtzel placed in the mulching about the plants before the fruit ripens will attract them, when they are readily destroyed.

Eelworm (Apelenchus fragaria) attack produces a curious malformation of the flower stems and buds; it was given the name of the “cauliflower disease” by Miss Ormerod, and is figured and described in her “Fourteenth Report of Injurious Insects.” It was prevalent at St. Paul’s Cray, Kent, in May, 1890. Occasional plants, however, have been noticed in highly manured plantations for many years past. Though considered to have been introduced with peat-moss litter, it was certainly fostered by using manure from horses fed with clover hay. All infested plants should be burned. Excessive applications, especially of unreduced stable manure, should be avoided in presence of an attack, using a mixture of superphosphate and kainit in equal parts in the autumn, and nitrate of soda in the spring instead of humus-forming substances.

The grubs of the spotted garden gnat (Tipula maculosa) sometimes cut off the flower-stalks close to the ground. Searching for the grubs, which usually hide in the ground near the plants, is the surest remedy, but nitrate of soda dressings usually paralyze them. Caterpillars occasionally prey on the foliage. They are removed by hand-picking and squeezing. Weevils also prey on the foliage and the grubs on the roots (see page 219, present volume). Cuckoo spit (Aphrophora spumaria) is sometimes a nuisance on both outdoor and indoor plants, attacking the flower stems and young leaflets. It is destroyed by crushing with the hand, or syringing with a solution of soft-soap, 1 ounce dissolved in a gallon of hot water, adding a wineglassful of tobacco juice, applying when lukewarm, and washing off with clean water an hour afterwards.

Aphides are not particularly troublesome on outdoor plants, but if they appear syringe them with tobacco juice diluted with six times the quantity of water. If this is done before the flowers expand, and rain does not fall before the fruit is formed, the tobacco must be washed off. When in frames aphides infest the scales of the crowns.
Dusting with tobacco powder is the best cure. Aphides multiply rapidly on the swelling crowns of forced plants, and infest the trusses as soon as they appear. A sharp look-out should be kept for them, and, when the first insect is seen, fumigate, and repeat if necessary until the flowers are showing colour. The plants must be perfectly clean then and at all times; but fumigation must not be practised when the plants are in flower, and only moderately after the fruit is set or it will not swell freely. The tender foliage is also injured by an excess of tobacco smoke.

Red Spider (see page 269, Vol. I.) is most injurious outdoors on plants with downy leaves, and is a consequence of drought, for when rains are forcible red spider cannot thrive. The preventives are copious waterings, mulching, abundance of nourishment and forcible syringings. Under glass, red spider will not cause trouble where the plants are properly syringed, sufficient atmospheric moisture maintained, and the supplies of liquid food adequate. If neglected in those respects the plants may be seriously injured. Strong remedies cannot be applied on account of the fruit, but the plants may be well syringed with clear water. Infested plants should be removed from peach houses and vineries, for red spider on strawberies cannot be kept off the peach trees or vines if near them.
ORCHARD HOUSES.

About the year 1849, the late Mr. Thomas Rivers erected at Sawbridgeworth, Herts, a rough lean-to shed, supported by larch-poles sawn in half, boarded at the back, front and ends, with sliding shutters at the front and back for ventilation, a door at one end, and a fixed roof formed of rafters 20 inches apart, glazed with large panes of sheet-glass, for the cultivation of peach trees in pots. This was the first orchard house and it more than realised expectations. A span-roofed shed was next constructed 20 feet wide, 12 feet high in the centre to the ridge-pole, and 5 feet at the sides. This house was provided with deal boards on hinges running the length of the structure on both sides, and was a still greater success. The next house was a span-roof, 14 feet at the ridge-pole, 24 feet wide, and 100 feet long. This size is considered the most convenient. It was built in 1855, at a cost of £140, and has produced annually for the last thirty-three years from 3,500 to 4,000 peaches and nectarines, the harvest of fruit extending from the beginning of July to the first week in October. This house contains of peaches and nectarines alone, 107 trees, 31 pyramids, from 8 to 10 feet high in 18-inch pots, ranged in three rows down the centre, and 76 half-standards and bushes on both sides, ranged in two rows alternately, the pots 3 feet apart. These trees comprise the permanent residents, but in addition, the house will hold and protect against frost an equal number of pears, plums, and cherries, all of which can be removed to the open air about the end of May. Up to this time no difficulty will be felt in overcrowding, and the trees will not have made sufficient growth to incommode each other. The advantage of thus utilising an orchard house will be at once seen, as sometimes there is a general wreck of outdoor fruits from spring frosts, and entire destitution can thus be escaped.

Such, in the words of Mr. T. F. Rivers, was the beginning, development, and advantage of the orchard house. These structures are simple and, as compared with fruit houses with brick walls and movable side and top lights, inexpensive. The orchard house is, according to the original intention, a glass structure erected on the most economical scale consistent with stability. The main object of orchard houses is that of providing
accommodation for the culture of choice, but somewhat tender fruits, superior in size and quality than it is possible to obtain from trees in the open ground, or outside walls. Since their introduction, orchard houses have been improved in appearance, whilst combining economy in construction with efficiency. The following illustrations and particulars of the conformation of the structures to which they apply have been obligingly placed at our disposal by Mr. Rivers.

**Lean-to House.**—Suppose a structure 30 feet long is required. An outline 30 feet long and 12 feet 6 inches wide should be marked out. Then six posts of oak or good yellow deal, 5 inches by 3 inches, and 11 feet 6 inches in length, or of larch-poles 16 inches in girth, cut in two, and the flat sides placed outwards, must be firmly fixed 2 feet in the ground; the ground ends, before fixing, should be charred 2 feet 6 inches from the bottom, and then have a coat of boiling coal tar. These will form the back line of posts, standing 9 feet 6 inches in height from the surface of the ground. For the front six posts of the same thickness, 6 feet 6 inches long, must be firmly fixed 18 inches in the ground, so that they stand 5 feet out. Two posts will be required at each end; these will form the door-posts. On the posts, both at the front and back, must be nailed a plate 6 inches by 3 inches, on which the rafters are to rest. The rafters must be 14 feet long. A 9-inch deal 3 inches thick will make four, each nearly 4½ inches by 1½ inch. The rebate for the glass is formed by nailing a slip of ½-inch board exactly in the centre on the upper side of each rafter; this will leave about ½ inch of the rafter on each side for the glass to rest on. The rafters are fitted to the back and front plate by cutting out a piece on the underside so that they lie level, and are securely nailed, leaving a space of 20 inches between each rebate. A ¾-inch board, 6 inches wide, must be nailed along the top to the end of each rafter, so as to be even with their upper edges, and in this a groove formed to receive the upper ends of the glass. At the bottom a piece of 1-inch board, 6 inches wide, must be let in for the glass to rest on and to carry off the water, sawing a piece out of each rafter, and filling the space between the board and plate with 1¼-inch boarding fillets. British 16-ounce glass answers, but 21-ounce thirds sheet is best for glazing, and the size 20 inches by 12 to 15 inches, placing it crosswise, bedded in good putty with ½-inch laps and secured with sprigs. Top putty is not necessary, but the rafters must be primed before and well painted after glazing, cutting the putty off level with the glass. On and outside the back posts ¾-inch well-seasoned deal boards should be nailed, and also sliding shutters in grooves 3 feet by 1 foot provided—two close to the roof and two 18 inches from
the ground. The front and ends (except the doorway) must also have $\frac{3}{4}$-inch boards nailed on outside the posts, but the upper one in front should be on hinges so as to let down the length of the house. This, with the back shutters, door, and shrinking of the boards in the summer, provide efficient ventilation. The woodwork should be painted with anti-corrosion paint. Such a house may be erected at a cost of about £30. If it is intended for apricots, figs, nectarines, peaches, and vines a south aspect is necessary; if for apples, cherries, pears, and plums an east or west view will answer, except in cold districts, where the most favourable aspects—that is, south-east or south-west, and sheltered situations are essential.

An improved lean-to house, Fig. 59, differs only from the original in the posts being fitted with cast-iron sockets for fixing in the ground, glass about one-third down the front immediately beneath the eave and down the ends to the same, a boarded ventilator just below the glass in front and at the back on the same level opening the length of the house, and four sliding shutters, 3 feet by 1 foot, at equal distances apart, close to the roof. The appearance is as satisfactory as can be desired in the garden, and the extra cost is but slight, whilst the structure possesses every essential cultural advantage.

Where there is a wall or close boarded fence to serve as a back a lean-to house may be built against it with a great saving in expense, but as sliding shutters cannot be let into boundary walls or fences, a continuous wooden ventilator, 15 inches wide, in lengths of 10 feet, on hinges at the top of the sloping roof, and opening upwards by simple cranks, lever, and sash cord, will provide (in conjunction with the openings in front) efficient ventilation. A framed and glazed ventilator is, however, better for the top of the house than a wooden one.

**Span-Roofed Houses.**—Though a lean-to with a south aspect has the advantage of the fruit ripening earlier, and affords facilities for erecting an open shed at the back, the span-roof house has a more pleasing appearance, and being detached can be thoroughly ventilated. In a span-roof house peaches and nectarines ripen about the same time as on walls. It should run north and south, that is, the ends face those points, or if a deviation is made it should be between north and north-east and south.
and south-west for the ends, so that the house may have the full benefit of the sun throughout the year, and, though a sheltered situation is desirable, nothing must interfere with the free access of light and air. The small span-roofed house (Fig. 60) is 6 feet high at the sides, 10 feet from the path to the ridge, and 14 feet wide. The roof rests on oak posts 5 inches by 3 inches, 5 feet apart, but deal posts let into iron sockets are preferable; rafters 3 inches by 1\(\frac{1}{2}\) inch, 20 inches apart, are tied together at the apex of the roof by a light flat iron tie screwed to every fourth bar. The path is down the centre, and the rows of trees may be placed on each border 3 feet from stem to stem. The house can be of any length, and is an agreeable and economic structure.

A cheap large span-roofed house, 20 feet wide and 12 feet from the ground to the ridge, may be built as follows: Oak or deal posts in cast-iron sockets, 6 inches by 4 inches and 7 feet long, should be placed flatwise, so as to stand 5 feet 3 inches out of the ground, and the soil well rammed round them, or concrete poured in so that they stand firmly. These posts should stand in two rows 20 feet apart, 6 feet asunder in the rows. On these nail the plates, 4 inches by 3 inches, to receive the rafters 4\(\frac{1}{2}\) inches by 1\(\frac{1}{2}\) inch, which must be nailed to the ridge-board, 7 inches by 1\(\frac{1}{2}\) inch, at the apex of the roof, placing the rafters 20 inches apart, that is, to receive glass that width. The sides and ends should be formed of \(\frac{3}{4}\)-inch deal boards. For ventilation a shutter 18 inches wide, made into 15-feet lengths and opening on hinges downwards, the lower edge 18 inches from the ground, should be placed on each side; and for top ventilation an aperture 1 foot deep at each end just under the apex of the roof, and to this a shutter on hinges should be fixed; these shutters ought to be kept open from the beginning of June till the end of September. The roof should be supported and kept rigid either by light "collar beams" of wood to every sixth rafter, by iron rods, so disposed as to tie the roof securely, or, best of all, by two rows of iron pillars formed of 2-inch gas pipes, 6 feet from each side, the lower ends let into a small square of brickwork and cement in the ground, the upper ends let into the purlin. These pillars should be about 10 feet apart. A house built after this method
is a plain but useful structure, for its sides, ends, and doors (there should be one at each end in the centre) are all of boards, and its roof only of glass. This is the original description of span-roofed orchard house, and will give fruit in as great abundance as a house built ornamentally and at a great expense.

A house combining lightness with strength, cheapness and appropriateness, is desirable in private gardens. Such (Fig. 61) may be 24 feet wide, 12 feet high in the centre, and 5 feet 3 inches at the sides. Part of the sides ($d$) and ends are glass, and on each side and at both ends is a wooden shutter 18 inches wide, the lower edge 18 inches from the ground, on hinges opening downwards the length and width of the house, and below that glass to the ground. At each end, just under the ridge, openings down to and the width of the doors fitted with sashes, provide all the top ventilation necessary, and these are to be open all the summer. The roof is formed of rafters, $3\frac{1}{4}$ inches by $1\frac{1}{2}$ inches, fixed 20 inches apart from rebate to rebate, and are kept at the proper distance and from sagging by a purlin, which is supported on each side by galvanised tubing ($f$), $1\frac{1}{2}$ inch in diameter, let into the purlin and fixed in a stone slab ($g$) or small square of brickwork and cement at the ground. Each row of pillars is 6 feet from the sides of the house. Iron is lighter and better than the wood purlins, with a screw hole opposite each rafter, and a groove in the pillars clips the T iron bar and is secured with a pin through the tube and T bar. The iron pillars and iron bars ($e$) are placed to every sixth rafter, or about 10 feet asunder. With a pathway up the centre and trees on each side this house forms a charming avenue, but side paths are necessary for cultural purposes when the trees are in pots, then it is better to arrange them in three lines down the centre, and in two rows on both sides.

The essential difference between a fruit house on orthodox principles and an orchard house is in the former being provided with top and bottom ventilation and the latter with front or side only (except the hot-air openings at the apices of the ends). The side ventilators answer admirably in the summer, but in the spring it is not desirable at times to admit air by them, or only on the side against which a cold sharp wind is not blowing; and this even is so liable to reduce the temperature that Mr. Rivers has devised
a simple plan of admitting air through underground drain pipes, one end of these air ducts passing outside and the other rising about the centre of the house or where required, and covered with a movable lid for regulating the ingress of the air. This system of ventilating by cold air drains has long been practised in forcing operations, and it is an excellent method for effecting a change of air in cold weather, when the side ventilators of orchard houses or top-lights of other structures cannot be safely opened.

Some orchard houses are as elaborate in design as peacheries and vineries, and are sources of great interest to the owners of them and their friends. Such houses, however, are no better for the production of fruit than the simple and inexpensive structures before figured and described. All may be made as tenant's fixtures, if required, by arrangement with the horticultural builder, and can be taken to pieces in a few hours. A useful house is shown in the section (Fig. 62). It can be used for an autumn display of chrysanthemums, as the fruit trees on the central bed will then have perfected their crops and may be placed outdoors. If the house be heated, the temperature must not exceed 40° by artificial means in the winter, or the peach and nectarine trees will be prejudiced.

**Culture in Orchard Houses.**

There are two modes: 1, planted-out trees; 2, potted trees. By planted-out trees is not meant those trained to trellises, but trees in bush, pyramid, or standard form, similar to plantation and orchard trees, the latter giving the name to this system through the first trees being grown as low standards in pots and allowed to form round heads. Trees in the centre of a house 12 feet from the surface to the ridge should have the branches start from the stem 4 feet 6 inches from the ground; this will give about 6 feet for the head, which should always be kept 12 to 18 inches below the glass. Half-
standards (3 feet stems) answer for the next row on each side, and quarter-standards (18 inch stems) for the sides.

Peaches and nectarines succeed admirably in this form, but the roots of the trees must be restricted to borders of firm soil over thorough drainage, for the tendency of planted-out trees is to excessive growth, until checked by fruit production. Judicious root-pruning is better for accelerating fruitfulness than rigorously stopping exuberant shoots. The great point is to prune so as to admit sun and air through the trees, then sturdy, well-ripened wood will be secured, and fruit follow in abundance. The soil for the trees should be a calcareous clay, and firm, then a surface dressing of manure in the spring, supplemented by chemical manures, with a sufficiency of water, and the usual syringing will meet their requirements. Potted trees have the advantage of providing a great variety of fruit from a given space. A supply of apples, apricots, cherries, figs, grapes, nectarines, peaches, pears, and plums can be produced by trees in pots in one house, that is suitable for the purpose; but this cannot be effected in similar space by planted-out trees.

Moreover trees in pots are portable and can be removed whenever desired. When the pots are stood on bricks placed flat, and a little distance apart to leave the drainage openings clear, the trees have the advantage of the warm air of the house for the roots and are completely under control. Success or failure with these trees depends entirely on the management—due attention to watering, syringing, and applying topdressings of rich compost, supplemented by chemical or liquid manure, in order to sustain health and fertility. In these respects potted trees entail much work as compared with those planted out. The latter, however, are not suitable for the majority of amateurs, who must confine their cultures to the least room, and many of these enjoy the occupation of growing fruit trees in pots.

A few cultural remarks on the mixed house system of growing fruit will be useful. The trees may consist partly of fruits requiring to be kept constantly in the house, such as apricots, figs, grape-vines, nectarines, and peaches; and partly of those only needing to be placed in the house for the security of the blossoms and young fruits from spring frosts, such as apples, pears, and plums, these being given a favourable position outdoors from June to February inclusive. Cherries come within the latter category of fruits, but the trees must be continued under glass until the fruit is ripe and till removed from them, then they may be stood outdoors. This will admit more light and air to the kinds first named. Early varieties of the apricot, nectarine, and
peach may be removed to a warm situation outdoors as the trees are cleared of their crops, and the wood becomes sufficiently firm. By this procedure room will be provided for any plums or other fruits which it may be desirable to return to the house for perfecting and preservation in unfavourable weather. A great variety of fruits may, therefore, be successfully grown in one house, by good judgment and attention. After the blossoming is over, and the fruit set, the trees must have light and air right down to their base by standing them sufficiently distant from each other.

Other fruits may be grown in the orchard house. Wilson Junior blackberry grown in pots and placed in the house after its fruits are set outdoors ripens fruit of large size, which is delicious with cream. The bushes may be placed outdoors after the fruit is gathered. Lady apple, a small-fruitied and highly-coloured variety, is very prolific and ornamental; it is esteemed for dessert, and may be used as a table plant on the French paradise stock, either as a pyramid or low standard. Crab apples, such as the Dartmouth, John Downie, Siberian, and Tradescant, produce attractive blossoms and fruits in profusion, which are highly ornamental, and make a delicious preserve. All kinds of bush fruits succeed admirably in pots, as also do medlars and quinces, while strawberries of the first size and quality may be grown on shelves or stood on the border where they receive abundance of light, introducing them to the house in March and clearing them out directly the fruit is taken from them.

All the fruits named have been grown in orchard houses near towns, and have been of such appearance and quality as to secure premier awards at exhibitions. Some business men find relaxation in cultivating fruit trees in pots, and derive considerable advantage from the pursuit. With no more ground in a sunny position than suffices for the erection of an orchard house, and a corresponding space left outside whereon to stand plants, persons may secure a supply of fruit of their own growing, and a display of chrysanthemums in the autumn from one house. The fruit trees in this case being placed in the house at the end of February, or when the buds commence swelling, and remain until October, when they may be placed outdoors, except such as are specified to be kept inside, and with the pots protected they will be perfectly safe for the winter, especially if a wire cage is provided to exclude birds. The chrysanthemums grown outdoors during the summer will take the place of the fruit trees in October, and afford a display of bloom of great interest until Christmas.

The arrangement for using the orchard house for chrysanthemums as well as fruit trees necessitates provision for artificial heat. This is not really necessary for fruit trees in
favoured localities, but it is imperative in cold districts to insure safety for the blossoms and young fruit in the spring, as well as for the ripening of late fruits and the maturating of the wood. The need for heating is much greater in small or narrow houses than in large and wide ones, but a 4-inch hot-water pipe in front and at the back of a lean-to, or both sides of a span-roof house, will suffice for widths of 12 to 18 feet, and two rows of similar piping are ample for houses of 24 feet breadth. This command of artificial heat is a great advantage in the spring, especially when the blossoms in an early season may not be sufficiently protected by a glass roof should severe frosts occur. A little warmth, moreover, assists the setting of the fruit and the swelling of the crop. Artificial heat ought not, however, to be used for more than the exclusion of frost at night, and a day temperature of 50° ought not to be exceeded by artificial means, with a free circulation of air. An attempt at forcing a number of fruits in one house means the failure of some, but absolute safety only from frost, cold, and damp, will ensure the success of all. Abundance of heat is furnished by the sun in the summer; it should be utilised in cold districts by closing the ventilators somewhat early on fine afternoons after the fruit is set, and fire heat ought only to be employed when it becomes really necessary, and then a little air at the same time is desirable, except when severe frost prevails. Artificial heat to the extent of excluding frost is advised for orchard houses in all but the warm parts of this country; in the north or cold localities it is absolutely essential for securing crops of fruit. Routine treatment has been given under the respective fruits, but a few further hints applicable to trees in orchard houses will be useful to beginners.

Potting and Re-potting.—The pots may range in size from 10 to 18 inches, according to the age and size of the trees. The necessary compost should be prepared beforehand, and allowed to remain several days or weeks after it has been well mixed. Two-thirds rather tenacious loam, and one-third well-decomposed manure answers for all the fruits. Some sifted brick and mortar rubbish or chalk may be added for stone fruits. A 9-inch potful of bone meal may be added to each barrowload of the compost; if the loam be turfy, use Thomas's phosphate instead of bone dust. The compost should be placed under cover to become workable—that is, neither too wet nor too dry. Trees in a healthy condition only need the removal of loose surface soil and a little from the sides of the ball with a pointed stick, placing in fresh compost and ramming it firmly. This should be performed in October. Trees that require a shift should be taken out of the pots, have the drainage removed, the sides of the ball loosened, long roots shortened, and be placed in clean
properly drained pots a size larger, making the soil firm with a hand rammer. When
trees are in an ill-conditioned state through defective drainage, and consequently sour soil,
they should be taken out of the pots, the drainage and soil cleared away, and placed in
clean well-drained pots of the same size or smaller. Sufficient space must in all cases
be left below the rims of the pots for holding water. This must be given sparingly
until the roots are working freely in the new soil; yet this must be properly moist until
the leaves fall, and during the next season not allowed to become parchingly dry.

Ventilating.—The trees must be stood apart from each other in the spring, before the
blossoms unfold, for it is impossible to separate entangled branches without destroying
many flowers. In the winter, the house should have the ventilators wide open whenever
the temperature is above the freezing point, but a still air is desirable when the weather
is severe. This will cause the trees to start naturally in the spring, even when they are
kept in the house during the winter, yet somewhat earlier than those which are outside;
these being introduced before the flower buds have cast their scales, and they must not be
unduly excited. From the first indication of growth a circulation of air should be
maintained day and night by leaving the ventilators open more or less, according to the
weather. After the blossoms show colour they are susceptible of injury from frost, and
fire heat, if at command, should be used to exclude it, but a temperature of 40° is ample,
or even less in severe weather; the chief essentials are a dry atmosphere, free ventilation,
and safety from frost. If the weather be cold and dull, a little fire heat will prove of
great advantage by day, if only to ensure a circulation of air, yet it must be applied
carefully, say to maintain the temperature at 40° to 45°—never more than 50° without
full ventilation. After the fruit is set, and the weather becomes warmer, growth may
be accelerated by closing early in the afternoon, but too much air cannot be given in the
early part of the day, avoiding sharp currents, and a little should always be admitted at
night. In the summer the ventilation must be attended to early, and be full during the
hotter part of the day, modifying the amount where it is desired to make the most of
sun heat. These remarks apply to orchard houses in cold localities, and for the tenderer
fruits, such as nectarines and peaches; in favourable localities and for the hardier fruits
full ventilation is required day and night during the summer months, or from the end of
May to the close of September, but the cultivator must exercise judgment in the
admission of air at all times. No fixed rules can be laid down for following under all
circumstances.

What each kind of fruit requires has been given under its heading, and the only
general maxims for ventilating a house of mixed fruits are:—1, during the winter—
from the leaves falling to the buds commencing to swell—ventilate fully day and night,
closing only in severe weather; 2, from the blossoms being visible to the fruit setting,
allow a little air constantly between 40° and 45°, then admit full ventilation at 50°,
closing for the day at that temperature, subject to the condition just named, and close
the house entirely only in case of a prospect of frost and during its prevalence; 3, from
the fruit setting and to the early part of June observe 50° as the point at which to open
and close the house, always subject to leaving a little air on constantly, except when
frost prevails, and modify the amount of ventilation to prevent the temperature falling
below 50° during the daytime; 4, from the early part of June the ventilators may
remain wide open day and night till October, when it will be necessary to moderate the
ventilation for the benefit of late fruits, and prevent the sudden collapse of the foliage
in case of sudden and severe frost, otherwise ventilating freely in order to secure the
thorough ripening of the wood.

Syringing.—This must be practised from the time the fruits are safely set until they
commence ripening, each tree receiving attention, both early in the morning and in the after-
noon, except when the weather is cold and dull, for the trees must not be kept constantly
dripping with water. One good syringing does more to free the trees of insect pests
than many light dampings, therefore apply the water with force after the foliage becomes
able to bear it, but the leaves must not be damaged by applying the water too forcibly.
The water used should be of a similar temperature to that of the house. When it is not
possible to syringe the trees, the application of water about the house will maintain a
genial atmosphere, provided the floor be of earth and the pathway ashes or gravel, which
are not only more economical but far better than flagged or cemented floors, on account
of the constant evaporation of moisture and gases escaping from the soil charged with
liquid passed through the pots. After the fruits are gathered the trees must receive
proper attention in respect of syringing as before, but it suffices to keep them free from
insects and dust.

In smoky and dusty localities the glass should be frequently washed, keeping it as
clear as possible during the growth of the trees, and some woollen netting, ¼-inch mesh,
tacked tightly over the ventilating openings, will sift the air, and collect sooty and
dusty matter that would otherwise enter the house and settle on the trees.
FRUIT-GROWING FOR PROFIT.

MR. WILLIAM PAUL, F.L.S., in a paper read at a meeting of the Society of Arts, truly says: "Fruit-growing as a recreation, or for one's own use, is one of the most fascinating and diverting of occupations, and may be pursued with satisfaction by the uninitiated. But fruit-growing for profit is a different thing. Here knowledge is wanted. The possession of it, rightly applied, will be attended with success; the absence of it with failure." This knowledge it has been our endeavour to impart in the preceding pages, so as to meet the requirements of different classes—1, growers of fruit mainly for private consumption; 2, growers for exhibition; 3, growers for market.

In the first-named section tastes differ, yet all agree in wanting the best variety of fruits to last in succession over as long a season as possible, and to meet all requirements for dessert or cooking. Many persons do not look at the cost of production so long as they can have fruit of their own growth; but some grow more fruit than is required for family use, and dispose of the surplus in the markets. This class includes amateurs, cottagers, farmers, tradesmen, private gentlemen, and noblemen, all of whom possess, either personally or through those employed, some preliminary instruction and training.

Growers for Exhibition or Pleasure.—These like to have (and will have at any cost) handsome dishes or collections of fruit for showing at exhibitions or on their tables, whether the trees are good croppers or not, or the fruit of the first quality for dessert or cooking. Beautiful fruit gives much pleasure to this class of individuals, who advance the art of fruit-growing more than is generally credited by testing new or little-known varieties, and so bring their qualities to light. The growers who make a hobby of fruit-growing, and take pleasure in seeing the variations in colour, size, and quality of the different varieties, who like to test sorts which are new or unknown to them, and find out their suitability for their soil or climate, without thought of profit, are the most advanced pomologists. These, as a rule, pronounce fruit-growing a failure. Mr. R. D. Blackmore's testimony is significant upon this point. He says: "I have been engaged
in that pleasant pastime [fruit-growing] since the year 1857, having bought some 12 acres of land for the purpose. For many years I gave my entire attention to it, sparing neither money nor labour. But during all those years I have not succeeded in securing proceeds enough to cover the wages alone, except for two golden seasons, and those two just met their expenses. The land is well suited for the purpose, but I have lost many thousands [of pounds] by this insane investment."

Growers for Market must have knowledge and something more. Henry Dethicke, in the "Gardeners' Labyrinth," published more than 300 years ago, says: "Not sufficient is it to a gardener that he knoweth, or would the furtherance of the garden, without any cost bestowed, which the works and labour of the same require. No. The will, again, of the workman, in doing and bestowing of charges, shall small avail, without he have both art and skill in the same. For that cause it is the chiefest point in every faculty and business, to understand and know what to begin and follow." This view has been endorsed by every subsequent writer up to the present time, and implies that no vocation or profession can be made profitable without special knowledge, industry, and business aptitude. True it is that some men appear to be natural fruit-growers, because they see "what to begin and follow." But whoever may fail in the attempt it is a great mistake to suppose that intelligent farmers, labourers, or mechanics cannot grow fruit profitably, for many grow sufficient to supply their own needs, and the sale of the surplus pays the cost of production; whilst most owners of land, good in staple and location, find the returns in rents considerably more from land under a well-conducted system of fruit culture than from that under ordinary agricultural tillage. This signifies knowledge of a particular order, for all fruit growers must be good cultivators, also characterised by "patient perseverance, untiring application, a timely seizure of offered opportunities, and thrifty regard for occasions upon which available resources should be called into united co-operative activity."—(Mr. E. J. Baillie, F.L.S.) Work, business tact, commercial enterprise, and intuitive or acquired market methods, are the essentials required in fruit growing for profit. The opposites of these—dread of work, inaptitude for business, lack of energy and perseverance, and ignorance in growing and marketing produce—lead to nothing but failure. Mr. Blackmore indulged in fruit-growing as a "pleasant pastime," and paid for it; he did not work on commercial lines, but hundreds who did so work have succeeded and extended their operations enormously.

Labourers and Fruit.—Practical knowledge of the land and its working fits the agricultural labourer for growing fruit. Many cottages have gardens attached, and in
these fruit of a quality suitable for home consumption and for sale has been grown from time immemorial. Yet these gardens are often cumbered with old worn-out trees, and produce inferior fruit scarcely worth carriage to market. This state of things is unfortunately the rule rather than the exception, and demands a remedy. In some instances this can be effected by judicious pruning, thinning, and cleansing the branches of varieties worth retaining, by dusting them while damp with quicklime, also scraping the stems, but not into the live bark, and coating them with a mixture of quicklime and soot formed into a wash; also extracting and burning perennial weeds with the prunings, spreading the ashes beneath the fruit trees; supplying solid manures, if obtainable, otherwise a mixture of bone meal and kainit in equal parts, 3½ pounds per rod, in the autumn after the trees have been trimmed, pointing in lightly, and supplementing in the spring, when the buds unfold, with powdered nitrate of soda, 2 pounds per rod. If the varieties are not good, and the trees have healthy stems, the remedy is grafting with better kinds in the spring. This may be carried out so as not to interfere materially with the supply of fruit by operating on the least profitable trees first, following with others in two or three years, and so on until the whole are transformed into producers of excellent fruit. Many gardens that bring little profit to their occupiers may by the practices indicated be made remunerative.

But some trees are so antiquated, and the varieties so inferior, as to be practically beyond useful renovation. It then becomes a question of having fresh land and trees, or going without fruit, and where new ground can be acquired in suitable positions, cottagers should be encouraged and taught to grow fruit for home use, also for their neighbours who have no trees. This would be from every point of view better than introducing so much foreign produce into country towns and rural villages. For small holdings, if not large, low standards on dwarfing stocks are the trees of the future, with currants, gooseberries, raspberries, and strawberries between the rows and in the lines, to secure a maximum of profit from the ground in the shortest time.

Farm Gardens and Orchards.—The remarks on cottage gardens apply to farm gardens, in which 90 per cent. of the trees are comparatively worthless through age or variety. But the farmer has not the same difficulty in securing ground for a new garden or orchard, as land in most cases is available in near proximity to the homestead. The great impediment to farmers becoming fruit growers for market is not so much lack of commercial enterprise as laying out capital from which they have only a remote prospect of securing a fair return. The farmer, under a yearly tenancy,
wisely refrains from fruit-growing as an industry. Even when the landlord provides
the garden or orchard properly stocked, it is questionable whether he does not eventu-
ally derive more benefit from it than does the tenant. But the advantages should
be mutual. Much land has doubled and trebled in value for letting in fifteen years
after planting it with fruit trees, and many landlords have shown a laudable desire to
improve the circumstances of their tenants by adding orchards to farmsteads, often
draining and fencing the land, finding, planting, staking, also pruning the trees for a
year or two till well formed and established. Several instances could be pointed to
where this has been done to the mutual benefit of landlord and tenant, both on large
and small holdings. The large holder of land has perhaps been shown the more favour,
though it is not such a vital question with him as it is to the small holder whether
fruit-growing is made to pay or not, and the latter will perhaps have more attention
in the future.

Small Holdings.—Up to the middle of the present century, the principal supply of
hardy fruits for the British markets was derived from market gardens near towns and
small holdings in the country. This was mainly due to the efforts of the late Mr. T.
A. Knight, and the Horticultural Society of London, in furthering the fruit-growing
industry by experiments with varieties, and diffusing valuable information. The result
was a full supply of fruit for a time, but the increased population demanded an enlarge-
ment of the towns. Buildings took the place of market gardens, and the value of
land was so enhanced that fresh plantations of fruit trees were practically prohibited in
the vicinity of towns. Manufacturing industries also made such rapid strides as to
render fruit-growing near them uncertain, and few fruit plantations were established to
meet an increased demand. This made it possible and profitable to import fruit for
the supply of the masses. The rural districts profited for a time by the obliteration
of suburban fruit gardens, but eventually became inadequate, through neglect in form-
ing new plantations for affording a supply of the best fruit in proportion to the
requirements of the population. This lack of forethought marked the decadence of
small holdings in many districts, and they were at length added to the adjoining
farms.

But the supply of home-grown fruit to the markets was only temporarily interfered
with by the engulfing of small by large farms, for some enterprising persons secured
land favourably situated for fruit-growing, and in plots proportionate to their capital.
These have been the principal suppliers of fruit to the British markets in recent times.
The situation of fruit gardens, farms, or orchards mainly in districts favouring production, points to the importance of being guided chiefly by the placing of the best produce in the markets at the least expense. Growers must consider that, because if they choose to raise more fruit in any locality than is needed by the towns in the immediate neighbourhood, the expense in disposing of the surplus must fall upon them. Railway companies will not carry fruit at specially low rates to populous districts inadequately supplied by the gardens and orchards in their immediate neighbourhood. They act on commercial principles, so must growers of fruit, and if too much is produced in a locality to be disposed of at a profit in its raw state, it must be dried or converted into jam, or otherwise dealt with. The railway companies have not produced the glut, and they will not clear it away for nothing.

In the large fruit-growing counties—Hereford, Kent, Devon, Somerset, Worcester, Gloucester, and Cornwall, it may be a question whether it will be profitable to materially increase the acreage under fruit, though new plantations must be made from time to time, to maintain the efficiency of the supply of fruit as the older trees fail. In all the other counties of England and Wales, except Shropshire, Dorset, Middlesex, Monmouth, Berkshire, and Buckingham, the area under fruit is totally inadequate to supply the needs of the towns within easy marketing distances, and it is in these that the best openings for the establishment of small holdings or fruit farms present themselves to those with capital. This decentralization—the re-establishment of small holdings, partly on fruit-growing lines primarily for the supply of the markets nearest them, would alike settle the questions relating to railway rates and importations of hardy fruits. In the counties north of the Humber and Mersey, it may not be possible to grow fruit in the immediate neighbourhood of the great centres of industry on account of the deleterious conditions of the atmosphere, but in most rural districts enough fruit could be grown to meet the demands of the consuming community of a quality and at a price securing for it preference over the imported. This is really the one thing needful to enable the British fruit-grower to regain and maintain command of the markets.

Landowners' Gardens and Fruit Farms.—Many of the gardens of the nobility and gentry supply fruit for the market, though few of them produce sufficient to cover the cost of production, unless the large amount which is often required for home use is properly valued.

In some cases, however, the ostensible private gardens are really fruit manufactories, especially as regards the output of choice fruits grown under glass. The superintendents of such establishments receive encouragement through being allowed to exhibit
their choicest productions and gain prizes, if they can, at exhibitions. The growers are still further encouraged by commission on sales of produce, and the result is high-class fruit commanding remunerative prices, for there is always a demand for choice samples in moderate quantities.

Some landowners devote a portion of their domains to growing hardy fruit for market. These fruit farms are occasionally managed in combination with, but, as a rule, separate from the private establishment. In the latter case the management devolves on men experienced in marketing methods, and who have been engaged in the cultivation of crops from youth upwards exclusively from a pounds, shillings, and pence point of view. It is simply transferring industrial energy and cultural skill from herbage, cereal, and root crops to fruit production. This class of cultivators—enterprising fruit farmers—have an immense advantage over small growers through their connections with tradesmen and salesmen, and thus effecting sales on the most advantageous terms. What large growers do for themselves, small must do by co-operation, that is, combine in the purchase of trees, manures, and the conveyance of goods, so as to involve the least expense in production and distribution, and secure the best profits on the work.

*Tradesmen and Mechanics.*—These classes of cultivators mainly devote their attention to growing fruit for their households. It would be a mistake, however, to conclude that their cultures have not some influence on the supply of the markets. Many buy a piece of land, build a residence, plant fruit trees against the walls, assign a portion of ground to bush and other kinds, with the result that more fruit is grown than the occupier requires for his own use. If the produce is high-class it is readily disposed of at good prices for fruiterers' windows, but if the grower keeps the best for himself and friends, and disposes only of the worst, he must be content with costermongers' prices, while he, at the same time, lowers the prestige of the home produce. These remarks apply chiefly to tradesmen and mechanics near towns with few manufacturing industries, where the soil and climate are as well suited for fruit production as in many rural districts where fruit is successfully grown.

There are individuals in various stations of life, who may derive both pleasure and profit in fruit-growing, if they acquire knowledge to bring the land into a high state of cultivation, and send the result of their labours into the markets in an attractive and appetising manner, leading to the freer use of fruit as food to the improvement of the national health. What the sons and daughters of Britain effect in the lands of the West, and at the Antipodes, *they may* do at home by the exercise of muscles and brains; but nothing
short of educated heads and hands—business tact with intelligent persevering habits—will bring success in the fruit-growing industry.

**SUPPLY AND DEMAND.**

The natural outcome of the cultivation of the soil is food produce. Its value depends mainly on the demand. If the markets are overstocked the prices rule low; if the supplies are short, prices rise in proportion. But under all circumstances there is a difference in the prices obtainable, and this is regulated by the quality of the article. Fruit may be divided into three grades—1st, 2nd, 3rd, and these apply to every kind, variety, and the purpose it is to serve—dessert, kitchen, or preserving. These three grades represent all the qualities required by consumers—1st, for those able to pay the highest price for a select article; 2nd, for the use of the middle class, a good all-round commodity generally acceptable at reasonable prices; 3rd, for the lower classes requiring a combination of amount with quality on the easiest terms. In addition to these grades we have a vast quantity of inferior fruit that never ought to be offered in the markets, but kept at home and used for feeding pigs. The British fruit-grower must grade his produce and sell by sample. Improved market methods, central agencies, and increased facilities of conveyance, with organisation, are the essential points upon which those connected with the fruit-growing industry must concentrate attention. Government aid is useful so far as it relates to statistics of importations of fruit, and might be of service in certain cases of fungal and insect-infested districts for limiting the plagues. But the fruit-growing industry must be founded on self-reliance. The population is ever-increasing and the demand for fruit is always growing. If home growers do not satisfy this demand, supplies must be drawn from beyond the sea. It is a question of the best article at the lowest price. Foreign competition must not be feared but faced. It need not cause alarm to cultivators in this country though it is formidable, as will be seen from the following summary:

**IMPORTS IN 1892 AND 1893 OF FOREIGN AND COLONIAL FRUIT.**

<table>
<thead>
<tr>
<th>Imports</th>
<th>January</th>
<th>February</th>
<th>March</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>Bushels.</td>
<td>236,662</td>
<td>209,262</td>
</tr>
<tr>
<td>Cherries</td>
<td>Bushels.</td>
<td>334</td>
<td>533</td>
</tr>
<tr>
<td>Pears</td>
<td>Bushels.</td>
<td>3,742</td>
<td>2,518</td>
</tr>
<tr>
<td>Grapes</td>
<td>Bushels.</td>
<td>334</td>
<td>533</td>
</tr>
<tr>
<td>Unenumerated</td>
<td>16,995</td>
<td>16,832</td>
<td>-143</td>
</tr>
</tbody>
</table>
THE FRUIT GROWER’S GUIDE.

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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1892</td>
<td>1893</td>
<td>Difference</td>
<td>1892</td>
<td>1893</td>
<td>Difference</td>
<td>1892</td>
<td>1893</td>
<td>Difference</td>
</tr>
<tr>
<td>Apples</td>
<td>147,655</td>
<td>198,351</td>
<td>+50,696</td>
<td>01,608</td>
<td>98,442</td>
<td>+6,834</td>
<td>71,072</td>
<td>33,857</td>
<td>-37,215</td>
</tr>
<tr>
<td>Cherries</td>
<td>...</td>
<td>8</td>
<td>+8</td>
<td>8,613</td>
<td>92,126</td>
<td>+3,513</td>
<td>115,918</td>
<td>106,213</td>
<td>+9,705</td>
</tr>
<tr>
<td>Plums</td>
<td>5</td>
<td>10</td>
<td>+5</td>
<td>125</td>
<td>1,035</td>
<td>+911</td>
<td>6,103</td>
<td>28,053</td>
<td>+21,950</td>
</tr>
<tr>
<td>Pears</td>
<td>1,006</td>
<td>660</td>
<td>-346</td>
<td>143</td>
<td>3</td>
<td>-140</td>
<td>23</td>
<td>4,732</td>
<td>+4,709</td>
</tr>
<tr>
<td>Grapes</td>
<td>628</td>
<td>2,448</td>
<td>+1,820</td>
<td>1,720</td>
<td>2,672</td>
<td>+952</td>
<td>3,398</td>
<td>5,186</td>
<td>+1,788</td>
</tr>
<tr>
<td>Unenumerated</td>
<td>19,487</td>
<td>34,559</td>
<td>+15,072</td>
<td>39,710</td>
<td>79,217</td>
<td>+39,507</td>
<td>93,535</td>
<td>236,708</td>
<td>+143,173</td>
</tr>
</tbody>
</table>

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</thead>
<tbody>
<tr>
<td></td>
<td>1892</td>
<td>1893</td>
<td>Difference</td>
<td>1892</td>
</tr>
<tr>
<td>Apples</td>
<td>559,658</td>
<td>642,279</td>
<td>-82,621</td>
<td>901,359</td>
</tr>
<tr>
<td>Cherries</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Plums</td>
<td>1,181</td>
<td>12,362</td>
<td>+11,181</td>
<td>19,269</td>
</tr>
<tr>
<td>Pears</td>
<td>72,776</td>
<td>107,715</td>
<td>+34,939</td>
<td>12,012</td>
</tr>
<tr>
<td>Grapes</td>
<td>277,520</td>
<td>390,616</td>
<td>+123,096</td>
<td>99,012</td>
</tr>
<tr>
<td>Unenumerated</td>
<td>78,671</td>
<td>71,076</td>
<td>-7,595</td>
<td>39,584</td>
</tr>
</tbody>
</table>

The figures show: 1, that we are laying out an immense sum every month on colonial and foreign fruits; 2, that our home supply of such produce as the public needs is inadequate for consumptive demands. In favourable seasons our harvest of hardy fruits ought not only to meet the requirements of our own people, but we ought to have a large surplus of preserved fruit for shipping to other parts. In no country in the world can soft fruits be grown so well and preserved so cheaply as the United Kingdom. But it may be urged that our climate is fickle and full crops cannot always be relied on. Neither can they in other countries, as every year's statistics abundantly demonstrate. We are not handicapped by the weather to half the extent that is popularly supposed, and not nearly so much as by habitual negligence or faulty routine in cultivation,
FRUIT-GROWING FOR PROFIT—IMPORTATION OF FRUIT.

preservation, and distribution. Experienced and enlightened growers know the truth of this, and it is, in fact, proved by their successful practice and extensions of culture. Seasons affect the fruit-yield undoubtedly all over Europe and in America, as well as in England.

In 1893 the fruit crops in England and most other countries were full, and produce of the larger kinds clear in the skin, highly coloured, and excellent in quality. Bush fruits generally suffered by the extreme heat and drought; strawberries from Hampshire were in the London markets on the 4th May, fruits small, and crops of short duration. Where strawberries occupied trenched and enriched land they gave good results, while the crop from old plants in exhausted soil was hardly worth gathering.

The lessons to be drawn from the fruit crops of 1893 are: 1, neglected orchards do not produce profitable crops; 2, only well-managed trees on cultivated land bear fruit fitted for present-day competition; and 3, when the supply to the markets is inadequate or inferior, foreign fruit is largely imported.

For comparison with 1893—an unprecedentedly hot and dry season—the Board of Trade returns of raw fruits for 1889 and 1890—a wet year—are subjoined:

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples . . .</td>
<td>Bushels.</td>
<td>243,265</td>
<td>201,880</td>
</tr>
<tr>
<td>Unenumerated</td>
<td>11,804</td>
<td>14,410</td>
<td>+2,606</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>April.</td>
<td>May.</td>
<td>June.</td>
</tr>
<tr>
<td>Apples . . .</td>
<td>Bushels.</td>
<td>272,256</td>
<td>40,059</td>
</tr>
<tr>
<td>Unenumerated</td>
<td>9,564</td>
<td>17,388</td>
<td>+7,824</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>July.</td>
<td>August.</td>
<td>September.</td>
</tr>
<tr>
<td>Unenumerated</td>
<td>345,697</td>
<td>402,392</td>
<td>+56,695</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For comparison with 1893—an unprecedentedly hot and dry season—the Board of Trade returns of raw fruits for 1889 and 1890—a wet year—are subjoined:
<table>
<thead>
<tr>
<th>Imports</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1889</td>
<td>1890</td>
<td>Difference</td>
</tr>
<tr>
<td>Apples</td>
<td>Bushels</td>
<td>Bushels</td>
<td>Bushels</td>
</tr>
<tr>
<td>Unenumerated</td>
<td>409,638</td>
<td>686,262</td>
<td>+276,624</td>
</tr>
</tbody>
</table>

The apple and plum crops were almost everywhere deficient in England in 1890, also in America, yet 1,450,000 barrels of American and Canadian apples were imported into Great Britain in 1891.

Fruit, like every other product, is consumed in proportion to its price. The advent of Free Trade somewhat lowered prices, and enormously increased importations of fruit, yet the supply did not keep pace with the demand for fruit of fine colour, shape, and quality. This is clearly shown both by the importations and the increase of the fruit-growing area in this country. In 1839 it was 90,000 acres; in 1872 it was 169,808 acres. In 1891 the fruit area had risen to 268,000 acres, 58,700 acres being devoted to small fruits, or double what it was five years previously. Notwithstanding the great increase, the demand, for apples especially, has exceeded the supply, for we find that during the ten years (1881—1891) the average quantity of apples annually imported into this country considerably exceeded 2,000,000 bushels, and in 1891 the quantity was 3,147,373 bushels.

Statistics of the fruit acreage and importations as issued by the Board of Trade should be studied by British fruit growers. Exaggerated views as to the advantages to be gained by the extended cultivation of fruit would not then mislead on the one hand, nor pessimistic utterance on the British fruit grower’s occupation being gone on the other. Fruit-growing in this country is profitable, or the area would not increase annually, while the importations show that the home produce has not yet reached sufficient development to satisfy the advancing taste and increased demand for fruit by the population of this country. Fruit culture under favourable circumstances by competent persons is likely, for some time to come, to be profitable on an average of seasons; but we advise it to be commenced in a small way—in the garden of the cottage, small holding, and farm—and gradually extended as opportunities offer and experience warrants. This caution is imperative to prevent novices embarking on rash ventures in the hope of making fortunes in growing fruit.
LAND AND LOCATION.

Certain districts are better suited by soil and climate for fruit production for profit than others, and it is by having regard to these conditions—the fitness of things—that success is achievable. Cultivators, therefore, who pay the most regard to the natural adaptability of fruits to the soil and position, obtain the best results with the least expenditure of labour and manures. It is not wise to assume that because there are thousands of acres of land, bringing little or no profit to owners or occupiers under ordinary agricultural crops, that such land, if planted with fruit trees, might be made to return good profit. Everything in cases of this kind depends upon circumstances—climate or location and soil.

Climate.—A locality somewhat high, yet the site sheltered, and a pure atmosphere, should be chosen for fruit-growing. The bottoms of valleys offer great inducements in respect of soil, moisture, and shelter, but the blossom and young fruits are frequently destroyed in low situations by spring frosts, while they escape on slopes and uplands. In selecting a site give preference, therefore, to ground above the line of fog and sheltered by hills or trees. Those conditions are absolutely essential for the production of apples, cherries, pears, and plums with certainty, and saleable at good prices. In many rural districts, there are parishes, estates, and farms—even those of 100 acres or less—which offer suitable sites for planting the trees. (See climate, page 58; situation and shelter, page 65; Vol. I.)

Soil.—Aim at a good soil in a favourable situation, as these advantages secure an abundance of good fruit over a long period at the least outlay in manures and culture. A medium loam of good depth (2½ to 3½ feet), with a calcareous gravelly-clay subsoil, on gravel or rock, and naturally drained, is the most suitable for fruit trees. Such soil may only be found here and there, but there is far more fitted for fruit-growing than is generally credited. A good idea of the fitness of a site and soil may be gathered from the condition of fruit trees in the immediate locality. By taking note of those growing in gardens or orchards, and of the kinds of fruits best succeeding, useful information is obtained. Where there are no gardens or orchards, the condition of the herbage, crops, and forest trees form a good criterion of fitness for fruit-growing. Rich pasture land and that growing good crops of wheat will suit apples and pears; clover land is suitable for cherries, plums, and other stone fruits. If elm trees flourish the soil and climate are not bad for fruit trees generally, whilst an apple soil is indicated by thriving crab trees, a cherry soil by gumless wildings, a pear soil by fruitful thorns,
and a plum soil by the vigour and productiveness of blackthorns and bullaces. Take all these things into consideration—make careful inquiry, secure the opinion of experts, and serious initial mistakes may be avoided. Further particulars in respect of the suitability of soils for fruit trees will be found under soils and subsoils, Vol. I., page 21, and a succinct account of the soils of this country for apple and fruit-growing generally on pages 340—343, Vol. I.

Tenure.—As a rule, the fruit grower for profit ought to own the land, or hold it on a long lease, under definite and equitable terms. Practical landlords are as ready to grant as good tenants are to acquire long leases. In many cases trees are found by the landlord, the tenant paying for planting, but no compensation is allowed for unexhausted improvements. In several instances confiding tenants have engaged in fruit-growing without any security beyond that accorded by the extension of the Compensation for Improvements Act to fruit trees and glass structures. This should not be considered satisfactory. A special agreement is the best for both parties, as the cost involved in recovering compensation under Acts of Parliament chiefly benefits assessors at the expense of both landlord and tenant.

There is no question of ownership being the surest guarantee of deriving profit from land by the growing of fruit, and it should be sought near railway stations or towns where produce may be disposed off and manure obtained on easy terms.

Leases are generally framed in the interests of land-owners, as they naturally expect the land to be as good at the end of the lease as it was at the beginning. The tenant must act accordingly, and not indulge in expenditure from which he cannot benefit during the term. For orcharding standard trees on free stocks, with or without bush fruits between them, a thirty years' lease of good land is absolutely necessary to enable the tenant to derive a fair share of the profit, and even then he cannot benefit to anything like the same extent as the landlord, for when the term expires, the trees, in good fruit years, will yield as much as the land is worth. Ownership is the only condition of safety in orcharding, unless the tenant can command a renewal of the lease upon terms equitable alike to himself and the landlord.

Land for planting with fruit trees on the dwarfing system—apple, cherry, pear, and plum trees in low standard, pyramid, or bush form—should be acquired under a twenty-one years' lease, and the cultures restricted to early and free-bearing varieties. This, or an agreement guaranteeing compensation for improvements, is essential, as the capital laid out is much greater than by either mixed culture or ordinary orcharding. Ground for
bush fruits—currants, gooseberries, and raspberries—ought not to be taken for a less term than fourteen years. For a strawberry plantation a three years' term for light soil, five years for medium, and seven years for heavy land will safeguard the grower.

The conditions sketched may appear more favourable to tenants than to landlords. Such is not the case, for a landlord would secure a higher rental for land on lease for fruit-growing, and have ample security for his rent in the value of the trees, whilst the condition of the land is assured by the manures applied. Persons entering on fruit-growing as an industry must act strictly on sound commercial principles. Occupants of large fruit farms hold them on lease, and the same security must be extended to small holdings before fruit-growing for profit can be considered a safe investment, as it certainly is a source of income to those fortunate enough to obtain plots of good fruit-land at a reasonable rent.
SYSTEMS OF CULTURE—ORCHARDING.

THREE methods of growing hardy fruits for profit are practised in this country:—1, simple orcharding: tall standard trees planted on grass; 2, similar trees planted on tilled ground with bush fruits as an undercrop, the ultimate object being an orchard on grass; 3, cultivated plantations: low standard trees on dwarfing stocks, also pyramid or bush form, in association, or each fruit allotted a portion of ground to itself; no grass.

Simple Orcharding.—This system is the oldest and still has its advocates, but it cannot be recommended to any but those owning land or holding it under long and renewable leases, in favoured situations and naturally good soils. Under these circumstances the fruit grown by cared-for trees is good and the crops often abundant. Each grower claims superiority; the orchardist for fruit grown on grass land, the plantationist for fruit produced on cultivated land. Orcharding suits the farmer, as it entails the least first cost and subsequent maintenance; while grass land has special attractions for poultry, the orchard being also useful for pigs, sheep (at lambing time) and young cattle; the grassy bed is, moreover, favourable for wind-fallen fruit.

The formation of an orchard of mixed fruits for home use or market having received attention in Vol. I. (pages 82—90), with a plan (Fig. 14, page 89), showing arrangement: also planting, pruning, and staking being illustrated (Fig. 31, page 149), it only remains to treat of orcharding solely for profit. The chief points to be kept in view are appropriate situations and good soil, making sure of tenure by purchase or lease, and proceeding on lines calculated to insure a fair remuneration on the sum originally invested, also in working the concern. If in a tenancy drainage, fencing, preparing the ground, purchasing trees, planting and protecting them be done by the landlord, he will be justified in advancing the agricultural rent 6 per cent., and letting it on a fourteen years' lease; at the expiration of the lease it may be equitably renewed for another fourteen or twenty-one years at a further advance of 6 per cent. on the rental. If the landlord foreclose at any time within the first term, or at the end of it, the tenant should be entitled to compensation for the full term (fourteen years) at the rate of 12 per cent. Simple conditions of this character are better for landlord and tenant than the quibbling and
expenses attending valuation for unexhausted improvements. In making agreements it must be remembered that the interest of the tenant in the land exceeds that of the landlord, for the tenant has all risks to bear whilst the landlord is practically secured against loss.

**Draining.**—The necessity or otherwise for this must be determined by the instructions given on page 33, Vol. I., and, if found necessary, be carried out according to the conditions there advised. The expense varies with the nature of the soil and subsoil, distance between the drains, price of pipes, and distance of carriage, the total outlay per acre for draining heavy soils ranging from £5 5s. to £8; medium soils from £4 5s. to £5 10s.; and light soils from £3 5s. to £5 per acre.

**Fencing.**—Quickset hedges are formed by planting strong thorns or quicks 4½ inches apart; price for strong quicks, £1 10s. to £1 15s.; extra strong, £2 to £2 10s. per thousand. The ground for the hedge must be well prepared by trenching and levelling, this costing about 3d. per yard run. Forming a bank for the quicks, including ditch, costs about 6d. per yard run. Guard fences for quickset: 2 oak cleft rails with posts 9 feet apart, and a stake between, 4s. per rod; 3 oak rails, 6s. per rod; 3 oak rails and extra stout posts, 9s. per rod. Birds, insects, and fungi are encouraged by thorn hedges, which also abstract nourishment from the soil to a distance corresponding to their height. Pale fencing is durable and requires no attention; cleft oak pales, with 2 arris rails and oak posts 9 feet apart, fixed complete, per rod, 4 feet high, £1 17s.; 5 feet, £2 6s.; 6 feet, with 3 arris rails, £2 10s. Barbed wire is employed in legitimate positions.

**Preparing for Planting.**—Correct methods for this are given under Orchards, Vol. I., pages 82—90. Planting in grass land is often contracted for, and varies according to the size of the excavations and nature of the ground, as well as the rate of wages in different parts. In friable soils and for small trees the holes are frequently only 2 or 3 feet over, about 1½ to 2 feet deep, and the bottom broken with a pick or mattock; for good planting, the holes should be at least 3½ feet in diameter, even where the soil is of a free nature, and not less than 6 feet across where the medium is close and stiff. The preparation of the stations is important and must be well done (see page 85, Vol. I.). It is false economy to make the holes so small that a cut with the spade has to be made to receive the roots extending beyond the excavations. The total cost of holing, planting, staking, protecting, and manure for mulching over the roots is per acre:—Small holes and mellow soil, £4; medium-sized holes and friable loam, £6; large holes and
stubborn soil, £8. The respective sums have reference to apple trees planted 24 feet apart = 75 per acre.

If the land to be employed for an orchard be in "seeds" or clover ley, or following a cereal crop, it should be well broken up and pulverised to an even depth. This may be effected by trenching two spits deep where the soil is good to that depth, or by double digging where the second spit of soil is much poorer and more stubborn than the top, for in this case the bottom spit should be merely turned over in its position, and the top spit turned over on it. Trenching or double digging adverse soils costs, per rod: Light soils, from 10d. to 1s.; medium soils, from 1s. to 1s. 3d.; heavy soils, from 1s. 3d. to 1s. 6d. Trenching strong gravelly loam, two spits deep, and loosening the bottom 10 to 12 inches deep with a fork or pick, ¾d. to 1d. per square yard. General trenching in favourable fruit soils costs ½d. per square yard = £10 1s. 8d. per acre; in heavy soil, ¾d. per square yard = £15 2s. 6d.; extra preparation by trenching 2 feet deep, loosening the bottom to a depth of 12 inches, and forming a level or even-inclining surface, 1d. per square yard = £20 3s. 4d. an acre.

Turning a deep furrow by an ordinary plough costs 10s. to 15s. or £1 per acre; followed along each furrow by a subsoil plough cost 15s. per acre; total expense of preparing the land by subsoiling, £1 5s. to £1 10s. per acre. Breaking up land with the steam cultivator, passed twice through it in opposite directions to a depth of 15 to 18 inches, costs £1 5s. to £1 10s. per acre.

The object of trenching, double digging, subsoiling, and steam cultivating land is to secure an open condition to allow the free filtration of water through the soil, followed by air with all its beneficial effects. Harrowing is necessary after subsoiling and steam cultivating to produce a level surface. A dressing of manure may also be required, say 20 tons per acre. When adequately manured and a root crop taken, the land is left in good condition for planting. Otherwise a moderate amount of manure may be thoroughly mixed with the soil, then after just covering the roots of the tree in planting, apply a thin layer of manure, and fill in with the remaining soil. The land may be cultivated beneficially for five years, not interfering with the roots of the trees, then be sown with grass seeds for permanent pasture, cost: £1 5s. to £1 10s. per acre. (See page 87, Vol. I.)

Instructions on planting, pruning, and staking will be found on pages 147—153, with illustrations, Fig. 31, page 149, Vol. I. Staking is important; putting the stakes to the young trees at once and protecting them with straw or sacking from injury by the
ligatures tied round them. These require to be examined at midsummer and in the autumn, to see that they are not too tight. Protection from sheep, hares, and rabbits is afforded by placing galvanised wire netting, $1\frac{1}{4}$-inch mesh, 4 feet high and 8 inches in diameter, close round the trees at a cost of about 1s. each. Thorn or briar boughs thrust into the ground and securely fastened around each tree, form a cheap protection against sheep and calves. Hares and rabbits will not touch the trees if the stems are coated with Tree Protective Composition (Dickson's Chester). Where cattle and horses are grazed a fence around each tree is imperative. It may be formed in two ways:—1, setting larch posts to form a square, then nailing "slats" of split fence-rails horizontally, close enough at the lower part to exclude sheep and, higher up, the heads of cattle or horses; 2, driving 7-feet lengths of split fence rails, about 2 inches in thickness, into the ground, that part creosoted, and fastening them at the top with braces. The protecting fences (Fig. 63) should be 5 feet high, and fixed about 3 feet from the tree.

The remarks in respect of preparing the land, planting, staking, and protecting apply to all kinds of standard fruit trees for orcharding; differing, however, in certain particulars. Remarks on each fruit as regards soil, cost of trees, expense of maintenance, and certain returns in produce or profit, are subjoined.

*Apples.*—Standard apple trees require a good loamy medium and a deep subsoil. They do not thrive upon land a few inches deep even of fairly-good soil resting on chalk, gravel, sand, or stubborn clay. The trees should be on stocks raised from pips of apple
trees, or on crab stocks. Crabs are the hardiest and best stocks for orchard trees. At
four to six years old from the bud or graft the trees are fit for planting. They should
have straight, stout, clear stems, 6 to 6\(\frac{1}{2}\) feet from the ground to the commencement
of the head. This applies to all standard trees for orcharding. Standard apple trees,
rangefrompricefrom1s. to 2s. 6d. each. Stout, but not gross, trees with well-formed
heads are the best, and can be purchased at 1s. 6d. to 2s. each, 15s. to 21s. per
dozen, £5 to £7 10s. per hundred. The distances they should be planted apart depends
upon the variety and soil, and are given on page 336, Vol. I. In particularly favourable
soils 3 feet more distance should be allowed for the “small growers”; 6 feet for the
“medium” and “large growers.” Good varieties for marketing purposes are:

For planting at 18 feet apart = 134 trees per acre: dessert—Beauty of Bath,
Devonshire Quarrenden, Benoni, Cox’s Orange Pippin, Baumann’s Red Winter
Reinette, and Braddock’s Nonpareil; dessert or culinary—Duchess of Oldenburg, Dutch
Mignonne, and Lemon Pippin; culinary—Domino, Potts’ Seedling, Stirling Castle,
Yorkshire Beauty, Winter Hawthornden, Betty Geeson, and Lane’s Prince Albert.

For planting at 24 feet apart = 75 trees per acre: dessert—Devonshire Quarrenden,
Benoni, King of the Pippins, Cox’s Orange Pippin, Brownlees’s Russet, and Scarlet
Nonpareil; dessert or culinary—Worcester Pearsmain, Beauty of Hants, and Cox’s
Pomona; culinary— Keswick Codlin, Warner’s King, Grenadier, Lord Derby, Bismarek,
Sandringham, Lane’s Prince Albert, Alfriston, Newton Wonder and Dumelow’s Seedling.

For planting 30 feet apart = 48 trees per acre, if good pasture is desired: dessert—
King of the Pippins, Cox’s Orange Pippin, and Golden Russet; dessert or culinary—
Gascoigne’s Seedling, Blenheim Orange, and Hormead Pearsmain; culinary—Lord
Grosvenor, Warner’s King, Tower of Glamis, Bedfordshire Foundling, Golden Noble,
Tyler’s Kernel, Mère de Ménage, and Bramley’s Seedling.

A dozen good varieties for general orcharding are:—Lord Grosvenor, Duchess of
Oldenburg, Worcester Pearsmain, Warner’s King, King of the Pippins, Gascoigne’s
Seedling, Cox’s Orange Pippin, Blenheim Orange, Beauty of Kent, Lane’s Prince
Albert, Newton Wonder, and Bramley’s Seedling.

The average expense of forming an acre of apple-orchard in grass is—including 75
trees at 1s. 6d. each (£5 12s. 6d.), holing, manuring, planting, staking, and bush pro-
tecting (£5 18s. 6d.)=£11 11s. Trees and labour only:—Lowest—75 trees at 1s. =
£3 15s., planting and staking 75 trees at 7\(\frac{1}{2}\)d. = £2 6s. 10\(\frac{1}{2}\)d., total £6 1s. 10\(\frac{1}{2}\)d.; medium
—75 trees at 1s. 6d. = £5 12s. 6d., planting and staking 75 trees at 9d. = £2 16s. 3d.,
total £8 8s. 9d.; highest—75 trees at 2s. = £7 10s., planting and staking 75 trees at 1s. = £3 15s., total £11 5s. The lowest price is for small trees and 3-feet holes; medium for good trees and 4½-feet holes, and the highest for strong picked trees, 6-feet diameter holes, and double staking. Draining, subsoiling, and manuring costs about £10 per acre, and the total expense of forming an apple-orchard, on the most approved agricultural principles, ranges from £15 to £21 per acre.

In some cases the orchard is formed of apple and plum trees at equal distances apart—17 feet = 150 trees per acre; and the cost of manuring, ploughing, subsoiling, harrowing, trees, planting and staking amounts to £21 per acre. The trees are set in squares, apples and plums alternately in the row, and in the alternate rows the plums are placed opposite the apples in the adjoining rows. By this plan the returns are increased during the early part of the bearing period, the ground being cultivated for the first five years, then laid down in grass, and at fourteen years from planting the produce of the whole has realised £40 per acre. The plums are ultimately removed and the apple trees left 34 feet apart—not too great distance for strong-growing kinds, such as the Blenheim Orange, Newton Wonder, and Bramley’s Seedling—in good deep soils. Large trees at the distance named bear heavily at thirty to forty-five years from planting, sometimes producing 10 bushels of good fruit per tree = 370 bushels per acre, and have fetched 3s. 6d. per bushel, packed in buyers’ baskets and put on rails = £64 15s. A tree at Faversham, in Kent, produced 60 bushels of apples in 1893.

Standard apple trees on grass produce little fruit until the fifth season, and, as a rule, do not prove remunerative before the seventh year. Blenheim Orange requires ten to twelve years to arrive at profitable bearing. The direct loss of herbage is recouped by the fruit produced up to the seventh year, and the value of the grass about equals the rent of the land during the seven years. The cost of pruning, protecting the stems, adjusting the ties, and sticky banding, amounts to about £1 10s. a year = £10 10s. an acre; this, added to the cost of forming an apple-orchard of 75 trees, £11 11s., amounts to £22 1s., the total outlay up to the commencement of the remunerative returns.

The value of the crop in the eighth year, season being favourable, is 2s. 6d. per tree = £9 7s. 6d.; tenth year, 5s. = £18 15s.; and in the fourteenth year, 7s. 6d. to 10s. = £28 2s. 6d. to £37 10s. per acre. If the site, soil, and varieties have been well chosen, and the cultivation good, the orchard will consist of 75 thriving trees per acre, each producing, in the fifteenth year from planting, 2½ bushels of good fruit =
168\frac{3}{4} bushels per acre. The average value of this quantity of first-class apples disposed off direct to consumers is, per bushel: Kitchen, 3s. 6d. = £29 10s. 7\frac{1}{4}d.; cooking or table, 4s. 6d. = £37 19s. 4\frac{1}{4}d.; dessert, 6s. = £50 12s. 6d.; mean of gross returns, = £39 7s. 6d. per acre. Expenditure: pruning, sticky banding, and spraying trees, £3 15s.; gathering, storing, packing, and delivering fruit in grower’s baskets, £8 15s.; rent, £4; tithe and rates, £1 5s.; interest (5 per cent. on outlay up to period of profitable bearing, and constituting a vested interest in the land of £22 1s.) £1 1s. = £18 16s. This, deducted from the gross returns, shows a profit of £20 11s. 6d. per acre for apples sold locally by a cottager, small holder, or farmer.

When the apples are sold and delivered to fruiterers in the growers’ baskets, the prices average, per bushel: kitchen, 2s. 6d. = £21 1s. 10\frac{1}{4}d.; culinary or dessert, 3s. 6d. = £29 10s. 7\frac{1}{4}d. per acre. Expenditure (as above), £18 16s. = £10 14s. 7\frac{1}{4}d. profit per acre. The expenses allow for delivery to from 4 to 7 miles from the place of production; if within 3 miles, add £1 10s. to the profit per acre.

Sending produce packed in salesmen’s baskets by road, water, or railway, has a varying result. Taking an average and transmitting by railway a distance of 50 to 100 miles, the returns (clear of railway, market, and salesman’s charges) are, per bushel: Kitchen, 2s. = £16 17s. 6d.; cooking or eating, 3s. = £25 6s. 3d.; dessert, 4s. = £33 15s.; mean of gross returns, £25 6s. 3d. per acre. Expenditure, as before, less £1 10s. for baskets = £17 6s.; and the profit is £8 0s. 3d. per acre.

The rent, tithe and rates, cost of production and marketing in the cases cited are on the highest scale, and are necessary to secure the best returns, for low rents and outgoings signify indifferent land, and the returns are extremely variable. Nevertheless, fairly good profit is derived from land rented at £2 (including outgoings) per acre, planted with useful varieties of apple trees on grass, and left (beyond protection) to take care of themselves. Such trees in the fifteenth year have produced the quantity of apples before named—75 trees, 2\frac{1}{4} bushels each = 168\frac{3}{4} bushels per acre; and been gathered, packed in salesman’s baskets, and delivered on rail at a distance of 7 miles at a cost of £6 15s. (no-purpose journeys being made and only delays allowed for, as other goods were laden with on the return journeys). Sent 150 miles by rail, delivered in the market, sold by salesman, and after paying all charges for transit, toll and commission (this being done by the salesman), the returns averaged, per bushel: Kitchen, 1s. 6d. = £12 13s. 1\frac{1}{4}d.; cooking or eating, 2s. 6d. = £21 1s. 10\frac{1}{4}d.; dessert, 3s. 6d. = £29 10s. 7\frac{1}{4}d.; mean, £21 1s. 10\frac{1}{4}d. per acre. Expenditure, £8 15s.; profit,
systems of culture—orcharding—apples.

£12 6s. 10d. per acre. This is given as an example of how the profits to be derived from fruit-growing are sometimes calculated—that is, from the returns, as in this case from a good year, which only occurs, in most instances, every other season; and taking an average, as in the preceding cases, the profit is not more than half = £6 3s. 5½d. per acre, under the most favourable circumstances, and the crop is often seriously prejudiced by insect attacks, so that great risks are run by those planting fruit trees and leaving everything to chance.

From the fifteenth to the thirtieth year the profits accruing from an apple-orchard in grass have been returned at £10—£30 a year per acre. These variable amounts are seldom explained, but they may be accounted for by (1) indifferent land or situation, soft-ruited or inferior varieties = £10; (2) fairly good land and site, serviceable varieties = £20; (3) specially favouring soil and aspect, and choice varieties = £30 per acre.

The actual produce of 75 trees on an acre of good land in grass is 240 bushels per annum between fifteen and thirty years from planting, and sound-keeping apples average 3s. 6d. per bushel = £42 per acre. But the expenditure increases proportionately with the bearing, being one-third more (£1 5s.) for pruning, sticky banding, and spraying; similar addition (£2 18s. 4d.) being made to the gathering, storing, and packing account annually. Manure must also be applied to sustain the trees in profitable bearing, say, the following mixture early in the spring:—Pure dissolved bones (ammonia 2½–3, phosphate 30–35 per cent.), 5 cwt., £1 10s.; kainit (potash 24–26 per cent.), 3 cwt., 6s.; nitrate of soda, 2 cwt., 18s. = £2 14s. Every third year twenty tons of stable or farmyard manure may be required, worth on the ground, £7 10s.; one-third, £2 10s.; collectively = £9 7s. 4d. This, added to the prior full expenditure (£18 16s.) = £28 5s. 4d.; and the net profit is £13 14s. 8d. per acre annually.

Standard apple trees on grass often give much better returns than those furnished in the preceding averages, both before and after thirty years from planting. The yield per acre for full-bearing apple trees is given at six tons for Kent, and the price per ton at £10 = £60 gross return. The period of best production in the apple as a standard in Kent is stated by Mr. Cecil Hooper to be the fifteenth year, 3½ bushels per tree = 240 bushels from 75 trees, and must realise 5s. per bushel to afford a gross return of £60 a year per acre. The best record in the Midlands at that age is £46 13s. 4d. in one year per acre, the purchaser gathering the crop. The trees in question do not attain their best period of production generally until the twenty-fifth year, and under judicious management they will continue to bear profitable crops until the fiftieth year, or longer.
At twenty-five years from planting, a tree here and there may produce eight bushels of fruit in a year = 600 bushels, and be sold at 8s. per bushel = £240 per acre. It must be remembered, however, that profits are not ruled by exceptional crops and prices, but by averages, which are affected by cankered and sparse fruiting trees, as well as the heavy-laden and constant bearing. To act on exceptionally favourable returns is wholly fallacious. The most that can be expected from fruit-growing for profit is fair remuneration; and those investing in standard trees on grass must be prepared to wait patiently for it. The way thereto has been pointed out as clearly as possible for safe guidance, and the experience will be useful in respect to other fruits.

Cherries.—Standard trees succeed well only in some parts of the country, such as in Mid Kent on the Lower Greensand and on the loams, brick-earth, and other débris of the Tertiary series over chalk in East Kent, West Hertfordshire, and Buckinghamshire. Cherry trees also thrive on the flints in the counties of Gloucester and Worcester, as well as in the deep sands of Bedfordshire. A dry subsoil is imperative, and a high or exposed situation essential, for the cherry blossom early in March is liable to suffer from spring frosts. Low sites and heavy clay-soils are unsuitable.

The trees should be on the wild cherry (Cerasus avium) stock, and have stout, clean stems not less than 6 feet in height, and well-formed heads, free from gum. The prices of the trees range from 1s. 6d. each or 15s. per dozen, to 2s. 6d. each or 24s. per dozen, and the highest-priced are usually the best worth the money. They should be planted 30 feet apart = 48 trees per acre, which, at 24s. per dozen = £4 16s. Suitable varieties:—Black—Early Rivers, Werder's Early, Waterloo, Black Eagle, Büttner's Black Heart, and Turkey Black Heart; light or red—Frogmore Early, Elton (does well in heavy soil), Governor Wood, Bigarreau, Bigarreau Napoleon, and Florence; Duke cherries require a warm soil and situation: May Duke, Royal Duke, Archduke, Late Duke; cooking or preserving—Flemish Red, Kentish, and Morello. The Duke and Kentish will be accommodated at 18 to 21 feet apart; Morello at 21 to 24 feet apart. Plums are sometimes planted between the cherry trees, so that the cherries stand 30 feet and the plums 15 feet apart. The ground is cultivated about five years, then sown with grass seeds, or the spaces between the cherry and plum trees may be set with gooseberry and currant bushes, to remain ten years, then be taken out and grass seeds sown. The plum trees may remain about twenty-five years, when the cherry trees will require the whole of the space, as they are then vigorous and productive.

Standard cherry trees require a little pruning the first seven or eight years, but it
must be done carefully and judiciously, preferably in October, with a view to securing well-furnished, evenly-balanced heads, and this without the branches being too close or crossing each other. After the trees are shaped, pruning must be confined to removing cross-growths and irregularities, little being required after the first few years.

About the seventh year from planting the trees will produce fruit ranging in value from 2s. to 5s. per tree up to the tenth year = £4 16s.—£12; average £8 8s. a year per acre. From this, the commencement of remunerative return, the trees increase rapidly in productiveness, and at fifteen to twenty-five years from planting the period of best fruitfulness is reached, when the average price realised for the fruit on the trees is £12 10s.—£15 per acre annually, less 5 per cent. auctioneer's commission. The trees continue profitable for many years after attaining the period of best production, and the average yearly returns are about £30 per acre for thriving cherry orchards. Large orchards—50 to 100 acres—average £15 a year per acre. Choice lots frequently sell for £42, and special lots sometimes reach £80 per acre. These prices are for the crops on the trees, the seller taking the entire proceeds of the sale, less the auctioneer's 5 per cent. commission.

The grower gathering, packing, and sending the cherries to market may receive, in gross returns, about £100 per acre. Mr. Hooper puts the yield per acre in Kent at four tons, and the price per ton (in 1889) at £25 = £100. An acre of 48 thriving trees in full bearing produces about 372 half-sieves of 24 lbs., or 186 sieves of 48 lbs., and the average price per half-sieve is 5s. 4½d., or 10s. 9d. per sieve = £99 19s. 6d. gross returns per acre. The lowest average price for cherries in the London markets, wholesale, in 1898, was 4s. 4d. per half-sieve = £80 12s.; highest average, 10s. 4d. per half-sieve = £192 4s.; and the mean, 7s. 4d. per half-sieve = £136 8s. per acre. These prices are significant, marking the difference in the returns for moderate, good, and first-class fruit; but the bulk of the fruit only realises the lowest and mean prices, for the highest are only obtained for choice and comparatively few samples. It is safe, however, to take the average of the lowest and mean prices = £103 10s. per acre, not being guided by extreme crops and prices, for trees producing 16½ sieves each = 6 cwt. 20 lbs., or 792 sieves = 16 tons 19 cwt. 1 qr. 20 lbs. per acre are very exceptional, as also are prices ranging from 7s. to 15s. per half-sieve, mean 11s. = £204 12s. per acre, for when these prices are secured the trees do not carry more than half a crop, 98 sieves = £102 6s. per acre.

The clear profit, when the grower bears all the expenses of gathering, packing, and
marketing, is variously estimated. Some set it at £30, others at £40, and a few at £60 per acre. In such cases of divergence it is wiser to take the mean of the first two = £35, than of the whole = £43 6s. 8d. It is easy, however, to account for the difference in the results through situation, soil, varieties, and management. Where the orchard grass is eaten off by lean, unfed sheep, the returns cannot possibly be so good as where the sheep are fed with cake or corn, nor where the orchard receives 30 or 40 tons of stable or farmyard manure, in addition to eating the grass off by cake-fed sheep and occasional applications of chemical manure. This liberal attention costs about £10 per annum, and is returned with interest in mutton and cherries, some estimating the grass equal in value to the rent, but that is a fruit-grower's not a farmer's view; therefore, putting the expenditure for all purposes at £25 per annum, and the gross returns at £49 19s. 9d. (half a full crop at mean average gross returns in good years to allow for bad seasons and losses), the clear profit is £24 19s. 9d. a year per acre = 50 per cent. interest on capital and cost of production.

The illustration, Fig. 64, represents a cherry tree in blossom, from a photograph supplied by Mr. Walter Kruse, Leeds, near Maidstone, who gives the following dimensions of the tree: Diameter of head, 55 feet; circumference of trunk near the
ground, 7 1/2 feet; just below the graft, 6 feet; round the swelling where it has overgrown the stock, 12 1/4 feet. The stock is the wild cherry, the bearing variety, the Black Heart. A hundred flowers have been counted in one bunch. The last crop was 7 half-sieves of 24 lbs., value home, £1 1s. 6d. Since then the tree has been shattered by lightning. A more gigantic old tree in the orchard of Mr. A. J. Thomas, Rodmersham, Kent, once gave as its heaviest crop half a ton of fruit.

Pears.—Standard trees on pear stocks with clean stems 6 feet in height are suitable for planting on grass, and are largely cultivated in East Kent, also in the counties of Gloucester, Hereford, and Worcester. They are somewhat extensively grown in Hertfordshire, and flourishing trees may often be seen in various parts of the country where apple trees are complete wrecks through age or poorness of soil, for the pear is longer-lived and thrives in light soils over gravel, preferring sand to calcareous matter. It does well, however, on calcareous gravel in Hertfordshire where the chalk is several feet from the surface, on oolite where the soil is sandy or gravelly and deep, and on light soils where water does not lodge within several feet of the surface.

Crawford, Lammas, Caillot Rosat, Jargonelle, Williams' Bon Chrétien, Hessle, Beurré d'Amanlis, Eyewood, Beurré de Capiaumont, Fertility, Louise Bonne of Jersey, Bishop's Thumb, Althorp Crasanne, and Swan's Egg, are useful table varieties; Catillac and Verulam for stewing. (See page 124.)

The trees being more or less upright or pyramidal in habit may be planted a little closer than apple trees, but the better plan is to place the pear trees 30 to 36 feet apart, and plant plum or damson trees between them, then at twenty to twenty-five years from forming the orchard, the plum or damson trees should be removed, leaving the pears in good profit, with the sun shining on the ground between them, and the grass consequently far better for grazing as in parks.

Pear trees require similar treatment to apple trees, and are later in coming to remunerative bearing. This is not reached until the fifteenth year, and the period of best production until the twenty-fifth to the thirtieth season from planting. The crops are less certain than those of apples, through pear trees blossoming early and being liable to suffer from spring frosts. Large trees of Lammas, Hessle, Fertility, and other free-bearing varieties sometimes produce enormous crops—10 to 20 bushels per tree, and bring £1 10s.—£3 per tree = £72 per acre for 48 trees at £1 10s. per tree Such crops and prices are exceptional. The gross returns in the best years reach an average of 20 half-sieves per tree = £84 at 1s. 9d. per half-sieve—the actual gross return from
a Covent Garden salesman, the fruit sent by railway a distance of 52 miles. But this only occurs once in three years, and the mean average gross return is £28 a year per acre. Sometimes a grower realises a large sum for a particular tree carrying a heavy crop of fine fruit, chronicles it, and thereupon calculations are made by optimists or sensationalists. Such records are, if interesting, certainly misleading, and the reason there is no counteracting statement of failures is suggestive of the special pleader—land to sell or let or trees for disposal. A widow woman cleared £3 a year every other year for the produce of a Hessle pear tree, and a gardener sold £3 15s.-worth of Windsor pears from one tree in a season. Such records require discounting 75 per cent. for safe guidance in cultures by the acre and for an average of seasons.

Taking an average of the production of the trees from the periods of remunerative bearing to the best production—80 bushels = £18 gross returns annually per acre—orchard pear-growing is not favourable for those having to send the fruit over 50 miles to market. Mr. Hooper records a better average for Kent—placing the commencement of remunerative return in the twelfth and period of best production in the twentieth year, the yield per acre at 2 tons, and the price at £10 per ton = £20 gross returns per annum. Orchard pear trees, however, wax in productiveness with age, and the heirs of the planters certainly find the trees healthier and more profitable than apple trees of the same age, some, perhaps, producing 25 bushels each in a season. With plum or damson trees between the pears the returns are much better in a quarter of a century from planting, and afterwards the profits will surpass those of apple trees on a similar soil, for pear trees are to gravelly and sandy soils what the cherry trees are to deep calcareous gravels—long-lived, healthy, and in favourable seasons enormously productive.

*Plums and Damsons.*—These succeed almost everywhere and in nearly every soil. The commoner varieties both of plums and damsons do well in garden or orchard fences, and may be planted in hedges near farm and other homesteads. They form capital screens and are advised for shelter. (See Orchard, Vol. I., page 89.) The following varieties—the Czar, Sultan, Belgian Purple, Gisborne’s, Pershore, Jefferson, Mitchelson’s, Victoria, Prince Engelbert, Diamond, Pond’s Seedling, Bush, Monarch, and Archduke plums are suitable for orchards. Early Rivers and Wyedale—the earliest and latest best plums—are dwarf growers; Winesour forms a large tree and succeeds on the limestone. The best damsons are Farleigh or Crittenden, Shropshire or Prune, and
At per In 104 13 height. 4s. good Such but the o Good 52 10s. needed, gross shallower The oes, and the root ed fruits, like shoots, and trees shoots, like for and soils, early or about yields, must have due consideration in fruit-growing for profit, but good well-rooted trees are essential, and in the end the most economical. The trees should not be deeply planted. Only the damsons and small-fruited plums must be employed for shelter, as the branches of many plums are brittle and liable to break when laden with fruit in situations much exposed to the wind.

Greengages are sometimes planted in orchards on grass, and do well in good soils and favourable situations, such as at Mentmore. Denniston's Superb, Green Gage or Reine Claude, and Reine Claude de Bavay are good varieties.

Standard plum and damson trees do not require much pruning. Strong leading shoots must be shortened to ensure a well-furnished head, and the growths judiciously thinned to prevent crowding or the shoots crossing each other. A too free use of the knife results in sappy growths, and tends to gumming and decay in the branches. The trees should be attended to early in July for the removal of crossing and superfluous shoots, and the pruning completed early in October. This will only be required for a few years to keep the centre clear and secure an open, evenly-balanced tree, not mopp-like by a multiplicity of twigs, nor straggling through neglect of pruning. After the heads are formed very little pruning is needed, but they must be cleared of dead twigs and spurs, keeping the growths sufficiently thin to allow free access of sunshine and air for ripening the crops and wood.

Plum trees commence bearing profitably in five to seven years, and damsons at five or six years from planting; but allowance must be made for the difference in soil and early fruiting proclivities of the different varieties. Strong growing varieties in rich soils afford little fruit until the tenth year. At this age the produce of the orchard is about 65 bushels per acre = £13 nett. In the fifteenth to twentieth year the trees attain the period of best production, the yield occasionally reaching 261 bushels (about 60 lbs. each), and brings in gross return 8s. per bushel = £104 8s. per acre. Such returns are, however, very exceptional. In ordinary seasons and on an average the crop rarely exceeds 261 bushels and the return nett 4s. per bushel = £52 4s. per acre.
Deducting all expenses, interest on capital, rent, tithe, rates, and working, the clear profit averages £20—£30 per acre for trees in full bearing. This lasts from the fifteenth to the thirtieth year, for plum trees do not continue profitable nearly so long as those of the apple, cherry, and pear, hence plums are frequently put between them and removed when the permanent trees become large. This is necessary when the land is held on a long lease, but for standard plum trees on grass, a thirty years' lease will secure the tenant against loss.

Very high prices are obtained for plums at times, £28—£38 per ton, and then the crop is scarce in most districts, but the fruits large. Quoting high figures and ignoring low is quite misleading, for very high prices only occur about every fifth year. Plum trees occasionally bear enormous crops, "glutting" the markets, the fruit scarcely paying the growers who have a good business connection, while those relying on local demands or sending erratically to market derive no profit, but incur loss in gathering and other expenses. In 1893, the average lowest price for plums was 3s. per bushel (sieve), and the highest 6s., mean average 4s. 6d. per bushel = £8 8s. per ton; but there is far more fruit sold at the lowest and mean than at the highest average prices, therefore it is safest to take the average of the first two—4s. per bushel = £7 9s. 4d. per ton = £52 4s. per acre. Some growers, however, averaged 5s. per bushel = £65 5s. per acre, and made from £20—£30 per acre profit.

Damsons usually sell well at prices ranging from 6s.—10s. per bushel, and in years of scarcity they bring double these prices. Damson trees, however, are more certain croppers than plums, consequently give a heavier yearly return, and average about 3s. 6d.—4s. 6d. per bushel nett = £52 4s. per acre. In 1893, damsons only realised 3s.—5s. per bushel, and profits were considerably lessened through the earliness and shortness of the damson season. The yearly return for an acre of thriving trees in full profit ranges from £21—£35 clear of expenses.

The whole of the returns relating to the several orchard fruits are based on the trees at the best period of production, and on the principle of their being of the most suitable marketing varieties, planted in favourable situations and soils, and from first to last accorded judicious and intelligent culture. Of the value of ordinary farm orchards we have no evidence. Few farmers keep account of such "trifles" as fruit, if they did they would find that most of the scraggy apologies for orchards are mere wasters of grass by the trees that cumber it, while the fruit is scarcely worth gathering. The farmers' salvation in whatever he grows rests in high cultivation, the greatest bulk of the
best produce, and unless those desirous of engaging in fruit growing for profit are able and willing to act on that principle, it would be wisest to have nothing to do with it, but go on struggling with adversity to the end.

Taking the whole life of the fruits, from planting the trees to the cessation of useful production, the profits are not more than to warrant a safe investment of capital, and afford a fair living by hard working, and something for old age. Fortunes accrue only to the few growers possessed of energy, enterprise and business aptitude in a superior degree, others secure a fair livelihood, while several fail. So is it with the trees, some prove thrifty and profitable where others become wasted by "canker" or "gum"; many bear profusely for a time, but cease to be profitable when others are remunerative and will afford good returns for many years. The precocious varieties are not nearly so long-lived as those slow in arriving at a profitable bearing state. The first are more fitted for cultivated plantations than orchards on grass, and have been disregarded in the following approximate estimate of the periods of remunerative bearing and the yearly values from planting the trees to their ceasing to be profitable: — Apples, 40—60 years, profit £10—£20; cherries, 60—75 years, profit £15—£30; pears, 75—100 years, profit £10—£20; plums, 30—40 years, profit £15—£30 per acre. These estimates, based on the doings of trees in favourable situations and soils, also subject to 25 per cent. discount, to allow for losses from spring frosts and invasions of fungi and insects, are fairly representative of the best British orchards.
FRUIT PLANTATIONS.

The time elapsing before substantial return is made by standard trees of tardy bearing, the inadequacy of the supply of fruit of home growth for the demand of British markets, and the depressed state of agriculture, have given an impetus to the cultivation of fruit trees calculated to afford early and heavy crops. This implies the growing of apples (cherries are only partially amenable), pears, and plums in low standard, pyramid, and bush form, with the selection of early, free, and constant bearing varieties. The estimates of profit to be derived from this system are extended from the yield of a few trees to several acres, and made to show returns of £50—£120 a year per acre. Major Hambling, of Dunstable, grew 50 bushels of apples on 10 poles of calcareous soil in 1893 = 800 bushels per acre, which at 2s. 6d. per bushel = £100. A plantation of dwarf pear trees at ten years old gave a return of £120 per acre. An acre of Early Rivers' plum is credited with a return of £200 in one year. Fruit crops of exceptional bulk and value are highly worthy of record as showing what can be accomplished under specially favourable circumstances by the exercise of high cultural skill, but they are very far from being representative of what can be attained by the great majority of cultivators.

In the plantation method of growing fruit low standards are employed instead of tall ones as in orchards. This is an immense advantage in most situations through the lessened danger of damage from wind. Moreover, the trees being of compact growth and quick bearers, they can be planted closer, early and heavy yields being obtained. The fruit is also of finer quality from superior cultivation, while the operations of spraying, pruning, thinning, and gathering the crops are greatly facilitated. Bush fruits are often grown between the lines of the large trees, for the utilisation of all the ground, and afford good returns for a time, or until the permanent trees enlarge, the bushes then ceasing to bear profitably. From the third year the plantation affords good returns, both from the low standards and bushes; the first commencing to bear profitably in the fifth season after planting, and reach their period of best production from the tenth to the fifteenth year. This period endures for a similar length of time, though there
Fig. 65. Plan of Fruit Plantation. (Scale 1 inch = 108 feet.)

References:—A, standard trees (o) in "opposite vacancy" order, 18 feet apart, with currants, gooseberries, or raspberries (.) between the rows, 6 feet apart. B, low standard apple, cherry, pear, or plum trees (o) in squares, 12 feet asunder, with currant or gooseberry bushes (.) between the rows, 6 feet apart. C, large pyramid or bush trees (+) in "opposite vacancy" order, 18 feet apart; compact early-bearing trees (.). D, pyramid or bush trees (.) at 6 feet apart; every alternate tree and row temporary. E, red currant bushes (.) in squares, 6 feet asunder. F, gooseberry bushes in "opposite vacancy" order, 6 feet apart. G, black currant bushes (.) in squares, 6 feet asunder. H—I, damson trees (o) next the fence, 18 feet apart, with temporary ones (not shown) between I—J, damson or hardy plum trees (.), 18 feet apart, with temporary ones between if the plantation consists of dwarf trees in A and B, not otherwise. H—J, compact-growing plum trees (.), 18 feet apart, with temporary ones between, if exposed on the south side, but not adjoining a road and standard trees are not planted in A. The shaded part, roads or avenues.
are many exceptions. Some trees do not make good progress through canker or gumming, while the enormous bearing of others in their early years causes their speedy collapse, as compared with less precocious sorts of hardier constitution. The plantation system also applies to fruit trees in pyramid or bush form; in fact, it is a general term signifying any fruit in cultivated ground, examples of which are shown in the plan (Fig. 65) of a plantation of about 10 acres.

In laying out a fruit plantation sufficient distance should be left between the trees and fence to allow a conveyance to pass along without coming in contact with the trees when full grown. Parallel avenues should also run through the plantation, if large, dividing it into convenient plots. This can be done by leaving out one row of trees in the case of standards, or such number in other cases as will allow a team of horses to pass along and turn at the ends. Manure can then be readily applied, fruit collected and placed on conveyances, either on the avenues or along the line of the fence, without carrying by hand an inconvenient distance.

The drainage of the land, preparation of the ground, and planting the trees are practically the same as advised for orchards and gardens; and the particular requirements of each fruit in respect of situation, soil, manures, pruning, and general management having been treated, it is only necessary to refer to the several kinds for marketing purposes to enable intending growers to acquire information that may be of service.

Apples.—Standard trees are sometimes 20 feet apart = 108 per acre, cost 1s. 3d. each = £6 15s., with currant or gooseberry trees 5 feet apart each way = 1,634 per acre, cost 12s. 6d. per hundred = £10 4s. 3d., total cost of trees = £16 19s. 3d. per acre; planting, staking, trimming, and manuring = £9 0s. 9d., = £26 for trees and planting per acre. In three years from planting the trees commence bearing, and increase in value yearly, so that the return for fruit sold in the seventh year may reach £40 per acre. Deduct from that amount £15 for expenses of cultivation and marketing the fruit £2 11s., also 5 per cent. interest on capital (£5 in draining, £20 trenching, £26 in trees and planting = £51), and rent, tithe, and rates £5 5s. = £22 16s., and the clear profit is £17 4s. per annum. This average will be sustained, for when the bushes are no longer serviceable the permanent trees will have increased in size and profit. When the bushes are removed the open spaces can be utilised for various crops—bulbous and other flowering plants; but this is alien to fruit-growing, as also is the taking of onion and other crops between the rows of trees during the first and second years of the plantation, though some growers, not all, find the association profitable.
Plantations are frequently formed of low or half-standard trees, grafted on the Paradise or Nonesuch stocks, which promote early bearing. These stocks are worked near the ground, the scions are allowed to grow with a single stem to the height required, then topped to form the heads of the trees (see "Low Standard," Figs. 15 and 16, pages 26—28, Vol. II.). The price of this form of tree of a size fit for planting ranges from £4 to £7 10s. per hundred, but many large growers prefer two-year "feathered" trees—unpruned of that age from the graft; these are shortened, the side growths tipped or removed at the lower part, leaving the upper two or three for forming the head (Fig. 66, K—M).

By shortening the side growths not required to form branches instead of cutting them off closely, fruiting spurs form along the stems and produce useful fruit, as shown in N. These stem spurs may remain until the head of the tree is well formed and commences bearing freely, and then be gradually removed. Two years feathered trees cost £3 15s. to £6 per hundred, the price varying according to variety and character; the best feathered trees are nearly as costly as half-standards. Either may be planted 12 feet apart = 302 trees per acre, average cost half-standards = £17 17s., feathered = £15 12s. 6d. per acre. Between the trees and rows currant or gooseberry trees are
planted 6 feet apart = 908 per acre, price strong, £1 5s. per hundred = £11 7s.; good, for planting with smaller apple trees, 12s. 6d. per hundred = £5 13s. 6d.; total cost of trees, £29 4s. and £21 6s. respectively per acre. These added to the cost of draining, trenching, planting the trees and manuring = £35, amount to £64 4s. and £56 4s. per acre respectively, and represent the expenditure of forming a plantation of half-standard apple trees in the most approved manner.

The trees and bushes of a profitable size when planted come into profit in the second year, poor trees and bushes in the third or fourth, and about pay expenses in the first year of bearing. From this, if due regard is given to thinning the fruit, so as to have it fine and prevent stunting the trees by overbearing, the crops will increase annually, reaching £60 for fruit sold about the seventh year. This sum will continue to be realised annually for a number of years, for when the bush fruits fail the apple trees will be at best period of production. If £25—expenses of cultivation, rent, tithe, rates, and interest on capital—is deducted from the return for fruit sold, a clear yearly profit of £35 is shown. This is not reliable, for the crops of fruit vary according to seasons, and are not full oftener than once in three years, and about 25 per cent. off the profit of the best seasons ought to be set aside to meet the deficiencies of bad years.

Bushes and pyramids are fashionable. Their advantages are: (1), the trees come quickly into bearing, as they produce fruit the second year from planting; (2), they may be set closely; (3), the fruit is finer and the trees well under the control of the cultivator for applying the preventive and remedial measures against fungal and insect attacks; also for facilitating cultural operations. Its defects are: (1), the trees seldom sustain in their late years the prospect they give at the commencement of bearing; (2), after the best period of production is reached the trees bear indifferently at the lower part or near the ground; (3), the blossoms are more liable to injury from spring frosts than those of standard trees. This method of culture is, as a rule, best suited to gardens or sheltered plantations. The trees should be on the English or Nonesuch Paradise stocks.

Varieties to sell direct from the tree: Dessert.—Mr. Gladstone, Devonshire Quarrenden, Duchess of Oldenburg, Yellow Ingestrie, Lord Lennox, and Worcester Pearmain. Kitchen.—Improved Keswick Codlin, Lord Grosvenor, Potts' Seedling, Yorkshire Beauty, Stirling Castle, Grenadier, Manks Codlin, and Warner's King.

For storing:—Dessert.—King of the Pippins, Beauty of Hants, Cox's Orange Pippin, Wyken Pippin, Baumann's Reinette, Court Pendu Plat, and Sturmer Pippin; Kitchen.—New Hawthorden, Small's Admirable, Queen Caroline, Lord Derby, Bismarck, New
Northern Greening, Lane's Prince Albert, Newton Wonder, Dumelow's Seedling, and Bramley's Seedling.

The trees should be planted 6 feet apart—the permanent ones at 12 feet, with early bearing varieties between the trees and rows = 1,210 per acre, price 1s. 6d. to 2s. 6d. each; bearing trees £6 per hundred = £72 12s. per acre. Bearing trees are cheaper than maidens, as they are formed and come into profit in the second year. Cost of draining and preparing the ground, manuring and planting the trees, £35—total expense of forming a plantation of bush or pyramid apple trees, £107 12s. per acre.

The most useful form of tree is the Open Bush (page 14, Vol. II.), the management of which is given on page 15, Vol. II., and is the shape advised for trees of upright growth and popularly termed pyramids. The Cup-shaped Bush is shown on page 179, and Fork-branched on page 181, both Vol. I., but in most cases little regard is had to shaping the trees, the maiden tree being usually cut down to a foot from the ground or even less, and the branches are therefore close to the ground, which impedes manuring and cleaning. (See Fig. 67.)

The trees ought to have 12 to 18-inch stems, be cut to form any of the above shapes, and after that be allowed to grow freely, merely shortening the tips of the shoots to
secure evenly balanced heads, and taking out any crossing growths. When the trees produce a crop, mulching may be carried out in June, the fruit thinned in due course, and liquid manure applied for swelling the fruit. Manuring is best done in the winter. Farmyard manure, rags, fur-waste, shoddy and fish manure are used for plantations. Superphosphate of lime, kainit and nitrate of soda may also be used with advantage as supplementary of the solid manures.

In seven years the return for fruit sold may reach £60 per acre, and double this amount in another seven years; but everything depends on the situation, soil, season, culture, and progress of the trees, such varieties as Cox's Orange Pippin and Baumann's Reinette having occasionally brought £120 per acre. When the temporary trees are encroached on by the permanent ones, they must be removed to other ground, and if carefully lifted they will transplant safely in the autumn with a partial loss of crop for one year, an abundant yield following if the season be favourable.

Allusion may be made to planting trees at 18 feet apart of large growing varieties, such as Lord Grosvenor, Blenheim Pippin, Tyler's Kernel, Newton Wonder, and Bramley's Seedling, for developing into natural bushes, with early-bearing varieties between, as shown in Fig. 65, at C, page 285. This method answers admirably in good deep soils, and the cost of trees—537 at £6 per 100 = £32—is considerably less than for bushes at 6 feet distance. The advantages are the trees get abundance of light and air, so essential in free soils for sturdy and well-ripened growth, and the lessened need of interference with the roots, while the returns after seven years are more satisfactory.

Cherries.—Standard, half-standard, pyramid, and bush trees succeed in plantations on the Mahaleb stock. Only certain varieties are healthy on this stock. Six sweet cherries suitable for this mode of culture are Early Rivers, Empress Eugenie, Governor Wood, May Duke, Archduke, and Duchesse de Palluau. The trees and blossom of these varieties are rather tender, and require sheltered (not low) situations. Standards should be planted 12 feet apart, with two gooseberry bushes between each pair of cherries in the rows, and the spaces between the rows occupied with strawberries; these should be removed after bearing two or three full crops and their place taken by strong gooseberry or currant trees at 6 feet apart. The plantation will afford good annual returns from the second year. Half-standards may be planted 9 feet every way, with a gooseberry bush at every 4½ feet. This method is only suitable for shallow soils. Pyramidal and bush cherries may be planted 6 feet apart, as they grow compactly by summer pinching and
juvenile root-pruning, and bear enormously, especially the Morello and Kentish. These varieties should be planted alternately, as the Morello is more vigorous than the Kentish, and the advantages are mutual. At 6 feet distance the cost of trees for planting an acre is considerable—1,210 maidens, £6 per 100 = £72 12s. per acre; three-years-old coming into bearing—£7 10s. per hundred = £90 15s. per acre. Maiden trees produce some fruit in the third, and three-years-old trees a profitable amount in the year after planting. In the seventh year of bearing the trees average 7 pounds of fruit each = 352 half-sieves, which at 4s. each = £70 8s. per acre. In the twelfth year the trees average double the amount of fruit named, and return £140 8s. per acre. When the fruit is fine through thinning and high cultivation, also attractively packed in boxes, high prices are realised, occasionally doubling the price of sieve fruit = £280 16s. per acre. Cherries are profitable fruit, but the trees thrive only in certain districts, and the sweet varieties suffer most of any fruit from birds. Morello and Kentish are far less liable to devastation. Standard Morellos at 12 feet and Kentish at 9 feet distance on the Mahaleb attain their best period of production about the twelfth year, and the plantation proves remunerative from the second by growing bush fruits between the cherry trees. Half standards, however, afford greater facilities for pruning and picking the fruit. The returns from them are even better than from pyramids and bushes from the twelfth year. The trees should be kept cleared of dead spurs, cutting away worn-out branches in favour of promising growths. This applies particularly to the Morello.

**Currants—Red.**—A rather light or free working soil, preferably a little damp rather than dry, grows red currants well. Short stemmed (6 inches) are better than 12-inch stemmed bushes. They should be two years old from the cutting. Profitable varieties are Cherry (Scotch Red, Knight's Early), Red Dutch (New Red Dutch), with Raby Castle [Victoria] as suitable for gardens. The ground requires to be well prepared and liberally manured if in poor condition. In ordinary soils the bushes should be allowed 5 feet, or 6 feet in good soils. The trees may be bought at 10s. per hundred, but parsimony is often costly afterwards, and it is cheaper in the end to procure stout well-formed bushes at £1 5s. per hundred than mere "scrag" at 6s. By taking a number a reduction is generally made in the price. At 5 feet distance apart, 1,742 bushes are required to plant an acre, cost at 10s. per hundred = £8 15s.; at £1 per hundred for bearing bushes = £17 10s.; at 6 feet apart—1,210 bushes = £6 1s.—£12 2s. The bushes should be kept cup-shaped, the leading shoots shortened at from 6 to 10 inches, and laterals cut back to form spurs. Summer pruning is imperative to
secure fine fruit. In the fourth year from the cutting the bushes commence bearing and increase yearly, being in full bearing about the fifth to seventh year from planting, and produce about 1 ton = 2,240 pounds per acre, average prices 1½d.—3d. per pound = £14—£28 per acre. From this period to the twelfth or fifteenth year the average yield is 2 tons = 4,480 pounds = £28—£56 per acre. Double the crop named is realised in some seasons, but red currants are very susceptible of damage to the blossom from frost, and to have the fruit ruined by wet weather. The expenses of cultivation, picking and marketing, range from £17—£20 per acre yearly. This is exclusive of rent, tithes, and rates of the land.

**Currants—Black.**—These require a fairly deep soil, retentive of moisture, and thrive in the better descriptions of clay land. On strong land the bushes grow stout and vigorous. Bushes with stocks close to the ground are the best. (See Fig. 50, Y, page 155, Vol. II.) Black Naples, Baldwin's, and Lee's Prolific are good sorts. The bushes should be set 6 feet apart in good land; 5 feet asunder suffices on ground in moderate condition. They can be purchased at 10s. to £1 5s. per hundred from nurserymen. Some growers prefer bushes with the buds removed from the part of the cutting inserted in the ground, but remove no buds on the part above ground, cutting off the top at the third bud. This gives three good stems close to the soil, and suckers do not come from the root part. It is an excellent practice. Shortening the leading growths is hardly necessary, but it must be done to prevent a loose habit. As the fruit is borne on wood of the previous year and on spurs, no general pruning of the extremity growths must be performed, confining the manipulations to shortening old or elongated parts to successional branches, and thinning where crowded. The bushes produce remunerative crops when four years old, and in full bearing—about the eighth year—average 2,240 pounds (1 ton) per acre annually, price 2d.—3d., average 2½d. per pound = £23 6s. 8d. per acre. After this, up to the eighteenth year or longer in good land and under liberal treatment, the average yield is about 3 tons per acre = £70 annually, and the expenses of cultivation, picking, packing, carriage, and commission, are about £30, net profit £40. This represents the highest cultivation in good land. The general results average a produce of 1½ tons = 3,360 pounds at 2½d. = £35, and the expenses £17—£20 per acre. Extraordinary crops are recorded of 800 bushels (48 pounds each) = 38,400 pounds, at 2½d. per pound = £400 per acre, but the price actually realised was 7s. 6d. per bushel = £300, and the calculation based on a selected ½ acre from a large plantation. That is how large profits are
FRUIT PLANTATIONS—BLACK CURRANTS—GOOSEBERRIES.

made to appear (in print), and as obtainable by general cultivators—a stupid fallacy. Mulching in hot seasons is necessary.

Gooseberries.—These succeed on porous land, but not hot and dry, in good loam, and properly drained clayey land. For affording green or ripe berries select: Keepsake, Whitesmith, Whinham's Industry, Queen of Trumps, Antagonist, Crown Bob, Lancashire Lad, and Warrington. Every plantation should comprise a good proportion of the last-named variety for supplying late ripe berries. Early Sulphur is valuable for affording early ripe fruit; Rifleman is good for late use. Monarch is also a fine variety for plantations. Red Champagne bears enormous crops of small, highly flavoured berries for dessert or preserving, but it only "takes" with the better class of buyers. Speedwell, Leader, Leveller, Companion, Lion's Provider, and Careless are special varieties to supply early green berries and ripe fruit in punnets for the shops. They are more suitable for the garden than the plantation.

At two years old from the cutting the best plants are ready to set; price from fruit farms 6s.—12s. per hundred; prepared shapely bushes from nurseries 12s. 6d.—£1 5s. per hundred. The land ought to be steam-cultivated, deeply worked with a subsoil plough, or bastard trenched, and liberally manured. The bushes should be planted 5 feet apart on ordinary soils, 6 feet asunder in rich ground, average distance 5½ feet = 1,440 per acre. Pruning is performed from October to the end of January, and is confined to cutting away rank growths, shortening irregularities, thinning (yet leaving a moderate supply of young wood), and keeping the centre fairly open. A bearing tree partly pruned is shown in Fig. 68.

The ground is dressed with stable manure, every autumn in some cases, biennially in others, while some growers only apply solid manure every third year. The amount given varies according to the vigour and cropping of the bushes. Twenty tons per acre is a minimum dressing for trees in good holding soils, fairly vigorous, and bearing average crops; double or treble that amount is applied where the ground is lightish and free, the growth very moderate, and the crops annually abundant. Rags, shoddy,
and other refuse substances are largely used in Kent at the rate of 1 to 2 tons per acre, and being of a slow decomposing nature they are applied at somewhat distant intervals, a portion of the plantation receiving a dressing in turn. Where solid manure is only occasionally used stimulants are given in the intervening years. Nitrogenous manures are essential to enable the trees to sustain heavy crops and secure early berries. Soot—80 bushels or more per acre—is used in some districts, applying it early in the spring. This dressing may follow farmyard manure in the second year. In the third season superphosphate and kainit in equal parts may be supplied just before digging the ground, spreading the mixture under the branches and for a foot beyond, at the rate of 3½ pounds per rod, and when growth begins in the spring, sprinkle powdered nitrate of soda similarly on the ground at the rate of 2 pounds per rod—rather less where naturally damp. This method of manuring applies to all plantation fruits, and is recommended as efficient and economical. The ground should be dug with a four-pronged fork in the winter, extracting perennial, and burying annual, weeds with the manure. This insures a loose surface that rain can enter freely, and facilitates hoeing, which should be done during the summer as necessary. Liquid manure and mulching are of great benefit, particularly in shallow soils. This applies to all bush and plantation fruits, for trees often fail to swell their crops properly in hot and dry seasons for lack of liquid nourishment and mulching to maintain uniform moisture in the soil.

It is best to gather the fruit in its green state from recently planted gooseberry bushes for the first few years, as this enables them to recuperate each season, and make free progress, which is not the case when heavy crops are allowed to ripen. After the bushes become well-established and vigorous, a portion of the berries are picked directly they are large enough for sending to market. A few of the earliest green gooseberries for puddings and tarts sometimes bring 8d. per pound or 1s. per quart. Sheltered situations are necessary to secure berries for very early gathering. As much as £120 per acre net has been cleared in one season for green gooseberries between standard plum trees, the gooseberry bushes being 5 feet, the plum trees 20 feet apart, and the value of the plums was returned at £80 = £200 per acre. This is recorded as a feat in cultivation. The price for early green gooseberries usually commences at 4d. per pound or 6d. per quart, but the general price soon reaches the average of 1¾d. to 2d. per pound, or 2d. to 3d. per quart. Gathering the berries green insures a heavier constant yield than would be the case were all the crop left to ripen. Some growers recuperate any weakly or overborne bushes by gathering the whole crop while green.
FRUIT PLANTATIONS—COB-NUTS AND FILBERTS.

With healthy bushes about one-third is often left to ripen, two-thirds removed as green, but it is entirely a matter of judgment. Those left to ripen should be well clear of the ground. In seasons of scarcity of cherries and plums, it is a good plan to gather all the green fruit at the base of the bushes and thin the others moderately, to insure a heavy crop of large ripe berries. Early mulching in such cases is necessary to assist the berries to swell, and enable the bushes to bear a crop the following season.

An average crop of gooseberries after the seventh year is 2½ tons = 5,600 pounds, to 3½ tons = 7,840 pounds, and the prices 1½d. to 2d. per pound—mean 6,720 pounds, price 1½d. = £49 per acre. All expenses in connection with an average crop amount to £20 = £29 profit per acre, exclusive of rent, tithe, rates, and interest on capital. Taking an average of ten years, from the fifth to the fifteenth year, the yearly returns range from £12 10s. on moderately good land and culture to £25 on the best soil and under the best management. Better returns are had from bushes in gardens under special culture, averages of a peck per bush being recorded, or 1s. per bush clear profit = £87 2s. with the bushes at 5 feet, and £72 with the trees at 5½ feet apart per acre respectively.

Nuts.—Cob-nuts and filberts require a moderately light soil, but they thrive well on heavy land interspersed with calcareous gravel or flints, also “stone-shattery” soil in Kent, and gravelly mediums with a goodly admixture of loam of a holding nature. A situation sheltered from high winds is essential. Standard apple, pear, plum, or damson trees, planted at two-thirds the distance the nuts are apart, afford protection from spring frosts. Apple or pear trees should be employed on deep loams, plum or damsons on strong or shallow soils. Prepared basin-shaped nut bushes can be purchased from 30s. to 50s. per 100. A typical tree has a stem 1½ to 2 feet in height, from which the branches are trained laterally, so as to form a centre of a saucer shape. The trees ultimately attain a diameter of 8 to 12 feet and a height of about 6 feet. Cob-nuts are more grown than filberts because the trees are hardier, the nuts larger and more saleable.

Lambert Filbert or Kentish Cob and Webb’s Prize are good for plantations. Cosford is a free bearer and the profusion of its catkins renders it valuable for fertilising other varieties. Red, White, and Prolific filberts, with Merveille de Bollwyller and Pearson’s Prolific cob-nuts are suitable for gardens. Standards (4 feet stems) on Spanish hazel-nut stocks are appropriate for the non-pruning system. The trees are planted 12 feet apart = 302 per acre, less the number of standard trees employed for top-growth.
Currant or gooseberry bushes are set between the trees and rows. These render the plantation profitable from the second year, and are taken away when the nut trees require the space. At four or five years from planting, sturdy shaped trees produce some fruit, and about the eighth year a paying crop. In exceptionally fine seasons the crop may reach 1 ton or more, but 8 to 10 cwt. per acre is an average yield. The price ranges from 3d., in very abundant, to 3s. per pound in very scarce years. The prices are entirely ruled by the supply, but the higher prices in a scarce year compensate for light crops. The average price is 7d. for moderate and 1s. 4d. for high quality nuts = £26 2s. 8d. for 8 cwt. at the first, and = £59 14s. 8d. at the latter price per acre. The gooseberry or currant bushes more than pay expenses up to the twelfth or fifteenth year. The best nut crops are obtained where the trees are not overtopped by others, but this is only practicable in sheltered situations. The ground in Kent is manured every other year with 1 to 1½ tons of rags or shoddy, and dug in the winter with pronged forks. It is kept clean by hoeing once or twice during the summer. Pruning is done in late winter or early spring, care being taken to keep the trees in cup form and the centre clear. The finest and most promising bloom-bearing young wood is retained and the older and coarser branches cut away, leaving some growths bearing catkins on the same branches. The trees are mere skeletons after pruning (see the right-hand side of Fig. 69). Standard trees merely require the dead or worn-
out branches cut away, irregularities shortened, and the growths judiciously thinned where too thickly placed.

**Pears.**—Half-standards on quince stocks or double-grafted are worked near the ground, the pear taken up to form the stem, and the head originated at the height required. Varieties of spreading habit succeed at 12 feet apart, with columnar ones between them 6 feet asunder. Bushes or pyramids to be root-pruned may be planted 6 feet apart. These being root-pruned will lift to other ground safely when the permanent trees require the whole space. Instead of temporary pear trees, currant or gooseberry bushes can be set 6 feet apart between the pears. This is a good plan when it is not intended to extend the plantation. Pear trees on quince stocks thrive on all good soils, also on light land, but on these mulching and liquid nourishment must be given in the summer. Heavy wet soils are unsuitable, but clayey loams kept open by gravel or flints, and having a fair depth of ameliorated surface, produce heavy crops of large, bright, juicy, well-flavoured pears. The situation must be sheltered. Crawford may be planted in two lines, 6 feet asunder, the trees in "opposite vacancy" order, 9 feet apart, on the exposed sides as screens. Being a regular bearer and of compact growth it will pay in fruit and in affording pollen for fertilising other varieties.

Suitable varieties for a plantation are:—Summer Doyenné, Beacon, Clapp's Favourite, Beurré Giffard, Jargonelle, Williams' Bon Chrétien, Triomphe de Vienne, Madame Treyve, Dr. Jules Guyot, Fondante d'Automne, Beurré Superfin, Beurré d'Amanlis, Jersey Gratioli, Louise Bonne of Jersey, Doyenné Boussoch, Eyewood, Marie Louise, Pitmaston Duchess, Bishop's Thumb, Duroudeau, Comte de Lamy, Duchesse d'Angoulême, Beurré Hardy, Beurré Bosc, Émile d'Heyst, Beurré Clairgeau, Marie Louise d'Uccle, Maréchal de Cour, Princess, Beurré Bachelier, Beurré Baltet Père, Doyenné du Comice, Beurré d'Anjou, Marie Benoist, Josiphine de Malines, Olivier des Serres, and Easter Beurré. Varieties for stewing:—Vicar of Winkfield, Bellissime d'Hiver, Catillac, and Verulam.

Low standard, or two to three years' pyramid or bush trees, cost 15s. per dozen, £6 per hundred. At 12 feet apart = 302 trees = £18 2s. 6d.; gooseberry trees 6 feet apart = 908, at £1 per hundred = £9 1s. 6d.; planting, staking, and manuring £10 = £37 4s., total cost per acre, exclusive of draining and trenching the land. The bush fruit about pays expenses in the second year; in the third the pear trees may yield 1s. each in fruit, and the gooseberry bushes 6d. each = £37 10s., or a profit, after deduct-
ing £17 for cultural expenses and £5 5s. for rent, &c. = £15 5s. per acre. In the fifth season the trees and bushes are in remunerative bearing, and increase in value yearly, reaching their best in the tenth or twelfth year, by which time the soft fruit bushes will have been reduced in size or removed then or soon afterwards. When the pear crops are full the trees should be heavily mulched and supplied with liquid manure, or top-dressed with quick-acting fertilisers, washed in after the fruit is well set, thinning the fruit carefully—leaving two or three fruits of the large, or four or five of the medium, fruited varieties to every foot run of branch well furnished with foliage, and keeping superfluous spray well in hand, to expose the fruit to the sun for colouring. Good even-sampled fruits readily fetch 5s., and choice 10s., per bushel. Each tree produces a bushel when in full bearing = £75 10s. and £151 respectively, per acre. The low standard trees, as a rule, give better returns than pyramid, and both continue profitable for as long after as in attaining the period of best production. Superior exhibition fruits are had by severe thinning and extra feeding. These bring fancy prices, but fine, clear, highly-coloured, even-sized specimens at 9d. to 1s. per dozen pay better than a few of double or treble their size fetching 6d. to 1s. each.

Pyramids or bushes at 6 feet apart cost—1,210 at £6 per hundred = £72 12s.; or, including draining and preparing the ground, planting, staking, and manuring, £107 12s. per acre. In the second or third year the trees will bear half to a dozen specimen fruits each, worth 9d. to 1s. per dozen, if carefully and showily packed in boxes = £22 17s. 3d., £45 7s. 6d., £30 5s., or £60 10s. respectively (according as the trees bear), per acre. It does not pay nearly so well to grow pears on pyramids or bush trees to sell by half-sieve as by the dozen; also bear in mind that the return to the grower is seldom more than half that realised by fruiterers, often not more than one-third, and fruit sold in the shops at 3d.—6d. each may only bring 1d.—2d. to the grower. From the fifth to the seventh year the trees of the large fruited varieties will produce 2 to 3 dozens, and the medium size 3 to 5 dozens of "boxable," averaging 2s. 6d. per tree = £151 5s. per acre. Assuming the trees to be root-pruned and kept 6 feet apart, they reach the period of best production in the tenth to twelfth year, and give an average return of 3s. to 4s. per tree = £181 10s.—£242 respectively per acre. To secure this result the blossoms must be protected from frost in the spring, and the cultivation be high = £50 per annum; but this method of growing choice pears should not be attempted by those unskilled in fruit-growing, for it requires a thorough knowledge of the several varieties to be carried out successfully.
FRUIT PLANTATIONS—PLUMS.

Up to the seventh year the trees have ample room at 6 feet apart, on the free system—that is, merely shortening irregular growths, and keeping the heads open by the removal of needless spray and crossing shoots; then every other tree and row must be removed. These will form 3 acres of plantation at 12 feet apart, and if denuded of blossom the following spring, will recuperate so as to bear crops the year succeeding. At this distance the sun shines on the ground between them, and, with judicious pruning, on every branch to its base. From the twelfth year such trees will bear a bushel of fruit each for selling by the bushel, or 6 to 10 dozen specimens for packing in boxes holding 1 dozen each.

The pruning of pyramid and bush trees at 12 feet apart consists in shortening the side shoots in June, removing superfluous branches during the summer, leaving the leading growths intact, unless unduly long, until October, then shortening to secure sturdiness and growths in the right direction, cutting the side shoots to three or four buds. Aged trees should have the growths thinned where crowded. Every autumn, if the trees crop well, apply a top dressing of stable or farmyard manure, about an inch thick, to a foot beyond the spread of the branches and leave it there, pointing lightly in the spring, or if the roots are matted at the surface, cover with a little soil from between the trees. Kainit and superphosphate in equal parts may be sprinkled on the soil in February at the rate of 3\(\frac{1}{2}\) pounds per rod, and when the fruit is set, supply powdered nitrate of soda similarly at the rate of 2 pounds per rod. Soot and guano are useful stimulants, either as top-dressings or in liquid forms. It must always be remembered that the early blossoming of pear trees endangers the crop of fruit.

Plums.—These thrive on loams, clayey loams, ferruginous gravelly marls, and calcareous clays. They grow well in soils too shallow for apples and pears. Shelter from exposed points is necessary; this may be provided by damson trees set to form a semi-hedge. The trees may be half-standard, open bush, or pyramid. Suitable varieties are:—Early Prolific (Rivers'), Czar, Goliath (requires a warm soil), Sultan, Victoria, Belgian Purple, Mitchelson's, Prince Engelbert, Pond's Seedling, White Magnum Bonum, and Monarch. Gages:—Denniston's Superb, Early Transparent, Green Gage, Golden Transparent, Bryanston, and Reine Claude de Bavay; also for dessert:—De Montfort, Jefferson, and Coe's Golden Drop.

Half-standards or pyramids may be planted 9 feet apart in firm soils, in friable and rich 12 feet. Good trees—half-standards with 3 or 4 feet stems, or pyramids or bushes, two or three years old—cost £6 per hundred = £32 6s. 3d. for 587 trees at 

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9 feet, and £18 2s. 6d. for 302 trees at 12 feet apart, per acre. Gooseberry bushes may be planted between the trees and rows when the distance is 12 feet, and is more economical and quite as satisfactory in returns as planting pyramid plums at 6 feet and thinning for the permanent trees to stand 12 feet apart, unless it is proposed to extend the plantation. If the trees grow too vigorously they should be taken up early in November and replanted. In this way the trees become, and are kept, fruitful at 6 feet distance for some years without crowding. The trees come into remunerative bearing about the seventh year, and are in the best production about the twelfth. Root-restricted trees come sooner into bearing than free half-standards or pyramids. Good culinary plums from trees at the best period of production return about £100 per acre, even in "glut" years if the fruit is thinned to swell to a large size; thinning can be done on low trees and it pays. The finest culinary and dessert plums packed in small boxes fetch much more than the above return per annum. Farleigh and Bradley's King damsons succeed admirably as half-standard or pyramid trees.

Pruning trees at 9 or 12 feet apart should be confined to tipping irregular and removing crossing and superfluous growths in June or July, finally regulating the trees for securing an open and evenly-balanced head in October. Trees planted 6 feet apart should have the growths pinched in the summer, thinning and shortening them in the autumn. When the pruning is completed, spread about an inch thickness of stable manure or rich compost on the soil, from the stems to a foot beyond the spread of the branches, pointing it in very lightly, or if the roots are matted at the surface cover with a little fresh soil from the open spaces, which should be manured and dug without damage to the roots. This will be required every year when the trees crop heavily, supplementing in February with superphosphate and kainit in equal parts, at the rate of 3½ pounds per rod. The rains will wash this in, and it should be followed by a dressing of powdered nitrate of soda when the fruit is well set for a full crop. Plum trees on the plantation system are worn out sooner than standard trees, not being profitable after twenty-five years—some earlier and some later.

Raspberries.—A fairly good soil, with a cool or moist base (not water-logged) is necessary for securing full crops, for if too light and porous the fruit does not swell satisfactorily. It should be deeply dug or subsoil ploughed. The canes are placed in rows ranging from 3 to 12 feet apart. When 3 feet, that distance is allowed between the plants = 4,840 per acre. Strong canes cost 12s. per hundred = £28 19s. 4d. per acre. When the rows are 4 feet apart the canes are placed 2 feet asunder—5 feet
18 inches, or feet 15 inches in the rows. In rows of greater width the plants are set 15 inches apart, the ground between being cropped for a time and in turn occupied with raspberries as the others wear out. This is an excellent method, as the raspberry is only profitable a few years under plantation culture. Some growers prefer stools or hills of three canes each, 4, 5, or 6 feet apart, according to soil and variety. Red Antwerp, Fastolf, and Carter's Prolific are popular varieties, but Baumforth's Seedling and Superlative are being extensively planted. The canes are shortened to about 2 feet at planting, and the result is strong suckers for ripening and fruiting in the second year.

An average crop is 1½ ton = 3,360 lbs. per acre, price (wholesale) 2½d.—5d. a pound, according to locality, season, or crop = £35—£70. There is a great demand for this fruit for jam, raspberry vinegar, and confections. In full bearing the crop in some cases averages 2 tons per acre, and the prices vary from £18 to £45 per ton. The crop is more liable to suffer from wet than any other, hence it is uncertain; yet raspberries are largely grown, some persons having plantations of from 20 to 40 acres. The canes should be thinned each spring to the number required for the succeeding year's crop, and the spent fruiting canes removed as soon as the crop is taken. In late autumn the canes are shortened to 2 to 3½ feet long according to their strength, and to be self-supporting, for they are not staked in plantations; but it is a good plan to wind yarn round the top of the canes so that they do not hang down under the weight of fruit and thus become spoiled in showery weather. A top dressing of manure or litter is needed in the summer before hot weather sets in, especially in light soils and those liable to bake, the crop also paying for applications of sewage or other liquid nourishment in dry seasons. A dressing of manure in the autumn is imperative, pointing it in, and an application of nitrate of soda in the spring assists the swelling of the crop. The durability of the plantation in profit ranges from eight to twelve years or longer, this being greatly influenced by the soil and management.

Strawberries.—The strawberry succeeds on sandy soils with liberal manuring, on loams and in the freely worked clays. The land should be deeply ploughed, subsoiled if necessary, and well manured. Early potatoes may precede the strawberries, so as to have an enriched soil, clean and in good tilth. The runners are taken from the best plants directly the fruit is picked, put in nursery rows, and thence planted in the fruiting quarters in the autumn, or left on the plants till the autumn, then either planted permanently or placed in a nursery bed and set in the spring. It is better to layer the runners in pots,
turves or soil, and plant in the fruiting quarters as soon as well rooted, so as to secure a
good crop the following year. Market plants are commonly planted in March, but they
produce nothing the first year. Varieties grown are:—Noble, Keen's Seedling, Alice
Maud, President, Sir Joseph Paxton, Elton Pine, Eleanor, and British Queen (where the
ground is suitable). (See selections, page 224.) The rows are usually 30 inches apart
and the plants 18 inches in them, though some are set 30 inches apart every way and
the ground horse-hoed both ways.

Plants in small pots range in price from 10s. to 15s. per hundred; those from the
ground, 2s. 6d. to 5s.; 30 inches apart every way an acre requires 6,970 = £34 15s.—
£52 2s. 6d. for plants from small pots; and £8 14s.—£17 8s. for those from the ground.
If the plants are set 15 to 18 inches asunder in the rows, for every other to be taken out
after the first year of bearing, the cost of plants would be doubled. This is an important
consideration, and points the difference between garden and field culture. With the
plants from pots 30 inches between the rows, and 15 inches apart in the rows, so as to
get a full crop the first year, and calculating them at £6 per thousand delivered—say
14,000—the cost for plants alone would be £84 per acre. Calculate the produce the first
year at half-pound per plant, and the price 4d. per pound, the return per acre is £116 6s. 4d.
Double the weight has been obtained from small pots in gardens, but the average is not
more than that stated. The price would be higher for first-class early produce in the
first year, while in the second season the land with half the number of plants would bear
their fullest crop—say 6,970 pounds = £116 3s. 4d. This from small plots has been
doubled, and the net return given at the rate of £150 per acre, or taking the three
years (the duration of the plantation), £100 per annum clear of all expenses. The plants
in this case were raised on the premises, and the annual cost of production given at £50,
exclusive of rent, rates, and interest on capital.

The field plantations give nothing the first year, in the second year a full crop,
averaging half-pound per plant = 3,485 pounds, which at 4d. per pound is £58 1s. 8d. per
acre; cost of production and marketing, £20; profit, £38 1s. 8d. per acre, exclusive of
rent, rates, and interest. This, be it remembered, is far the best year, and the average
of three years would bring down the profit to £25 an acre, even when the seasons are
favourable. Much higher averages have been recorded, but they prove more or less
exceptional as influenced by seasons and prices.

The chief factor in success is heavy manuring with the intelligent culture bestowed.
The first year's plants have the runners picked off by hand, and the land is kept free from
FRUIT PLANTATIONS—STRAWBERRIES.

weeds horse-hoeing being the cheapest method. Stable, farmyard, or town manure is applied in late summer, when the runners are removed, to stimulate the growth of stout crowns, from 20 to 80 tons being used per acre. Digging is not practised in light soils, but the plants are moulded up with a plough to keep the crowns warm and dry in midwinter. Where the ground is rather heavy, the alleys are lightly dug between during the winter. A dressing of soot is applied in March or early April according to season and locality, 40 to 80 bushels per acre, this tending to keep down slugs, as well as to stimulate and sustain growth and crop. Powdered nitrate of soda, 2 pounds per rod, may be employed instead of the soot. Mulching should be done early in June. Clean stable litter or barley straw is used at the rate of about 1½ ton per acre. As soon as the crop is gathered, the runners are cut off with a hook, the land broken between the rows with a horse-hoe and cleared from weeds, runners, and mulching. On light soils two crops, or with heavy manuring, three only pay; on deep rich loams, also marls and greensand formations, the plants bear profitably for five or six years.
UTILISATION OF WALLS AND BUILDINGS.

All walls may be used for fruit-growing, and will bring a good return if the trees are properly attended to. Walls are valuable in absorbing heat and yielding it by radiation for the benefit of trees trained against them. A low wall is not so favourable for fruit-growing as a higher one, because it accumulates less heat during the day, and parts with it more quickly when the surrounding air is colder.

There is considerably more heat concentrated on a 12-feet wall, and the ground in front, than is the case with a 6-feet one, and where peach trees fail on a 6-feet wall they may succeed against one 12 feet in height. Regard, therefore, must be had to the height of walls as well as to location in respect of their value for fruit production.

Walls running east and west have one surface to the south, which is the best aspect, the other face is necessarily presented to the north, and this is of the least importance, but the superior results obtained from the southern side more than counterbalance the loss. Walls running north and south have each an east and west aspect, and the latter is the more desirable. Whatever point of the compass a wall presents its surface to at right angles, that is the aspect thereof.

South Walls.—Apricots, cherries, figs, grape-vines, peaches, and nectarines are appropriate for the south and favourable positions generally, but in cold districts pears or plums should be planted. Similar remarks apply to trees for south-east and south-west walls in warm and cold localities.

West Walls.—Apricots and peaches succeed on these, in districts south of the Thames; north of London pears or plums ought to be planted.

East Walls.—Pears and plums. North-east and north-west walls answer in the southern parts of the country for the same fruits, but in the northern and cold districts, the Morello cherry succeeds better and is more profitable.

North Walls.—Although the Duke race of cherries succeeds on north walls, the fruit
does not pay so well as that of the Morello; pears and plums are not good enough from such an aspect for market.

*Apricots.*—Varieties: Hemskerk, Moorpark, Powell’s Late, Breda and Shipley’s should be planted in cold districts. The apricot requires a calcareous soil, but it succeeds in firm siliceous or stony ground. The fruit meets a ready local sale at the residences of the opulent for preserving at prices ranging from 1s. 6d. to 3s. per dozen, according to size and season. Sometimes 4s. per dozen is realised for fine fruit. If sent to market the fruit should be packed in boxes, but only good returns can be expected from first-class fruiterers and for high-class fruit. Cottagers have been known to sell enough fruit from one tree on the south side of their house to pay the rent. Dwarf trained trees cost from 5s. to 10s. 6d. each. These have from twenty to thirty shoots and come into bearing in the second or third year from planting. In the seventh year the trees cover a large extent of wall, bearing freely on well-ripened young shoots and spurs. Maiden trees range in price from 1s. 6d. to 2s. 6d. each, and one year trained trees can be had of the principal nurserymen for 3s. 6d. to 5s. each. Maiden trees ought not to be allowed to bear much fruit until the fourth or fifth year.

*Cherries.*—Varieties: Early Rivers and Governor Wood, grown on a south wall, come in very early and bring good prices at first-class shops if neatly packed in boxes. Empress Eugenie, May Duke, Archduke, and Duchesse de Palluau succeed well in most districts against a north wall, enhancing their value by prolonging the season. Morello succeeds admirably against north or west walls, gables, and the sides of houses, stables, or barns. Cherries prefer a calcareous or firm sandy soil. Dwarf trained trees cost from 2s. 6d. to 5s. each, standards for buildings to which cattle have access (the stems being protected), 3s. 6d. to 7s. 6d. each. They commence bearing about the third year and become profitable in the seventh or eighth season. Burdening the trees with heavy loads of fruit in their early years causes them to become stunted. The produce has reached 1 pound per square foot of surface covered, but a fourth of that amount of fruit is nearer the average. Only fine fruit pays in punnets or boxes, price from 3d. to 1s. per pound.

*Figs.*—Varieties: White Marseilles, Brown Turkey (the best), and Brunswick (for large areas, gables, and walls of buildings). Calcareous soil or a firm gravelly stratum is necessary. Dwarf trained trees cost from 3s. 6d. to 5s. each; standards, 5s. to 10s. 6d. each. The trees commence bearing as soon as well established. If they
grow too freely root-pruning must be performed and the soil made firm. Standard trees must have the stems protected with hay-bands in severe weather. The fruit brings from 3s. to 12s. per dozen, according to size and season. Warm localities, especially near the sea-coast in the southern parts of the country, should be chosen for figs.

Grape Vines.—Varieties: Black July, Black Prince, Black Hamburg (in warm soils and localities only), Chasselas Vibert, and Royal Muscadine. Soil free and well-drained, warm, siliceous, or gravelly. Plants (called canes), cost 2s. 6d. to 3s. 6d. each. Bearing commences in the second or third year. About half pound per foot run of rod is a good average annual yield, price 3d. to 1s. per pound. Well thinned and cultivated grapes are superior to much imported produce and make excellent wine.

Peaches.—Varieties: Alexander or Waterloo, Dymond, Violette Hative, Barrington, and Gladstone; fruit ripe from the middle of July to the end of September. Nectarines for which there is an increasing demand: Lord Napier, Hardwicke Seedling, Dryden, and Victoria (in warm situations only). Dwarf maiden trees cost 1s. 6d. to 2s. 6d. each; dwarf trained with seven to thirteen branches, 5s. to 7s. 6d. each; standards: maiden, 3s. 6d.; trained, 7s. 6d. to 10s. 6d. each. Peach trees require strong soil, with a free admixture of calcareous gravel; light soils must be made very firm and be well mulched in the summer. Trees planted as maidens commence bearing in the third year; trained trees in the second year after planting. One fruit per square foot is a good average crop to have fruit of the first size and the best quality. The price ranges from 2s. to 10s. or 12s. per dozen, according as it is poor or extra fine, abundant or scarce, average price, 3s. to 4s. per dozen. Extra fine late fruits command more money than do early and midseason sorts.

Pears.—Varieties: Jargonelle, Williams' Bon Chrétien, Madame Treyve, Souvenir du Congrès, Triomphe de Vienne, Beurré Superfin, Louise Bonne of Jersey, Marie Louise, Pitmaston Duchess, Duchess d'Angoulême, Beurré Diel, Doyenné du Comice, Princess, Glou Morçeaux, Beurré d'Anjou, Marie Benoist, Nouvelle Fulvie, Beurré Rance, and Easter Beurré. The above cover the season August to April. Beurré Clairgeau grown against a wall attains great size and brilliant colour, and fancy prices are sometimes given by fruiterers for the imposing appearance, not the quality, of this pear.

For large areas and light soils the trees should be on pear stocks. Upright trained trees are best for chimney stacks and high narrow spaces, dwarf horizontal trained for
house ends and sides, standard horizontal trained for buildings to which cattle have access, protecting the stems. Upright trained trees cost 3s. 6d. to 5s. each; dwarf horizontal trained, 3s. 6d. (two tiers) to 5s. (three tiers); standards trained, 5s. to 7s. 6d. Trained trees commence bearing the year after planting, if then of good size, and they are in good bearing at six or seven years from planting. One pound of fruit per square foot is a full average crop, price 1d. to 3d. per pound for summer and autumn fruit; 3d. to 6d. for winter fruit. Boxed fruit brings from 9d. to 9s. per dozen, extra large fruits realising 12s. or more per dozen. The average price for specimen fruit is 9d. to 1s. 6d. in the summer and early autumn; 1s. 6d. to 3s. for winter; and 3s. to 6s. per dozen in the spring. Extra fine fruit is eagerly sought after by fruiterers, and they will give special prices for choice specimens. Small or ill-shaped pears are only fit for packing in sieves, and do not pay nearly so well as the best fruit.

For garden walls, cordon trees on quince stocks are the most quickly profitable. Maiden trees cost 1s. to 1s. 6d. each—8s. to 12s. per dozen. They may be planted 18 inches to 2 feet apart, and trained diagonally. Double-grafted trees may be purchased at 2s. to 2s. 6d. each (1 year old); older trees cost 3s. 6d. to 5s. each. Trees planted as maidens come into bearing in the second or third year afterwards. They produce the largest and highest-coloured fruits. The fruit must be thinned, and the trees mulched and well supplied with water or liquid manure in the summer, especially in rather light soils during hot seasons.

**Plums.**—Varieties: Denniston’s Superb, Early Transparent, Green Gage, Bryanston Gage, Golden Transparent, Reine Claude de Bavay—these gage plums require to be well thinned when the trees bear heavily, so as to have the fruit fine. Jefferson, Kirke’s, and Coe’s Golden Drop—all dessert plums of the first order; Czar, Victoria, and Monarch—good for eating or cooking; White Magnum Bonum, and Pond’s Seedling—for compôtes and preserving. Plum trees succeed in any good soil, preferably strong and stony. Light soils should be well limed. Dwarf maiden trees cost 1s. each; good dwarf fan trained, 3s. 6d. to 5s. each; standard fan trained for high walls or buildings, 5s. to 7s. 6d. each. Maiden trees commence bearing in the third year after planting; trained trees in the first or second year. When six or seven years old they become profitable. Half to a pound of fruit per superficial foot is a full crop. Overbearing must be guarded against by judicious early thinning, so as to secure large fruit; for, unless much superior to plantation fruit, it will not pay (as it ought) for packing in boxes. Good fruit sells for 9d. to 1s. per dozen, and sometimes double
those prices. If it has to be packed in baskets, the price realised will range from 1s. 6d. to 3s. 6d. per stone. Aim high, secure large, well-coloured fruit with a good bloom, carefully preserved, temptingly packed, and the best prices will be obtained.

_Unsatisfactory Trees against Buildings._—Trees often fail to prosper through being roughly planted in stones or gravel, the roots then strike down into the subsoil, and sappy unfruitful growths follow. Where the ground adjoining a building is composed of rubble it should be taken out or moved 2 feet deep, and not less in width than one-third the height of the wall. If the loam to be placed in is of a close nature, one-third of the finer particles of the rubble may be mixed with it. This, made firm, will be more suitable for fruit trees than a border formed of rich loam and manure.

Fruit trees against walls often suffer from dryness at the roots, the fruit dropping instead of swelling, or ripening prematurely. Soakings of diluted house slops along the side of the wall and a few feet outwards during late autumn or early spring to render the soil thoroughly moist, would do much to prevent the misfortune. If a gravel path or causeway runs alongside the wall, liquid manure poured into holes made with a crowbar, until the ground became thoroughly moistened, then filled with rich compost, greatly assists weakly trees in swelling their crops.

But trees against walls oftentimes grow too luxuriantly through the soil being heavily manured and cultivated. The remedy will be found in root pruning—severing perpendicular roots—firming the ground, and leaving it undisturbed for a radius from the stem of one-third the height of the wall. When the trees have reached the limit of space, they often produce spray in abundance, but fruit sparingly. Root-pruning and a judicious thinning and shortening of the spurs afford growth more calculated to produce fruit; but the better practice is to lay young wood in from the base of the branches, and cut away the old as the new extends for furnishing the space profitably.

Space on low walls of almost any aspect can be attractively and usefully occupied with currants and gooseberries.
FRUIT FOR SALE—UNDER GLASS CULTURE.

This comprises two methods: one in wall-cases or orchard houses, unheated in warm situations or heated in cold districts—so as to have fruits with certainty and in perfection at their natural seasons; the other in heated structures, called forcing-houses, for having the fruits ripe at given times. Various structures essential to attain these objects have been illustrated and described under the different fruits, therefore a few observations on the cultivation of fruit for sale, according to the methods under notice, only remain to be made.

Cool Treatment.

Wall-Cases. A glazed cover, supported on iron standards, with a sloping roof, movable roof-lights, 6 feet wide, fixed against a wall 10 feet in height, costs 16s. 6d. per foot run. Such a structure allows space for a narrow walk inside, fruit trees being trained to the wall and cordon trees in front, thinly disposed and extending about one-third up the sloping lights. If the wall be 12 feet in height, and a lean-to or three-quarters span-roofed house is erected against it, 12 feet in width, with boards and front lights, on the principle of an orchard house, the cost is about £1 5s. per foot run. Trees can be grown on the wall, and others in front in bush form, affording, when in full bearing, twenty-four peaches per foot run of house, worth 6s. to 12s. The wider structure costs relatively only one-third more than the case, but the returns are doubled. Growers must take matters of this kind into consideration.

As regards the cost of construction, some persons assert that a house constructed of the best materials in the most approved style is the cheapest in the end. An elaborate span-roofed structure, 30 feet long and 20 feet wide, appropriate for a gentleman’s garden, costs £80, exclusive of brickwork, internal fittings, and cartage; a market fruit-growing house of the same dimensions—30 feet long, 20 feet wide, 10 feet from floor to ridge, sides 5 feet 6 inches high, 2 feet 6 inches glass below the eaves, with boards below, costs £50 complete, about half the expense of the noble house. As for profit, there is little or none in structures costing twice as much as is necessary to produce fruit of the largest size and greatest excellence.
Fruit grown under glass is more showy than that grown outdoors, and, therefore, commands better prices. There is also less danger of damage from inclement weather, but taking a run of seasons, and disregarding local requirements, outdoor fruits may pay better than those grown on the cool treatment system under glass, for the simple reason that it meets the pockets of the greater number of consumers. Growers of fruit for sale must study the local or general demand, and meet it in the best way. If peaches cannot be grown without covering the wall with glass, calculate the difference between the cost of their production with the glass, and of pears on the wall without the expensive covering, then decide on what is likely to pay the best.

*Apples.*—Only the choicest Continental and American varieties, or special coloured and home-raised sorts, can possibly pay for growing under glass. If the trees are grown in pots, the house will be at liberty from November to March inclusive.

*Apricots.*—These succeed better in wall-cases than in span-roof houses, planted-out trees being more economically managed and more certain in cropping than those in pots. The fruit clashes with imported produce, but choice British-grown apricots command the highest prices, as they are much fresher and superior in quality to the foreign.

*Cherries.*—By husbanding the sun heat after the fruit has stoned, the early varieties are ripe with the first consignments from abroad. Packed attractively in boxes, they command 8d. to 1s. per pound; they are in every way superior to foreign cherries. Late cherries, such as Emperor Francis and Florenee, bring remunerative prices. The trees succeed well in pots, and the house is available for other purposes from October to February inclusive.

*Figs.*—Unless the climate be warm, and there is a special demand for the ripe fruit, figs are not profitable in wall-cases or cool houses, as only one crop can be ripened of the large-fruited varieties in a season.

*Grapes.*—In warm sites grapes ripen in unheated houses, but means of affording artificial warmth is a great aid in preserving the crop or ripening it in unfavourable seasons, and it is absolutely necessary in cold districts. Grape-vines are often trained over the pathways in cool houses in which other fruit is grown, and sometimes on the roofs, at 10 feet or more apart, without prejudice to the trees beneath. The grapes realise from 3d. to 1s. per pound.

*Peaches and Nectarines.*—These comprise the most prized cool-house fruit. Planted-out trees are best for wall-cases and the roofs of cool houses, trees in pots answering in light positions. The prices are occasionally as low as 2s. per dozen, and the best
fruit seldom brings more than 6s. per dozen from mid July to the middle of September, while large well-grown late fruits may realise 8s. to 12s. per dozen in some seasons.

**Pears.**—Fruit from trees grown under glass is, as a rule, more imposing in appearance than superior in quality. In cold districts the fruit from trees kept under glass is large, highly-coloured, and well flavoured, but in most localities it is better to grow the trees in pots, place them in the house for blossoming and setting the fruit, and transfer them outdoors at the end of May or early in June. The method is shown in the illustration (Fig. 70), from a photograph taken in Mr. Rivers' nursery, and which we are enabled, by the courtesy of the proprietors of the *Gardeners' Magazine*, to reproduce. Grape-vines may then be grown beneath the roof in the summer, making the most of the sun-heat. The combination has proved remunerative—a crop of pears being secured on the removed trees, while the grapes cover the expenses of cultivation, and sometimes leave a margin of profit. Large, highly-coloured, clear-skinned pears bring from 1d. to 1s. or more each.
Plums.—Only the gage and large dessert plums grown under glass bring prices likely to prove remunerative, at first-class shops or at the residences of the wealthy. The fruit clashes with imported, but the home grown is much superior in size, colour, bloom, and quality; attractive boxes containing a dozen choice fruits selling from 1s. to 3s. each. The trees succeed admirably in wall-cases; also in pots in light houses.

Strawberries.—Where shelves can be fixed without interfering with the light, or not producing drip on the trees, strawberries in pots may be grown successfully in wall-cases or cool houses, and good fruit, ripe a fortnight before that in the open air, brings 2s. per pound, more or less, according to size and quality. La Grosse Sucrée, Noble, Sir Joseph Paxton, and Royal Sovereign are good varieties for the purpose. British Queen usually commands good prices at first-class shops.

Forced Fruits.

The fruits usually forced for supplying the markets are figs, grapes, melons, nectarines, peaches, pineapples, and strawberries. Apricots, cherries, and plums are seldom forced, the process being considered uncertain, and the fruit not in great request. Early fruit, however, is greatly prized for banquets, and brings good prices.

Apricots.—When these are forced so that the fruit is ripe in May or June, and the specimens are large and well coloured, they bring from 6s. to 12s. per dozen, moderate examples realising only 3s. per dozen. The demand for this fruit is, however, limited, and it is only the fruiterers in a large way of business that are able to dispose of it on terms satisfactory to the grower, who must consult the salesman before speculating in forced-apricot culture.

Cherries.—English cherries are the finest in the world. Trees started at the new year ripen the fruit towards the end of April or early in May. Early Rivers, Governor Wood, and Black Tartarian are good varieties, either for trellises or in standard form for pots. By the potted system the house is set at liberty from July to December, as the cherry trees are better outdoors after the crop is gathered and the growths ripening. The uses to which the house can be put compensates for the extra labour the system entails as compared with planted-out or trellis trees. One pound boxes of ripe cherries bring fancy prices in April, good fruit realising 2s. per pound during May, but the prices soon drop to 1s., or less when imported cherries come to hand. As very little forcing is necessary to have cherries ripe in May and early in
June, it is worth the attention of growers as to whether this fruit would pay for early forcing; it is a question of cultural skill and arrangement with first-class fruiterers. They can always sell the first and the best of every kind of fruit.

_Figs._—It is only in a few establishments, where growing figs for home use has been diverted to marketing, that this fruit is forced for sale. Only a moderate demand exists for figs at any time. Brown Turkey is one of the best varieties. White Marseille is earlier, but white figs do not sell so well as the black or brown. Negro Largo is large and forces well. Planted-out trees restricted to narrow borders give the best results. Started at the New Year, the fruit ripens in May or early in June, and brings from 6s. to 12s. per dozen. Three fruits per superficial foot of trellis is a full early first crop. The second-crop figs ripen in August, and bring 2s. to 3s. per dozen. It is only at first-class fruiterers that figs can be disposed of to advantage.

_Grapes._—No other forced fruit is so popular as the grape; the supply being mainly from forced vines. The chief varieties grown for early and summer use are:—Black Hamburg, Madresfield Court, Foster's Seedling, and Buckland Sweetwater. These afford a supply from April to December, and of the varieties named, Black Hamburg produces fully two-thirds of the summer grapes. Of winter grapes, grown for market, quite two-thirds are Gros Colman. Black Alicante is also still grown largely for the early winter supply, but it is rapidly giving place to Gros Colman. Lady Downes, though the best of late grapes, is of little value for marketing. Indeed, Black Hamburg for early and summer use, and Gros Colman for late autumn and winter supply, are the chief black grapes grown for sale. Muscat of Alexandria is the principal white grape cultivated for summer, autumn, and winter use. Its season is from June to December inclusive, for though it may be kept longer, the losses are considerable. Duke of Buccleuch is grown to a limited extent for early, and Trebbiano for late supplies. Canon Hall Muscat requires the same high temperature and careful management as Muscat of Alexandria, and, well represented, brings the highest prices of all.

In growing grapes for market one variety only should be grown in a house, so that it may receive appropriate treatment. Market growers generally use the soil most convenient. When the soil is very porous, farmyard manure is freely used, as by Mr. Ladds, of Bexley. Others use fish refuse, giving potash and calcareous matter in the form of oyster shells, or brick-field rubbish for drainage. All aim at a fairly porous soil, resting on a well-drained base. A somewhat heavy, yellow loam, freely interspersed with
gravel or gritty matter, is unquestionably the best soil for vines. Large, low, span-roofed houses are extensively employed, so that the vines may be attended to without ladders, and vary in length from 100 to 300 feet, the width being about 24 feet. These vineries are of cheap construction, costing about 1s. per superficial foot, including heating. The vines are planted both in outside and inside borders, as is most convenient, and the houses are utilised for growing tomatoes whilst the vines are young.

Some growers employ rather lofty, well-constructed houses, costing about 2s. per superficial foot of area, including heating, paths, and roof wires; plant the vines inside, the front or side walls being so constructed as to allow the roots to pass outside, and employ supernumerary vines or tomatoes until the permanent vines become remunerative.

Grape-growing for market is practically identical with that for home use. The vines sometimes come into remunerative bearing the second year, but usually the third
season after planting. The yield of a house, 100 feet long and 24 feet wide, is 800 pounds under early forcing, worth about 2s. per pound = £80; for summer crops about 1,600 pounds, which at 1s. per pound amounts to the same sum. The cost of production is about equal, for the forced vines cost more for fuel but less for thinning, manures, also watering, generous support being requisite to enable the vines to carry heavy crops of fruit. With the rods $4\frac{1}{2}$ feet apart, Muscats are produced by market growers early in June at the rate of 1 pound per foot run of rod = 530 pounds at 4s. per pound = £106; summer Muscats (July to September) yield about 2 pounds per foot run of rod = 1,060 pounds, bringing the same amount of money (at 2s. per pound) as the early forced; late Muscats (October to December inclusive) produce about $1\frac{1}{2}$ pounds per foot run of rod = 795 pounds at 3s. per pound = £129 5s. These are gross returns for grapes from structures of equal size—100 feet long and 24 feet wide each. Alicante and Gros Colman produce $3\frac{1}{2}$ pounds per foot run of rod with the rods $4\frac{1}{2}$ feet apart, or $\frac{3}{4}$ pound per foot of area, which for a house 100 feet by 24 feet is 1,800 pounds, and the gross return is 1s. 6d. to 2s. per pound = £135 for Alicante and £180 for Gros Colman. The woodcut (Fig. 71), reproduced from a photograph, represents a house of Gros Colman grapes grown for market by Mr. Stephen Castle, at Messrs. A. and J. Quertier's establishment, Fordingbridge.

The distances of the rods vary with different growers, some following the spur and others the extension system, but the object is the same in all—namely, a maximum crop consistent with its maturing properly. This is imperative at all seasons, and never more so than when prices are low. The consumption of grapes has increased fifty per cent. in the last decade (1880—1890), because the supply has been good as well as cheap. Sensational prices cease with the increase of consumers, for the production receives its incentive from the demand, and it has become a question of producing the heaviest crops of the first quality at the lowest price in order to maintain a supply at all times. Channel Island and English grapes were sold by public auction in the open market at 3d. per pound in 1893. The lowness of prices was due to the enormous supplies of excellent quality consequent on the tropical summer; yet the chief market growers, with regular business connections, managed to realise from 1s. 6d. to 2s. per pound for the best produce of varieties that could be held back without prejudice until the markets were less congested. It was only by business tact and heavy crops that grape-growing could be made remunerative.

Market grape-growing is based on the highest culture, heavy manuring, and...
maximum cropping. Money is not wasted in expensive borders, costly structures, and the fancies that may be indulged in in private gardens. All that is needed to grow grapes profitably is comprised in a favourable rooting fertile medium, cheap yet useful and appropriate houses, getting the vines quickly into bearing, cropping them as heavily as possible for colouring well, feeding highly, and managing well all round. Thus the most profit is got out of the vines in the shortest time at the least cost, and when the vines give indications of exhaustion they are cleared out, young ones planted, and tomatoes grown with them to afford a return for the outlay whilst the vines are becoming established.

Melons.—Early fruit cannot be grown without artificial heat, and late summer fruit has to compete with imported, of which specimens of 3 pounds or more are offered in the shops at 1s. each. There is a good and steady demand for melons in May and June, but their production is somewhat costly, as a high temperature is requisite over a period of three months, or from the time of planting to the ripening of the fruit. Where a sufficiency of leaves and stable litter can be readily obtained it is not difficult to produce melons in frames by June. They may also be grown in low houses or pits which in the autumn, winter, and spring are used for plants or forcing strawberies. This is better than allowing the structures to remain empty, for good melons will bring from 1s. to 2s. each up to and including August, and as the cost is comparatively little, it is questionable whether the fruits do not pay as well as those ripe in May and sold at 4s. to 6s. each, or as June fruits at 2s. to 3s. each. Where a number of structures are heated from one boiler the cost of production is materially reduced, and melons may be grown to pay well; indeed, some expert cultivators find them as remunerative as any other fruit. The varieties must be handsome, well coloured, and of high quality.

Nectarines.—This fruit is not nearly so popular as the peach. Whether this is due to lack of knowledge of the nectarine, or to its somewhat different flavour, it would be difficult to determine. The nectarine is certainly a more beautiful and richer fruit than the peach, but it is also much smaller, and less melting. Still nectarines are increasing in favour, and some growers for sale find them quite as profitable as peaches, especially early in the season. Early Rivers is the best nectarine for early forcing, and after it Lord Napier, a heavy and regular bearer. It is liable to shrink and become discoloured at the apex of the fruit, probably due to over-syringing or continuing it too long. This greatly detracts from its marketing value. Goldoni, Darwin, Pine Apple, and Stanwick Elruge, are also favourite varieties. Nectarines bring about one-third less
money than peaches, but the trees perfect about one-third more fruit on a given area of surface.

Peaches.—Alexander (Waterloo is very similar) is the best variety for very early forcing; Hale's Early for succeeding; Stirling Castle, Royal George, Dymond, and Grosse Mignonne for mid-season forcing. (For other varieties, see page 63). Some growers prefer the trees trained to trellises, 1 foot from the glass, wonderful fruit being so produced; others prefer the trees in low standard form and planted out, while a few growers consider the orchard-house system—cultivation in pots or planted out—shows better results. Where water is abundant, trees in pots (see illustration, Fig. 72), afford good crops, otherwise it is a more costly means of production than the others. The tree represented is one of many grown by Mr. Rivers, and is reproduced from a photograph. The planted-out low standard method is the simplest, and in light roomy structures it has been found the most profitable. The trees are allowed to grow freely for the first two or three years, cropping them moderately; then permitted to carry two or three fruits per foot of area, or as many as the trees will perfect; and when they commence falling off in bearing, are rooted out and others planted. Fruits 18 ounces in weight have been grown on low standard planted-out trees, but such weights are exceptional. Alexander peaches have realised £2 2s. per dozen at the end of March and early in April. The cost and risk of production is not greater to have Alexander, Waterloo, or Early Louise peaches ripe in April than to have
Stirling Castle, Dymond, or Royal George ripe in May—in fact, the expense is one-fifth less.

Except the very early varieties, peaches cannot be forced to pay before the beginning of May or the middle of that month, when good fruits of Hale’s Early, Stirling Castle, Dymond, or Royal George bring from 6s. to £1 per dozen. At the end of May or early in June the prices have receded 3s. to 12s. per dozen, because fruits of the

![Fig. 73. Peach House at Bexley Heath.](image)

very early varieties are forthcoming from trees started at the New Year with moderate assistance from fire heat. As the season advances prices rapidly decline, so that mid-season forcing, to have the fruit ripe in July, is not so profitable as it was before the introduction of the very early varieties, the fruit from which is easily had in unheated houses in the south of England early in July, and from walls by the middle of that month. The cost of production is cheapened about one-fourth by these very early
peaches, and their value when outdoor fruits are plentiful is very low, as in 1893, when they were 1s. per dozen, whilst good fruits of the standard varieties: Dr. Hogg, Dymond, Royal George, Grosse Mignonne and Noblesse, brought prices up to 6s. per dozen. Only very early, and very fine peaches pay for early and mid-season forcing, for from the middle of July the markets are over-stocked with fruit from the Continent, the southern parts of England, and private gardens. Late peaches and nectarines pay better than mid-season forced fruits, as they come in when imported and wall fruit is over. Mr. F. Burton has grown peaches for market very successfully at Bexley Heath, the photographic illustration (Fig. 73), showing the interior of one of his houses when the trees were in flower. Mr. J. Walker grows them with equal success, the trees trained to roof wires in very large houses, at Ham.

Pine-Apples.—The demand for this fruit has greatly fallen off of late years, and the prices have been so reduced through the consignments from St. Michael’s, which arrive in excellent condition, that it is considered unprofitable to grow the pine-apple in quantity at the present day. Nevertheless, first-class English-grown fruit is in moderate request at about 2s. per pound for fruits of from 4 to 6 pounds weight each. It is only from first-class fruiterers, who have to supply select desserts, that remunerative prices can be obtained for English-grown pine-apples, and their principal supplies are drawn chiefly from private establishments. At these places oak or beech leaves are plentiful, so that the pine plants cost nothing beyond labour for bottom heat, and by utilising the available space by the sides of the pathways, or the pit-edges, for French beans, and shelves for strawberries, the expenditure for fuel is considerably reduced. Under these conditions the cost of producing a summer pine-apple is about 2s. 6d., and that of a winter one 3s. 6d. The great difficulty to be overcome in pine-apple growing is the limited demand for the fruit, yet there has of late been an increasing sale of the best home-grown pines (which excel all imported fruits), and some persons have found their culture profitable.

Strawberries.—These are produced largely in private establishments, where there is ample room for the plants outdoors in the summer, and adequate means of forcing them in low, light, airy, well-heated houses, also on shelves in peacheries, vineries, and wall-cases or orchard houses. Some market growers also make a speciality of forcing strawberries, employing the structures for other crops when not occupied with strawberry plants, such as tomatoes, cucumbers, or decorative plants. The varieties selected are generally those with high-coloured, glossy fruit, which must also be of good size,
well shaped and properly finished. John Ruskin is one of the best first-early, then La Grosse Sucrée, followed by Vicomtesse Hericart de Thury, Noble, Royal Sovereign, President, Auguste Nicaise, Sir Charles Napier, and Sir Joseph Paxton. British Queen meets with favour corresponding to its value at first-class fruiterers, while Waterloo as a late forcer is esteemed for its large size and rich glossy crimson colour. Good ripe strawberries at the end of February or early in March bring 1s. to 1s. 6d. an ounce, but are comparatively rare, and not generally profitable, as the crop is one-third only of that of similar plants ripening in April, when the prices range from 2s. 6d. to 6s. per pound. Though April and May are the chief months for forced strawberries, those which ripen later bring good prices. When outdoor fruit is forthcoming in abundance, the prices soon drop to a level at which strawberries cannot be grown under glass to pay.
PACKING AND MARKETING FRUIT.

NOTHING is more lamentable than to see the loose, thoughtless, and reprehensible manner in which much fruit is packed and sent to market. In numbers of instances no care whatever is taken in selection, but small, specked, and partially decayed fruits are included with others which, if kept to themselves, would form a creditable sample. Also it is pitiable to see good fruit of the softer kinds, such as grapes, plums, and peaches, spoilt in transit either through over-ripeness when sent off, or loose packing—the fruits shaking to and fro till they are rendered worthless by bruising. It has been stated that in many agricultural districts less care is taken in sending fruit to market than potatoes. This is true, because the potatoes are sorted but the fruit is not—large and small, good and bad, being all sent together, and all consequently branded as "bad" in the market. It is not so much the superiority of the imported hardy fruit itself as convenient careful methods of packing which has given it such a firm position in our markets. The best fruit in the world may be spoiled in a railway journey, and vast quantities are so spoiled every year—the labour and expense of months being prejudiced, and to a large extent wasted, by neglect in sorting and errors in placing the produce on sale. It may be useful to refer to packing different kinds of fruit for market.

Apples.—Early apples should be gathered when large enough or sufficiently matured for the early season's markets, as they usually bring the best prices. The soft-fleshed kinds, such as Lord Suffield, Ecklinville Seedling, and others, travel badly if left on the trees to become fully ripe, but if gathered under-ripe they must be marketed as soon as possible. If the trees are heavily cropped a third, or even half, may be picked for immediate sale, and those left will grow much finer than if the full crop had been left to ripen. Apples for late storing are best left on the trees as long as possible, without incurring danger from frost. Storing has been fully treated on pages 203—214, Vol. I. Choice fruit is best laid in single or double layers on shelves in a fruit room; large quantities may be laid on a dry floor, and covered after sweating with straw. The fruit must be kept secure from frost.
Although the best fruit pays the best for growing, there may be a proportion of second and even third-class produce from the same trees. American and Australian apple growers find that only the best sorted samples pay for exportation, and they utilise the seconds and thirds for cooking, drying, or cider-making at home. Grading, therefore, is imperative, for there is a market for "firsts," another for "seconds," and one for "thirds." If the fruit is sent unsorted to the market it may only realise a third-rate price, whereas if this fruit had been properly graded the firsts would make the best price in the market, the seconds a fair price, and the thirds realise their proportionate value; or if the markets were fully supplied without the thirds, they could be realised for cider-making, converting into jam or jelly, drying, or feeding stock. It is better to do this than mix thirds with the better fruit; indeed, it pays better to throw inferior fruits away than to mix them with good. All windfallen or bruised apples should be kept by themselves, and be marketed separately.

Pack fairly—even-sized fruits in one package, and have them the same throughout—not the best only on the top and inferior beneath. Only place one sort in a package—mixing sorts is a stamp of inferiority. Brand the packages so that they can be disposed of by sample, then buyers can purchase as many as they like, and, finding what they buy the same all through and reliable, will come again.

Choice apples should be packed in small packages, second quality fruit can be marketed in greater bulk. Extra choice apples may be packed in boxes in layers, other best fruit in flat baskets with lids (Fig. 74, A), or round ones without lids (Fig. 74, B). Common sorts can be offered in the prevailing package of the market to which the fruit is sent. Pots, holding from 84 to 112 pounds, are mostly used in the West of England; in the northern provincial large towns, as Manchester, Sheffield, and others, apples are sold by the stone of 14 pounds, and it is not important whether they are packed in boxes or baskets, provided they are easily lifted by one or two men. Those for London markets are usually packed in "sieves" holding about 1 bushel. (When a half-sieve is mentioned it signifies half-bushel, and a sieve 1 bushel.) These baskets are round, and when filled with apples appear as in the engraving (Fig. 74, B). Salesmen supply them in some cases, and in others the growers find their own. The sides of the baskets should be lined with clean paper, called "fruit paper," costing about 1s. 6d. to 3s. per ream for whitey-brown, and 3s. 6d. for blue paper. It ought to stand over the sides sufficiently for folding over the fruit. Some clean straw or coarse hay is placed over the paper, the whole secured by two sticks—a hazel about as thick as the thumb split
lengthwise, pointed at the ends, and stuck into the upper rounds of the basket. These sticks rise slightly above the fruit and protect it from the weight of the other baskets; this being important, as they are packed on the top of each other, and the bottoms being slightly hollow they pack firmly. In summer time long green grass is generally used, and in winter mixed litter or pea-haulm. In using those or other baskets take care to pack the fruit firmly. The baskets must be well filled, arranging the top layer to present an attractive appearance. Fruit loosely packed always travels badly.

American apples are packed in barrels, each containing 2½ bushels. A piece of thin paper is placed over the bottom, the fruit packed tightly, and a lever employed to press it into the barrels. This causes slight indents in the fruits, but indentation from pressure merely impacts the juices, and decay is less likely to occur than is the case from the bruises inflicted by loose packing. One great advantage of packing apples in barrels is their becoming the property of the purchaser of the fruit. Greengrocers like them because they take up little room, and there is not the trouble of keeping an account of and returning empties to the senders of the fruit. Packing in barrels is a great boon to the salesmen and buyers. The system deserves the attention of home-growers, especially those sending large quantities of apples long distances. The barrels must be clean or new, and each stamped at one end with the brand of the grower or consigner as a guarantee that the contents are what they are described (Fig. 75). Old oil-cake casks
or flour barrels must not be used for packing apples for market, but these and sacks are generally employed for sending apples by the ton to jam factories. Care should be taken to send good weight and good fruit, then there will be no difficulty in finding purchasers.

**Apricots.**—These should be gathered as soon as they are well coloured and before they get soft. The fruit must be carefully packed in small shallow boxes, just deep enough to hold one layer, lining the sides and ends with lace-edged paper standing up about \( \frac{3}{4} \) inch so as to fold over the fruit and form a fringe. Paper shavings, woodwool, or dry, clean, soft moss may be used on the bottom to raise the fruit to the required level, just even with the edges of the box, and some blue or pink tissue paper be placed between them, so as to leave the upper part bare when the box is opened without disturbing the fruit. A sheet of clean white paper being placed over the fruit, the fringe turned down, and fitting evenly and tightly without crushing the fruit, affix the lid lightly with one or at most two tacks at each end. Apricots for preserving or crystallising may be packed in boxes: (1) capacity 10 pounds, inside measurements—length 16\( \frac{1}{2} \) inches, width 10\( \frac{3}{8} \) inches, depth 2\( \frac{1}{4} \) inches; (2) capacity 22 pounds, inside measurements—length 18\( \frac{1}{2} \) inches, width 11\( \frac{3}{8} \) inches, depth 4\( \frac{3}{8} \) inches. The boxes must be lined with clean paper, the fruit packed tightly (without crushing) to prevent its shifting and being damaged in transit. Preserving apricots should be evenly coloured, but not soft, when gathered. Soft apricots travel badly and only keep sound three or four days.

**Cherries.**—These are mainly gathered in Kent by women, but elsewhere boys and men are employed. The fruit must be ripe, evenly coloured, and free from damage. Cherries are usually packed in half-sieves, holding 24 pounds. Early and choice Bigarreau and other kinds are placed in quarter-sieves, holding 12 pounds. The baskets are lined with clean paper, folded over the fruit, a little grass or similar material placed on the paper, and then secured with split hazel sticks in the form of a cross. All cherries must be gathered when perfectly dry. Choice fruit may be packed in boxes, capacity 10 pounds; inside measurements—length 16\( \frac{1}{2} \) inches, width 10\( \frac{3}{8} \) inches, depth 2\( \frac{1}{2} \) inches. Very fine cherries may be
placed in 2-pound boxes or baskets (unreturnable), or be packed in 1 pound punnets. Morellos sell best by the box, two layers only being placed in each, and the weight of the fruit written on a card in each box with the name, as well as on the outside. Choice cherries should be cut off the trees with scissors. Morellos, especially, require this care, and they must have assumed a dark red colour when picked. Cardboard boxes are often used for packing cherries, two layers being placed in each, with the stems cut to about ½ inch in length. For sending great distances the fruit should be packed in wood boxes, and growers must open communications with dealers abroad, for English cherries ripen when the fruit in Southern Europe is over, and are superior to them in flavour. Similar remarks apply to plums and other soft fruits.

**Currants.**—Both black and red currants are generally gathered by women, black currants at the rate of 4d. to 8d. per half-sieve, according to the crop, and red at the rate of 3d. The fruit must be coloured, yet not soft, before gathering, otherwise it will smash and be almost useless when delivered in the market. The half-sieves should be lined with paper, the fruit even in sample, sound, and free from leaves. A sheet of paper should be placed over the fruit, taking care to have the nett weight 24 pounds—any lack of weight, or baskets inferior to sample, lowering the price enormously. The packages are finished with long green grass, kept firm with crossed sticks, the ends pushed through the top of the baskets, and cut even. Each basket then only requires a label, and is ready for the market. Salesmen generally supply baskets, and the requisite number should be ready in time, and as needed, otherwise picking may be delayed and losses considerable, especially when the weather is critical. These remarks apply to all soft fruits. Large, well-ripened red currants may be packed in 1-pound punnets, or small, neat boxes or baskets (not returnable). White currants may be packed similarly for dessert. There is only a limited demand for small packages of currants.

**Figs.**—The fruit should be gathered before it is thoroughly ripe, but sufficiently so for ripening in the course of two or three days. Figs should be placed in shallow boxes 2 or 2½ inches deep, on a layer of soft, clean, dry moss, or woodwool, then tissue paper, laying each fruit in a soft fig (or vine) leaf, with the stalk uppermost, stopping the spaces between the fruit with coloured tissue paper, to make firm. Cover the fruit with a few vine leaves, then tissue paper, and over this enough packing to keep the whole tight when the lid is tacked down. The box should be large enough to hold 1 dozen fruits in a single layer. When opened, and the upper packing removed, the
fruit will have an attractive appearance, provided the side lining paper has a neat fringe, and is turned over about \( \frac{1}{2} \) inch all round. Where large quantities of figs have to be packed, two-layer boxes are sometimes used. These are 20 inches long, ends 12 inches by 3\( \frac{1}{2} \) inches, and hold about 20 pounds. A one-layer fig box is the same length and width, but 2 inches in depth, and holds about 10 pounds.

**Gooseberries.**—Green gooseberries are gathered by women and boys at the rate of 1d. per stone or 2d. per half-sieve, the price varying in different parts of the country, and according to the crop. For the London markets the baskets contain 28 pounds of fruit. The sides are lined, the paper being sufficient to allow of the two sheets lying over one another when turned down, to screen the fruit and keep it clean. Some pea haulm, or rough green grass, is then placed over the paper, the whole secured with two sticks. Ripe gooseberries for market must only just have assumed their colour when gathered. If soft they are not only apt to split in damp weather, but will not travel well nor stand handling. Warrington may be riper than most other kinds, but even this variety is liable to suffer damage. Ripe gooseberries are packed in half-sieves, similar to green. They are also packed in upright punnets, this extra care and labour being well repaid. Choice gooseberries packed in chip punnets, holding \( \frac{1}{2} \) pound or 1 pound, find ready customers in the shops. The punnets are supplied by salesmen at the rate of 5s. to 8s. per gross. Larger quantities of ripe gooseberries may be packed in chip baskets with handles, the handle lying flat during transit.

**Grapes.**—Large quantities of grapes are sent to market in small baskets, holding from 8 to 16 pounds, first lining the baskets with tissue paper, then placing the bunches close together, covering with a sheet of paper, and finally putting this basket into a larger one, termed a "flat." This description of package is shown in Fig. 76.
Some packers place a little clean, soft, dry moss over the bottom of the basket, cotton wadding being objected to, and over this a layer of tissue paper reaching up and over the sides. The grapes are placed as cut in the basket, stem upwards, and quite close, to prevent rubbing. The more attractive the grapes appear when packed the better. Place the basket of grapes in the square shallow basket ("flat"), cover the fruit with a sheet of tissue paper, close the lid of the hamper, and secure it with string. Attach a card to the lid outside on which "Grapes—with care. Please keep this side up," is legibly written or printed. Then affix a label with the contents written on the top line—say "Madresfield Court Grapes, 16 pounds," then the address of the salesman or fruiterer to whom the package is to be forwarded, and below that the name of the sender—"From A. B." Such package will travel safely by rail, and if displayed for sale with as good a bloom as when cut from the vine they realise best prices.

Cross handle baskets are used for enormous quantities of grapes, especially from the Channel Islands. Each basket (Fig. 77) is lined with paper, the grapes placed in stalk end upwards and closely together, weighing the basket before and after they are put in, then a stick is placed across about midway of the distance between the handle and each end, and over these sticks a sheet of paper, so as to cover the whole top, securing it with string. The sticks keep the paper from the grapes, the handle serving as a guard, and preventing other packages from being placed on the grapes. This method of packing grapes is recommended by salesmen. The baskets hold from 10 to 12 pounds of grapes. Growers having only small quantities of fruit to dispose of will find their best customers in fruiterers within easy reach, and these prefer the grapes packed in from 2 to 4 pound split baskets. These are boat-shaped, lined with paper, covered with stouter paper after the grapes are packed, and the baskets sent in crates. Grapes so packed travel safely, and are very handy and acceptable to many purchasers. The baskets also suit dealers and buyers, because "free"—not returnable.

For distant shipment, say to the United States of America, where English late grapes realise good prices in the large cities, boxes are generally employed, capacity 25
pounds; inside measurements—length 18½ inches, width 11¾ inches, depth 5 inches. The box is lined, the grapes placed in tightly, but not crushed, covered with a sheet of paper, the sides folded over, then the lid put on and secured with tacks. Care is taken to quite fill each box, some paper shavings, dry soft moss or woodwool being used at the base when considered necessary, but no material, except paper, should be placed on the fruit, for it is important that the boxes open well and show the quality of the grapes at a glance. Grapes damaged in transit lose value. Common grapes frequently lose half, and best grapes sometimes two-thirds off the prices they would have brought had they been carefully packed or not been damaged in transit. Care also must be taken to give good weight, stating this on a card inside as well as on the label outside the package.

Early grapes command good prices for a short time—Black Hamburgs in April and May, and Muscat of Alexandria's early in June. The early black grapes soon lose colour and should be marketed before they become red. It is the same with late grapes, and both lose weight by keeping. Assuming Gros Colman to be at its best in November or December, every 100 pounds of grapes kept until March loses 25 pounds, therefore 100 pounds of grapes sold in December at 2s. per pound = £10, are almost as valuable as 75 pounds in March at 3s. 6d. per pound = £13 2s. 6d.—often more so when depreciation from decay and bad keeping are taken into account. The losses consequent on keeping grapes to a late period in the spring has been to a great extent lessened by cutting and storing them in rooms specially erected for that purpose, as described on pages 316—322, Vol. II.

Melons.—Melons should be cut in the early ripening stage, or two or three days in advance of their best condition, securing a portion of stalk with each fruit. Wrap each melon in tissue paper, then roll in cotton wool, and place closely together on paper shavings, stopping the interstices between the fruits, and fill the basket or box with the same material so that the fruits cannot be displaced in transit. Dry, soft, sweet moss or hay may be used instead of paper shavings. Avoid old newspapers—they give a second-hand appearance to fruit packages, and the value of the fruit is rated accordingly.

Nuts.—The crop of filberts is often gathered green, as soon as the kernels fill the shell, and they are sent to market at once. This is a practice generally adopted where hops are grown, so as to dispose of the crop before the hop-pickers arrive. But the nuts are best left until September and October, then they come off the trees with a good
shaking. They are then picked up by women and boys, spread about 9 inches thick on a floor (boarded preferably), and turned over occasionally to prevent moulding. In this way they will keep for a length of time, but the bulk is generally sent to market by the middle of December. Well-preserved nuts bring good prices in February. The nuts are looked over before packing, and all small or faulty ones picked out. They are packed in sieves (7 gallons each) just as they grow, with the husk on and covered with paper, straw or coarse hay being spread over it, and this is kept in place by sticks. Nuts (filberts and cobs) are sold in Covent Garden Market by the 100 pounds (4 pounds extra being given), otherwise by the pound, hundredweight, or ton. A demand for English cob-nuts has arisen in America, and it only needs meeting in a business-like manner to assume important proportions. Many acres of land in this country might be profitably cleared of the worse than worthless scrub, planted with nut trees, and with little more attention than gathering the crop, at a cost of £1 to £1 10s., would yield a yearly average of \( \frac{1}{3} \) ton of nuts, worth £25 to £35. Green, well-kernelled nuts are in request for dessert on the Atlantic steamers.

Green walnuts command a fair price for pickling. Ripe walnuts sell for 4d. per pound retail; wholesale the price is often half, or less—the retailer often deriving more profit at a single turn-over than the grower does for a year’s labour and care. The ripe walnuts are shaken or beaten down, picked and spread on a floor until the husks part readily from the nuts, not allowing them to lie until the shells are discoloured. They are then cleaned by rubbing in a sack and packed in half-sieves or other baskets. Chestnuts are treated in a similar manner.

*Peaches and Nectarines.*—Mr. W. H. Divers, Belvoir Castle Gardens, an experienced grower, describes his method of packing as follows:—“The peaches must be gathered as soon as they begin to feel soft at the base, and then sent to market as quickly as possible. They require very great care in handling, or they show every finger-mark in a short time, and only realise very low prices. . . . For marketing the fruit the salesmen generally supply boxes about 3 inches deep, that will hold about two dozen in one layer. Each fruit should have a strip of white tissue paper wrapped round the sides, so as to cover the lower half of the fruit. A twist at the bottom after wrapping it round will help to keep it on. Strips of cotton wool about 1\( \frac{1}{2} \) inch are then cut across the piece and opened out from each end, so as to form a strip of wadding about 2\( \frac{1}{2} \) feet long, and 1\( \frac{3}{4} \) inch wide. This is carefully rolled round each fruit as many times as it will go over the tissue paper. The boxes should be lined with cotton wool inside,
and the peaches placed in them closely together as they are wrapped. When the box will hold no more, small pieces of wadding may be gently pushed in the corners of the package and wherever there is room, so as to make all secure and prevent any movement of the fruit. If they are packed in the way I have described, they should now be firmly in the boxes with nothing around the upper half of the fruit, so that everyone can see their size and colour when offered for sale. A sheet of tissue paper must next be laid over them, and then one or two pieces of wadding, the same size as the box, so as to fill up and prevent any movement when travelling. Packing peaches requires great care, but pays for all the attention bestowed upon it. I have for several years past packed from 4,000 to 6,000 annually in the above manner, and had no complaints from anyone about damage, although some of it travelled 400 to 500 miles. There is no system equal to it, although moss, dried grass, and other things are sometimes recommended. The table on which the packing is done should always have a strip of wool on it to lay the fruit on. Peaches will keep several days if laid on some dry and soft material in a cool and dry room."

Peaches and nectarines for travelling short distances are sometimes packed in flat punnets, holding half-a-dozen each, covered with tissue paper. Another slightly smaller punnet filled with moss covered with tissue paper is inverted over the fruit, its head resting on the moss lining of the packed punnet, and the two secured together with string. The punnets are placed in boxes so that they cannot move, and when received by the fruiterer he simply has to unpack the box, remove the inverted punnet, and place the fruit in the shop window.

Pears.—Most of the early pears are of better quality if gathered before they are fully ripe, and should not be left to colour on the trees. They must be gathered and packed with great care. Every fruit thrown into the basket or falling on another not only bruises itself, but also the one it drops on. Early pears are packed in half-sieve or sieve baskets, lined with fruit paper, and are covered with paper, a little long grass, and this secured with hazel sticks. Autumn pears should be gathered and sent to market similar to summer pears.

Late pears should be left as long as possible on the trees, as they ripen much better if left to mature thoroughly. Medium-sized baskets lined are the best for pears, placing each in steadily, and when emptying the basket, guard against the slightest bruising of the fruit. In gathering from standard trees a bag is frequently used; but nothing could be worse, as the fruits move about with every movement of the pickers and are bruised.
Pears require a rather higher and drier atmosphere for storing than apples, and are improved in quality by being placed in a rather warmer situation shortly before use. (See storing fruit, pages 203—214, Vol. I.)

General orchard and second-class plantation pears can be packed in the same way as apples, that is, in sieve or bushel baskets, but choice fruit should be packed in boxes, very choice pears placed in single layers. The boxes must be large enough to admit of a little packing beneath and over the fruit. Specimen Pitmaston Duchess and other very large pears require a box from 18 to 20 inches in length, 12 inches in width, and 4 inches in depth; extra large fruit take a box 24 inches long, 15 inches wide, and 6 inches deep for a dozen. Those sizes are exceptional. Ordinary fruits such as Louise Bonne of Jersey and Durondeau pack well in a box 15 inches long, 10 inches wide, and 3½ inches deep. Such will hold two tiers of small fruits, as Beurre d'Aremberg. Boxes that will take 1 dozen large fruits will hold 1¼ dozen medium, aslant, or 2 dozen smaller in two layers, and all should be firmly packed. Several boxes may be tied securely one on another, but they are preferably packed in crates.

Pineapples.—The fruit should be cut when well coloured all over—not allowed to become dead ripe, so that it will keep in sound condition several days, and be an attraction in the fruiterer's window. It is best cut with a portion of stem, and all that is needed is to wrap it in clean, white, rather stout paper, with the leaves of the crown drawn upwards rather than crumpled and broken, securing with matting at both ends and at the joint between the crown and fruit. Nothing further is required beyond laying the fruit flat in a box on a good bed of paper shavings or sweet hay, and adding more all round and over to make all tight when the lid is lightly nailed on. Two, three or more fruits can be placed in a box, but it is best to have them in a single layer.

Plums.—If the fruit has to be sent a long distance it must be gathered as soon as well coloured, and before it becomes soft. Plums are sent to the London markets packed in half-sieves, which are generally made to a little over 28 pounds. Damsons are packed similarly to plums, but many growers prefer flat, lidded baskets, a bushel flat being 21 inches long, 16 wide, and 10 inches deep, inside measure.

Choice plums for dessert may be packed in shallow boxes, just deep enough to hold one layer. The box for such varieties as Jefferson, and Coe's Golden Drop, should be 10 inches in length, 6 inches in width, and 2 inches in depth, inside measurement, for holding a dozen specimen fruits. The ends should be of ¾-inch stuff, sides ¼ inch, bottom ½ inch, and lid ¼ inch, secured together with wire nails, and the timber dressed
as smoothly as possible. It ought to be a free box—the buyer taking it as well as the fruit. The box should be lined with paper, that at the sides and ends standing up $\frac{1}{2}$ inch to $\frac{3}{4}$ inch, with a lace edge for turning down over the fruit. Only tissue paper should be used for packing, placing some between the fruits and in the corners of the box, leaving the upper side of the fruit exposed, when it will only need covering with a sheet of tissue paper, the lace paper turned over and the lid lightly nailed on. All the gage plums, when large and fine, can be marketed in boxes. Cardboard and other boxes answer fairly well for sending plums short distances. Such expedients as cast-off boxes from confectioners impart a second-hand appearance to the fruit. A two-layer plum box is $15\frac{1}{2}$ inches long, $8\frac{1}{4}$ inches wide, and $3\frac{1}{2}$ inches deep. It holds about 10 pounds. Gage and other choice plums travel well in such boxes as the one shown (Fig. 78), if care is taken to pack tightly and before the fruit gets soft.

_Raspberries._—When required for dessert, raspberries should be gathered with stalks and packed in flat 1-pound punnets, similar to strawberries, and sent to market in a large box. (See strawberries.) If the fruit is required for preserving, it should be gathered without stalks and carefully packed in small glazed earthenware jars or crocks, holding 7 pounds; or large, holding 14 pounds. These crocks are used both for raspberries and strawberries in the Midland and Northern counties. They are clean, retain the juice, and are worth adopting everywhere for juicy fruits, in place of the dirty basketing system. In Kent, women pick the fruit for preserving into small wooden or galvanised pails, and earn from 1s. to 2s. per day. Such raspberries are sent to market in tubs, holding 28 pounds or 56 pounds each. This fruit is one of the most difficult to market in good condition; it is also oftener spoiled by rain than
PACKING AND MARKETING FRUIT—STRAWBERRIES.

any other. Advantage, therefore, should be taken of every fine day when the fruit is perfectly dry to gather all that are coloured. They should, however, be all of the same degree of ripeness, for unripe and over-ripe, as well as faulty fruit equally spoil the samples.

Strawberries.—The fruit should be gathered as soon as it becomes red and perfectly dry, the dew having passed off. This is the best plan, for strawberries gathered when damp do not have a rich, glossy appearance when they reach the market, and wet fruit is not good for preserving purposes. In large cultures picking, however, is done very early in the morning, and necessitates a good supply of labour, as 6,000 pecks of 12 pounds each have been picked from a farm in one day. The pickers are paid at the rate of 5d. a peck, and have to be out by 3 o'clock in the morning to get the first supplies for the early trains. Women pack the fruit for dessert in punnets, about 6 inches in diameter and 2 inches deep, for early and fine fruits, but for later pickings punnets known as "deep pounds" are preferred. A few leaves should be placed in the bottom and around the sides of the punnet, the strawberries packed in it attractively, but without recourse to the deceptive practice of topping with extra fine fruit while that beneath is inferior. A punnet of strawberries properly packed is shown in Fig. 79.

No small, damaged, or decayed fruit should be packed with the good. Each punnet must contain the exact weight of strawberries stated—whether ½ pound or 1 pound. The punnets are placed in deal boxes, holding five dozen, a dozen punnets being placed in a tier, as shown in Fig. 80, and the several tiers are supported on movable bottoms resting on strips nailed on the sides of the box. The fruit must not be piled above the edge of the punnets. Some growers use boxes 34 inches long, 21 inches wide, and
22 inches deep, inside measurement. These have ledges on two sides of the box 4 inches from the base for a false bottom to rest on, this being made of strips of deal ⅛-inch thick and long enough to reach the small ledges at the sides. By having the first ledge at 4 inches from the bottom, and the other at 8½, 13, and 17½ inches respectively, the box will hold five layers of punnets, fifteen in a layer, 75 pounds of fruit. Each layer of punnets is covered with rhubarb or cabbage-leaves with the mid-ribs taken out, the leaves being perfectly dry. The boxes, of course, may be of any size, provided the punnets pack tightly in them without crushing the fruit. The boxes are best with locks, and should be sent off by spring vans.

Square chip baskets, 5 inches across the top, 3 inches at the bottom, and the same in depth, holding about 1 pound of fruit, have come into favour, and no wonder, as they are handy, therefore appreciated when containing fine strawberries attractively packed (Fig. 81). The handle bends down and fits closely over the edge of the basket, then any desired number can be arranged in a box, or twelve baskets be placed in one, as shown in Fig. 82. A few soft leaves should be spread on the fruit before placing on the lid. Several boxes may be tied together in a stack; but the better plan is to pack the baskets in a box of three to five tiers as described for punnets.

Strawberries for dessert should be gathered with not less than half an inch of stalk. Fruit for preserving is generally gathered without stalks, and placed in glazed earthenware crocks or pots holding 18 to 24 pounds each, these having the lids properly secured retain all the juice. In Kent the inferior fruit is put in tubs or barrels, holding 56 pounds, and sent to jam makers. By inferior is meant the small of the larger-fruited varieties, for no bad
fruit finds favour with fruit-preservers; indeed, many have fruit of particular varieties grown specially for them, and are as particular about the quality as connoisseurs are of having picked fruit for dessert.

Sending Fruit by Parcel Post.—A considerable amount of fruit is sent by parcel post. There are a number of packages—forms to suit all tastes—for this purpose, light, well-arranged, and cheap. Some are substantial and intended for frequent journeys; these are the worst of all, for a dirty package causes loathing. The packages should be new, and with the fruit tempting, this being packed closely, so that it cannot move and be damaged in transit. The direction label should be free, so that the post-office punches will be upon it and not on the box to crush it and its contents.

Persons wishing to market their fruit to the best advantage should note the way in which French growers send their produce to the British markets. The packages, as a rule, are small, neat, clean, handy, attractive, and "free"—unreturnable. Compare these imported packages with the rough English baskets, many from local growers being totally unfit for the purposes, and the reason becomes apparent why buyers prefer imported fruit. By the adoption of better methods in packing and marketing the demand for home-grown fruit would be enormously increased.
**PRICES OF FRUITS.**

Covent Garden, London, is the leading fruit market in the world. The experience of growers, however, points to the necessity of disposing of as much produce locally as possible, with a view of saving carriage, establishing a connection, and becoming thoroughly acquainted with the trade. Then, if it be necessary to extend the sphere of action, feel the way to the great marts, ascertaining by inquiries and observation the most likely one, at which there is a demand for the particular commodity wished to be disposed of, and finding such to afford a fair percentage of profit, adhere to it. Changing markets or salesmen is only useful as a speculation, and should only be indulged in (where it can be afforded) as a feeler, for a better opening that may present itself for establishing a trade. Sending fruit for disposal in the open market is always risky, for the prices depend upon the quality of the samples, the supply in the market, and the demand. When the grower sends regularly, and keeps himself well posted with his salesman or fruiterer, he may generally rely on a fair price for his goods, with less fluctuations than another sending spasmodically and without knowledge of there being a sale for what he proposes consigning.

**APPROXIMATE AVERAGE OF COVENT GARDEN MARKET WHOLESALE PRICES IN 1892 AND 1893, AS GIVEN IN THE GARDENER'S CHRONICLE BY MR. JAMES WEBBER.**

<table>
<thead>
<tr>
<th>Fruits</th>
<th>JANUARY</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7th, 1892</td>
<td>9th, 1892</td>
<td>14th, 1892</td>
<td>12th, 1892</td>
<td>21st, 1892</td>
<td>29th, 1892</td>
<td>24th, 1893</td>
</tr>
<tr>
<td>Apples, per half-sieve</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American, per barrel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobs, per 100 pounds</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grapes, per pound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melons, each</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pine-apples, St. Michael</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>Fruits</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>4th, 1892</td>
<td>2nd, 1893</td>
<td>11th, 1892</td>
<td>9th, 1893</td>
<td>18th, 1892</td>
<td>16th, 1893</td>
<td>25th, 1892</td>
</tr>
<tr>
<td>Apples, per half-sieve</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American, per barrel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobs, per 100 pounds</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Grapes, per pound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pine-apples, St. Michael</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit</td>
<td>3rd, 1892</td>
<td>2nd, 1892</td>
<td>19th, 1892</td>
<td>8th, 1892</td>
<td>16th, 1892</td>
<td>24th, 1892</td>
<td>31st, 1892</td>
</tr>
<tr>
<td>------------------------</td>
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<td>-----------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>Apples, per half-sieve</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>40 0</td>
<td>40 0</td>
<td>40 0</td>
<td>40 0</td>
<td>40 0</td>
<td>40 0</td>
<td>40 0</td>
</tr>
<tr>
<td>Grapes, per pound</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
</tr>
<tr>
<td>Pine-apples, St. Michael, each</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
</tr>
<tr>
<td>Strawberries, per pound</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
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</tbody>
</table>

March 31st, 1892, same as 24th, except Strawberries, 8s to 12s; also March 29th, 1893, same as 23rd, except Grapes, new, per pound, 4s to 6s; and Strawberries, per pound, 2s to 6s.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>5th, 1892</th>
<th>6th, 1893</th>
<th>12th, 1892</th>
<th>11th, 1893</th>
<th>19th, 1892</th>
<th>18th, 1893</th>
<th>26th, 1892</th>
<th>25th, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per half-sieve</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
</tr>
<tr>
<td>Grapes, new, per pound</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
</tr>
<tr>
<td>Pine-apples, St. Michael, each</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
</tr>
<tr>
<td>Strawberries, per pound</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
</tr>
</tbody>
</table>

May 15th, 1893. Peaches, per dozen, 6s to 9s. May 25th, 1893, Peaches, 6s to 9s. May 25th, 1893, Gooseberries, per half-sieve, 2s to 3s 6d.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>2nd, 1892</th>
<th>1st, 1892</th>
<th>9th, 1892</th>
<th>8th, 1892</th>
<th>16th, 1892</th>
<th>24th, 1892</th>
<th>31st, 1892</th>
<th>3rd, 1893</th>
<th>2nd, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per half-sieve</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
<td>10 0 0 3 6</td>
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<td>10 0 0 3 6</td>
</tr>
<tr>
<td>Tassanian, per case</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
<td>4 0</td>
</tr>
<tr>
<td>Cherries, per half-sieve</td>
<td>16 0 0 3 6</td>
<td>16 0 0 3 6</td>
<td>16 0 0 3 6</td>
<td>16 0 0 3 6</td>
<td>16 0 0 3 6</td>
<td>16 0 0 3 6</td>
<td>16 0 0 3 6</td>
<td>16 0 0 3 6</td>
<td>16 0 0 3 6</td>
</tr>
<tr>
<td>Curtains, black, per half-sieve</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
</tr>
<tr>
<td>Gooseberries, per half-sieve</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
</tr>
<tr>
<td>Grapes, per pound</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
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<tr>
<td>Peaches, per dozen</td>
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<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
<td>3 6</td>
</tr>
<tr>
<td>Pine-apples, St. Michael, each</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
<td>2 0</td>
</tr>
<tr>
<td>Strawberries, per pound</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
<td>6 0</td>
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</tbody>
</table>

June 16th, 1892. Melons, each, 5s to 6s 6d. June 23rd, 1892, Melons, each, 2s to 3s. June 30th, 1892, Grapes 1s to 2s. June 23rd, 1893, same as June 22nd.
# THE FRUIT GROWER'S GUIDE.

## JULY.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>7th, 1892</th>
<th>8th, 1893</th>
<th>10th, 1893</th>
<th>14th, 1892</th>
<th>15th, 1893</th>
<th>16th, 1892</th>
<th>17th, 1893</th>
<th>21st, 1892</th>
<th>22nd, 1892</th>
<th>23rd, 1892</th>
<th>27th, 1892</th>
<th>28th, 1892</th>
<th>29th, 1892</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per half-sieve</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
</tr>
<tr>
<td>Cherries, per half-sieve</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
<td>40 to 80</td>
</tr>
<tr>
<td>Currants, black, per half-sieve</td>
<td>30, 70</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Gooseberries, per half-sieve</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Grapes, per pound</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Peaches, per dozen</td>
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<td>10</td>
<td>10</td>
<td>10</td>
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<td>10</td>
<td>10</td>
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<td>10</td>
<td>10</td>
<td>10</td>
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<td>10</td>
</tr>
<tr>
<td>Pome-apples, St. Michael, each</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
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<td>20</td>
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<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
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</tr>
<tr>
<td>Plums, per half-sieve</td>
<td>03, 10</td>
<td>03, 10</td>
<td>03, 10</td>
<td>03, 10</td>
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<td>03, 10</td>
<td>03, 10</td>
<td>03, 10</td>
<td>03, 10</td>
</tr>
<tr>
<td>Strawberries, per pound</td>
<td>03, 16</td>
<td>03, 16</td>
<td>03, 16</td>
<td>03, 16</td>
<td>03, 16</td>
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</tbody>
</table>

## AUGUST.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>4th, 1892</th>
<th>5th, 1892</th>
<th>6th, 1892</th>
<th>10th, 1893</th>
<th>11th, 1893</th>
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<th>16th, 1892</th>
<th>17th, 1893</th>
<th>20th, 1892</th>
<th>21st, 1892</th>
<th>22nd, 1892</th>
<th>23rd, 1892</th>
<th>24th, 1892</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
</tr>
<tr>
<td>Cherries, per half-sieve</td>
<td>30 to 50</td>
<td>30 to 50</td>
<td>30 to 50</td>
<td>30 to 50</td>
<td>30 to 50</td>
<td>30 to 50</td>
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<td>30 to 50</td>
<td>30 to 50</td>
<td>30 to 50</td>
<td>30 to 50</td>
</tr>
<tr>
<td>Currants, black, per half-sieve</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
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<td>40</td>
</tr>
<tr>
<td>Filberts, per 100 pounds</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
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<td>35</td>
</tr>
<tr>
<td>Grapes, per pound</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Peaches, per dozen</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pome-apples, St. Michael, each</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Plums, per half-sieve</td>
<td>03</td>
<td>03</td>
<td>03</td>
<td>03</td>
<td>03</td>
<td>03</td>
<td>03</td>
<td>03</td>
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<td>03</td>
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<td>03</td>
</tr>
</tbody>
</table>

## SEPTEMBER.

| Fruit | 1st, 1892 | 2nd, 1892 | 3rd, 1892 | 4th, 1892 | 5th, 1892 | 6th, 1892 | 7th, 1892 | 10th, 1893 | 11th, 1893 | 12th, 1893 | 13th, 1893 | 14th, 1893 | 15th, 1893 | 16th, 1893 | 17th, 1893 | 20th, 1893 | 21st, 1893 | 22nd, 1893 | 23rd, 1893 | 24th, 1893 | 27th, 1893 | 28th, 1893 | 29th, 1893 | 30th, 1893 |
|-------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Cobs, per 100 pounds | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peaches, per dozen | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pome-apples, St. Michael, each | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plums, per half-sieve | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## OCTOBER.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>6th, 1892</th>
<th>7th, 1892</th>
<th>8th, 1892</th>
<th>9th, 1892</th>
<th>10th, 1892</th>
<th>11th, 1892</th>
<th>12th, 1892</th>
<th>13th, 1892</th>
<th>14th, 1892</th>
<th>15th, 1892</th>
<th>16th, 1892</th>
<th>17th, 1892</th>
<th>18th, 1892</th>
<th>19th, 1892</th>
<th>20th, 1892</th>
<th>21st, 1892</th>
<th>22nd, 1892</th>
<th>23rd, 1892</th>
<th>24th, 1892</th>
<th>25th, 1892</th>
<th>26th, 1892</th>
<th>27th, 1892</th>
<th>28th, 1892</th>
<th>29th, 1892</th>
<th>30th, 1892</th>
</tr>
</thead>
</table>
## PRICES OF FRUITS—PROVINCIAL MARKETS.

### NOVEMBER.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>3rd, 1892</th>
<th>2nd, 1893</th>
<th>10th, 1892</th>
<th>9th, 1893</th>
<th>17th, 1892</th>
<th>16th, 1893</th>
<th>24th, 1892</th>
<th>23rd, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>2 to 7</td>
<td>2 to 7</td>
<td>1 to 6</td>
<td>2 to 7</td>
<td>2 to 7</td>
<td>1 to 6</td>
<td>2 to 7</td>
<td>1 to 7</td>
</tr>
<tr>
<td>Coho, per 100 pounds</td>
<td>100</td>
<td>32 6</td>
<td>100</td>
<td>32 6</td>
<td>100</td>
<td>32 6</td>
<td>100</td>
<td>32 6</td>
</tr>
<tr>
<td>Grapes, per pound</td>
<td>4 6</td>
<td>4 6</td>
<td>10</td>
<td>6 6</td>
<td>10</td>
<td>6 6</td>
<td>4 6</td>
<td>6 6</td>
</tr>
<tr>
<td>Pears, apples, St. Michael, ea.</td>
<td>4 0</td>
<td>6 0</td>
<td>3 0</td>
<td>7 6</td>
<td>4 0</td>
<td>6 0</td>
<td>3 0</td>
<td>7 6</td>
</tr>
</tbody>
</table>

### DECEMBER.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>1st, 1892</th>
<th>November</th>
<th>20th, 1892</th>
<th>8th, 1892</th>
<th>7th, 1893</th>
<th>15th, 1892</th>
<th>14th, 1893</th>
<th>22nd, 1892</th>
<th>21st, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>2 to 7</td>
<td>2 to 7</td>
<td>1 to 6</td>
<td>2 to 7</td>
<td>2 to 7</td>
<td>1 to 6</td>
<td>2 to 7</td>
<td>1 to 7</td>
<td>2 to 7</td>
</tr>
<tr>
<td>Coho, per 100 pounds</td>
<td>100</td>
<td>102</td>
<td>32 6</td>
<td>120</td>
<td>125</td>
<td>32 6</td>
<td>120</td>
<td>125</td>
<td>32 6</td>
</tr>
<tr>
<td>Grapes, per pound</td>
<td>4 6</td>
<td>6 0</td>
<td>10</td>
<td>6 6</td>
<td>10</td>
<td>6 6</td>
<td>4 6</td>
<td>6 6</td>
<td>10</td>
</tr>
<tr>
<td>Pears, apples, St. Michael, ea.</td>
<td>4 0</td>
<td>6 0</td>
<td>2 6</td>
<td>7 6</td>
<td>4 0</td>
<td>6 0</td>
<td>2 6</td>
<td>7 6</td>
<td>4 0</td>
</tr>
</tbody>
</table>

December 22nd, 1892, same as 21st.

## AVERAGE PRICES OF HARDY FRUITS IN LONDON AND LARGE PROVINCIAL TOWNS MARKETS IN 1892 AND 1893.

### JANUARY.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>December</th>
<th>31st, 1891</th>
<th>6th, 1893</th>
<th>7th, 1892</th>
<th>12th, 1893</th>
<th>14th, 1893</th>
<th>19th, 1893</th>
<th>21st, 1892</th>
<th>28th, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, English, per bushel</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>150</td>
<td>230</td>
<td>12 6</td>
<td>15 0</td>
<td>23 0</td>
<td>12 6</td>
<td>15 0</td>
<td>23 0</td>
<td>15 0</td>
</tr>
<tr>
<td>Pears, per half-sieve</td>
<td>2 0</td>
<td>2 6</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

* Baldwin, Newtown Pippin, or Northern Spy.  
† Choice dessert.

### FEBRUARY.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>4th, 1892</th>
<th>2nd, 1893</th>
<th>11th, 1892</th>
<th>9th, 1893</th>
<th>18th, 1893</th>
<th>16th, 1893</th>
<th>26th, 1893</th>
<th>23rd, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>119</td>
<td>23 0</td>
<td>22 0</td>
<td>15 0</td>
<td>20 0</td>
<td>14 0</td>
<td>15 0</td>
<td>20 0</td>
</tr>
<tr>
<td>Pears, per half-sieve</td>
<td>10 0</td>
<td>16 0</td>
<td>14 0</td>
<td>16 0</td>
<td>8 0</td>
<td>17 6</td>
<td>12 0</td>
<td>10 0</td>
</tr>
</tbody>
</table>

* Newtown Pippin, Northern Spy, and Golden Russet.

### MARCH.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>3rd, 1892</th>
<th>2nd, 1893</th>
<th>10th, 1892</th>
<th>9th, 1893</th>
<th>17th, 1892</th>
<th>16th, 1893</th>
<th>24th, 1892</th>
<th>23rd, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
<td>s. d.</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>15 0</td>
<td>28 0</td>
<td>21 0</td>
<td>15 0</td>
<td>28 0</td>
<td>21 0</td>
<td>15 0</td>
<td>28 0</td>
</tr>
<tr>
<td>Pears, per half-sieve</td>
<td>12 0</td>
<td>20 0</td>
<td>12 0</td>
<td>20 0</td>
<td>12 0</td>
<td>20 0</td>
<td>12 0</td>
<td>20 0</td>
</tr>
</tbody>
</table>

* Newtown Pippin, Northern Spy, and Golden Russet.
### THE FRUIT GROWER'S GUIDE.

#### APRIL.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>7th, 1892</th>
<th>8th, 1893</th>
<th>14th, 1892</th>
<th>13th, 1893</th>
<th>21st, 1892</th>
<th>20th, 1893</th>
<th>29th, 1892</th>
<th>27th, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>American, per barrel</td>
<td>2 to 6</td>
<td>6 to 6</td>
<td>4 to 6</td>
<td>6 to 6</td>
<td>4 to 6</td>
<td>6 to 6</td>
<td>4 to 6</td>
<td>6 to 6</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
<td>10</td>
<td>15</td>
<td>10</td>
<td>15</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

* Newtown Pippin, Northern Spy, and Golden Russet. + Nonpareil.

#### MAY.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>5th, 1892</th>
<th>4th, 1893</th>
<th>12th, 1892</th>
<th>11th, 1893</th>
<th>19th, 1892</th>
<th>18th, 1893</th>
<th>29th, 1892</th>
<th>28th, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>American, per barrel</td>
<td>25 to 30</td>
<td>10 to 15</td>
<td>20 to 30</td>
<td>15</td>
<td>20 to 30</td>
<td>17 to 20</td>
<td>20 to 30</td>
<td>17 to 30</td>
</tr>
<tr>
<td></td>
<td>12 to 16</td>
<td>15</td>
<td>12 to 16</td>
<td>12</td>
<td>12 to 20</td>
<td>12 to 20</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Tasmanian, per case</td>
<td>6 to 9</td>
<td>10 to 15</td>
<td>6 to 12</td>
<td>9 to 12</td>
<td>10 to 12</td>
<td>9 to 12</td>
<td>10 to 12</td>
<td>9 to 12</td>
</tr>
</tbody>
</table>

* Nonpareil.

#### JUNE.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>2nd, 1892</th>
<th>1st, 1893</th>
<th>9th, 1892</th>
<th>8th, 1893</th>
<th>16th, 1892</th>
<th>15th, 1893</th>
<th>23rd, 1892</th>
<th>22nd, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>American, per barrel</td>
<td>5 to 10</td>
<td>10 to 15</td>
<td>10 to 15</td>
<td>10 to 15</td>
<td>9 to 10</td>
<td>10 to 15</td>
<td>9 to 10</td>
<td>10 to 15</td>
</tr>
<tr>
<td></td>
<td>6 to 10</td>
<td></td>
<td>6 to 10</td>
<td></td>
<td>5 to 10</td>
<td></td>
<td>5 to 10</td>
<td></td>
</tr>
<tr>
<td>Tinmanian, per case</td>
<td>12 to 20</td>
<td>15 to 20</td>
<td>12 to 20</td>
<td>15 to 20</td>
<td>12 to 20</td>
<td>15 to 20</td>
<td>12 to 20</td>
<td>15 to 20</td>
</tr>
<tr>
<td>Cherries, per half-sieve</td>
<td>70</td>
<td>100</td>
<td>66</td>
<td>100</td>
<td>66</td>
<td>100</td>
<td>66</td>
<td>100</td>
</tr>
<tr>
<td>Currants, black, per half-sieve</td>
<td>19</td>
<td></td>
<td>20</td>
<td></td>
<td>19</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Gooseberries, per half-sieve</td>
<td>30</td>
<td></td>
<td>26</td>
<td></td>
<td>30</td>
<td></td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Apricots, per box 10 pounds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greengages, per box</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strawberries, per peck</td>
<td>60</td>
<td>100</td>
<td>60</td>
<td>100</td>
<td>60</td>
<td>100</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

* Imported, per box of 16 pounds. + Imported.

#### JULY.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>7th, 1892</th>
<th>8th, 1893</th>
<th>14th, 1892</th>
<th>13th, 1893</th>
<th>21st, 1892</th>
<th>20th, 1893</th>
<th>29th, 1892</th>
<th>27th, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>American, per barrel</td>
<td>5 to 10</td>
<td>10 to 15</td>
<td>5 to 10</td>
<td>10 to 15</td>
<td>5 to 10</td>
<td>10 to 15</td>
<td>5 to 10</td>
<td>10 to 15</td>
</tr>
<tr>
<td></td>
<td>5 to 10</td>
<td></td>
<td>5 to 10</td>
<td></td>
<td>5 to 10</td>
<td></td>
<td>5 to 10</td>
<td></td>
</tr>
<tr>
<td>Australian, per case</td>
<td>60</td>
<td>100</td>
<td>60</td>
<td>100</td>
<td>60</td>
<td>100</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Cherries, per half-sieve</td>
<td>40</td>
<td>60</td>
<td>40</td>
<td>60</td>
<td>40</td>
<td>60</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Currants, black, per half-sieve</td>
<td>30</td>
<td></td>
<td>40</td>
<td></td>
<td>30</td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Gooseberries, per half-sieve</td>
<td>30</td>
<td></td>
<td>30</td>
<td></td>
<td>30</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Pears, per half-sieve</td>
<td>2 to 3</td>
<td>3 to 4</td>
<td>2 to 3</td>
<td>3 to 4</td>
<td>2 to 3</td>
<td>3 to 4</td>
<td>2 to 3</td>
<td>3 to 4</td>
</tr>
<tr>
<td>Plums</td>
<td>2 to 3</td>
<td>3 to 4</td>
<td>2 to 3</td>
<td>3 to 4</td>
<td>2 to 3</td>
<td>3 to 4</td>
<td>2 to 3</td>
<td>3 to 4</td>
</tr>
<tr>
<td>Strawberries, per peck</td>
<td>1 to 2</td>
<td>2 to 3</td>
<td>1 to 2</td>
<td>2 to 3</td>
<td>1 to 2</td>
<td>2 to 3</td>
<td>1 to 2</td>
<td>2 to 3</td>
</tr>
</tbody>
</table>

* Imported, per box of 8 pounds.
### PRICES—PROVINCIAL MARKETS.

#### AUGUST

<table>
<thead>
<tr>
<th>Fruit</th>
<th>4th, 1892</th>
<th>3rd, 1893</th>
<th>11th, 1893</th>
<th>10th, 1893</th>
<th>15th, 1892</th>
<th>17th, 1893</th>
<th>25th, 1892</th>
<th>24th, 1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>40 to 60</td>
<td>30 to 60</td>
<td>20 to 60</td>
<td>20 to 36</td>
<td>20 to 50</td>
<td>16 to 36</td>
<td>20 to 50</td>
<td>20 to 60</td>
</tr>
<tr>
<td>Cherries, per half-sieve</td>
<td>50 to 56</td>
<td>40 to 50</td>
<td>29 to 40</td>
<td>30 to 50</td>
<td>30 to 56</td>
<td>16 to 40</td>
<td>30 to 50</td>
<td>20 to 50</td>
</tr>
<tr>
<td>Currents, black, per half-sieve</td>
<td>40 to 50</td>
<td>30 to 40</td>
<td>40 to 50</td>
<td>30 to 40</td>
<td>30 to 50</td>
<td>16 to 40</td>
<td>30 to 50</td>
<td>20 to 50</td>
</tr>
<tr>
<td>Gooseberries</td>
<td>30 to 40</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>30 to 40</td>
<td>16 to 30</td>
<td>30 to 40</td>
<td>20 to 30</td>
</tr>
<tr>
<td>Pears, per bushel</td>
<td>15 to 20</td>
<td>10 to 20</td>
<td>12 to 20</td>
<td>12 to 20</td>
<td>12 to 30</td>
<td>10 to 20</td>
<td>12 to 30</td>
<td>10 to 20</td>
</tr>
<tr>
<td>Plums, per half-sieve</td>
<td>40 to 60</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>30 to 40</td>
<td>16 to 30</td>
<td>30 to 40</td>
<td>20 to 30</td>
</tr>
</tbody>
</table>

*Victoria, 4s. to 5s.; Orleans, 6s. to 7s.; Gisborne, 3s. + Duches, 3s. per box of 70. + Heads, 4s.; Williams, 6s. per bushel on August 31st, 1893.*

#### SEPTEMBER

<table>
<thead>
<tr>
<th>Fruit</th>
<th>8th, 1892</th>
<th>7th, 1893</th>
<th>15th, 1892</th>
<th>14th, 1892</th>
<th>22nd, 1892</th>
<th>21st, 1892</th>
<th>29th, 1892</th>
<th>28th, 1892</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>20 to 40</td>
<td>16 to 40</td>
<td>20 to 40</td>
<td>20 to 50</td>
<td>20 to 50</td>
<td>20 to 50</td>
<td>20 to 50</td>
<td>20 to 50</td>
</tr>
<tr>
<td>Peas, per half-sieve</td>
<td>30 to 40</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>30 to 40</td>
<td>16 to 30</td>
<td>30 to 40</td>
<td>20 to 30</td>
</tr>
<tr>
<td>Damson, per half-sieve</td>
<td>30 to 40</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>30 to 40</td>
<td>16 to 30</td>
<td>30 to 40</td>
<td>20 to 30</td>
</tr>
</tbody>
</table>

*Gisborne, 2s. to 2s. 6d.; Victoria, 2s. 6d. to 2s. 8d.; Orleans, 2s. 9d. to 2s. 6d.; Greengage, 2s. 4d.; + Eggs, 2s. 3d. 6d.; Victoria, 2s. 4d. to 2s. 6d.; Greengage, 2s. 6d. to 2s. 8d.; Bullaces, 2s. 4d. to 2s. 6d.*

#### OCTOBER

<table>
<thead>
<tr>
<th>Fruit</th>
<th>6th, 1892</th>
<th>5th, 1893</th>
<th>13th, 1892</th>
<th>12th, 1892</th>
<th>20th, 1892</th>
<th>19th, 1892</th>
<th>27th, 1892</th>
<th>26th, 1892</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>20 to 40</td>
<td>16 to 40</td>
<td>20 to 40</td>
<td>20 to 50</td>
<td>20 to 50</td>
<td>20 to 50</td>
<td>20 to 50</td>
<td>20 to 50</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>10 to 10</td>
<td>9 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>9 to 10</td>
<td>10 to 10</td>
<td>9 to 10</td>
</tr>
<tr>
<td>Peas, per half-sieve</td>
<td>50 to 60</td>
<td>40 to 50</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>40 to 50</td>
<td>50 to 60</td>
<td>40 to 50</td>
</tr>
<tr>
<td>Damson, per half-sieve</td>
<td>30 to 40</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>30 to 40</td>
<td>16 to 30</td>
<td>30 to 40</td>
<td>20 to 30</td>
</tr>
</tbody>
</table>

*Cooking, 2s. 6d.; Blenheim, 4s.; + Bullaces, 2s. 4d. 6d.; + King of the Pippins and Damson's Seedling, 4s.; Blenheim, 4s. 6d.*

#### NOVEMBER

<table>
<thead>
<tr>
<th>Fruit</th>
<th>3rd, 1892</th>
<th>2nd, 1893</th>
<th>10th, 1892</th>
<th>9th, 1893</th>
<th>17th, 1892</th>
<th>16th, 1893</th>
<th>24th, 1892</th>
<th>23rd, 1892</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>10 to 10</td>
<td>9 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>9 to 10</td>
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<td>9 to 10</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>0 to 10</td>
<td>0 to 10</td>
<td>0 to 10</td>
<td>0 to 10</td>
<td>0 to 10</td>
<td>0 to 10</td>
<td>0 to 10</td>
<td>0 to 10</td>
</tr>
<tr>
<td>Peas, per half-sieve</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
</tr>
<tr>
<td>Bullaces</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
</tr>
</tbody>
</table>

*King of the Pippins, 4s.; Wellington, 4s.; + Ribston, 4s. 6d.; Blenheim, 4s. 6d.; + Cox's Orange Pippin, King of the Pippins, 4s. 6d.; + Catillas.*

#### DECEMBER

<table>
<thead>
<tr>
<th>Fruit</th>
<th>1st, 1892</th>
<th>November 30th, 1892</th>
<th>8th, 1892</th>
<th>7th, 1893</th>
<th>15th, 1892</th>
<th>14th, 1893</th>
<th>22nd, 1892</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Apples, per bushel</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
<td>20 to 30</td>
</tr>
<tr>
<td>American, per barrel</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
<td>10 to 10</td>
</tr>
<tr>
<td>Peas, per half-sieve</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
</tr>
</tbody>
</table>

*Blenheim, 5s. to 7s.; Choice dessert, 10s.; + Best cooking, 4s.; Blenheim, 6s. 6d. to 7s.*
FRUIT PRESERVATION.

The preservation of fruits in various ways for home use dates from the remotest periods and is a leading industry in some countries at the present time, employing a large amount of capital and labour. The making of cider from apples, perry from pears, non-alcoholic (so-called) drinks—British wines—from small fruits, and converting various fruits into jam, mainly represent the industries springing from the cultivation of fruit in this country; though comparatively little has been done in the preservation of fruit by canning, crystallising, and drying. A few facts about some of the general features of the manufacture will not be unacceptable to many readers of this work.

Cider.—As a refreshing beverage with but small intoxicating powers when taken in moderation, cider has been esteemed from early times. Pliny alludes to it and perry as a wine made from apples and pears of every kind, and assigns it a Syrian origin. Biscay, long famed for its cider, received it from the Carthaginians, and it was brought into Normandy by the Moors, whence it was introduced into England. There is no record of cider being known to the ancient Britons. The Anglo-Saxons distinguished their “Eppelwin” from wine and mead. Though cider was made in the twelfth century, it was to a limited extent as compared with the present cider-making of Devonshire, Somersetshire, Herefordshire, and Worcestershire, while much excellent cider is made in the eastern counties. The manufacture in France exceeds 226,000,000 gallons a year.

Lists of the best cider apples will be found in Dr. Hogg’s “Fruit Manual.”

Cider apples may be grown in any part of the country where the soil is a deep clay loam of the Old Red Sandstone formation, irony soils being necessary to produce the highest flavour and quality in cider. Cider-fruit may be easily grown by farmers when trees of selected varieties are properly planted, duly cut back to form a head, nothing more being required beyond occasionally thinning the growths if they become crossed, and preserving them from damage by farm-stock, hares, and rabbits. Grease bands make
FRUIT PRESERVATION—APPLES—CIDER-MAKING.

the trees to a great extent secure against the winter moth, and with due attention to the prevention and destruction of other insect pests, the trees produce fruit for cider-making with little expense beyond manuring the orchards every few years after they come into bearing.

The quality of cider depends on: 1, kind of fruit; 2, condition of the fruit when ground; 3, manner of grinding and pressing; 4, method of conducting the requisite fermentation, and precautions to be taken against its excess.

1. A good cider apple, as a rule, has a red skin, yellow, tough, fibrous pulp, and is characterised by astringency, dryness, and ripeness at the cider-making season. Fruits with a green rind and pulp make thin, weak, colourless cider. When the skin and pulp are deeply tinged with yellow, the cider will almost always possess colour, strength or richness. The ripeness of apples for vintage is known by their fragrance and spontaneous dropping from the trees. In this state of maturity the limbs might be slightly shaken to secure such fruit only as are ripe, leaving the unripe on the trees till they acquire due maturity. Dry, cool weather is best for gathering cider apples. Avoid bruising more than can be helped, as mouldiness fixes on every wound, and communicates a musty flavour to the juice. The quality of an apple for cider is determined by the specific gravity of the must, or the weight of the unfermented juice compared with that of water (ascertained by an instrument called a saccharometer). Its weight and consequent value are in ratio to the saccharine matter—the higher the specific gravity the stronger and more highly-flavoured the cider. Brandy Apple (Golden Harvey) has a specific gravity of 1065, and represents the highest quality juice.

2. The fruit should be used when it has attained full maturity, and before it commences decaying. Each variety ought to be used separately, or only those kinds mixed which ripen about the same time. The more perfect the maturity of the fruit the greater the saccharine matter and the less watery the juice. The colder the weather short of actual frost, the more steady and equable will be the fermentation of the juice.

3. At whatever period grinding takes place it is absolutely essential that cool weather be chosen—preferably slightly frosty—to counteract the tendency to rapid fermentation. The ordinary mill consists of a heavy cylindrical stone 3 or 4 feet in diameter and about 1 foot thick, which is made to revolve and rub along in a circular trough in which the apples are placed. The apples should be reduced by the mill to a uniform mass in which the rind and seeds are scarcely discoverable, and the pomace be exposed to the air for a few hours. This exposure of the reduced pulp increases the specific gravity '014. For fine cider the fruit should be ground and pressed imperfectly, then the pulp exposed for twenty-four hours to the air, being spread and turned once or twice, to facilitate the absorption of oxygen; it should then be ground again, and the expressed juice added to it before it is again pressed. A more perfect method of grinding is in a mill with cylindrical rollers placed so near each other as to crush the pips, fed from a hopper above them, the apples from which pass between a pair of toothed or fluted cylinders, by which they are torn and partially crushed before reaching the perfectly crushing apparatus. After crushing, the mass is put into hair cloths and powerfully pressed (Fig. 83), and the liquor is run into casks.

4. Fermentation commences and terminates at periods varying with the condition or quality of the fruit and the state of the weather. The proper time to draw the liquor from the scum and sediment is indicated by its brightness, which takes place after the discharge of fixed air has ceased and a thick crust is formed on the surface, then the clear liquid should be drawn off into another cask. If the fermentation has been complete the liquor will remain bright and quiet, and nothing more will be required until the spring; but if a scum collects on the surface it must be racked off again, as this would produce bad effects if allowed to sink. Among the precautions employed to prevent
excessive fermentation is stunning or fuming the casks with burning sulphur, and is effected by burning a rag impregnated with it in the cask in which the liquor is to be decanted, after it has been partly filled, and rolling it so as to incorporate the liquor with the gas. A bottle of French brandy, or half a bottle of cider-brandy, added to a barrel, is likewise recommended to be added as soon as the vinous fermentation is completed.

The foregoing particulars for the making of this popular beverage, cider, are mainly taken from the article under that heading in "The Popular Encyclopedia," Blackie and Son.

Although cider of a certain description may be made from dropped, windfallen, or too small apples for marketing, it is necessary to employ sugar largely to make good cider for sale. French cider is greatly improved by the use of sugar. Cider-making is a matter of considerable importance, and success in it largely rests on using a considerable amount of sugar, especially in its manufacture from ordinary apples that cannot be sold in markets.

Perry.—This is the fermented liquor made from the expressed juice of certain varieties of pears, which are austere, hard, and uneatable; yet those which are the least palatable always make the best perry. Some of the best perry pears are:—Early varieties—Cheat-boy, Moorcroft, Parsonage, Taynton Squash, Thorn Pear, and White Squash. Midseason varieties—Arlingham Squash, Barland, Black Huff-cap, Holmer, Chaseley Green, Longland, Winnal’s Longland, White Longland, Oldfield, Pine Pear, Yellow Huff-cap, and Yoking House. Late varieties—Aylton Red, Butt Pear, Coppy Pear, Red Pear, Rock Pear, and Thurston Red.

Perry pears prefer a dry and somewhat loose soil, in which the roots may penetrate freely, and range extensively in search of nutriment. They succeed admirably in loams on the Old Red Sandstone, and calcareous earth should form a component part of the soil of a perry orchard. The trees require to be planted a considerable distance apart, as they attain a great size, a number of years elapsing before they produce fruit in abundance, but when aged they bear enormous crops.

Although perry is less esteemed than cider, some of it is not inferior to many foreign wines, indeed, it is often very agreeable when particular attention has been given to the selection of the fruit and its manufacture. Some dealers in Champagne wine are said to use perry in the adulteration of it. Perry is prepared in nearly the same manner as cider. The best brands of both are bottled, and bring good or high prices, according to their quality. Ordinary cider is retailed at about the same price as beer or porter.

Jam-making.—The large manufacturers mostly decline to furnish particulars of their
outputs for publication—"the benefit of which to themselves they do not see." Mr. W. P. Hartley, Aintree, Liverpool, turned out of his jam factory 100 tons of jam per day in 1891, which is equal to 112,000 2-pound jars daily, and the number of persons employed by him in the busy part of the summer months was between 1,400 and 1,500. There are many such (and some larger) jam factories in this country. Several others make 2,000 tons of jam per annum. In addition to many "company" concerns in connection with fruit farms—some turning out 100 tons of jam a year, using 50 tons of sugar, employing 400 persons for various terms, and needing nearly 58,000 glass bottles or jars in getting their jam ready for market—there are a number of private (so-called) establishments which have large fruit farms, and in all but scarce years convert the major part of the fruit grown into jam, while in full-crop years, or when there is a glut of fruit in the markets, the whole may be made into jam or jelly. Sir Walter Gilbey has a considerable area of land planted with fruit trees at Elsenham, Essex, and the fruit he has grown has been converted into jam at a factory which has been erected on the estate. The Earl of Coventry, Croome Court, Worcestershire, also has a large fruit farm, and has had medals awarded for jam prepared at the home factory. Jam is also extensively made from the fruit grown on Lord Sudeley's estate by the Toddington Fruit Farm Company, Gloucestershire, and there are many similar establishments.

"Machinery driven by steam is employed for dressing and sorting currants, the large being separated from the small at the same time. This for whole fruit jam, but a large selection of the consuming public want 'real jam,' and the makers pulp the fruit, say currants, by passing it down a hopper into a wire-woven cylinder, inside which brushes revolve, pressing against the wires, the pulp being squeezed from the fruit, and the stalks turned out as clean as if washed. The boiling also is done by steam in coppers (Fig. 84), holding two or three
bushels of prepared fruit each, and are double cased for affording space for the steam, which is turned on or off by a tap. Boiling commences quickly, and is fast or slow, as desired, being controlled by the tap. All works smoothly and briskly, and everything is scrupulously clean. The object aimed at is the production of jam, the best of its kind and grade at the least cost, therefore able to sell at a price suited to customers, and at a small profit. This cannot be effected by the old methods so as to supply shop-keepers with the manufactured article to sell at prices not materially higher than good raw fruit in all but 'glut' years.”

### RETAIL AND EXPORT PRICES OF FINEST QUALITY JAMS.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Retail</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apricot</td>
<td>each 0 7</td>
<td>each 2 1</td>
</tr>
<tr>
<td>Blackberry</td>
<td>0 5</td>
<td>1 7</td>
</tr>
<tr>
<td>Black Currant</td>
<td>0 6</td>
<td>1 10</td>
</tr>
<tr>
<td>Damson</td>
<td>0 5</td>
<td>1 5</td>
</tr>
<tr>
<td>Gooseberry</td>
<td>0 5</td>
<td>1 7</td>
</tr>
<tr>
<td>Greengage</td>
<td>0 5</td>
<td>1 7</td>
</tr>
<tr>
<td>Plum</td>
<td>0 4</td>
<td>1 3</td>
</tr>
<tr>
<td>Raspberry</td>
<td>0 7</td>
<td>2 1</td>
</tr>
<tr>
<td>Raspberry and Currant</td>
<td>0 6</td>
<td>1 9</td>
</tr>
<tr>
<td>Strawberry</td>
<td>0 6</td>
<td>1 10</td>
</tr>
<tr>
<td>Red Currant</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Glasses and tins not charged or allowed for; jam-pots allowed for at the rate of 6d. per dozen; 4-pound jars allowed 2d. each.

If half value is taken from the above prices, it will fairly represent those at which the several jams are sold by tons at the jam factories, and from the prices realised there has to be deducted interest on capital, wear and tear of plant, cost and manufacture of fruit into jam, expense of glasses, pots and jars, sealgae, storing, and packing.

A jam factory is a necessary adjunct to a large fruit farm or fruit-growing district. In the case of an establishment conducted on co-operative lines, the growers would derive the profits from their culture to which they are entitled only when they take steps to secure them. It is economical, therefore profitable, to have an outlet for fruit that cannot be sold at market at a paying price. Such outlet is provided by the jam factory where the fruit can be made into jam at once, or merely boiled down with sugar, and put into hermetically-sealed vessels in which it can be kept until a demand arises. Such pulp can be made into jam by the addition of sugar.

The process of jam-making is simple, and understood by most housekeepers. A good-sized copper (Fig. 88) is all that is required on a small scale to convert fruit into jam, and good jam in glasses and jars commands a remunerative price. Farmers might utilise the boilers of the engines used for farm purposes in converting fruit into jam by adapting machinery and boilers suitable for them. There is no difficulty in disposing of good jam. But jam factories on the mutual benefit system, to which fruit may be consigned by growers, are the great desiderata of the times, and they will, no doubt, soon be started in this country. The illustrations are supplied by Messrs. Brinjes & Goodwin, Whitechapel Engine Works, Fieldgate Street, E.

**Canning.**—This means preserving fruit in tin cans and glass jars, and is an important industry in the United States, Canada, and other countries. In 1890, 4,436,671 pounds of fruit, preserved with sugar, of the value of £70,972, was imported into this country from the United States. Canned fruit will keep for long periods, as air and
germs are excluded. Ordinary jam will only keep good a year or two, yet if proper care is taken in boiling and excluding air and the germs of fermentation, a good article will retain its high qualities for years. The principles involved in canning are the same as in jam-making—the rule of uniformity and cheapness of product. Old kitchen processes, good as they are for preserving fruit for home use, are too costly and slow for supplying the wants of the world. Canning might be adopted in this country, co-operative factories being established to which fruit could be consigned. Surplus fruit could be utilised, panic prices avoided, and the producers share with consumers in the advantages.

"The chief features of canning operations are:—1, preparation of the cans (which is done in the winter); 2, preparation of the fruit; 3, packing in the cans; 4, introduction of the syrup; 5, capping the cans; 6, cooking the fruit; 7, labelling and casing. The outfit of a cannery is of the same general kind, but there is much difference in size and cost. An American cannery, built of rough timber, except the floors, which should be of the best material and laid to drain well, consisting of two storeys, costs 7,026 dollars, including tools and machinery, and has a capacity for putting up half a million of cans during the season. There are, however, several patented devices to meet the wants of the small canner, but the consensus of growers is in favour of relegating the manufacturing to a co-operative establishment, as the attention and investment in labour, cans, and sugar are considerable. Sugar is more than 100 per cent. cheaper in this country than in America generally, and fruit ought to be canned so as to be able to undersell the American manufacturer.

"The progressive steps in the process of canning comprise:—1, Receiving, weighing, and crediting the fruit; 2, passing the fruit to the peeling and cutting room, where it is handled by the operatives by piecwork; 3, thence the prepared fruit goes to the filling tables, where it is put in cans grouped in frames holding a dozen; 4, these are carried to the syrup tables, where other operatives fill the cans with syrup from pipes connecting with tanks to which syrups of different densities, according to the fruit which is being worked, or the grade of goods, is stored in bulk; 5, the cans go next to the capping tables, where the cover is put on and soldered, sometimes by hand, sometimes by soldering machines, the heat being secured with gasoline, a minute vent-hole, previously made, is left in the cover of each can; 6, the cans are then placed in large iron frames, holding a gross, and these are raised and swung about by cranes and plunged in the cooking-baths, in which the water is kept boiling by means of steam from the boiler, which is situated outside the building; 7, the amount of cooking varies with different fruits, and with the same fruit in different conditions. The cooking must be directed by an experienced man, and on his judgment depends largely the success of the whole work of the cannery; 8, the vent-hole is closed at once, and the final touch of the cooking process given; the cans, after thorough cooling, are ready for labelling and casing. Such is an outline of American commercial canning, there being no partitions in the cannery proper, and the manager from his glazed office has the whole concern under his eye, from the entrance of the fruit to its exit from the cooking-baths. A large cannery has a capacity for turning out 100,000 cases in a season, and employs about 500 operatives. The United States export canned fruit of the value of 834,668 dollars."

Home-canning is practised to a large extent in the United States and Australia, mainly for two reasons: 1, to have on hand a good supply of canned fruit for family use; 2, to steady prices of raw fruit in the local or general markets, which the fruit-grower will supply if he gets a paying price.

The following procedure for home-canning is taken from "Canning Fruit," by Mr. Shelton, Queensland:—"The process of canning is a simple one, being merely to drive out the germs of fermentation by heating the fruit and
excluding the air. Success in canning depends not on the amount of sugar used, but on the entire exclusion of air. To accomplish this there are two methods in use. The first and most perfect method, and that employed by the canning factories, is to pack the fruit, neatly prepared, as closely as possible in the glass jars. Fill the jars with syrup made by boiling water and sugar together, in the proportion of about one cup of sugar to one quart of water. This will make syrup enough for two quart jars. Place the jar in a tank or boiler of tepid water on a rack, so as to allow the water to come within an inch of the top of the jar; screw on the cover loosely without the rubber, cover the tank or boiler, and boil the fruit till it is done. Ten, or at most twelve, minutes are enough for berries, currants, or other small fruits; from twenty minutes to three hours for peaches, pears, and apples. Have some syrup ready for filling up the jars.

When done, remove the jar from the water, fill to the top with hot syrup, wipe off the neck, put on the rubber, and screw down the cover tightly.

The second method is the one most used by the housewife in America. It is simply to boil the fruit in sugared water in a porcelain-lined stewpan or kettle until it is sufficiently cooked, and pour it boiling hot into the jars, stirring it about with a spoon to let the air-bubbles escape, fill up with hot juice or syrup, wipe the neck with a moist towel, put on the rubber, and screw down the cover tightly, and tighten again when cold. A tin funnel to put in the mouth of the jar, made for the purpose, facilitates the filling of the jar. If the fruit is in pieces, like apples, peaches, and pears, it should be placed in the jars carefully with a fork or spoon, a little sugared water being first put in to temper the jars. If there is fruit remaining in the kettle it should be drawn to one side of the stove, and not allowed to overcook while the filling process is going on; frequently fruit is spoiled in this way. In an accident of this kind it is better to use the fruit right up on the table, and prepare fresh fruit for the jars.

The advantages of this method are that much more fruit can be put into each jar, after shrinking by cooking, than in the fresh state. A bushel of cherries, berries, currants, or peaches can then be disposed of in a half-day by a woman accustomed to canning. To achieve the best results in this work it is necessary that the fruit be fresh, of best quality, and not over-ripe. Soft fruit, like strawberries, should be canned the day they are picked. It is better not to can any fruit picked over-night, and care should be used in handling all fruit for canning purposes. All jars must be in perfect condition. After having been once used, they should be thoroughly scalded and put away. The rubber should be put inside the can and the top screwed on loosely. This is a better plan than screwing the top

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Fig. 86. Glass Jars for Canning, with Metal Top and Rubber.

References:—A, Mason jar, patent; a, metal top; b, rubber. B, “Lightning” patent jar of canned fruit complete; with adjustable wire fastening for saving breakage.
FRUIT PRESERVATION—CRYSTALLISED FRUITS.

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tightly on to the rubber. Fruit in glass jars must be kept in a cool, dry place, away from the light, preferably in a cool dark cellar. Thick brown paper should be wrapped round jars where there is light."

Crystallised Fruits.—Exact processes for British fruits can only be learned by experience. The theory and practice is as follows:—"The theory is to extract the juice from the fruit, and replace it with sugar syrup, which, on hardening, preserves the fruit from decay, and, at the same time, retains the natural shape of the fruit. All kinds of fruit are capable of being preserved under this process. Though the

Fig. 87. "American" Evaporator No. 3.

method is very simple, there is a certain skill required that is acquired only by practice. The several steps in the process are about as follows:—

"First, the same care in selecting and grading the fruit should be taken as for canning; that is, the fruit should be all of one size, and as near the same ripeness as possible. The exact degree of ripeness is of great importance, which is at that stage when fruit is best for canning. Peaches, pears, and other large fruits are pared and cut in halves, as for canning; plums, cherries, and small fruits generally are pitted. The fruit having thus been carefully prepared, is put in a basket, or a bucket with a perforated bottom, and immersed in boiling water. The object of this is to dilute and extract the juices of the fruit. The boiling—length of time the fruit is immersed—is the most important part of the process. If left too long, it is overcooked and becomes soft; if not immersed long enough, the juice is not sufficiently extracted, which prevents a perfect absorption of the sugar.

"After the fruit has been thus scalded and allowed to cool, it can be assorted as to softness. The next step is the syrup, which is made of white sugar and water. The softer the fruit the heavier the syrup required. Ordinarily, about 70°, Balling's saccharometer, is the proper weight for the syrup."
"The fruit is then placed in earthen pans, and covered with the syrup, where it is left to remain about a week. The sugar enters the fruit and displaces what juice remained after the scalding process.

"The fruit now requires careful watching, as fermentation will soon take place, and when this has reached a certain stage the fruit and syrup are heated to a boiling degree, which checks the fermentation. This heating process should be repeated as often as necessary for about six weeks.

"The fruit is then taken out of the syrup, and washed in clean water, and it is then ready to be either glazed or crystallised, as the operator may wish. If glazed the fruit is dipped in thick, sugar syrup, and left to dry quickly in the open air. If to be crystallised, it is dipped in the same kind of syrup, but is made to cool and harden slowly, thus causing the sugar which covers the fruit to crystallise. The fruit is now ready for boxing and shipping. Fruit thus prepared will keep in any climate and stand transportation." (Prize Essay, State Board Horticulture, 1888, by Mr. J. J. Pratt, of the Yuba City Cannery, California.)

Crystallised fruit sells well; most of that sold in this country is imported from France, and obviously a great deal of it might be displaced by British, if the same knowledge were acquired here and taste exercised in its production.

**Fruit Drying.**—This has been recommended as a panacea for the low prices of fruit in great abundance years. The arguments in favour of the practice were mainly derived from American sources. In California, 12,150,000 pounds of various fruits are dried annually. Of that amount 100,000 pounds are sun-dried, and 250,000 pounds evaporated apples; 200,000 pounds of sun-dried, and 40,000 pounds of bleached plums; and 25,000 pounds of sun-dried pears. These represent the fruits likely to be "evaporated" (if at all) in this country.

Of the principal fruits dried in California (and it is similar in other countries exporting dried fruits) there is not a golden prospect of drying profitably in this country, for the raw material is worth more relatively than the manufactured goods.

Mr. Pidgeon's ("Royal Agricultural Society's Journal," for March, 1890), states that in the western portion of New York State, a district lying within a radius of forty miles around the city of Rochester, produced in 1888, 37,750,000 pounds of evaporated fruit (all but 750,000 pounds of which were apples) of the value of £297,000. Mr. Pidgeon states that to produce this amount, 250,000,000 pounds (111,000 tons) of green apples, and 250,000 quarts of fresh raspberries were operated on; 19,000 tons of coals were burnt in 1,500 drying houses (each containing one
FRUIT PRESERVATION.—DRYING APPLES.

or more evaporators of various sizes), and 45,000 hands were employed during the four months of the year, bringing about the result quoted above.

Passing from the foregoing approximations, we find that in the year 1888 apples in the dried state were exported from the United States to the extent of 11,903,161 pounds, of the value of 812,682 dollars. In that year 489,570 barrels = 61,196,250 pounds of green apples, were exported by the United States, of the value of 1,876,801 dollars. The importance of dried fruits to an exporting country is immense, but England is not an exporting, but an importing country. In 1886, 3,261,460 bushels of apples were imported into this country, and £857,095 paid to exporters. Of that amount the United States contributed 1,647,032 bushels, value £478,895, and the remainder came from Canada, Belgium, Holland, and France. In the season 1888-89 the United States and Canada supplied 1,401,382 barrels of apples to British markets.

In face of the facts adduced, it has been urged that there ought to be some means of dealing with the surplus fruit which in excess-crop years remains ungathered or is otherwise wasted. In October, 1892, trials with evaporating machines were conducted at Chiswick in the gardens of the Royal Horticultural Society.

Drying fruits is an old industry that was somewhat general in Kent about half a century ago, plums being dried in ovens or on trays over fires, but the custom ceased as French prunes were found to be cheaper and better. The experiments at Chiswick confirm this fact—the variety Italian Prune (Fellemburg), a large, dark, oval plum with firm flesh giving the best results. It is good for dessert and preserving, and hangs till it shrivels, but it can only be grown satisfactorily in many parts of this country against a wall. The small plums, such as Rivers’ Prolific, are too small for drying, too little flesh and too much stone. Diamond, Monarch, and other large, dark, tough-skinned, firm-fleshed plums dry well, and are quite equal to French cooking prunes, which are sold retail at 5d. per pound. The soft-fleshed and tender-skinned plums, as Victoria, do not dry well. Preserving plums by converting them into jam in cases of surplus is, therefore, more generally applicable than drying them in this country.

In the case of apples a special variety seems as imperative as in plums, and it appears hopeless to make any profit out of drying soft apples in which there is most waste in excess-crop years. This is made clear by Mr. Barron’s report of the Chiswick experiments:

"Fruit drying.—During the operation a temperature from 175° to 200° is required for apples, and the time occupied is about three hours.

<table>
<thead>
<tr>
<th>10 pounds of fresh fruit</th>
<th>gave 1 pound</th>
<th>8 1/2 ounces when dried.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellini</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>New Hawthorden</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Blenheim Orange</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Frogmore Prolific</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Lord Suffield</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Small’s Admirable</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

The parings and cores have to be added to the weight of the dried fruit when calculating the exact reduction by evaporation. For plums the temperature required is about 250°, and the time required is from eight to ten hours."
Dried apples in tins, about 3 pounds each, are retailed at 5d., or 4s. 9d. per dozen tins; 1 gallon, 1s.; 1 dozen 1 gallon tins, 11s. 6d.; rings 6d. per pound, to produce which 5 pounds of raw fruit is required. Of the success of drying apples there can be no question, as the object is to drive out the water and retain the more digestible and nutritious components of the fruit, but it is not so much with the principle as with the commercial aspect of the product we are concerned. It has been tried in Kent and Worcestershire, and, though the consensus of opinion is conclusive that apples and plums can be thoroughly dried by evaporators, all the saccharine matter being retained, and the produce remarkably good when stewed or made into pies, the practice has not yet been much adopted for commercial purposes.

The mode of preparing apples for drying in an evaporator is, first to pare them, then to remove the core, and finally to cut them into slices or rings (Fig. 88). The pared apple is submitted to the fumes of sulphur before slicing, this is called “bleaching,” and the object is to prevent the discoloration of the fruit. It improves the appearance and does not injure the flavour. Paring, coring, and slicing is done very rapidly by machinery. The prepared fruit is then placed on wire trays, made to fit inside the drying chamber of the evaporator, and there remains until the whole of the moisture has been abstracted. The time occupied in doing this varies from two and a-half to four or even five hours, according to the kind of apples operated on. After passing through the evaporator, the next thing is to pack the dried fruit in neat boxes which hold 25, 50, or 75 pounds. These boxes are lined with paper. Fifty-pound boxes are those mostly used. They are 24 inches long, 12 inches deep, and 12 inches wide, they are made of ½-inch stuff (with ends 1 inch), poplar wood being preferred. The evaporated fruit, before being used for making pies, tarts and compotes, is soaked in water for a sufficient length of time (say twelve hours) to swell it to nearly its normal bulk.

There are a number of evaporators, some intended for home use, the size recommended for small farmers being the “American” Evaporator No. 3 (Fig. 87, page 349), manufactured by Ph. Mayfarth and Co., London Office, 16, Mincing Lane, E.C. Size, 9½ feet long, 28 inches wide. Can be set up in a few minutes. Adapted to burn wood, coal, or coke. Extreme height 6 feet. Consumes about 80 pounds of coal, or equivalent, per day. Capacity, 400—500 pounds of apples per day of twenty-four hours. Trays, piping, fire-irons, and improved furnace complete, 22 trays,
pattern A, £19 10s.; 33 trays, pattern B, £21 15s.; 55 trays, 22 pattern A and 33 pattern B, £26 10s.; thermometer 3s., packing 5 per cent. extra of the price.

An apple-parer, corer, and slicer for small concerns costs 18s., but for industrial establishments a more powerful machine is required. Mayfairth's "Electra" (Fig. 80) pares and cores the apples, and cuts them into a spiral, but the blade which cuts the spiral can be removed for making whole apples—that is, without the skin and the core; price £3 15s. Whole ringlets are prepared by a machine called the "Simplex" (Fig. 88), supplied with nine blades arranged in the form of steps, and dispenses with the cut required to transform the spiral cut into ringlets; price £1 7s. 6d. Large evaporators are made for drying apples and other fruit for export. The cost of drying apples is given by Mr. Pidgeon in the "Royal Agricultural Society's Journal," March, 1890, as follows:—"A bushel of green apples, weighing about 50 pounds, can be dried at a cost of from 6d. to 7½d. The total cost of the dried product is from 3d. to 5d. per pound, and of the average selling price from 3½d. to 6d. per pound. One bushel of green apples produces about 6 pounds of dried apples. One pound of coal is consumed in evaporating enough green fruit to yield a pound of dried fruit. Before drying, the apples are pared and cored by one of the many ingenious contrivances in use for that purpose. The pares and cores are dried and sold for jelly making, realising about £4 per ton. A bushel of apples yields about 20 pounds of 'meat' and 20 pounds of refuse (cores, etc.). The 30 pounds of 'meat' are reduced to 6 pounds by evaporation, and the 20 pounds of refuse to 4 pounds."

The apples evaporated are reduced from 50 to 10 pounds weight; this is an important consideration for export, much of the dried product being imported into France for cider-making, simply because it is richer in saccharine matter than green, and also cheaper in price and transit.

As to the profits of drying apples, the Zimmerman Machine Company give the following particulars:—"A bushel of green apples weighs about 50 pounds, is worth from 7½d. to 10d., and will produce 6½ pounds of evaporated fruit. It will cost 5d. to do the work, and the market value of the evaporated fruit will be from 5d. to 7½d. per pound. Assuming these figures to be correct, then the 6½ pounds of evaporated fruit at the lowest price (5d. per pound) will realise 2s. 8½d. Deduct the value of the fruit at highest price (10d.), cost of evaporating, 5d. = 1s. 3d., leaving a gross profit of 1s. 5d., or about 2½d. per pound, from which carriage and salesman's commission will have to be deducted. The net profit will be over and above the value of the apples as gathered from the trees."

The same company give the following figures to show the result of one month's run, working day and night, of a No. 3 evaporator:—"Produce 2,700 pounds evaporated apples at 7½d. [more by 1½d. per pound than they can be purchased for retail] = £84 7s. 6d. Cost: 470 bushels apples at 10d. [two-thirds less than the price in England when the markets are glutted] = £18 15s.; fuel, 30 days at 1s. 0½d. per day = £1 11s. 3d.; labour, 30 days, £8 6s. 8d. = £28 12s. 11d. This deducted from the value of the produce shows a gross profit of £55 14s. 7d."

It only remains to point out that as with dried plums or prunes, the conditions in America for producing and drying apples are very different from those in England. Land is much easier, climate favours growers on the American, African, and Australian Continents, also European more than in this country. Nevertheless, there would be abundance of work for evaporators in prolific seasons. Best fruit, however, realises the most money when marketed as fresh. Second-rate fruit in excess-crop years might be converted into good evaporated, the price for which would probably yield a larger profit than if marketed in the green state. The abundant years occur so infrequently, and the waste then occurring being mostly confined to fruit of inferior quality, it would be inadvisable for every English fruit-grower to invest in an evaporator, but there is no reason why one should not be set up in large fruit-growing districts, for drying the fruit in seasons of great plenty, which otherwise would
be wasted, either by buying it outright, or evaporating it for others at a reasonable charge.

In the important matter of packing fruit, also in the several methods of preservation and distribution referred to, cultivators in Great Britain, as a body, have been too long content to let their rivals in other lands "hold the field"; but there are exceptions, and as those persons who adopted the best methods in all things that bear on the production and presentation of fruit, have, as they ought, achieved the greatest success, so it is hoped that others will follow in their steps and persevere, till the stigma of inferiority, in the great industry in question, is removed from our land. To aid in the realisation of this object has been the earnest desire of all who have shared in the production of The Fruit Grower's Guide.
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THE END.
THE FRUIT GROWER'S GUIDE

BY

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AND LECTURER ON HORTICULTURE FOR THE SURREY COUNTY COUNCIL

WITH ILLUSTRATIONS BY MISS MAY RIVERS

AND

NUMEROUS ILLUSTRATIVE DIAGRAMS BY WORTHINGTON G. SMITH AND GEORGE SHAYLER

IN THREE VOLUMES

VOL. I.

LONDON

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LONDON:
PRINTED BY VIRTUE AND COMPANY,
CITY ROAD.
This Work is Dedicated

(BY PERMISSION)

TO

THE WORSHIPFUL COMPANY OF FRUITERERS

IN RECOGNITION OF THE

ACTIVITY AND INFLUENCE OF AN ANCIENT CITY GUILD

IN PROMOTING THE

EXTENDED AND BETTER CULTIVATION OF FRUIT

IN THIS COUNTRY.
PREFACE.

"It must never be forgotten that fruit is the product of cultivated soil and cultivated talent."

SHIRLEY HIBBERD.

In the production of this volume it has been no small advantage to have had the privilege of consulting the eminent pomologist, Dr. Robert Hogg, who obligingly glanced through many of the proof pages, and bestowed on them, where needed, the delicate touches of a master's hand.

For matter supplied I am indebted to Mr. George Abbey, a gardener of long experience and great knowledge. Without his valuable co-operation, the subjects, especially the fungoid and other enemies of fruit, could not be so complete as they are, while elucidatory plans, sections, and sketches have enhanced the measure of my obligations to him.

All the routine cultural teaching is presented in consonance with my own experience, and I hold myself wholly responsible for the soundness, or otherwise, of the practices advocated, especially for those that may be deemed faulty in character; and the greatest favour that discriminating readers, experienced in fruit culture, can confer will be in pointing out what they may consider defective, with the view to subsequent rectification.

I desire to thank Mr. G. Bunyard, Maidstone; Mr. A. H. Pearson, Chilwell, Notts; Mr. T. Francis Rivers, Sawbridgeworth, Herts; Mr. A. J. Thomas, Sittingbourne; and Messrs. James Veitch & Sons, Chelsea, for supplying the specimens of fruits which are portrayed in this volume by Miss May Rivers. It should be explained that the Late Black Bigarreau and Bigarreau de Gueben Cherries (facing page 190) were gathered from trees in pots in an unheated house at Sawbridgeworth; and the fine Cox's Orange
Pippin Apple (facing page 312) was grown in a similar way; all the other specimens were produced by trees in the open ground.

Works that have been consulted in the preparation of the volume are—Wickson’s “Californian Fruits” (Dewey, San Francisco); Thompson’s “Gardener’s Assistant” and the “Popular Encyclopedia” (Blackie); Nicholson’s “Dictionary of Gardening” (Upcott Gill); Hogg’s “Vegetable Kingdom” (Kent & Co.); Miss Ormerod’s “Manual on Injurious Insects” (Simpkin, Marshall, Hamilton & Co.); Griffith’s “Manures,” Fream’s “Soils,” and Johnson’s “Gardener’s Dictionary” (Bell & Sons), with the Gardeners’ Chronicle and the Journal of Horticulture. Quotations have been acknowledged in the text, and obligations are tendered to all sources of information.

To all those practical gardeners and expert fruit growers who spontaneously expressed their approval of this work as it appeared in monthly parts, I desire to tender my thanks for their generosity, but I cannot ask, hope, or expect that they will continue to—

"Be to my virtues very kind,  
And to my faults a little blind."

It is enough to feel that they are in sympathy with the endeavour to make the Fruit Grower’s Guide a safe work to follow by those who are seeking to share in the increased production of superior fruit.

J. WRIGHT.

London.
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THE FRUIT GROWER'S GUIDE.

VOL. II.
THE FRUIT GROWER'S GUIDE

BY

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WITH ILLUSTRATIONS BY MISS MAY RIVERS

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THE FRUIT GROWER'S GUIDE

BY

JOHN WRIGHT, F.R.H.S.

ASSISTANT EDITOR OF THE "JOURNAL OF HORTICULTURE;" EDITOR OF "GARDEN-WORK"
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AND LECTURER ON HORTICULTURE FOR THE SURREY COUNTY COUNCIL

WITH ILLUSTRATIONS BY MISS MAY RIVERS

AND

NUMEROUS ILLUSTRATIVE DIAGRAMS BY WORTHINGTON G. SMITH AND GEORGE SHAYLER

IN THREE VOLUMES

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LONDON

VIRTUE AND COMPANY
CITY ROAD, E.C.
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VOL. III.

COLOURED PLATES.

Descriptions of the Fruits figured will be found in the Selections of Varieties of the Different Kinds in this and preceding Volumes.

ALPINE STRAWBERRIES
PEARS:—Pitmaston Duchess—Durondeau
ORANGES:—Blood Orange—Sustain—Tangierine
PEACHES:—Alexandra Noblesse (Rivers)—Royal George—Crimson Galande
PEACHES:—Grosse Mignonette—Bellegarde—Goshawk—Barrington—Dymond
PEACHES:—Nectarine Peach—Princess of Wales—Sea Eagle
PEACHES:—Milton—Goldoni—Victoria—Stanwick Elrabe—Newton
PEARS:—Jargenelle—Beurre d’Amanlis—Clapp’s Favourite
PEARS:—Gансel’s Bergamot—Van Mons Leon le Clerc—Portugal Quince—Durondeau
PEARS:—Olivier de Serres—Easter Beurre—Nouvelle Fuvie
PLUMS:—Count Althann’s Gage—Grand Duke—Green Gage — Early Orleans—Gisborne’s—Monarch—The Czar
PLUMS:—Jefferson—Victoria—Coe’s Golden Drop—Diamond—Pond’s Seedling—Autumn Compôte
RASPBERRIES:—Rivers’ Hornet—Sweet Yellow Antwerp—Baumforth’s Seedling
STRAWBERRIES:—Laxton’s Noble—James Veitch—Dr. Hogg—British Queen
PEARS:—Fondante d’Autôme—Louise Bonne of Jersey—Beurre d’Aremberg—Glou Morceau
PEARS:—Doyenné du Comice—Souvenir du Congrès—Beurre Superfin
NECTARINES:—Lord Napier (Rivers)—Humboldt (Rivers)—Dryden (Rivers)

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ALL BOOKS MAY BE RECALLED AFTER 7 DAYS
Renewals and Recharges may be made 4 days prior to the due date.
Books may be Renewed by calling 642-3405.

DUE AS STAMPED BELOW

OCT 2 1987

JUN 2 1987

UNIVERSITY OF CALIFORNIA, BERKELEY
BERKELEY, CA 94720

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