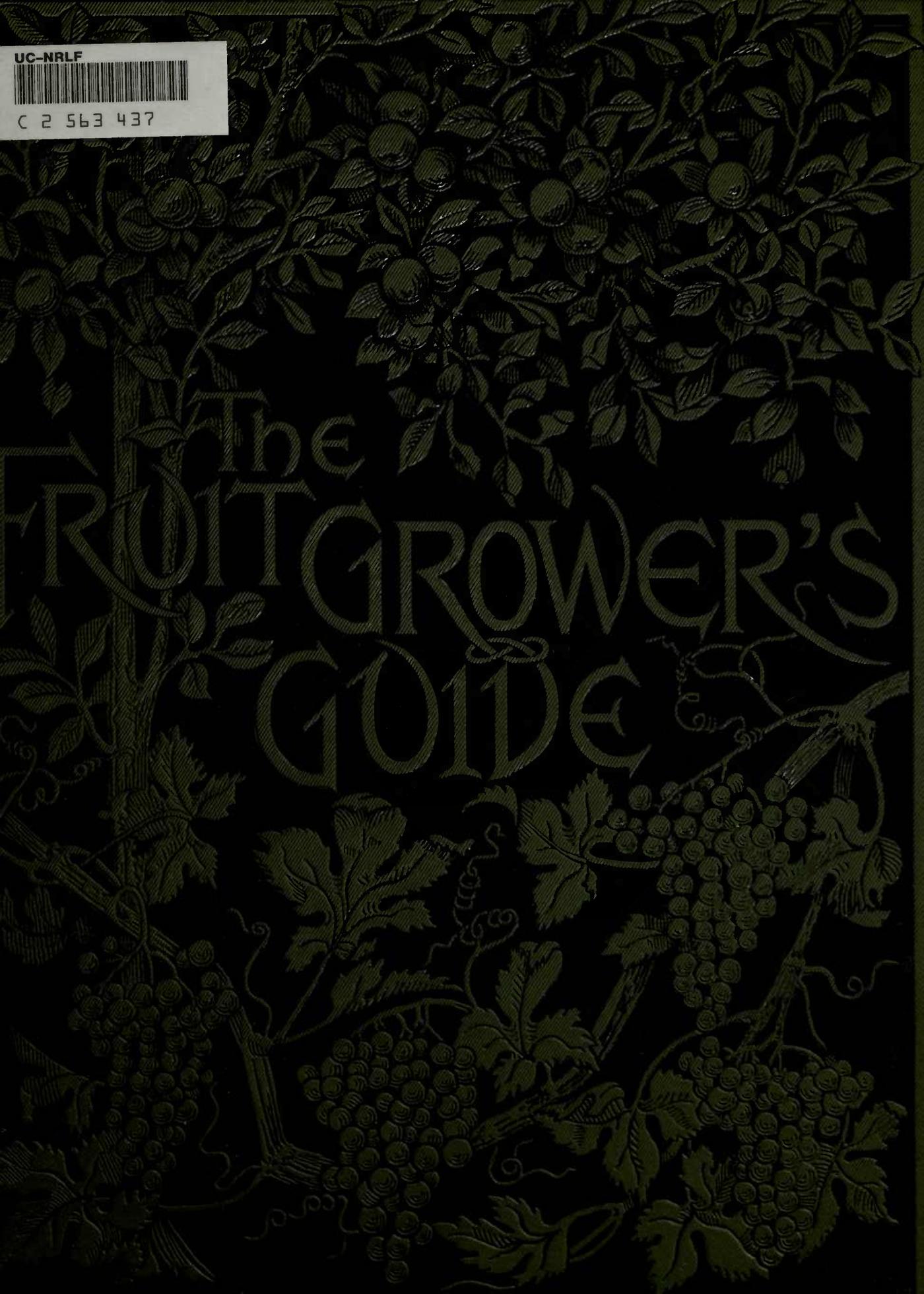


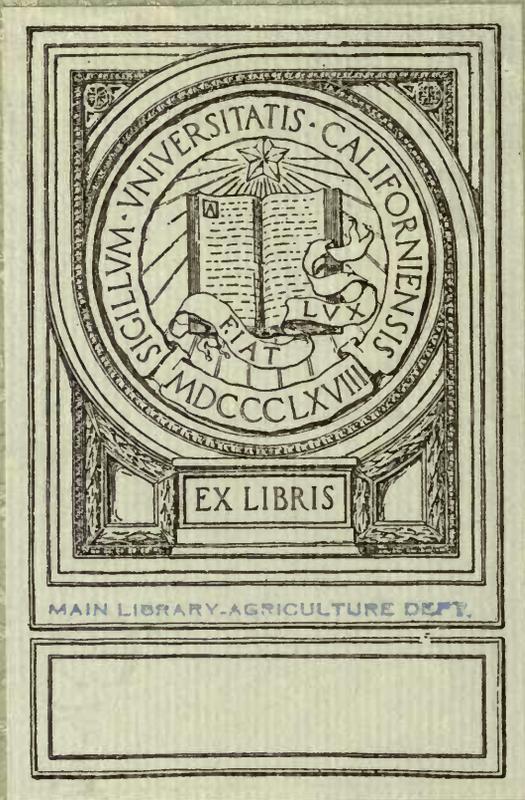
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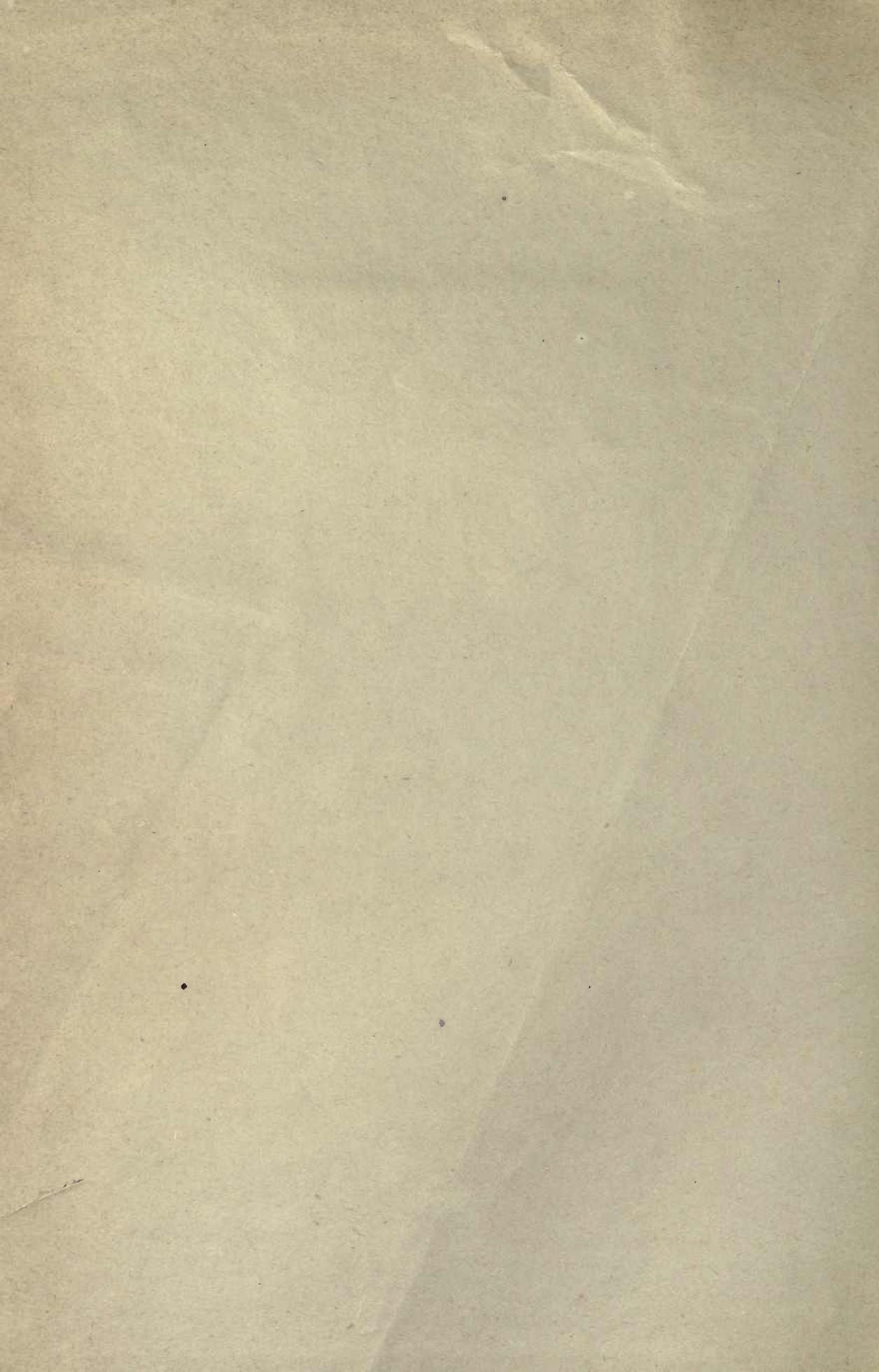
The FRUIT GROWER'S GUIDE



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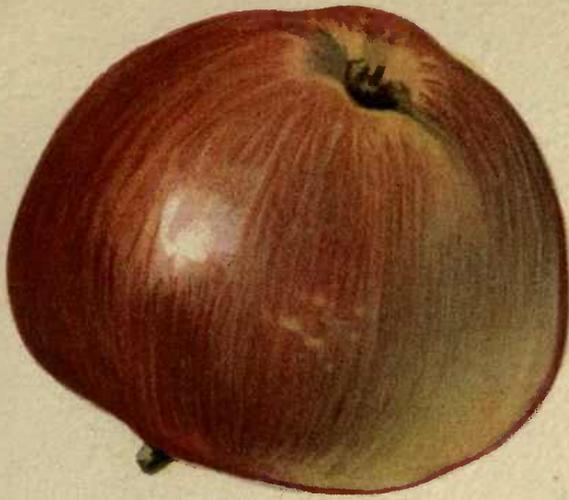


Lady Downe's Seedling.

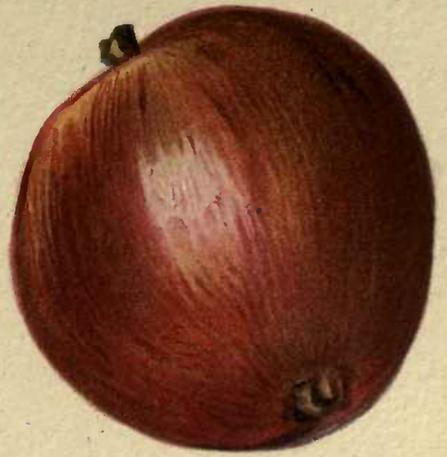
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THE
FRUIT GROWER'S GUIDE

BY

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AND

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DIV. V.

LONDON

VIRTUE AND COMPANY

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THE FRUIT GROWER'S GUIDE.

MELONS.

THE Melon (*Cucumis melo*) is believed to be a native of the hotter parts of Asia, and Lucullus is credited with its introduction to Rome from Armenia. It was originally brought to this country from Jamaica, and has been cultivated in England since 1570. The fruit forms one of the chief articles of food for the inhabitants in some parts of the East. In this country it is highly valued for dessert and other purposes, but it is a comparative luxury, inasmuch as glass structures and artificial heat are essential to produce it in the highest perfection.

The Cantaloup varieties were brought to Cantaluppi, near Rome, from Asia Minor. Introduced into France in 1495, they passed from thence into Spain, and from that country into England. In the Cantaloups we have both round and oblong, plain and netted, and orange or green fleshed fruits. Early Cantaloup melon is still one of the best for early use, the plant being hardier than many, and the fruit has a rich scarlet flesh. Bromhall Hall combines the earliness, free bearing and good qualities of early Cantaloup with a green flesh.

The Rock varieties have been so changed by cross-fertilisation that their carbuncled and thick rinds have given place to the small Scarlet-flesh melons represented in Scarlet Gem, and the large Scarlet-flesh seen in Little Heath—a hardier and better melon than many of recent introduction. Coulommier's melon, so largely grown on the Continent in the open air, is probably of the Cantaloup race, hardy, large fruited, and long keeping; choice varieties, seen in fruiterers' shops in late summer and autumn, are the result, probably, of crossing with the Central Asia (Khiva and Afghan) varieties. They do not thrive well in this country, and their quality is much below that of the Cantaloup and Rock races.

The Green-fleshed race seems to have been the most universally esteemed, for we find

next to no difference between the small Green-fleshed Egyptian, the small Green-fleshed Masulipatam (India), and the small Green-fleshed American Pine Apple melons : round, a little flattened at the ends, ribbed, slightly netted, greyish green, thin rind ; weight, in fine examples, 2 to 3 pounds ; flesh green, rich, juicy and sugary. These combine the freest bearing properties with the highest quality in melons. Bailey's Green-flesh, the "Squire," is perhaps the only representative of this race left.

Persian Melons are famed for their regular form, oval shape, large size, thin rind, thick greenish-white or white flesh, and delicate texture ; they are sweet, very juicy and rich in flavour. The melons grown in the open air in the plains of Persia (especially Ispahan), at Bokhara, Cabul, and Cashmere, are considered the finest in the world. The best representatives of this class of melons are found in Eastnor Castle, Meredith's Cashmere, and Cox's Golden Gem, but these are departures, more or less, from the types through cross-fertilisation.

Fancy melons, such as the Figari, with obovoid fruit, about the size of a hen's egg, smooth, yellow, odorous, ornamental, unedible, and Queen Anne's Pocket, or Dudaim, very small, round, marbled with brown on an orange-red ground, powerful odour, are only of use for garnishing and decorative purposes. Both are probably of African origin.

VARITIES.

The varieties at present grown have been mainly obtained from the Cantaloup, Rock, small Green-flesh and Persian races by natural or artificial cross-fertilisation and selection. The most difficult to keep true to type is the small Green-flesh race, and it has been almost obliterated by the concentration of effort at improvement in form, netting and size, few, if any, new melons possessing the exceedingly rich, melting, juicy, sugary flesh found in Pine Apple. Scarlet Gem may be taken as a criterion of quality in the Scarlet-fleshed melons. The small-fruited varieties, as a rule, are much better flavoured than the large and coarse, but small fruit, by reason of over-cropping, poverty of soil, or mismanagement may be flavourless, whilst large, well-grown fruit of the same variety may be exquisitely flavoured. Many growers perpetuate one or more varieties of their own raising or selection, each a special favourite, and this is the best way to insure the particular quality that is most appreciated. Varieties are so numerous, and many so short-lived, that only a few possessing distinct characteristics are described here.

Melons are usually divided into three classes according to the colour of their flesh.

I.—SCARLET-FLESHED VARIETIES.

BENHAM BEAUTY.—Fruit large, globular ; skin yellow, regularly netted, thin ; flesh bright salmon red, very thick, melting, and exceedingly rich in flavour.

BLENHEIM ORANGE.—Fruit medium to large, globular, very handsome ; skin beautifully netted, thin ; flesh scarlet, very thick, melting, and deliciously flavoured.

LITTLE HEATH.—Fruit large, globular, ribbed ; skin netted, rather thick ; flesh very thick, juicy, and well flavoured. Excellent for frame culture.

SCARLET GEM (Turner).—Fruit small, nearly round ; skin handsomely netted all over, thin ; flesh scarlet, thick, melting, richly flavoured—the richest Scarlet-fleshed variety.

SCARLET PREMIER.—Fruit medium-sized, oval, flattened at the ends, handsome ; skin high coloured, beautifully netted ; flesh scarlet, solid, thick, fine aroma, and rich flavour.

SION HOUSE.—Fruit medium-sized, bluntly oval ; skin yellow, beautifully netted ; flesh scarlet, tinged with green next the rind, thick, melting, with a rich flavour and fine aroma.

II.—GREEN-FLESHED VARIETIES.

EASTNOR CASTLE.—Fruit medium to large, oval ; skin pale yellow, netted ; flesh pale green, thick, melting, and richly flavoured.

GOLDEN PERFECTION.—Fruit medium-sized, oval, very handsome ; skin bright yellow, netted ; flesh yellowish green, very thick, solid, melting, and exquisitely flavoured.

MONARCH.—Fruit medium to large, oval, handsome ; skin even, beautifully netted ; flesh green, firm, yet melting, very juicy, thick, sweet, and luscious.

PINE APPLE.—Fruit small, round, ribbed ; skin greyish green, very thin, slightly netted ; flesh green, thick, solid, melting, exceeding rich, and sugary—the most luscious melon.

VICTORY OF BATH.—Fruit medium-sized, bluntly oval, slightly ribbed ; skin greyish green, tinged with yellow next the sun, somewhat netted ; flesh green, thick, melting, juicy, and richly flavoured.

WILLIAM TILLERY.—Fruit large, oval, handsome ; skin dark green, beautifully netted ; flesh pale green, very thick, melting, and deliciously flavoured.

III.—WHITE-FLESHED VARIETIES.

CASHMERE (Meredith's).—Fruit medium to large, oval, slightly ribbed, sparsely netted, very handsome ; skin yellow, thin ; flesh nearly white, very tender, juicy, and exquisitely flavoured.

GOLDEN GEM.—Fruit medium to large, round, flattened ; skin yellow, beautifully embroidered, very handsome, thin ; flesh nearly white, thick, very juicy, and of rich flavour.

HERO OF LOCKINGE.—Fruit medium-sized, round, handsome, skin golden yellow, beautifully embroidered with white ; flesh white, thick, melting, and of very fine flavour. An excellent variety for growing in frames.

HOLBORN FAVOURITE.—Fruit medium to large, bluntly oval ; skin bright pale yellow, beautifully netted ; flesh nearly white, thick, juicy, and exquisitely flavoured.

LONGLEAT PERFECTION.—Fruit medium to large, bluntly oval, slightly ribbed, handsome ; skin smooth, small netted, yellow, thin ; flesh white, melting, and luscious. Good for growing on the extension system in houses.

THE COUNTESS.—Fruit medium, roundish oval ; skin yellow, closely netted, thin ; flesh white, thick, tender, juicy, and of excellent flavour. A free bearer and good setter.

Propagation.—The melon is an annual trailer, and is readily raised from seed. It is important that the seeds be saved from the finest fruit. Where a number of varieties are grown together there is great danger of cross-fertilisation and deterioration. To keep

the stock of a particular kind true, one variety only should be grown at one place. When more than one kind is grown and it is desired to keep a particular variety pure, the flowers should be enclosed in gauze bags before they expand, impregnating them when full-blown with the desired pollen, keeping them covered until the fruit commences swelling. Pollen of a different variety is more energetic than pollen of the same kind. This accounts for the great variations in the seedlings from a fruit, even after careful impregnation with pollen from the same plant—own pollen—when other varieties were flowering simultaneously. Cross-breds are also liable to sport; therefore every possible care should be taken in selection.

The age of the seed exerts some influence on growth, fruitfulness, and time of ripening. New seeds produce the strongest growth, those two or three years old furnish healthy and free fruiting plants, and older seeds give plants that supply fruit in the least time from sowing. Seeds more than three years old are not desirable, for it is necessary that the young plants be strong and make good growth before they show fruit, so as to insure this being fine.

The seeds are best placed singly in 3-inch pots, half filled with a compost of two-thirds loam and one-third leaf soil, fine and pressed moderately firm, one crock and a little of the rough of the compost sufficing for drainage. Make an indent in the centre about $\frac{1}{2}$ inch deep, place in the seed—two if considered advisable, with a view of making sure of one plant, removing the weakest in due course—and cover with fine soil, not more than $\frac{1}{2}$ inch nor less than $\frac{1}{4}$ inch deep. The soil ought to be moist so that water will not be necessary immediately after sowing. Stand the pots on a shelf, not more than 1 foot from the glass, in a house with a temperature of 65° at night, 70° to 75° by day, with 10° to 15° rise from sun heat. Cover each pot with a pane of glass, which withdraw by degrees directly the seedlings appear, dispensing with it altogether when the seed-leaves are developed. Give water very carefully, especially in the early part of the year, and earth up the plants as they advance in growth to within $\frac{1}{2}$ inch of the rim of the pots. From the 3-inch pots the plants may be transferred to their fruiting quarters, or be shifted into 5-inch pots for growing stronger before planting.

When several seeds are sown in a pot, say an inch apart, the seedlings should be lifted carefully when the first leaf appears beyond the seed leaves, and placed singly in 3-inch pots, the stems being buried deeper than they were before, yet the seed leaves

should be about $\frac{1}{2}$ inch above the soil, then new roots will issue from the stem, and strengthen the plants. If it is found necessary to water newly potted-off plants, it is better to stand the pots in a tray containing about $\frac{1}{2}$ -inch depth of water for a short time so as to moisten the soil, than to apply it at the surface, which might cause the plants to damp off, especially early in the season. Too much care cannot be taken not to injure the roots or stems in potting-off seedlings, and the soil should be warm before using. It is a bad plan to allow the plants to become very much root-bound and starved in the pots before planting, and it is better to keep up a proper succession of young plants by frequent sowings than to hold plants over from one sowing for planting at a much later period, even if they are shifted into larger pots, for no plants succeed so well as those grown from first to last without any check whatever.

Soil.—A strong naturally rich loam, friable rather than adhesive, is the best for melons. The top 3 inches of a pasture the herbage of which is rich enough to fatten oxen will grow grand fruit without any admixture, and the rich soil found in valleys, especially that from warped land bordering rivers, is decidedly to be preferred before that from high ground. The turves should be cut in autumn, laid in a heap grass downwards, and a little soot sprinkled on each layer, about a bushel to each cartload. The turfy portion should either be broken in pieces with the hand or chopped up with a spade when required for use the following season. Light soils are not nearly so useful for melons as strong loam, but by adding a fifth of old cow-manure, and a sixth of clay dried and pounded, mixing the whole well, good fruit may be grown. Manure should only be sparingly used; too rich soil induces over-luxuriant growth, and it is better to apply a richer compost as a top dressing or "earthing" after the fruit is set, or supply liquid manure at the same period. The soil should be made very firm in order to force the roots to run slowly through it, produce abundance of fibres, and sturdy, short-jointed, fruitful growth.

Season of Fruit.—This depends upon the mode of culture adopted. 1. When grown in pits or frames by the aid of fermenting materials only, melons may be had ripe from the latter part of May to the beginning of October. 2. If grown in well-heated, light airy structures, ripe fruit may be had occasionally from the middle to the end of April, but generally from the early part of May till November or later. The best fruits, however, are only had when there is plenty of sun to ripen them.

CULTURE IN FRAMES AND PITS.

The oldest mode of cultivating melons in this country is in frames on hotbeds of fermenting materials, and large supplies of fruit are thus obtained in summer; therefore, concise instructions will be useful to those having no other means of raising and growing this delicious and highly perfumed fruit.

Site for Hotbeds.—Out-of-the-way corners, unless fully exposed to the sun from 6 a.m. to 6 p.m., are not suitable, for the melon requires all the light possible. The site must be open, exposed to the east, south, and west, with the protection of a wall or fence to the north. It is usual to select an open, sunny, sheltered situation for the frame ground, and to enclose it with privet or other hedges, and keep them closely trimmed to about $4\frac{1}{2}$ -feet height, so as to break the force of winds from every quarter. The site should also be dry, or so elevated above the ground level that water will drain from instead of to the beds.

Fermenting Materials for Hotbeds.—Oak, beech and Spanish chestnut leaves collected in the autumn when dry, closely packed together to form a ridge and thatched with coarse grass, reeds or straw, will keep nearly in the same condition as when stacked until spring. These, mixed with stable manure, form the best means for supplying the requisite bottom and top heat. Stable manure alone, if fresh and sweet, is suitable, but the heat is apt to be more violent at first and not so durable as that obtained by an admixture of equal proportions of stable manure and leaves early in the season, and two-thirds leaves and one-third stable manure after February. The stable manure and leaves should be thrown into a heap a fortnight before the material is wanted for making the hotbed, incorporating all well together, sprinkling the dry parts with water or liquid manure. In the course of about four days the materials will ferment, and should be turned, shaking and mixing well, putting the outside inside and sprinkling with water where too dry. This having been done three or four times the materials will be in a fit state to form a hotbed. The object of the mixing and turning is to secure uniform warmth, steady and prolonged heat, and the expulsion of noxious vapour.

The height of the hotbed depends on the time of year. If the bed is for a one-light box to raise plants in, it should be 3 feet 6 inches high for sowings in February, 3 feet for those in March, and 2 feet 6 inches for others later in the season. For beds to receive the plants in February, the height should be $4\frac{1}{2}$ feet, in March 4 feet, and after-

wards $3\frac{1}{2}$ feet, the beds in all cases being 6 inches higher at the back than the heights named.

To make the bed, mark out a space 6 inches wider all round than the frame, and so that this when placed on the bed will face due south. If the site is wet, spread a layer of fagots on the ground for building on. Place a layer of the prepared material on them, shaking it well and evenly over the area, and beat it down with the fork. Continue placing layer upon layer in the same manner, doing it neatly, keeping the sides perpendicular and firm until the required height is reached. If the bed is trodden it must be evenly, but well-beaten beds are the best.

If the bed is for raising plants the frame is better with an inner lining formed of $\frac{1}{4}$ -inch boards, less in depth by 9 inches at the back and 6 inches in front than the frame, kept an inch from the box by nailing narrow strips of board upright on the inside, so as to form an inch cavity all round, and thus top heat is furnished by means of linings against the sides of the box. The heat will rise in about a week. Level the surface of the bed, and put in sufficient manure to raise the inside to within 4 inches of the top of the inner frame, placing sawdust, leafsoil or spent tan on the manure for plunging the pots in. If the bed is intended for fruiting plants, a stick should be thrust into it from the outside, just below the frame, reaching to the centre. In about a week draw the stick out and clasp the end of it; if the heat is not more than the hand can bear, the frame should be taken off, and the surface levelled by adding some fresh yet sweetened material. If the heat is greater than the hand can bear, draw the lights down a little to allow the vapour to pass off, and defer levelling the bed until the heat is reduced. A surer method is to have a dipping thermometer with the bulb 6 inches below the surface. When this reads 100° there is no danger, and when a candle will burn in the frame the air is sweet. Beds formed in the manner described are for lining from the bottom. This is essential early in the season, but beds not made up before the end of March should be 18 inches wider than the frame all round, and linings placed against the sides of the frame will be sufficient during the summer.

Soiling the Bed.—Enough moderately dry soil should be placed on the surface of the bed to prevent too much heat and vapour rising—a couple of inches in thickness will suffice; then place half a barrowful of compost in the centre of each light. This should be in a moderately dry condition, yet moist enough for the healthy ramification of the roots through it. These mounds should be in the form of a cone, with the top flattened so that the depth of compost is about 9 inches, exclusive of the soil with which

the bed is covered. In the course of a day or two the soil will be warmed through; then the plants may be put out, but it is advisable to make sure that the heat does not exceed 90° to 100° at the base of the hillocks before doing so.

Planting.—Select the shortest-jointed plants. These may be of two descriptions—1, those which have one leaf, and showing the next with the growing point beyond the seed leaves; 2, plants stopped at the second rough leaf and pushing side-growths. In either case turn the pot upside down, gently tap the rim against the edge of the frame, and the ball will come out entire. Plant this immediately in the centre of the cone, the top of the hillock being dished a little to hold water, and after pressing the soil firmly round the ball, give a gentle watering; but if the soil is moist this may be omitted early in the season, as damp is then the chief enemy to be guarded against. A ring of dry soot or quicklime drawn around each plant a short distance from the stem is the best safeguard against slugs and injury by damp. Two plants may be placed on each hillock early in the season for first crops, but later one plant is ample for each light of an ordinary-sized melon-frame.

The plants must not be buried deeper in the soil than within an inch of the seed leaves. Short stems are the best; if long, the plants fall over, grow one-sided, and the stems may snap or fall a prey to canker.

Training.—Stopped at the second rough leaf, the plants will push a shoot from the axils of the main leaves, and in some varieties one from each of the axils of the seed leaves (*I*, Fig. 1). These may be left to form the four primary shoots when nearly of equal vigour, two being trained to the front, and two to the back of the frame; but the shoots from the seed leaves are generally weaker than those from the base of the rough leaves, and in that case it is better to rub off the former and originate more of the latter character, as shown in *J* (Fig. 1). If two plants are placed in a hillock, the two shoots proceeding from the base of the two rough leaves are sufficient to leave on each plant respectively. This must be kept in view, for over-crowding the growths is fatal to free setting and fine fruits. Two principal growths at the front and two at the back are sufficient for each light. These should be trained at equal distances apart, and should not be less than 18 inches asunder. They will grow rapidly and throw out laterals, which, however, should be rubbed off as soon as they appear to the extent of 6 inches from the stem; this not only keeps the stem clear and less liable to canker, but invigorates the principal growths. When these are short-jointed it is desirable to rub off every alternate lateral on opposite sides, but when the growths are long-jointed all may remain.

The principal growths should be stopped at 1 foot from the sides of the frame. This will throw the vigour into the laterals, and they may show fruit at the second or third joint. If the laterals do not show pistillate or fruit flowers at that extent of growth, take out their points at the second or third leaf, and this will cause them to push sub-laterals on which flowers will appear.

Another mode of training in frames is to stop the plants at the second rough leaf, then allow them to grow for a fortnight or so, by which time they will be well furnished with shoots. Four or six of the strongest are then selected, and spread out at equal distances, with their extremities pointing towards the sides of the frame, care being taken not to cross them, one half being taken to the front and the other to the back of

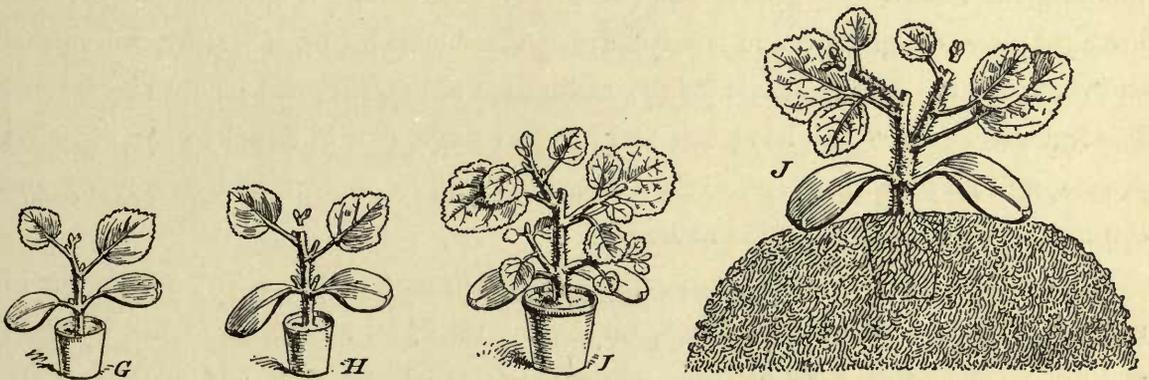


Fig. 1. MELON PLANTS AT PLANTING STAGE.

References :—*G*, plant with a pair of seed leaves and two rough leaves, ready for stopping. *H*, a plant with the growing point rubbed off. *I*, stopped plant, with shoots from the axils of the seed leaves and from the rough leaves. *J*, a plant stopped at the second rough leaf, the shoots rubbed off from the axils of the seed leaves, two shoots from the axils of the rough leaves, pinched at the second joint, and properly planted in the hillock.

the bed. The spray shoots that cluster round the stem are cut clean out, and thus the stem is kept clear, an important point. When the main growths reach to within 6 inches of the sides of the frame their points are pinched off. This causes the production of fruit-bearing laterals. Care is taken to remove any laterals that have a disposition to compete with the principal shoots in vigour. The flowers are in due time impregnated, and the setting of the fruit follows. When that is effected a piece of slate is placed under each fruit, and the shoots are stopped and thinned; then, with adequate support, the principal leaves duly perform their functions, and large richly flavoured melons are perfected.

Cropping.—Early in the season it not unfrequently happens that the plants show fruit blooms on the first laterals near the stem, and these are generally impregnated. It

may not be wise to miss a couple of fruits on a plant at an early period of the season, provided the growth is vigorous, but it is generally preferable to have a nearly full-sized plant and several flowers open at nearly the same time to obtain a regular crop of melons. Three or four full-sized fruits are as many as a healthy plant is capable of finishing perfectly under one light of an ordinary melon frame. Six fruits may be preferred and produced, but it is vain to expect one plant to produce six melons equal in size and quality to those on another plant producing three or four. The surplus fruits should be removed directly those selected for the crop are swelling freely—say, when about the size of a hen's egg.

Pruning.—After the fruit is set, stop all growths to two leaves as fast as they appear, thinning out useless wiry growths, and cut away shoots that if left would deprive the principal leaves of light, air, and nourishment. These main leaves, if healthy, will attract and elaborate the food necessary for the maturation of the fruit, and improve its flavour. The fruits when large may be elevated on inverted flower pots to complete the ripening process, still keeping the pieces of slate beneath them, to prevent moisture rising and causing decay of the fruit on the under side.

Maintaining the Heat.—When the night temperature falls below 70°, a covering of mats should be placed over the frame, varying in thickness according to the weather, and made secure with wood battens. On mild nights without frost, one mat, on frosty nights, two mats, and on severe nights, three mats, will in most cases be sufficient. The covering should be removed in the morning by the time the sun reaches the frame, or would do, if there were no clouds, for the plants must have light; and the mats must be placed over the lights soon after the sun leaves the frame in the afternoon. No stated time can be given, as the days vary. But, as a rule, the covering need not be removed before 8 A.M., nor replaced before 5 P.M., during February and March; an hour earlier and later in April and May; and after the middle of June the covering may usually be dispensed with, except on cold nights. The covering material must not hang over fresh linings, or noxious gases may pass into the frame, and destroy the plants.

Additional heat is provided by linings of fermenting materials kept in reserve, sufficiently warm to at once raise the declining heat of the bed.

Linings from the bottom are only needed for early beds, and not always in mild seasons. The frame will sink into the bed, and must be raised at intervals as needed to keep the glass about 1 foot from the plants. Raising the frame about the thickness

of a brick each time suffices. In lining from the bottom, the hot manure should be applied at the front first before the heat of the bed declines too much, the back lining following in about ten days.

With only sufficient fermenting material to form one bed, it is best to defer making it up until the beginning of May, 3 feet or more in height, and 18 inches larger than the frame all round. This will retain sufficient warmth for about six weeks, by which time the heat of summer will be almost sufficient to carry on the plants, but if cold weather set in, particularly at the time when the flowers are on the point of setting, short grass from lawns placed round the frames will revive the heat and be helpful.

Manure-heated pits are serviceable for growing melons. In filling these pits with fermenting material, sweetened, well beaten down, and trodden at the sides, allowance

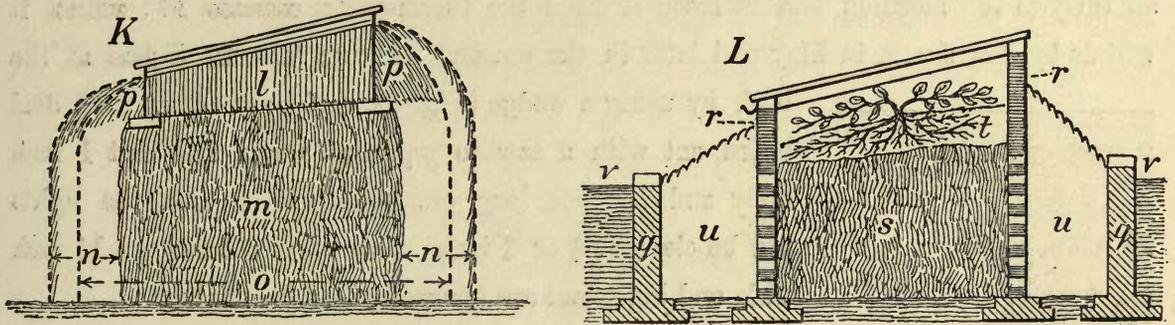


Fig. 2. FRAME HOTBED AND MANURE-HEATED PIT. (Scale: $\frac{1}{2}$ inch = 1 foot.)

References:—K, frame and hotbed: *l*, frame, 6 feet wide, resting on bricks at the corners; *m*, hotbed, 6 inches larger than the frame all round, for lining from the bottom; *n*, linings applied; *o*, width of bed when top lining (*p*) only is used. L, manure-heated pit: *q*, 9-inch retaining walls; *r*, $4\frac{1}{2}$ -inch walls, built in cement, pigeon-holed to the height of the retaining walls; *s*, bed of fermenting material; *t*, 10 to 12 inches' depth of soil; *u*, space for linings; *v*, ground level.

must be made for settling by bringing it up to the rafters. The lights being put on, the bed will be ready for soiling in a week or ten days, previously levelling it, and adding more manure if necessary, to bring the surface within a foot of the glass. The soil is then placed in the centre of each light in the form of a cone with a flattened top, the latter being only an inch or two from the glass. By the time the soil is warmed the bed will have sunk enough to admit of sturdy plants being put out, and afford room for their after growth, as shown in Fig. 2, L. The front lining will be required in ten days or a fortnight after planting the melons, and the back about ten days later in the spaces *u*. The fermenting materials must at all times be kept higher than the pigeon-holes, and the soil should be kept close to the walls, otherwise vapour may pass from the linings into the pit, and destroy the plants. The linings should be brought

up to the dotted lines, and will require renewal or additions, according to circumstances, for maintaining the proper temperature.

Economising Heat.—If melons are grown in pits or frames, the means being limited to the making-up of a bed to give the plants a start, it becomes imperative to husband as much of the sun's heat as possible. By its agency excellent melons may be had in August and September in pits and frames which have been employed up to May in forcing radishes, potatoes, and forwarding plants for bedding or other purposes. A barrow-load of soil in each light, in the form of a flattish mound, and 3 inches of soil over the rest of the bed, is ample. When the soil is warmed through, a strong plant may be placed in the centre of the mound early in June. The warmth of the bed and the sun heat, with requisite moisture, will carry the plants along quickly. Admit a little air early in the morning, and increase it when the thermometer reaches 80° , which it will do by 8 or 9 A.M. in May and later in the season. Always tilt the lights at the

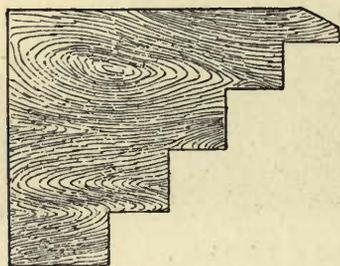


Fig. 3. NOTCH FOR VENTILATING.

back by using a wedge (Fig. 3), made out of an inch deal board, cut with a saw to represent steps, the first 1 inch wide and $1\frac{1}{2}$ inch long, cut slantingly, so that the lights can be elevated $\frac{1}{2}$ or 1 inch. The other notches are $1\frac{1}{2}$ inch wide and long, and are generally four in number.

This method of ventilating is far better than pushing down the lights, and causing a current of cold air to rush through the frame. The lights may be closed about 3 P.M., sooner or later, according to the weather, after a free use of tepid water to every part—plants, soil, walls, or woodwork. If, after closing, the sun's rays do not raise the temperature above 95° , no harm will ensue; but if the heat rise above 100° , admit a little air. The frame should be closed before the temperature falls below 80° , and if the sun raise the heat 10° to 15° after closing, so much the better.

Adding Soil.—Layers of fresh warm soil must be added to the hillocks as roots protrude through them, for it does not answer to cover the whole bed at once with the full depth of soil, except in the case of plants which are not put out before the end of May and afterwards. About three earthings are required, at intervals of two or three weeks, to cover the bed all over to a depth of 6 inches. This will leave the stems slightly elevated, and so prevent water resting against them. In all cases the soil should be made firm, and the final earthing completed without damaging the growths.

Admitting Air.—In the early stages, when the external air is keen, a cold inrush

may be prevented by a thin mat or piece of hexagon netting placed over the openings. Commence in the morning by raising the sashes a little at the back, increasing the openings with the increase of heat. As the season advances more air will be needed; regulate the time of opening and closing by the thermometer. Remember that the object is to displace foul air, and supply its place with fresh; also to prevent the heat becoming unsafe for the plants. Reduce the openings in the afternoon in proportion to the decline of sun heat, using warm water freely when the lights are closed.

Fruit-Setting.—A moist condition of the soil is necessary to insure free growth, but it must not be kept wet on the surface when the plants are in flower. It is well, therefore, to water the plants a day or two before the flowers are likely to open, to have the bottom heat brisk, and to admit abundance of fresh air. Keeping the frame close at the time of flowering prevents the pollen from being properly dried. If water is needed while the fruit is setting, supply it through drain-pipes about 18 inches apart, with one end inserted in the soil to the depth of an inch. Sometimes the flowers have the pollen converted into paste by the condensation of moisture in dull, moist periods; to prevent this a little air should be admitted constantly, and a good lining applied to the sides of the frame.

Watering.—Early in the season very little water is required. At first it must be given near, but not quite touching, the stems of the plants, but as the roots extend into the fresh soil more water becomes necessary. Moderate applications will only be needed until the fruit has set; then once or twice a week or, it may be, every other night, copious supplies will be required. The soil must not be allowed to become so dry as to cause the foliage to flag, but when getting rather dry afford a thorough supply of water. When the fruit begins netting water should be given rather less copiously; still, the soil must be kept perceptibly moist and even when the fruit is ripening there must be sufficient moisture at the roots to keep the foliage healthy. Water must be made tepid by adding hot to cold, or by exposure to the sun before applying it to the roots or sprinkling the plants.

Sprinkling.—A gentle sprinkling of the bed in the morning to the extent of the hillocks, but not over the plants, may be given when the surface becomes dry; this will be sufficient before April. In April the bed may be sprinkled on fine afternoons from 1 to 2 P.M., and after April at the time of closing the frame. This creates a moist atmosphere which invigorates the plants and is inimical to red spider. This sprinkling should not be practised in dull, cloudy, or rainy weather. About a gallon of water to a

light is sufficient for sprinkling the plants, and 3 gallons at a time in watering the roots. Whenever water is given, or the plants sprinkled, care should be taken not to wet the stem or centre of the plant whence the branches radiate, or decay will ensue. Withhold the sprinklings when the plants are coming into flower until the fruit is set, and again when it is advanced for ripening, for a dry atmosphere is essential to the perfection of the fruit.

Second Crops of Melons.—If the first crop of melons is cut in June and July a second crop may be had if growths have been encouraged for that purpose, but unless these are stout and a foot long, they are of no value for a second crop. These vigorous growths provided, cut away the old parts, renew the lining of the bed, and remove the surface

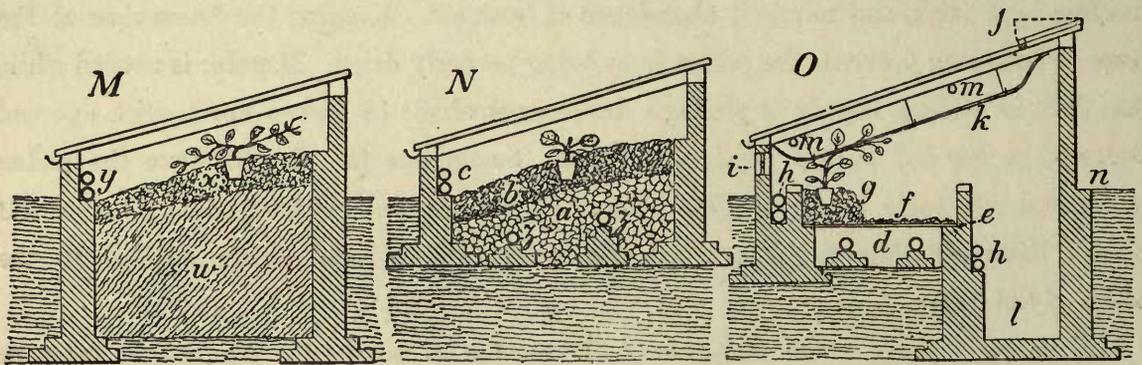


Fig. 4. LEAN-TO PITS FOR MELONS. (Scale: $\frac{1}{2}$ inch = 1 foot.)

References:—*M*, pit with fermenting material (*w*) for bottom heat: *x*, soil; *y*, hot-water pipes for top heat. *N*, pit with hot-water pipes (*z*) for bottom heat: *a*, rubble; *b*, soil; *c*, hot-water pipes for top heat. *O*, pit with chamber (*d*) heated with hot-water pipes: *e*, slate slabs or $1\frac{1}{2}$ -inch boards; *f*, bed; *g*, ridge of soil to plant in; *h*, hot-water pipes for top heat; *i*, wood ventilator, 18 inches long and 7 inches deep, hung on pivots and the ventilators fixed in the wall at 3 feet apart; *j*, top ventilating light, opening the whole length of the house; *k*, trellis; *l*, path; *m*, $1\frac{1}{2}$ -inch hot-water pipes; *n*, ground level.

soil to the depth of an inch, also a little from between the large roots; but the less these and the fibres are disturbed the better, and the soil should not be removed within a radius of 1 foot from the neck of the plant. Supply fresh compost, pressing it firmly around the roots. Give a gentle watering with tepid water; keep the frame rather close and shaded from bright sun until the plants become re-established, after which they require the same treatment as advised for the first crop of fruit.

CULTURE IN HOT-WATER-HEATED PITS AND HOUSES.

Pits or houses used in winter for forcing or plant growing are suitable for melons in summer; but unless fully under control for giving the necessary attention to them and thoroughly heated, they are unsuitable for early supplies. Bottom heat is sometimes

supplied by fermenting material, especially in brick pits used in winter and spring for protecting or forcing vegetables, and afterwards for melons (*M*, Fig. 4); and in other cases by hot-water pipes fixed in the bed and surrounded with rubble (*N*, Fig. 4); it is also furnished by hot-water pipes in a chamber beneath the bed (*O*, Fig. 4), and is then suitable for early or late melons.

Where fermenting material is used, the pit (*M*, Fig. 4) must be filled quite up to the rafters with that properly prepared, well beaten and trodden firmly, so as to prevent the bed falling too low, and causing the plants to be at too great a distance from the glass.

When hot-water pipes supply bottom heat, 6 to 9 inches of rubble, such as half-bricks, should be placed over them, and a layer of turves an inch thick, grass downwards,

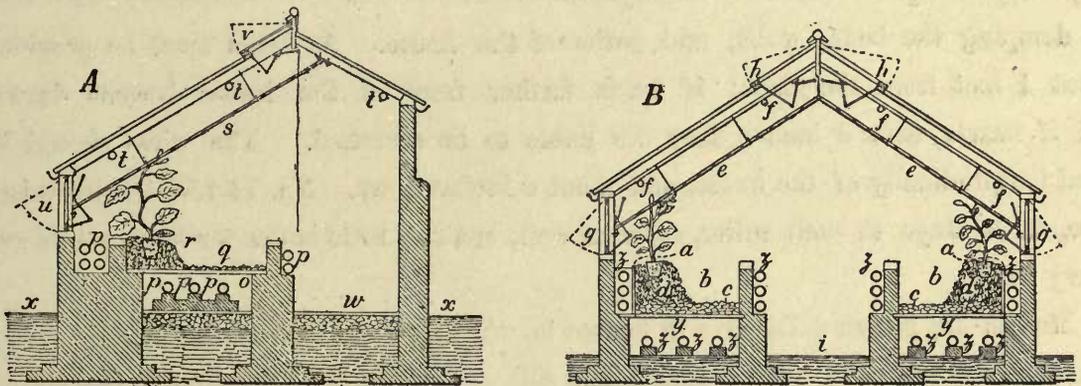


Fig. 5. THREE-QUARTERS SPAN-ROOFED AND SPAN-ROOFED MELON HOUSES. (Section through *O2*, Ground Plan, Vol. I., page 71.) (Scale: $\frac{1}{8}$ inch = 1 foot.)

References:—*A*: *o*, hot-air chamber; *p*, 4-inch hot-water pipes; *q*, bed; *r*, ridge of soil; *s*, trellis; *t*, 1½-inch hot-water pipes; *u*, front lights; *v*, top lights; *w*, path; *x*, ground level. *B*: *y*, hot-air chambers; *z*, 4-inch hot-water pipes; *a*, slate slabs; *b*, bed; *c*, rubble; *d*, ridges of soil; *e*, trellises; *f*, 1½-inch hot-water pipes; *g*, side lights; *h*, top lights; *i*, path.

put on the rubble to prevent the finer soil from passing into it. In the case of the bottom heat being supplied by hot-water pipes in a chamber, the covers, whether flagstones, slate slabs or boards, must not be laid in mortar, but have the joints open, and a little rubble placed on to prevent the joints becoming choked with soil.

The small lean-to (*O*, Fig. 4) is best adapted for early supplies of fruit, as in a dry site it may be sunk in the ground as shown, and with roof heat (hot-water pipes, *m*) the glass cannot become coated with ice. This is very important in early forcing, and the provision is equally necessary for a three-quarters span-roofed house, which is suitable for providing early and late melons of the choicest quality. This form of house (Fig. 5) and the lean-to's must face the south.

Span-roofed houses for early and late forcing may be placed with the ends east and west; for summer supplies, the ends may be north and south. There is an advantage in these structures, namely, the fruits on the south side of the house ripening in advance of those on the north. Span-roofed houses are the best for affording large supplies of fruit, but it is useless attempting to grow early or late melons without ample provision for heat, as highly heated surfaces produce an atmosphere inimical to melon plants. Valves should be provided on all the flow and return pipes, so that the bottom, top, and roof heat can be regulated to a nicety.

It will be observed that no provision is made in any of the structures for moisture by means of evaporation from trough pipes. Where considered desirable they may be provided, but atmospheric moisture can be adequately furnished by damping the beds, walls, and paths of the house. A trellis must be provided about 1 foot from the glass; if much farther from it the leaves become drawn, and if nearer than 9 inches they are liable to be scorched. The wires should be fixed longitudinally of the house, and about 6 inches apart. No. 13 I.W.G. galvanised wire, with stays at each rafter, answers well, but No. 10 is better for large plants and heavy fruits.

Melons are grown differently in houses to what they are in frames. 1. The soil is placed in a ridge or in hillocks along that side of the bed corresponding to the bottom of the trellis. A ridge extends the whole length of the bed, has a base of about 18 inches, and 1 foot in breadth at the top. Hillocks have a base of about 2 feet, and taper upwards so as to give a flat top 1 foot across. If the plants are to be trained as single cordons, the hillocks have their centres about 2 feet 6 inches apart; if the plants are allowed to become large, the mounds ought to be placed in the centre of each light, or not less than 4 feet apart, to secure strong plants able to perfect six or more fruits each, of the largest size. 2. Fresh soil is added to the sides of the ridges or hillocks as the roots protrude, but no more is given than suffices to keep the plants in steady progress until the fruit is set and swelling, when the final earthing is given, either all at once, or at one or two short intervals. 3. The plants are trained with a single stem, and the laterals all rubbed off when quite small to the height of the trellis, as shown in *R*, Fig. 6. Then the main shoot may be stopped if more than one main growth is required; otherwise it is allowed to extend to within 1 foot of the top of the trellis before being stopped.

TRAINING.

Single Cordons.—This is the simplest of all methods. The main shoot is encouraged to grow to about 1 foot from the top of the trellis, and its point is then pinched off. As it advances up the trellis every alternate lateral on both sides of the stem is rubbed off when discernible and less than 6 inches apart, but when the joints are farther apart all the laterals are left. These usually bear female blossoms at the second or third joint, and when three or four open at one time they are fertilised, stopped one joint beyond the fruit, and when three or four fruits are set and swelling on a plant they so appropriate the nourishment that little further growth is made. Sub-laterals, however, must

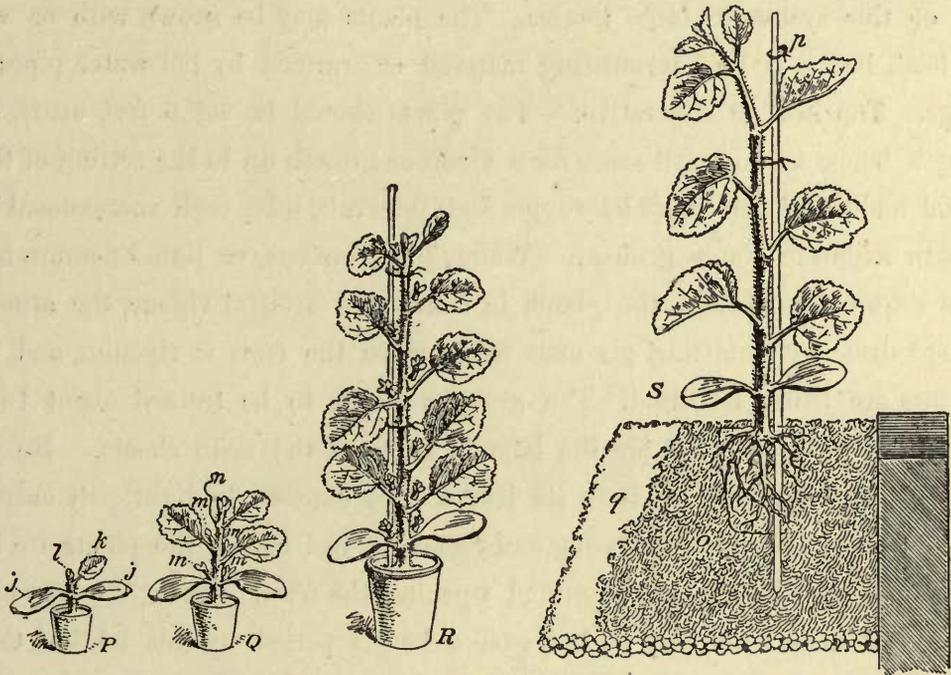


Fig. 6. MELON PLANTS FROM POTTING-OFF TO PLANTING-OUT FOR TRELLISES.

References:—P, plant potted-off: j, seed leaves; k, rough leaf; l, growing point. Q, plant ready to put-out, or transfer to 5 or 6-inch pot; m, laterals—rubbing-off size; n, tendril—to be cut off. R, plant in 5-inch pot ready to plant; detached growths—laterals rubbed off. S, planted: o, ridge of soil; p, stake secured to bottom wire of trellis; q, extent of soil to be added at one earthing.

be stopped to one leaf as made, and the growths thinned so that the space is occupied with as many good leaves as can have exposure to light. By this system the fruits ripen very closely together, and they so exhaust the plants that they are seldom worth keeping for a second crop. It is a very desirable method to follow with a view to early fruit.

Alternate System.—By this mode every alternate plant is trained on the cordon method to produce two or three fruits each on the first laterals for an early supply; but the other plants are not allowed to bear on such laterals, which are stopped at the second

or third joint, and the fruit is produced on the sub-laterals. The main shoot is pinched when it has extended about two-thirds up the trellis, and every other lateral on opposite sides of the stem rubbed off. Such plants attain greater vigour and produce fruit about three weeks later than those which are stopped more closely. Four to six fruits may be allotted to the later plants, which, consequent on less restriction in training, receive a larger amount of nutriment, and the fruits are larger, more juicy, and highly flavoured. When not over-cropped and kept clean, the plants produce a second crop little less in value than the first.

Extension Method.—All the free-growing varieties succeed admirably during the summer on this system in large houses. The plants may be grown with or without bottom heat, but a bed of fermenting material or warmed by hot-water pipes is an advantage. Top heat is imperative. The plants should be set 6 feet apart, and as much earth being used as will serve for a vigorous growth up to the setting of the first fruits, and additional soil must be supplied at intervals, after each successional setting of fruits, to keep the plants growing. Water, top-dressings, or liquid manure must be given as required to sustain the plants in continuous fruitful vigour, the atmosphere being kept drier by admitting air more freely when the fruit is ripening and successional fruits are being fertilised. The growths ought to be trained about 18 inches apart, so that there is room for the laterals between the main shoots. No growth should be allowed that cannot have its leaves fully exposed to light. By cutting out exhausted growths, training in young and removing bad leaves, the plants are kept in the several stages of setting, swelling, and ripening the fruit. Under the best management more and finer fruit may be had over a longer period by this method than any other, but the unexperienced cultivator had better try the extension system on a small scale before generally adopting it.

Setting the Fruit.—The flowers of the melon are monœcious (one sex in one flower, and the other in another, on the same plant), and produced in the axils of the leaf-stalks. The male or staminate flowers are by far the most numerous, and often borne in clusters on the main stem as well as the side shoots, but the female or pistillate flowers invariably form on the laterals and sub-laterals. Before fertilising any flowers, it is desirable to have a sufficient number open at one time to form the crop, for when one or two fruits are allowed to take the lead the later may turn yellow and fall, instead of swelling. Setting consists in transferring dry pollen from the anthers of one kind of flower to the stigma of the other when both are in a fully-developed state. The opera-

tion is generally performed by detaching a male flower, removing the corolla, and then gently brushing the anthers over the stigma of the flower intended to set fruit, as shown in the illustration (Fig. 7, *U*). This is usually effectual, but it is safer to apply pollen

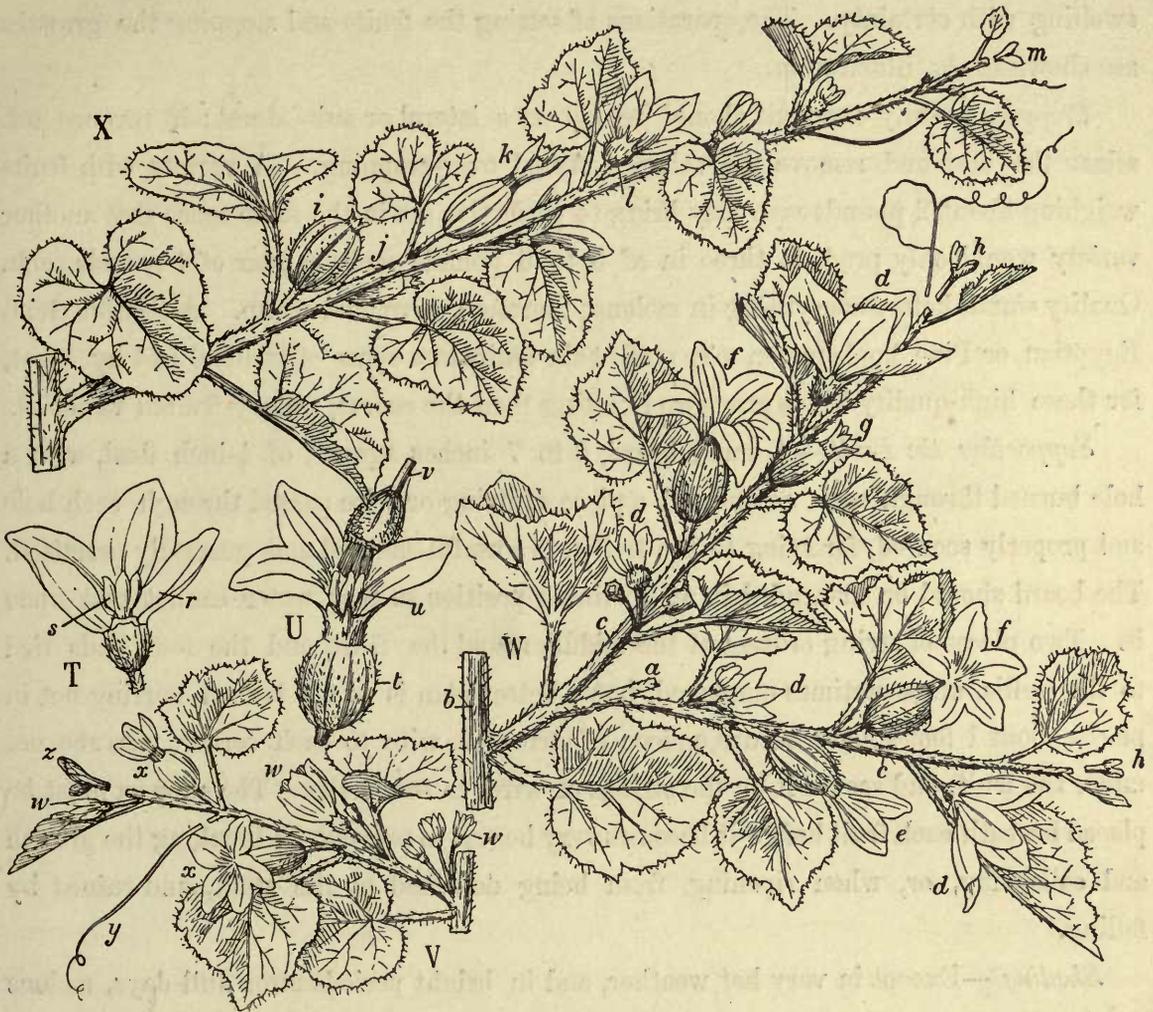


Fig. 7. SETTING THE FRUIT, AND MODES OF BEARING IN MELONS.

References:—*T*, male or staminate flower with one petal removed: *r*, corolla; *s*, stamens. *U*, female or pistillate flower: *t*, ovary (fruit); *u*, stigma; *v*, flower (*T*) denuded of corolla and pollen applied. *V*, lateral on cordon system: *w*, staminate; *x*, pistillate flowers; *y*, tendril detached; *z*, point to be pinched off at fertilisation. *W*, alternate system bearing on sub-laterals: *a*, lateral pinched at the second joint from the main shoot (*b*); *c*, sub-laterals; *d*, male flowers; *e*, female flower after fertilisation; *f*, flowers ready for fertilising; *g*, flower before expansion; *h*, points of sub-laterals pinched off two joints beyond the second fruit. *X*, lateral on the extension system: *i*, fruit set; *j*, fruit not set; *k*, flower after fertilisation; *l*, point of stopping if space be limited; *m*, point of stopping where space admits of extension.

by means of a camel's-hair brush. Impregnation, as it is called, is best performed on a fine day, after the house has been freely ventilated, say at noon, as the pollen must be dry even if extra fire heat has to be afforded in dull weather. On the cordon system

the lateral is usually stopped one or two joints beyond the fruit at the time of fertilisation, as represented in Fig. 7, V. By the other methods the laterals or sub-laterals may either be pinched when the flowers are fertilised or when the fruit commences swelling with certainty. The operations of setting the fruits and stopping the growths are shown in the illustration.

Cropping.—Only one fruit should be left on a lateral or sub-lateral; if two are set, select the best and remove the other. Avoid over-cropping. A variety with fruits weighing about 2 pounds each may bring to perfection six in the same space that another variety would only produce three in of 5 to 6 pounds each, or four of 4 pounds each. Quality stands before everything in melons; therefore, never over-crop. A Scarlet Gem, Egyptian, or Pine Apple melon may perfect six fruits in a space of trellis 6 feet by 4 feet, for these high-quality kinds are more exacting than the coarse, watery-fruited varieties.

Supporting the Fruit.—A small board, 6 to 7 inches square, of $\frac{1}{2}$ -inch deal, with a hole burned through each corner and a piece of string or wire passed through each hole and properly secured, for tying to the trellis, is a useful method and generally practised. The board should be suspended in an inclining position so that water cannot rest upon it. Two pieces of string crossed at the middle round the fruit, and the four ends tied to the trellis, are sometimes employed, but a better plan is to cut tanned herring-net in pieces about 1 foot square, secure a piece of string or wire to each corner, pass the net under the fruit, and secure it by the strings or wires to the trellis. The support must be placed beneath each fruit before it becomes very heavy, to prevent its breaking the growth and collapsing, or, when ripening, from being detached at the stalk, and ruined by falling.

Shading.—Except in very hot weather, and in bright periods after dull days, melons require little shading. Flagging, however, must be prevented by a temporary light material placed over the plants until they become established after planting; also it may be necessary to afford a light shading when the fruit is swelling. Melons, however, generally bear the full rays of the sun when active at the roots, and sturdy in growth through proper ventilation.

Temperature and Ventilation.—Bottom heat of 75° at 3 inches from the surface of the bed, and 80° at 9 inches depth, is ample for melons. The temperature may be ascertained by a dipping thermometer with the bulb 10 to 12 inches from the surface of the bed, and it should never register less than 75° nor more than 85° . The plants require more heat when setting, swelling, and perfecting their fruit than in the early stages of growth.

The temperature of the house must be maintained at 60° to 65° at night, and 70° to 75° by day by artificial means. A little air may be admitted at 75°, but the heat should rise steadily to 80° to 85° from sun, and be so kept through the day, closing early on bright afternoons to increase to 90° to 100° with plenty of moisture. Air must be very carefully admitted in early spring—in fact, at all times when it is sharp, or the wind strong. During the flowering and ripening periods more air should be given, and the atmosphere kept drier. Never lose an opportunity of closing early in the afternoon when the fruit is swelling, accompanied with abundance of atmospheric moisture.

Watering and Syringing.—Early in the year, and until the fruit sets, water should be supplied carefully, aiming at sturdy, solidified growth, never over-watering, nor allowing the soil to become so dry as to cause the foliage to become limp. When the plants are growing freely and the fruit swelling, abundance of water is required. The watering should be moderated when the fruit is setting and ripening, yet the foliage must not be allowed to flag. Early and late melons are impatient of syringing, but they require a genial atmosphere, which may be secured by damping in the morning, at closing time, and in the evening. During summer the plants may be syringed at closing time on fine days, and the walls and paths well damped three or more times a day. In dull weather less moisture will be required. Always use water warmed to the temperature of the house.

Feeding.—The melon does not relish strong stimulants. Drainings of stables, cow-houses, and piggeries, especially the latter, must be given very cautiously, and diluted with five times their bulk of water. A peck of cow manure to 20 gallons, or a peck of sheep-droppings or fowl manure to 30 gallons of water, form excellent liquid applications for melons, and may be applied once or twice a week during the swelling of the fruit, ceasing before ripening commences. Care must be taken not to supply an overdose, nor cause a check by applying the liquid cold.

Superphosphate of lime 5 parts, and nitrate of potash 2 parts, mixed, may be applied as a top-dressing at the rate of 4 ounces per square yard. Three applications are usually sufficient—the first when the plants are pushing the fruit-bearing laterals or sub-laterals and before they come into flower; a second when the fruit is set and commences swelling; and the third in three weeks after the second. The dressings should be lightly washed in.

Melons Cracking.—When the fruit approaches maturity that which has been grown “hard,” either through dryness of the soil or excessive evaporation, not infrequently

splits, and is thus spoiled. To prevent this evil the house must be kept rather warm and dry, freely ventilated, and the soil only needfully moist when the fruit changes for ripening. A gentle warmth in the hot-water pipes, a little ventilation at night, and water withheld from the atmosphere and soil are usually effective. Frames may be lined and the lights tilted about an inch at top and bottom so as to insure a circulation of air. When the plants are vigorous the precautions named are not always effectual, but by cutting the shoot on which the fruit is borne about half-way through below it, and attending to the other conditions, the splitting of melons may be usually prevented.

Ripening.—This is indicated by the fruit changing colour, and emitting a perfume not before distinguishable. When these characteristics become pronounced, and before it has parted at the stalk, the fruit should be cut with about an inch of the stem, laid on a shelf in the house, and shielded from the sun with paper until evenly matured; then, if removed to a cool, dry, airy fruit room till the skin is equally pervaded with the ripe tint, it will usually be at its best for dessert or exhibition. Experience is very important in ascertaining the right time to send a melon to table, and that once found is always applicable to the variety. Unripe fruit never pleases, and over-ripe is still more objectionable.

DISEASES.

Melons are subject to gum in the shoots and stems, and to canker at the collar.

Gum.—This is mostly engendered by wounds in pruning, especially when the growths have become strong and crowded. This causes the parts left to be so gorged with sap that it exudes from the cuts and shoots, often where there do not appear to be any wounds on the stems. Where this occurs it is a good plan to rub quicklime into the affected parts, and repeat as necessary. The best preventives are to avoid a very rich soil, keep the growths rather thin, rub off those not wanted early, pinch so as to give little occasion for the use of the knife, admit air freely on all favourable opportunities, and maintain a proper temperature, with a genial but not very moist atmosphere.

Canker.—One great cause of this malady is a close and over-moist atmosphere, but it may be caused by improper ventilation and watering close to the stems. The preventive is to keep the stems dry, and admit air constantly—a little sufficing in dull weather. But canker may arise from unhealthiness of the plant, the sturdy and clean-growing being most free from attack. The remedy is quicklime rubbed into the

affected parts as soon as the canker appears, and persisted in so as to keep them dry; this will generally keep the plants alive until the fruit is perfected.

Bacterial Trouble.—Melon plants sometimes become sickly and collapse in a short time. It is not easy to describe the appearance, for no two plants are alike, but the stem, bine, or leaf-stalk attacked usually becomes thicker, moist, and discoloured. This may be close to the base of the plant or between that point and the tip of the growth. Sometimes one leaf-stalk decays first and the disease spreads from it to other parts. Not unfrequently the leaves become spotted, that is, certain areas decay and fall away as if scorched. Occasionally the fruit is attacked, disease spots appear on the surface about the time it ought to ripen, and the flesh becomes useless. When tissue that is freshly diseased is examined, it is found swarming with bacteria—bodies producing a ferment, and no other cause of the disorganisation is to be seen. The malady has proved disastrous in the United States of America, and it is more widespread in this country than many are willing to admit. It is certain that the disease may be carried over from year to year in the soil, and in the seed also; therefore, soil sanitation or fresh loam, and seed from healthy fruit are the best safeguards against it.

Root Disease.—This is caused by a small nematoid worm (Eelworm, *Heterodera radicicola*). The nodules found on the roots are not always caused by this pest, for they may be present without the eelworms, and these may infest the roots whether the nodosities are present or not, but they generally attack the root nodules and live inside the tissues of the plants, causing them to perish. Attacked plants speedily succumb to the disease. The whole of the plants and roots should then be burned, the soil entirely removed, and before the house is again occupied with melons it should be thoroughly cleansed, and a fresh start made with soil and plants from a different source.

ENEMIES.

There is no pest so common and injurious to the melon as red spider (see Vol. I., page 269). The parasite may be introduced with the soil when the compost heap is allowed to be overgrown with grass and weeds, and is too dry when used. It is very necessary to commence with a clean house, thoroughly syringing it in every part with hot water, well scrubbing the wood and iron work with soft soap and water, removing every particle of the old soil, and thoroughly limewashing the walls. The leaves should be scrutinised closely in the early stages of the growth, taking care to have plants free from the pest at planting, and to sponge any infested leaves afterwards

very carefully, or remove and burn them if they can be spared, for the leaves are so brittle that they can hardly be sponged without injury. Maintain a proper amount of moisture in the atmosphere, and keep the roots of the plants well supplied with water and nourishment; then there will be little to fear from red spider, but if it should appear syringe the plants forcibly with clear rain-water warmed to the temperature of the house, and repeat as necessary. Plants in frames may be well sprinkled at closing time. Soot water, made by forming a peck of dry soot into a paste with water, adding 100 gallons of water, stirred thoroughly, allowed to stand until clear, then applied with a syringe, is effective against red spider. Sulphur formed into a thin cream with skim-milk, and brushed on the hot-water pipes when heated to 170° , or a little of the sulphur sprinkled on slates in frames where the sun can act upon it, gives off fumes inimical to the pests.

Thrips and Aphides.—These occasionally infest melons, especially when the atmosphere and soil are kept too dry. Black and green aphides increase marvellously on melons, but both these insects and thrips succumb to careful fumigation with the best tobacco paper on two or three consecutive evenings.

White Fly (Aleyrodes vaporariorum).—This small midge has milk-white, unspotted wings and a pale yellow body. The larvæ feed on the back of the leaves, pierce the skin and suck the juices; the pupæ are also fixed to the leaves, and the perfect insect emerges in a few days. The insects fall to the ground when disturbed or on fumigating; therefore, the floors and beds should be well damped before fumigating with tobacco, yet the plants must not be wetted. But, perhaps, a better means of destruction is to heat the hot-water pipes to 170° , brush them over lightly whilst hot with a cream of sulphur and skim-milk, and repeat in about a week, so as to kill the larvæ and insects that may have emerged from the eggs and pupæ.

MONSTERA DELICIOSA.

THIS plant is a native of Mexico, and forms a fine object in a large stove, where it will grow luxuriantly and fruit profusely. Its magnificent shining dark green leaves are divided in a singular manner, and the plant is highly ornamental. The fruit is oblong, about 12 to 14 inches in length, sometimes rather curved, deep sage green in colour, and marked all over the surface by hexagonal meshes. Fine specimens measure 6 to 8 inches in circumference. The fruit should not be eaten before it is quite ripe and the heads of the ovaries can be easily removed. The pulp is soft, rich and luscious.

Monstera deliciosa (*Philodendron pertusum*) is readily propagated by cutting the stems into convenient lengths, potting, and growing in moist heat.

It thrives well if planted on a well-drained mound of rich soil, against the damp wall of a stove, to which the plant attaches itself firmly by the long aerial roots. It also succeeds against the back wall of a banana house (page 95, Vol. II.). Colonel R. Trevor Clarke, Welton Place, Daventry, has superb specimens in a large, lofty stove conservatory. The plants have become attached to portions of the trunks of hardwood trees stripped of the bark, fixed erect between water-tanks; mounds of rich open soil over good drainage at the base of the trunks afford anchorage for the plants; and the aerial roots clasp the trunks and descend in long, spotted, snake-like form into the tanks; this they seem to enjoy as they do the water which is made to trinkle down the wooden columns by pouring it on the top and keeping them moist during the summer. The plants have also plenty of space with abundance of light; under which circumstances they grow freely and fruit abundantly.

It is only in large structures that the monstera can develop its wealth of beauty, but it may be grown in pots. Drain a large, say, 18-inch pot a quarter of its depth, place a part of a tree trunk about half the diameter of the pot in its centre, with a well-rooted plant, in a mixture of rough fibrous loam and turfy peat in about equal parts. With ample space for growth and adequate supplies of water, it makes a noble specimen. Winter temperature, 60°; summer, 65° to 85°, with a moist atmosphere.

MULBERRIES.

THE Black Mulberry (*Morus nigra*) is the best and only species worthy of cultivation in this country for its wholesome and refreshing fruit. It is said to be a native of Persia, to have been introduced into Europe by the Greeks, and that the Romans preferred it to every foreign fruit. The first trees grown in England were introduced in 1548, and planted at Sion House.

The mulberry is a hardy deciduous tree, milky-juiced, belongs to the same natural order (*Urticaceæ*) as the fig and our common stinging nettle (*Urtica dioica*), and attains to a height of 20 to 30 feet. Flowers greenish white, inconspicuous, unisexual, borne in separate axillary, catkin-like spikes. Fruit oblong, composed of numerous egg-shaped compressed grains, the whole 1 inch or more in length, and $\frac{3}{4}$ to 1 inch in diameter at the widest part; red changing to a blackish purple, juicy, sugary, with a slight acidity, and very agreeable; ripe from the middle or end of August to the beginning of October. The foliage is dense, from the largeness of the leaves and the shortness of the joints of the wood. Mulberries are occasionally used at dessert, more generally in pies and puddings. They make excellent jam (said to be useful in sore throats and affections of the chest), and may be preserved in various ways. A pleasant light wine may also be made from the fruit. The White Mulberry (*M. alba*) is grown for its leaves, which are used for feeding silkworms.

Propagation.—Various methods may be practised, namely, by seeds, cuttings, layers, budding, and grafting. 1. Seeds worked from the choicest ripe fruits, dried, and kept in a cool place, may be sown outdoors in May. Seedling trees are long in coming into bearing, often sterile, and only useful for stocks. 2. Cuttings about 1 foot long taken from the upper branches with a portion of two-year-old wood at their base, may be inserted in a shady border, so that only two eyes are left above ground, early in spring or in autumn. Bearing branches strike root readily, inserting them in autumn to a depth of about 2 feet, the laterals being shortened back a little, and the branch kept upright and steady by tying it to a stake. Duly supply water, and when the branch becomes well rooted remove the lower side growths—a few each year—to form

a clean stem of the height required, and then originate the head similar to that of a standard apple tree. 3. Layers, made of the young branches in autumn and spring, any of the usual methods being adopted; but amateurs may surround a fruiting branch with soil supported by a pot or box, remove a ring of bark where it passes through the soil, keep that constantly moist, and so provide trees for growing in gardens or orchard houses in bush or pyramid form. 4. Budding may be practised in July or August on seedling stocks. 5. Grafting is usually performed in spring, but the grafts seldom take well, as the stocks bleed profusely when cut in spring: inarching (page 136,

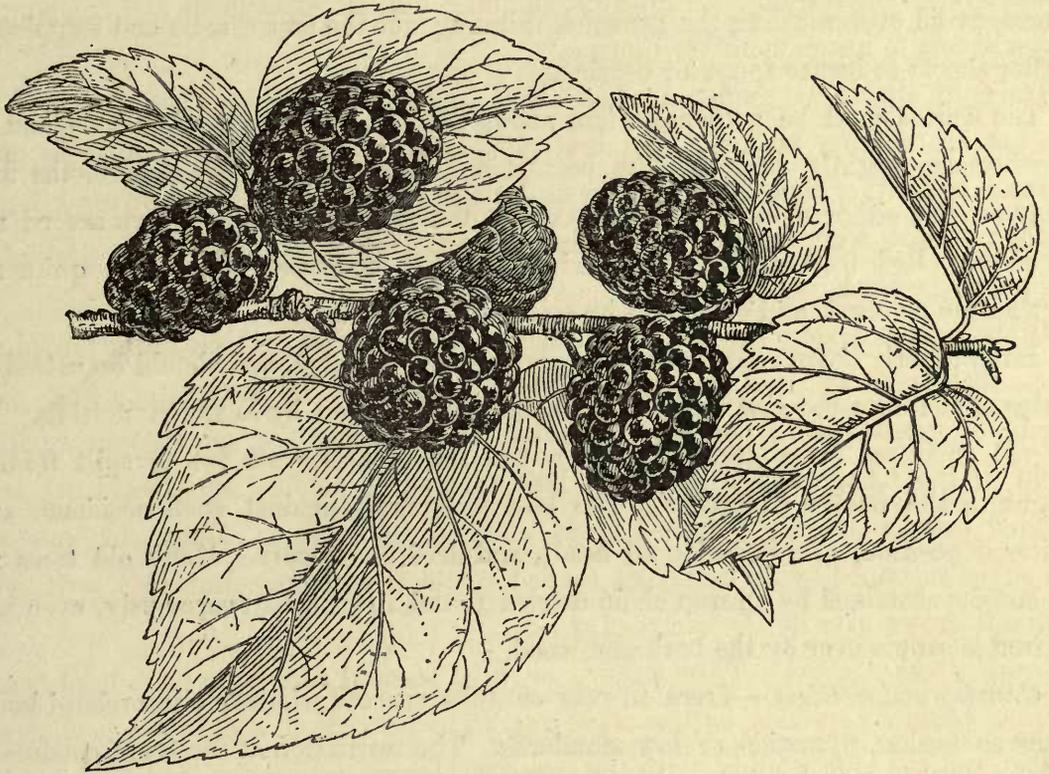


Fig. 8. THE BLACK MULBERRY.

Vol. I.), therefore, is preferable, operating when the leaves have expanded. It is customary to afford slight protection during winter to the seedlings or cuttings.

Situation and Soil.—In sheltered and not elevated situations the mulberry flourishes as a standard as far north as York; but in cold localities in the north of England and in Scotland it requires a warm aspect or a south wall. The finest and best-flavoured fruit is everywhere produced by trees grown in an orchard house. It succeeds in any good loam, preferably rather light, deep, and moist.

Ample in foliage, distinct and spreading in habit—about as broad as high, ornamental

and useful, the mulberry is often planted on lawns and orchards in grass to prevent damage to the fruit by its fall from the tree. Standard trees are the best for such positions. Pyramids may be grown in gardens, and trees may be trained to walls, keeping the main branches a foot asunder. Bearing trees of all forms are the most economical to purchase. They should be had of the large-fruited kind (Fig. 8); otherwise there is much uncertainty, and after waiting years they may prove indifferent in cropping, size, and quality of the fruit.

Planting is best performed in early spring; and as sunlight is necessary for fruitfulness, avoid overcrowding the growths, thinning out the superfluous and stopping the grosser shoots to insure spurs for bearing.

The fruit should be gathered when about to drop, as it does when ripe and the branches are slightly shaken. The best plan, however, is to place clean cloths under the trees, and either shake the branches or let the fruits fall of their own accord upon the cloths. Red fruit answers for cooking, but that for dessert should be quite ripe, dark purple or black, and dished on its own leaves.

Birds eagerly devour the fruits even before they are ripe, and should be netted out. Wasps skeletonise the ripe fruit, and can only be excluded by hexagon netting. Few fungoid or insect pests attack the trees, but the branches are apt to split from the weight of the foliage and fruit. The best safeguards against such accidents are—sheltered position, evenly balanced heads, and needful support. Many old trees with the boughs sustained by an iron chain carried round them fruit enormously, even when the iron is grown over by the bark and wood.

Growing under Glass.—Trees in pots or tubs succeed admirably in orchard houses, either as bushes, pyramids, or low standards. The restriction at the roots conduces to fertility, and the high feeding, with the superior climate, enable the grower to produce fruit fit for any dessert. The trees may also be forced in a fig house, and if started in January ripe mulberries may be had in June, when they are always welcome. Red spider attacks trees grown under glass, but it is easily kept under by syringing.

NUTS.

A NUT is a one-celled fruit, and contains when mature only (as a rule) one seed, called a nucleus or kernel, enveloped by a pericarp (rind or shell) of a leathery, hard, or woody texture. The chestnut is an example of a nut with a leathery, the common hazel-nut of one with a hard, and the walnut of one with a woody, shell. These comprise the whole of the nuts worthy of cultivation in this country for their kernels.

CHESTNUT.

THE Spanish, or Sweet, Chestnut (*Castanea sativa*) is a stately tree, with spear-shaped leaves and tapering serratures at the edge. The flowers are yellowish, the male on long cylindrical catkins, and the female, two or three together, in a prickly four-lobed involucre (bracts). The long hanging clusters of bloom appear about June, and the fruit, which is ripe in October, is enveloped in a husk defended by numerous complicated prickles. The chestnut tree is supposed to be a native of Asia Minor, and to have been cultivated in Europe from time immemorial, for its nuts, which are eaten as gathered, or baked and flavoured with salt. The developed tree is ornamental, and the timber is useful. Young trees are used for posts, fencing poles, stakes, and hop-poles, but trees grown close together in coppices are scarcely calculated to produce much fruit.

Varieties.—Devonshire Prolific (New Prolific) produces larger and finer-flavoured fruit, and ripens more thoroughly an abundant and general crop than any other. Downton (Knight's Prolific) is distinguished by the very short spines on the husks, and, though a fine nut, is not produced so abundantly and certainly as the preceding. There are many French and Spanish varieties; Nouzillard, a French variety, is one of the best, and Exalade, a dwarf grower, is recommended for garden or orchard culture.

Propagation.—Chestnut trees are readily grown from the seed, and varieties increased by budding and grafting. Seedlings from the improved varieties are apt to degenerate to some extent; yet a large percentage of good sorts may be expected and some distinct forms.

Seed.—Select the ripest and best formed. They may be sown as soon as ripe, but mice and rats often cause their destruction, and the seedlings are so injured by frost that the nuts are, perhaps, best stratified in sand, and sown in February or March, in drills 1 foot apart, and 3 inches deep, placing them about 4 inches asunder in the rows. Keep the ground clear from weeds, transplant the seedlings the following November, if they have made good progress; if not, defer it another year, and, after cutting off about one-third of the tap-root, plant in rows 3 feet apart, and the plants 2 feet asunder. Remember the object is fruit, not forest trees; therefore, transplant the trees every other year if growth is moderate, every year if it is strong, and allow sufficient room for them to develop properly. Prune off the side shoots to secure a clean straight stem for each tree, staking if necessary. Originate the heads at about 6 feet in height, and after the fashion of a standard apple tree. After the heads have been formed two or three years the trees may be planted in their fruiting quarters, or they may remain in the nursery several years, provided they are lifted annually or biennially so as to move with safety when required.

Grafting.—This is a certain method for perpetuating good varieties, and the trees produce fruit earlier than do seedlings. The scions should be taken from trees which have fruited satisfactorily. Seedling trees which produce empty burr may be worked to advantage, operating by the usual methods.

Budding—may be performed when the buds are sufficiently plump, which is generally the case in July. These make the best trees, and it is important to procure growths with buds in a proper condition, off good large-fruited varieties.

Situation and Soil.—Chestnut trees look well planted singly or in groups in parks and pleasure grounds; they grow, and form good specimens, in almost any position, but a warm site, with a southern exposure, and shelter at a distance from the north-west, north, and east, is necessary to ripen the fruit properly. A deep sandy or friable loam resting on a dry subsoil is best. The finest nuts we have seen were produced by trees growing in about 3 feet depth of loam overlying gravel. The chestnut does not fruit satisfactorily in stiff soils unless the subsoil is dry, or thrive where the subsoil is wet, nor succeed on shallow calcareous soil.

Planting.—By securing well-formed trees from a first-class nursery, carefully lifted and planted, several years' waiting is saved, for such trees commence bearing as soon as they are well established—worked trees in two or three years, provided they have good heads to begin with, whilst seedling trees may require a dozen or more years to overcome their youthful vigour and set about the production of fruit in earnest. Early

autumn is the best time to plant. Allow a distance of 30 feet, or in good soil 40 feet between the trees.

Pruning.—After the heads are duly shaped in their earlier stages, pruning should be limited to preventing the branches crossing each other, and cutting out irregularities to secure an evenly balanced head. The difficulty to contend with is the richness of our soil, which tends to more growth than becomes properly matured for the production of fruit. This grossness can only be arrested by chopping through some of the roots with a sharp spade or mattock. The fruit is produced on the young wood of the current year, near to the summit of the previous year's well-ripened growths; therefore to foreshorten these is to prevent the crop.

Gathering and Storing.—If the nuts are gathered from the trees when immature, as they sometimes are, they are light and poor in quality; hence it is better to allow them to fall. Any that remain in the husks should be taken out, and all thoroughly dried in the sun or in an airy room. When thoroughly dried, those not wanted for immediate use may be stored in air-tight jars, or packed in alternate layers with dry sand, and kept free from damp and frost until required for use. They are very excitable, and a very little moisture with warmth will bring on germination. The best-kept chestnuts we have seen were found a foot deep in gravel. They were stored there by squirrels, and the nuts were also the best flavoured of any that were tasted at Christmas.

COB-NUTS AND FILBERTS.

THE Common Hazel (*Corylus Avellana*) is indigenous in various parts of Europe, North Africa, and temperate Asia. It is found wild in every part of Britain, in forests and commons, on the banks of dingles and ravines, and in the mountainous parts. Several places take their names from hazel (Saxon, *hæsal*—a headdress), as Haslemere, in Surrey. The specific name, *Avellana*, has reference to the nut largely and successfully cultivated at Avellino in Italy, and it is probable that the Barcelona nuts of Spain are the produce of descendants of the trees that flourished and became famous at ancient Avellino. Be that as it may, our cob is synonymous with the Barcelona nut—the husk shorter than the nut.

The Filbert is supposed to be a native of Asia, introduced by the Romans into Italy, and thence to the rest of Europe. Yet the cob-nuts and the filberts are considered merely varieties of the common hazel, and have been produced by superior soil, climate, and culture. The cob-nut is round, the filbert long, and trees raised from seed adhere to the type. The word filbert is a corruption of the original English name for

this nut, full-beard—to distinguish it from the common hazel. Filberts have husks longer than the nuts. The difference, therefore, between cob-nuts and filberts consists in the length of the husks and in the form of the nuts—cob obtusely ovate, filbert oblong.

VARIETIES.

I. COB-NUTS.—The husk shorter than the nut.

COB (Barcelona, Downton Large, Great Cob, Large Cob, Round Cob).—Husk short, hairy, and much frizzled ; nut large, short, obtusely ovate, slightly compressed ; shell light brown, thick and hard ; kernel large, of good quality, excellent for early use, but does not keep long ; tree strong, upright and a good bearer.

COSFORD (Miss Young's, Thin-shelled).—Husk nearly as long as the nut, hairy, deeply cut ; nut large, roundish oblong, sometimes nearly round ; shell light brown, very thin and easily broken between the finger and thumb ; kernel large, white, sweet, and of excellent quality ; tree moderately vigorous, and an abundant bearer.

DOWNTON SQUARE.—Husk smooth, shorter than the nut ; nut large, short, four-sided, shell thick ; kernel full, sweet, and very good ; tree vigorous, spreading, and a good bearer.

MERVEILLE DE BOLLWYLLER.—Husk shorter than the nut, frizzled ; nut large ; shell thick ; kernel full, and of fine flavour ; tree a strong and sturdy grower, and a very profuse bearer.

PEARSON'S PROLIFIC (Dwarf Prolific, Nottingham Prolific).—Husk hairy, shorter than the nut ; nut medium-sized, obtusely ovate, shell thick ; kernel full, sweet, and well flavoured ; tree sturdy, compact grower, and an abundant bearer.

II. FILBERTS.—Husk longer than the nut.

FRIZZLED FILBERT (Cape-nut, Clustered Filbert, Cup Filbert, Frizzled Nut, Prolific Filbert).—Husk hairy, about twice as long as the nut, deeply frizzled, and spreading open at the mouth ; nut small, oblong, thin, somewhat flattened ; shell thick ; kernel full, and of excellent quality. This is a very elegant nut, its pretty frizzled husk setting it off to great advantage, and it ripens rather late. Tree a good grower, producing fruit abundantly in clusters.

LAMBERT'S FILBERT (Filbert Cob, Kentish Cob).—Husk nearly smooth, longer than the nut, and slightly cut at the edges ; nut large, some over an inch in length, oblong, and slightly compressed ; shell thick brown ; kernel full, covered with a reddish skin, very richly flavoured, and improves by keeping. All points considered, this is the finest of all nuts. Tree more vigorous than any other nut tree that produces fruit so profusely. It is also very hardy. There are improved forms of Lambert's Filbert, as Prize Exhibition Cob, and Webb's Prize Cob, that produce larger bunches, and are very prolific.

PURPLE FILBERT (Purple-leaved).—Husk hairy, longer than the nut, and contracted at the apex ; nut medium-sized, ovate ; shell rather thick ; kernel full, covered with a purple skin, sweet and of excellent quality. The leaves, husks, and nuts are of a dark purplish blood-red colour. Tree ornamental, a free grower, and produces fruit moderately.

RED FILBERT (Avelinier Rouge, Lambert's Red, Red Hazel).—Husk hairy, tubular, longer than the nut ; nut medium-sized, ovate ; shell rather thick ; kernel full, covered with a red skin, flavour excellent ; tree a moderate grower, and a good bearer.

WHITE FILBERT (Avelinier Blanche, Lambert's White, Wrotham Park).—Husk hairy, long, tubular, contracted round the apex ; nut medium-sized, ovate ; shell thick ; kernel full, covered with a white skin, sweet, and the best flavoured of all cultivated nuts ; tree a free grower and bearer, but tender, and requires a sheltered situation.

SELECTION OF NUTS IN ORDER OF RIPENING.

<p><i>Cob-nuts.</i></p> <p>Cob. Cosford. Merveille de Bollwyller.</p> <hr/> <p><i>Two for gardens.</i></p> <p>Cosford. Pearson's Prolific.</p>	<p><i>One for gardens.</i></p> <p>Merveille de Bollwyller.</p> <hr/> <p><i>Filberts.</i></p> <p>Red Filbert. White Filbert. Lambert's Filbert.</p>	<p><i>Two for gardens.</i></p> <p>White Filbert. Prize Exhibition.</p> <hr/> <p><i>One for gardens.</i></p> <p>Red Filbert.</p>
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PROPAGATION.

Nut trees are increased by seed, layers, and grafts.

Seeds—or nuts should be gathered when quite ripe, as they only are when they drop out of the husks or can be readily taken out. They may be sown at once if the weather is favourable (or stored in sand until the following February or March). Place them thinly in rows in the open ground, and cover with 2 inches of soil. Transplant the seedlings in the autumn of the second year 1 foot apart in rows 2 feet asunder. In another couple of years the plants will require more room, or they may be planted about 5 feet apart for fruiting. Seedlings are not to be relied upon to bear equal to the parents, and may be grafted with the desired variety at the height required. The cob or Spanish nut, the Constantinople hazel (*Corylus Colurna*) and Lambert's Filbert seedlings make good stocks.

Layers.—Two-year-old growths from stools pegged down firmly, and covered to about 3 inches' depth with soil in the autumn, will be well rooted by the following autumn, and may then be removed and planted 18 inches apart in rows 3 feet asunder, training them with clear stems $1\frac{1}{2}$ foot high, and when the trees have formed the framework of the head they should be planted out where they are to remain. When care is taken to remove the buds on the part buried in the soil, layers are unquestionably the best for dwarf culture.

Suckers.—These are generally the most favoured by growers, as they are produced freely. Some persons take the suckers from fruiting trees in autumn, shorten them to about 1 foot, and plant in nursery rows, similar to the two-year-old seedlings, and in two or three years they may be planted in their fruiting quarters. Suckers of 2 to 3 feet in height, when detached with good roots, may be planted out permanently at once.

Grafting.—This should be performed at the end of February or in March; whip-grafting is the best method. Moderate-growing yet fruitful sorts worked in strong-growing stocks grow large and produce fine fruit. Over-luxuriant and indifferently bearing varieties are induced to crop freely by grafting them on stocks of less vigour.

Situation and Soil.—Cob-nuts and filberts succeed in high and well-drained ground, as on knolls, banks, and hillsides, where they enjoy full exposure to light and air. Spring frosts are often fatal to nut crops in low ground. Exposed sites can be made available by planting sheltering belts and lines of common hazel, and these are useful in providing pollen for fertilisation and a plentiful crop of the coveted nuts. In flat and rather strong ground standard plum or damson trees at 30 feet apart may be

planted to over-top the nuts, whilst in light soils the hardier kinds of pears, such as Lammas, Hessele, and Swan's Egg, and in good soil apple trees, may be grown to shelter the bushes.

Nut trees like a good friable loam resting on sandstone, and thrive in somewhat shallow loams on brashy marl or shattery limestone. Land "full" of stones or fragments of rock, with sufficient soil to render the whole compact, and the substratum open and free from stagnant water, will grow, other conditions being favourable, excellent crops of nuts. Strong, deep, rich, and damp soils cause the trees to produce too much wood to be fruitful, and the heavily manured soil of gardens, particularly where the site is low, tends to more growth than is favourable to fruit production. Therefore, the highest and driest spot consistent with other surroundings should be chosen in private establishments for the nut plantation. Land previously cultivated will not require much preparation, but ground not already broken up must be properly prepared by trenching, and a thin, sandy or brashy soil should have some manure mixed with it.

Planting.—It is a great saving of time to select and plant well-rooted, clean-stemmed and well-branched trees, for they commence bearing as soon as they become well established, whilst unshaped bushes occupy the ground three or four years unprofitably. October, or when the leaves have fallen, is the best time to plant nut bushes. Allow 10 or in good soil 12 feet distance between the trees each way. Some of the dwarf varieties may be set closer. If the trees are intended to form a single row round a fruit plantation they may be planted 8 to 10 feet asunder. When planting in orchards on grass the stations should be properly prepared, mixing a little decayed manure with the soil to give the trees a start. Firm the soil well, stake securely, and spread a little manure on the soil over the roots.

TRAINING AND PRUNING.

Training.—Plants that were shortened when placed in nursery rows ought to be kept free of suckers, and the strongest shoot from each should be trained erect, removing the others. Suckers that are planted in their final positions after being detached from the parent bushes may be cut back to 18 inches from the ground, or, if the stem is considered too weak, the plants may be allowed to grow one season and then be shortened. The object in every case is to secure a sturdy upright stem, 18 inches in height, a number of strong growths at the upper part in consequence of the heading, and 12 to 15 inches of stem kept quite clear of shoots at the bottom.

If six strong shoots push in the spring after heading, they should be guided outwards and at equal distances by means of a hoop placed in the centre of the head. A bush started with six and doubled to twelve main branches is the best shaped, but there is often some difficulty in getting that number of shoots to start at the right height and place. In that case three of the best in vigour and position should be selected and all others suppressed. In autumn each shoot should be shortened to an outside bud about 4 inches from its base, and in the following summer two shoots from each branch will furnish the six required to form the head. Very pleasing and profitable bushes in goblet shape may be reared by the method described for apples (Vol. II., Fig. 6, page 13).

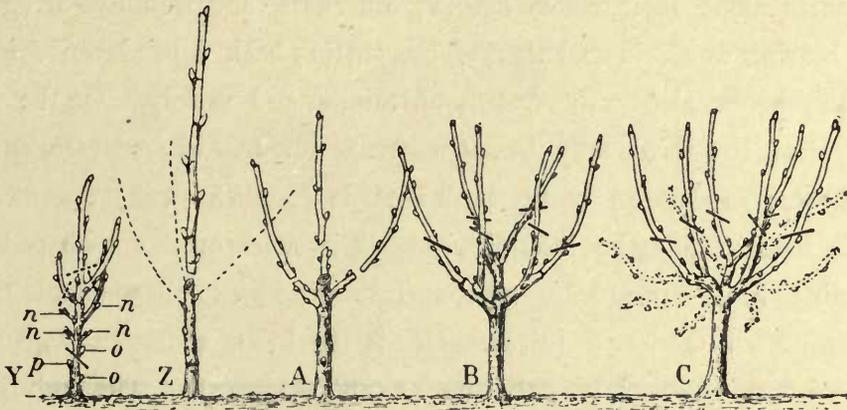


Fig. 9. FORMING BASIN-SHAPED COB-NUT AND FILBERT TREES.

References.—*Y*, layer or sucker tree established in nursery row or elsewhere, and pruned at the dotted lines to originate strong shoots for the head, cutting the shoots (*n*) off close to the stem, and removing the buds, *o o p*; but if the stem of the tree is too weak, cut it down to the bar, and remove all the buds, except *p*. *Z*, the result of heading it at *p* the previous year, headed as shown; dotted lines, growths to be encouraged in the following year, and all others removed. *A*, tree in result of heading it as shown in *Y* at the dotted lines, or of heading the tree *Z*, as shown; also showing the pruning required. *B*, tree in second autumn after heading, marked for pruning. *C*, nursery tree, three or four years old (two years trained) marked for pruning; shoots in dotted outline to be cut off close.

These six-branched bushes are suitable for cultivation in gardens. Trees from a nursery generally have a small head upon a stem of 12 to 15 inches, and this head is formed in a similar way to that of a red currant bush, but in shortening the first shoots, say three, the cut is made at an under bud, to cause the branches to spread instead of growing upright.

When planting, straggling roots are shortened, jagged ends pared smooth, and suckers removed. If the heads are small and weak at planting it is a common practice to allow the bushes to grow for a year and in winter cut them hard in to induce vigorous shoots from the base, and these, reduced to six of the best, form the foundation of the head. The illustrations (Fig. 9) will enable probationers to apply the foregoing remarks.

In the following year the leading growths, as shown in Fig. 9 *B*, *C*, or others, are trained at equal distances to form the main branches. These must be encouraged by pinching the side growths to about five leaves, and any strong shoots calculated to rob the leaders should be removed. It is important that the bush be kept open in the centre, and the main branches so far apart as to allow sunlight and air to freely circulate among them, as only thus can fruitful spurs be formed for bearing. In some cases nut trees are allowed to grow as they please, and often bear very well, but those properly managed afford the largest and best produce.

Pruning.—The leading growths require to be shortened in winter to cause them to push side shoots along their whole length; otherwise they would be irregularly furnished with bearing wood. The extent of the cutting back depends on the length and strength of the shoots, also on the system of training and variety. On the Kent semi-horizontal system, two-thirds may be cut off weak, one-half off moderate, and one-third off strong shoots; so that the weakly bush is made to push stronger growth, and the strong tree is induced to make fruitful wood. The more erect cup-shaped bush may have the leading shoots topped in summer, as in training a cup-shaped apple tree. Little winter shortening will then be required. This is the better course to adopt with strong leaders, as close pruning in winter only causes exuberant growth. The leading shoots are only to be considered as such until the limit is reached; then they are treated as side shoots. These should be cut back in autumn to two or three buds. Shoots will then push close to the main branch, and if not too luxuriant they will form blossom buds; but if the shoots are too numerous they must be thinned, and the strong checked or removed so as to equalise the flow of sap. An occasional shoot, bearing plenty of catkins, is left 6 or 8 inches long to afford pollen.

To prune nut trees successfully it is important to understand that the fruit is produced upon the upper part of the young shoots; also on short twigs or spurs. The nut is monœcious, the male blossoms (catkins) produced separately from the others, and both open before the leaves. The male flowers are conspicuous, long, slender, and pendulous, greyish in colour, but the pollen of the anthers is a pale yellow or gold. The female flowers are comparatively inconspicuous, and consist of tufts of crimson styles protruded from the bud, and these often have their stigmas so injured by spring frosts as to prejudice the prospects of the crop. The nuts are produced terminally, solitary, or in clusters. The illustration, Fig. 10, will assist beginners to a knowledge of the various parts of nut-tree growth.

When pruning is done too early too many catkins may be cut away, but with



Fig. 10. PRUNING FILBERT, AND CHARACTERISTIC GROWTHS.

References :—*B*, pruned branch : *e*, leader shortened to a wood bud (catkins produced from base) ; *f*, side growths or laterals long-pruned to secure catkins ; *g*, side shoot closely spurred-in ; *h*, spur ; *i*, long pruned shoot ; *j*, short-pruned shoot ; *k*, bearing shoot of preceding season may be cut away as shown, to secure large nuts, or be retained for bearing ; dotted lines indicate wood buds ; round and scaled represent blossom buds. *C*, pruned branch *B* in blossom and fruit ; *l*, male blossoms (catkins) ; *m*, female blossoms ; detached growths show results, but some growths are omitted to make clear : *n*, leader ; *o*, basal shoots ; *p*, extremity growths, to be cut off at the bars (*q*) after the fruit is set.

plenty of those pruning may be done as soon as the female blossom buds are well

distinguishable, and the buds and catkins in the condition shown in *B*. The number of catkins to leave is fairly represented. The laterals, as a rule, should be shortened to a female blossom bud as early in spring as these can be recognised, unless they consist of small twigs with a blossom bud at the extremity; then they must be left entire, and the bearing shoots of the preceding year either cut back to within $\frac{1}{2}$ inch of their base, to maintain a regular supply of young wood, or be left entire if there is a deficiency of bearing wood.

The safest time to prune is when the female blossoms are fully open, say in March or April, as then they cannot be removed in mistake, and the operation aids the distribution of the pollen. A sufficient number of catkins should be left at the upper part of the trees for purposes of fertilisation. If there is a deficiency of catkins, branches containing them may be cut from other trees or hazels, and suspended over branches containing the female flowers. It is also an excellent plan to shake the bushes, when the weather is calm, dry, and warm at the time of blossoming, to distribute the pollen.

In consequence of the somewhat close winter pruning a number of strong shoots are made in summer. These growths are superfluous, and most of them should be rubbed off as soon as seen. Yet it is necessary to maintain a succession of young, healthy, and fruitful twigs. Therefore the strong shoots for which there is space should be broken off towards the end of July by a twist with the finger and thumb, about the distance from the base they will be pruned to in winter, for producing catkins as well as nuts. This is especially requisite for the shoots at the upper part of the branches, alike to cause the buds below the fracture to swell and to equalise the vigour of the tree and let sunlight reach every part. The jagged ends of the shoots should be cut smoothly to a promising bud at the winter pruning, and a proper supply of young wood to displace worn-out twigs or spurs must be maintained in all parts of the tree.

At each winter-pruning the old useless wood should be removed, the spurs thinned, those elongated shortened, and the stronger growths regulated so as to keep the trees well balanced, with a sufficiency, but not an excess, of sturdy, fruitful wood, and all so disposed as to receive light and air freely. When the trees become too large, the branches may be shortened to a promising growth from as near their base as possible, but in a well-managed tree there will be no difficulty in displacing an old or worn-out branch by a young and fruitful one. It is only a question of a little forethought to reserve a young growth at the desired place, and when this has grown into a bearing state the old branch can be cut out in its favour.

Culture.—The nut bush produces the more and finer fruit as it is made to assume a tree-like habit; therefore all buds on the stems below ground should be carefully extracted before planting. Suckers are the greatest hindrance to nut production, and should be pulled up when in growth. It is a good plan to remove the surface soil for some distance round the tree in autumn, eradicate all the suckers, and lay on a coat of manure, covering it with soil taken from the open spaces. The ground between the trees should, if not rich enough, have a dressing of manure during the winter, and be dug, but not so deeply as to injure the roots. Old woollen rags are used in Kent as manure, and given once in two or three years, as considered necessary, at the rate of 1 to 2 tons per acre. Ordinary stable or farmyard manure may be supplied at the rate of 20 tons or more per acre, about $2\frac{1}{2}$ cwts. per rod being a fair dressing. In light soils it is desirable to dig early, so as to bury the weeds, and spread the manure on the surface as far outwards from the stem as the branches extend. The summer prunings decayed, and the winter ones reduced to ashes, form excellent manure for nut trees, about $\frac{1}{2}$ bushel in equal parts being applied to each rod of ground early in spring. The leaves ought always to be utilised, as they are large and of considerable manurial value, digging them in, or if collected and reduced to leaf soil, apply as a top-dressing. Weeds must be kept down by hoeing in summer, and when the nut crop is heavy, and the weather hot and dry, a few good soakings of diluted sewage or liquid manure may be advantageously given. A mulching of littery manure applied in advance of dry weather aids the trees wonderfully in thin, sandy, or rocky soil, and in such ground manure should be given every year. Trees on grass may have the contents of cesspools and manure-tanks poured around them in winter.

Gathering.—Cob nuts and filberts ought not to be gathered till quite ripe; the husks and nuts are then brown, and easily separated. Filberts have a certain amount of succulence at the base of the husks, and unless the nuts are thoroughly dried before they are packed for keeping, the husks mould or rot. Filberts must not be shaken off the trees, but carefully gathered, so that they may be preserved and served in the husks. Cob nuts should be gathered before they leave the husks; yet they are often shaken off the trees and picked up.

Storing.—After gathering, lay the nuts in an airy place or in the sun for a few days to dry the husks; then pack in tin boxes about 10 inches long, $6\frac{1}{2}$ inches wide, and $3\frac{1}{2}$ inches deep. Paste a strip of paper round the box after the lid is put on to render it air-tight, and store in a cool, dry place. This is unquestionably the best

method, as the husks retain their form and colour, or, should they lose the latter, it may be restored by placing the filberts, spread rather thinly, in a fine sieve over sulphur fumes, these being produced by burning a little sulphur over a small, clear charcoal fire. For home use the nuts are packed when the husks are dry in sweet casks, jars, or new flower-pots, a little salt being sprinkled in as the receptacles are filled to prevent mould, and keep the kernels crisp. They are kept in a cool and dry situation. Mr. H. W. Ward, the able gardener at Longford Castle, Wilts, recommends "nut vaults in the east portion of a south and east angle border, and under the shelter of a wall, made with dry bricks placed closely together to prevent the mice from getting through, 20 inches deep, 3 inches from the surface, to leave room for covering material, 18 inches wide at the bottom, and about 20 inches at top. In these vaults the pots of nuts are placed. They are covered with slates overlapping each other, and with the ends resting on the side walls of the vaults; then over the slates, 1½-inch oak boards, about the same size as the slates, so that they can easily be removed; after which the whole is covered with a couple of inches of soil, making it correspond with the other portion of the border, which has a slope of ½ inch in the foot.

"The nuts are taken out as they are required—say, sufficient for three or four days at a time, which can be easily done by removing a little of the soil from the first two boards and the slate, immediately replacing them, taking care not to let any of the soil fall into the pots in doing so."—*Gardeners' Chronicle*, Vol. VII., new series, page 467.

ENEMIES.

Squirrels, rats, and mice take and store the nuts in quantity. Guns and traps effectually stop their depredations, but a good cat is very useful in a nut plantation.

Nut Weevil (*Curculio nucum*, Linn. ; *Balaninus nucum*, Curtis).—This insect has a beak nearly as long as the body, and the antennæ in the middle, of a bright chestnut colour. The fine down on the body imparts a tawny appearance to the wing-cases, but the colour beneath the surface is black. It has three pairs of legs, and is of the shape shown in Fig. 11.

The female weevils appear on nut trees in May, crawl along the twigs, and deposit an egg in the interior of each nut visited, so that the grub, which hatches in about ten days, finds its food, and continues to feed on the nut without destroying its vitality, until full-fed. Then it eats its way out, either before or after the nut has fallen. The grub is dull white, with a horny, brownish head, plump, muscular, and legless. After

leaving the nut it buries itself in the ground, changes to a whitish pupa, from which the weevil emerges in summer, and deposits its eggs.

Clean culture in summer and winter are the best means of prevention, as the immature weevils are then found by birds. Dressing the ground in May with 40 bushels of soot per acre has been found useful. The trees may be sharply shaken in August, when the affected nuts will fall, and they should be collected and burned. This repeated a few times gets rid of the affected nuts, and prevents a recurrence of the plague.

Nut-louse (*Aphis coryli*).—This is not very troublesome, but it may be destroyed by the means advised under “Aphides,” Vol. I., page 258. A number of small caterpillars prey on the leaves, and, beyond disfiguring the trees, are not of consequence. Winter

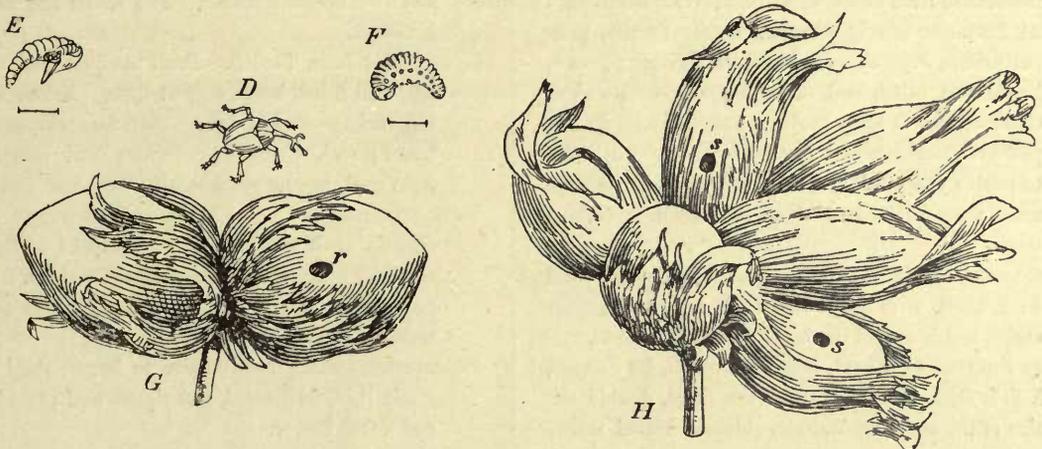


Fig. 11. NUT WEEVIL, PUPA, AND LARVA; INFESTED COSFORD AND RED FILBERT NUTS.

References :—*D*, weevil, natural size. *E*, pupa; line below, natural length. *F*, larvæ; line below, natural length. *G*, Cosford nuts : *r*, hole made by grub to let itself out. *H*, Red Filberts : *s*, holes made by grubs.

Moth, Mottled Umber, and Hop-dog (*Orgyia pubibunda*) caterpillars sometimes infest nut-tree plantations; for remedies see Vol. I., page 293.

WALNUTS.

THE Walnut (*Juglans regia*) is a native of Persia and Asia Minor, whence it was introduced to Greece 300 B.C., and was largely cultivated by the Greeks, who called it, as its specific name means, the royal nut. It was introduced into Italy by the Romans A.D. 65, whence it was carried into Spain, France, and other parts of Europe, including Britain. Turner, who wrote in 1551, says :—“It is so well known in all countries that I need not to describe”; but the walnut is not recorded to have been cultivated in this country before 1562.

“The fruits of the walnut, in their immature state, and when they are sufficiently soft to permit a pin to penetrate them without resistance from the shell, form an excellent pickle preserved in vinegar, and, boiled with sugar, they make an equally good confection. When ripe, the kernels are agreeable to eat, being deprived of their pellicle, which is very bitter, but which loses that bitterness in a great degree after the fruit has been kept for some time. They easily become rancid, and are then unwholesome and injurious, causing pyrosis, or water-brash, and heaviness in the stomach . . . The timber is of great value, and is largely used in cabinet-work, and for gun and pistol stocks.”
—(Hogg's *Vegetable Kingdom*.)

VARIETIES.

COMMON.—Fruit oval, well filled, but varying greatly on trees raised from seeds. The trees also vary in fertility.

DWARF PROLIFIC (Early Bearing, Noyer Fertile, præparturiens, Precocious).—Fruit oval, rather pointed, large, well filled, and of high quality. Its chief characteristic is early bearing, but the trees do not produce staminate and pistillate blooms until ten to twelve years old, and may not attain to perhaps more than half the size of the common walnut tree.

HIGHFLYER.—Fruit medium size, thin-shelled, and well filled with good-flavoured kernels; ripens early, and is one of the best in good situations.

LARGE-FRUITED (à Bijoux, Double, French, De Jangue, à Très Gros Fruit).—Fruit very large, double the size of the common walnut, oblong; kernel rather

small, seldom filling the nut, does not keep long, and soon becomes rancid. The shells are used by jewellers.

LATE (Saint Jean, Tardif).—Fruit medium size, roundish, well filled, keeps a short time. A late flowering variety—end of June—therefore escapes spring frosts; and, though productive and comes true from seed, has no great merit.

THIN-SHELLED (à Coque Tendre, à Mésange).—Fruit oblong, shell tender, and well filled: earlier and of better quality than the common walnut. Rooks prefer this to all other varieties, and it is unquestionably the best walnut.

YORKSHIRE.—Fruit medium size to large; shell moderately thin, well filled, and ripens well; tree hardy, and a free bearer.

PROPAGATION AND MANAGEMENT.

Propagation.—Walnut trees are commonly raised from seed, and varieties of merit are perpetuated by budding, grafting, and inarching. Trees from seed are the tallest and best for timber, but they are the worst for fruit production in this country. Select the best nuts, keep them in sand in a cool place till February or March; then sow them 6 inches apart, and 3 deep, in drills 18 inches asunder. Keep the ground clear of weeds in summer, and as soon as the leaves have fallen, take up the seedlings, shorten the tap-root of each, and plant 18 inches apart in rows $2\frac{1}{2}$ feet asunder. Transplant the trees again the following autumn, if they have made good progress; if they have not grown strong, let them remain another year. Successive transplantations should take place every second year, with increased distance between the trees, to insure fibry roots and well-matured growths, till the trees are transferred to their permanent positions.

Budding is best performed by the annular system (Fig. 55, page 176, Vol. II.), upon shoots of the preceding year where the wood is perfectly round. The ring buds must be taken from the base of the current year's shoots where the buds are minute and almost concealed in the bark, and the proper time for the work is early in September, but buds may be inserted near the summit of the wood of the preceding year, *i.e.*, close to the base of the annual shoot, by the shield method, using the small buds at the base of the

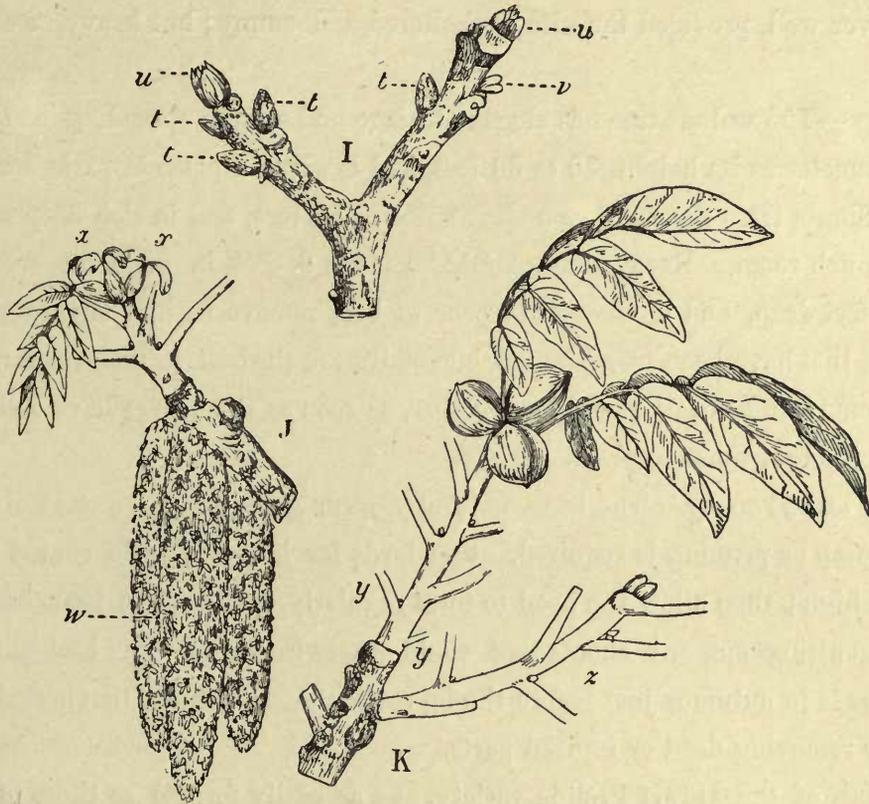


Fig. 12. BUDS, BLOSSOM, AND BEARING OF THE WALNUT.

References:—I, twig: *t*, male (catkin) blossom buds; *u*, female (fruit) blossom buds; *v*, wood bud. J, twig in bloom: *w*, male (staminate) flower, borne in catkins; *z*, female (pistillate—pistils and embryo fruit) flowers. K, twig in fruit—growth from the bud *I u*: *y*, basal buds—best for budding; *z*, growth from the wood bud *I v*, terminated by a female blossom bud.

one year's wood; this is best done in September, though it is sometimes performed in spring.

Grafting should be performed when the sap is in full flow, the scions being taken off several weeks previously, and laid in damp soil in a north border. Saddle grafting is most successful when the stock and scion are of the same size. Whip and cleft grafting (pages 122, 131, Vol. I.) may be employed when the stock is larger than the scion,

and a shoot should be retained on the stock opposite to where the scion is to be fixed. Inarching is performed in the manner described on page 136, Vol. I.

Situation and Soil.—The walnut tree does not succeed in cold, elevated, exposed sites. It is said to be quite hardy as far north as Edinburgh, in sheltered situations. Deep sandy loams suit the walnut, hot dry sands and parching gravels being worthless. Calcareous soils of good depth and perfect drainage produce excellent nuts, whilst thin loam over limestone or chalk neither favours growth nor fruit; stiff loams on gravel answer well, provided the site is sheltered and sunny; but heavy, wet soils are unsuitable.

Planting.—The walnut tree has elegant leafage and a large spreading head quite as much in diameter as its height, 40 to 60 feet, and is given a place in parks for ornament and use. Single trees should have a clear space of 60 feet, and in rich deep soil 80 feet is not too much room. Excavations should be made 8 feet in diameter, trenching the ground 2 feet deep, and if the soil is poor or bad, remove it, and supply good loam. Large trees that have been transplanted biennially are the best, as under careful planting they will come into bearing quickly. October, as soon as the leaves have fallen, and in spring, are the best times to plant.

Pruning and Training.—The trees naturally form good heads, so that little in the way of shaping or pruning is required. Standards for lawns or parks should have stems 6 to 8 feet high; then allow the head to form regularly, without the branches crowding each other, cutting out any shoots that would otherwise cross. The best time to prune walnut trees is in autumn, just before the leaves commence falling, that period also being suitable for removing dead or injured parts.

Pyramids, of the Dwarf Prolific variety, are as easily formed as those of apples or pears, provided the trees are carefully lifted every second or third year, but they require warm situations to produce nuts abundantly and of the best quality. For this purpose seedlings are unreliable.

Mode of Bearing.—Walnuts are produced in terminal clusters. The blossoms are staminate (male) and pistillate (female), separate on the same tree. Successful fruit production, therefore, depends upon the simultaneous presence of the two kinds of flowers, and failure is not unfrequently the consequence of the destruction or absence of the former (catkins) when the others are sufficiently developed to receive the pollen. Some varieties are tardy in coming into bearing through the absence of catkins while the trees are young. Dwarf Prolific at three years old and only $2\frac{1}{2}$ to 3 feet high

sometimes produces fruit, though it only bears pistillate blooms, these being then fertilised by the pollen from catkins growing on older trees. The essentials of a good crop of walnuts will be made clear by the engravings (Fig. 12, page 43).

Cultivation.—Next to none is required, nor is manure needed till the trees are old or exhausted. Two parts wood ashes from twigs, one part soot, mixed, distributed evenly in spring, at the rate of $\frac{1}{2}$ bushel per rod, and left for the rains to wash in, is a good top-dressing for walnut trees.

Gathering and Storing.—Green walnuts for pickling are generally ready for gathering in June, but the seasons make a difference of about a fortnight. The proper time may be ascertained by piercing the fruit with a needle, and when the shell is so soft as to allow the point to pass through easily, it is in the right condition.

Walnuts are generally ripe at the end of September or early in October. The husks should part readily from the nuts, and the shells are then not stained. The nuts may be rubbed dry, by two persons shaking a convenient quantity to and fro in a sack, not employing so much force as to break the shells. It is usual to beat the trees with poles when the fruit becomes ripe, and clear them of the nuts at one operation, but it is better to go over the trees two or three times, shaking the branches to dislodge the nuts as they ripen. In this way they are uniformly matured. Avoid bruising or breaking the buds more than can be helped in beating the trees. Spread the nuts in a dry airy place, and turn them occasionally till the husks come off readily. The shelled nuts, when dried with a cloth, or as before described, may be packed in alternate layers with sand in jars or casks, and stored in a cool place. A little salt scattered over them as they are put in, saves them from mould, and keeps the kernels plump, but flavour is best preserved in the ground or "vaults" (page 40). When the kernels shrivel the nuts should be steeped about twenty-four hours in water, or in milk and water preferably, rubbing them dry for table.

Diseases and Enemies.—Canker sometimes attacks the stems and limbs of walnut trees in cold localities, and fungi infest the leaves and fruit. Some caterpillars occasionally feed on the leaves, and the larvæ of the Goat Moth and Wood Leopard Moth at times attack the stems. Rooks carry the nuts off, whilst various birds pierce the thin-shelled kinds and peck out the kernels. Squirrels, rats, and mice are also fond of walnuts. A gun fired occasionally scares rooks, and the other depredators must be destroyed by the means available.

ORANGES, LEMONS, AND LIMES.

ORANGES.

THE Orange (*Citrus aurantium*) is a beautiful evergreen tree, bearing—often at the same time—odoriferous flowers with brilliant and delicious fruit. Oranges are pre-eminent amongst Christmas fruits, and commerce has brought them within the reach of every one. So enormous and regular are the importations that the cultivation of oranges for supplying the market has not been attempted by home growers; yet oranges of the highest excellence for dessert are produced in glass structures in this country. Mr. T. F. Rivers, Sawbridgeworth, Herts, probably the most extensive cultivator of the orange as a dessert fruit, states:—“The delicious little Tangierine orange is comparatively hardy, and may be grown to perfection in a heated orchard house. There is no fruit tree that approaches the orange; the beauty and profusion of its flowers and the golden fruit set off and relieved by the splendid glossy evergreen foliage combine to place it in the premier rank. My house has about fifty trees in it, studded with golden fruit, and is a special pleasure from the beginning of November, the season when the fruit assumes the rich hue peculiar to healthy oranges. The temperature ranges from 50° to 60°, not much above the outside air, the ventilators being open from nine in the morning till four in the afternoon, causing no discomfort from heat in the house, and no fear of catching cold on quitting. . . . There is no prettier dish for the dessert than the orange gathered with a stalk of leaves; the fruit is fresh, fragrant, deliciously juicy, filling a room with its perfume.” Home-grown oranges, produced in light, airy, well-heated, and properly-managed structures, are as superior in flavour to imported fruit as our Muscat of Alexandria grapes are to imported clusters of inferior varieties from foreign vineyards.

VARIETIES.

Good varieties of oranges are essential for producing the best fruit. The small oranges, such as the Tangierine and Mandarin, have small leaves and stems as well as miniature fruit. They are very delicious, the St. Michael's Tangierine being the

richest in flavour. The Mandarin is flatter, darker, and a trifle larger, sweet, and with rind so tender as to be edible. The Japanese variety, Satsuma, is larger still and productive, the Kumquat (also Japanese) being very dwarf, bearing small fruit, chiefly valuable for preserves and marmalade.

ST. MICHAEL ORANGES.

ST. MICHAEL'S.—Fruit medium to large, flattened; rind medium to thin; pulp solid and melting, with few seeds; ripens early (December) and keeps well; tree forms a large specimen as a standard, and is a prolific bearer. Botelha and Exquisite are good varieties of St. Michael's.

SILVER.—Fruit medium to large; rind pale yellow and very thin; flesh pale, juicy, piquant, and delicious; tree free in growth and a good bearer, forming a handsome specimen.

SUSTAIN.—Fruit large, remarkably bright, with a thin rind; pulp solid, melting, very juicy and high flavoured; one of the best.

VARIEGATED.—Fruit roundish oval, medium size; rind pale yellow, striped with green; pulp very juicy, brisk and piquant in flavour; tree ornamental, the leaves being margined with white; a good bearer.

WHITE.—Fruit large; rind pale yellow, striped; flesh very pale; flavour excellent; tree a good grower and free bearer.

MALTA ORANGES.

BLOOD.—Fruit medium to large, oval; rind medium to thin; flesh variable, from dark red to pale yellow; flesh solid, juicy, with few seeds, and richly flavoured; tree sturdy, and a very free bearer, many trees being ruined by over-cropping whilst young.

EGG OR OVAL.—Fruit large, oval; rind rather thick; pulp without blood-stains; juicy, but not very rich; tree similar to the Blood, very floriferous and a great bearer, succeeding well in pots, tubs, or planted-out.

BRAZIL AND OTHER ORANGES.

EMBIGNO.—Fruit large, round, with a nipple-like excrescence at the apex; rind thin and smooth; pulp pale, solid, melting, nearly seedless, juicy, and delicious; tree a free grower, although it does not attain a very large size, prolific, and commences to bear when young.

PERNAMBUCO.—Fruit large, shining; rind thin; pulp solid, melting, juicy, and delicious; tree a strong

grower, and, though not an early, an excellent bearer.

VALENCIA LATE (Rivers's Late).—Fruit large, oblong; rind thin; flesh very firm, juicy, and deliciously flavoured; ripens late, sometimes continuing the supply till August; tree vigorous, and a good bearer, but not free when young. One of the best varieties.

SELECTIONS OF ORANGES.

Six for planting in borders.

- Botelha.
- Sustain.
- Variogated.
- Embigno.
- Pernambuco.
- Valencia Late.

Three for planting in borders.

- Sustain.
- Variogated
- Pernambuco.

Two for planting in borders.

- Sustain.
- Pernambuco.

Three for pots or tubs.

- St. Michael's Tangierine.
- Exquisite.
- Blood.

Two for pots or tubs.

- St. Michael's Tangierine.
- Blood.

LEMONS.

THE Lemon is the fruit of *Citrus limonum*, a tree more vigorous than the orange, and is cultivated extensively in the Mediterranean islands and the countries bordering on that sea. Home-grown lemons are not found in the markets; but excellent fruit may be grown in this country. The uses of the lemon for cooling drinks and flavouring are well known. The Common or Lisbon, Genoa, and thin-skinned Villa Franca are sufficient to grow, the last named being considered the best of the trio.

LIMES.

THE Lime is the fruit of *Citrus limetta*, a tree closely resembling that of the lemon, with small, white, fragrant flowers. The fruit is pale yellow, roundish oval, with a protuberance at the tip, like a nipple; the vesicles of the rind are flat and concave, and the pulp slightly bitter. Chiefly used for cooling drinks. In respect of varieties it is only necessary to say that the Bijou has small, the Common medium, and the Imperial and Brazilian large fruits.

PROPAGATION AND MANAGEMENT OF ORANGES, LEMONS, AND LIMES.

Propagation.—The orange, lemon, and lime are increased by seeds, cuttings, layers, budding, and grafting. The object of raising plants from seed is mainly to obtain stocks for grafting. The seeds will grow in a greenhouse; but they are best sown about $1\frac{1}{2}$ inch apart in pots, and covered $\frac{3}{4}$ -inch deep with fine soil, early in spring, placing the pots on a hotbed. In the course of a few weeks the seedlings will be ready for placing separately in 3-inch pots, shading them from sun until established; then allow plenty of air, and eventually shift them into a size larger pots. They may be continued in the frame during the summer, or be removed to a warm house. In the second year they will be sufficiently strong for budding to form dwarfs, but seedlings to be budded or grafted standard high must be grown and trained with a clean, straight stem until as high as required.

Cuttings about 9 inches long, made of the strongest shoots, with a portion of two-years'-old wood, cut transversely below a joint, the leaves removed to the extent of about 5 inches from the lower part, and this part inserted in pots filled with sand in August, watered, and allowed to stand a day in a shady place, then plunging the pots in a bottom heat of 80° , under a hand-glass, shaded with a double mat, will emit roots in seven or eight weeks. Two-years'-old wood strikes well at any time. When

rooted, the plants must be established in separate pots, and treated as advised for seedlings.

Layering is effected by raising a pot filled with soil on a platform, so that a two-years'-old shoot can be placed in it, notched about the middle, where it is securely pegged, an inch or more deep. In soil kept properly moist, the layer becomes well rooted in about twelve months, and may then be detached from the parent.

Budding may be performed in August by the ordinary method, young plants being placed under a hand-glass after the operation. In the course of a month it will be seen whether the buds have taken; if so, loosen the ligature, and remove the top of the hand-light. Keep the plants in a warm greenhouse during the winter. Cut off the heads of the stocks in spring, 3 inches above the buds, and, if the pots are plunged in a hotbed, the buds will start and make shoots 2 feet or more long by August; then gradually harden them off. The plants will succeed without bottom heat, but they make much less growth. Some propagators consider the best time to bud is when the seedlings commence growing in the spring, and only the best buds should be chosen from healthy shoots. Spring buds start into growth almost immediately.

Side grafting may be performed in spring or at any time when the sap is in motion, the scion having its lower end placed in a phial of water to keep the leaves fresh until the union is complete. Besides seedlings of the orange those of the citron and lemon are employed for stocks. The Japanese or dwarf varieties are generally worked on *Citrus trifoliata*, which is almost hardy.

Compost.—To encourage free growth, young orange trees are sometimes grown for a time in leaf-mould and fibrous peat, but such a light mixture is not suitable for the production of fruit. For this important purpose choose the following when obtainable:—Fibrous red loam from an old pasture on a well-drained site, torn or chopped up, adding a $\frac{1}{2}$ -gallon of crushed bones and 1 gallon of pounded charcoal to every 3 bushels, mixing well. If the soil is deficient in grit, supply $\frac{1}{6}$ th part of drift sand; if too sandy, add $\frac{1}{6}$ th part of clay, dried and pounded.

Modes of Culture.—Oranges, lemons, and limes require similar cultural treatment. Dwarf or tall-growing varieties may be well grown in pots or tubs. Mr. Douglas has grown the St. Michael's orange in 13-inch pots, producing fruits $8\frac{1}{2}$ inches in circumference, the heaviest weighing 9 ounces, and 4 dozens of well-ripened fruit on a tree.

Though orange trees in pots or tubs produce well-developed fruit, superior in

quality to imported, yet the best results are had from trees planted in the ground like peach trees, and either trained to trellises or grown as standards in orchard houses. We have had great success in growing oranges in a pine stove. A border was made 2 feet wide and 3 feet deep, 1 foot of rubble was placed in for drainage, surfaced with a 3-inch layer of old mortar to keep it clear, the rest soil. A trellis of galvanised No. 10 wire was fixed to the wall for securing the trees loosely. They enjoyed the warmth, and the fruit was of the highest quality, and much appreciated.

Orange trees and pines succeed well together where the pits or houses admit of the combination. Orange trees also succeed fairly well in light, airy conservatories, where they have a winter temperature of not less than 50°. Lemons succeed under similar conditions. Magnificent limes are grown against the back wall of a plant-house by Mr. P. Crowley, Treasurer of the Royal Horticultural Society, and delicious jelly is made from them.

Oranges are well worthy of a house to themselves, a large, light, well heated and ventilated span-roofed structure, with a pathway all round, the trees in a central bed, and if possible a border for small trees between the pathway and sides of the house. Bottom heat is not absolutely essential, but it is a great aid in successful orange culture. Trees in pots can be stood on brick pedestals, as described for fig trees (page 195, Vol. II.), and tan or leaves used around them. Pots containing small trees can be plunged in the bed. To supply root warmth to trees in borders, a chamber beneath the bed heated by hot-water pipes is best, the latter being provided with valves so as to have the heat entirely under control. The section (Fig. 13) of an orangery will explain the matter better than many words.

Potting and Tubbing.—Over-potting is the greatest mistake made in orange culture. Every two or three years is quite often enough to re-pot healthy trees. The best time to interfere with the roots is from the early part of February to the end of March, according to the variety and period of starting the trees. Whatever the size of the trees, pots or tubs, a shift should never be larger than to admit of 1 inch of fresh compost all round the ball of roots. If badly rooted, the tree, instead of requiring a larger pot or tub, should have a smaller one. A tree well rooted in a 7-inch pot may be shifted into a 9-inch, and so on, and as the tree has to remain in the pot two or three years, it ought to be placed in it carefully. Use clean pots only, and quite dry. If they are new, soak them in water for a few hours, and afterwards let them stand until their surfaces are dry. Good drainage is essential; therefore, select some of the

iron bolts, and the apertures for drainage should not be less than 1 inch in diameter, and 6 inches apart.

Planting.—Select healthy bearing trees in pots or tubs. If they are to be grown in beds over bottom heat, provide 6 inches in depth of clean drainage on the covers of the chamber, which must have the joints open, and place a thin layer of turves on the rubble, for keeping the drainage clear; then a depth of 18 inches is left for soil, as shown in the section, Fig. 13, *d*. Make sure that water will not lodge in the chamber, by placing rubble in a trench over the drains (Fig. 13, *g*). If there be no bottom heat, provide 1 foot of rubble for drainage, and leave space for 18 inches' depth of soil, or, if the borders are narrow, 24 inches. Place in the compost rather firmly, and it will suffice to form a flattened cone 6 inches wider all round than the ball. Turn the tree out of the pot or tub, loosen the sides of the ball, remove the surface soil and the crocks, firm the soil well on which the base is to rest and around the roots, as advised for potting. Do not plant too deeply. The surface roots should be just level with the top of the wall capping.

Top-dressing.—Orange trees in pots, beds, or borders should be top-dressed after the fruit is gathered or just before the blossoms appear. Remove the surface soil down to where the fibrous roots are plentiful, and pick any soil not occupied with fibres from amongst the larger roots. Supply fresh compost, and press it down firmly. Active roots will then soon permeate the fresh compost, and absorb manurial elements that are supplied in liquid form.

Training.—A low-headed conical tree is the best for pots; to form such, a tree one year from the bud should be cut down in spring to 1 foot from the soil (Fig. 14, *L, o*). One of the growths that push afterwards should be trained upright and secured to a stake, and of the other shoots that start two or three of the best placed should be retained and the rest rubbed off. The foundation of the future tree is now laid (Fig. 14 *M*), after which it is only necessary to shorten the leader annually to secure the needful side growths, also to shorten any of these that outgrow the others, aiming at a compact, fruitful tree.

To form a standard tree, the leading growth should be trained perfectly upright, tying it to a stake. Side growths may be permitted to a moderate extent, as they tend to stiffen the stem. When the tree has formed a stem of the desired height, head it in spring, encourage three of the best growths equally disposed, and suppress the growths from the stem, not removing them entirely. The principal shoots for forming

the head may be pinched when they have grown 6 inches, and if this is early in summer, they will push two or more growths each, ripen the wood well, and perhaps give a sprinkling of fruit the following year (Fig. 14, *N*). If the three shoots do not appear likely to much exceed 6 inches in length, let them remain and shorten them to 6 inches each before the buds swell the following spring. Further shortening will not be needed, as the heads will become quite close enough by the natural forking of the shoots each year. Some varieties are drooping in habit, others semi-erect, and others form grand conical trees. A semi-erect variety treated as a standard is shown in Fig. 14, *O*, and

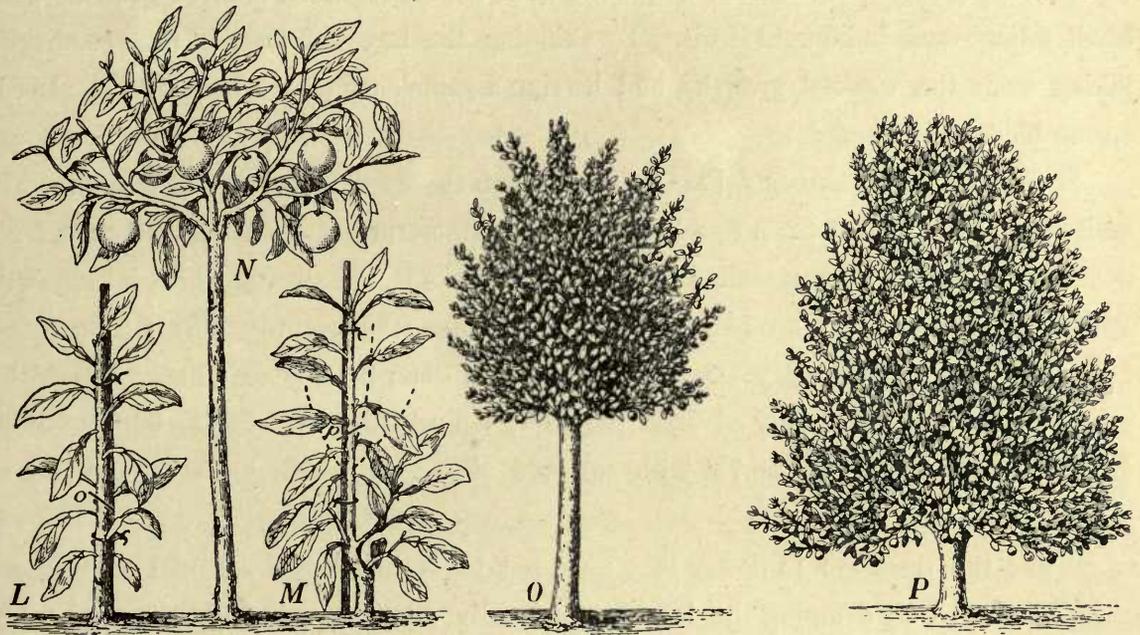


Fig. 14. FORMING CONICAL AND STANDARD ORANGE TREES.

References.—*L*, orange tree one year from the bud : *o*, point of pruning to form a conical or pyramidal tree. *M*, conical tree in second year : *p*, point of shortening ; dotted lines indicate growths the result of pruning the leader. *N*, standard in third year after heading. *O*, standard tree of semi-erect habit. *P*, conical-shaped tree in full bearing.

a low-headed conical tree in Fig. 14, *P*, both being shown on a much reduced scale to the three preceding figures, and in full bearing.

Trees for trellises must be headed at the requisite height to insure the proper furnishing of the space with branches, these being trained about 1 foot apart and the bearing wood proceeding from them at similar distances. Fan-shaped trees are the best for walls and trellises, as the training allows of the cutting out of worn-out branches and supplanting them by free growing and fruitful wood.

Pruning.—The natural shape of orange trees is such as to prevent the necessity of

much pruning, and, as a rule, it should be confined to shortening any growths that are inclined to take the lead, thinning the crowded, as well as removing the weaker parts which have become unsatisfactory. Trees in pots or tubs can be kept compact by pinching, but a somewhat free open growth gives the best crops of fruit. Trees on trellises merely require the old wood cut out and a supply of young provided to maintain them in a bearing state. Just before starting into growth is the most suitable time for pruning orange trees. The fruit is borne on the wood of the preceding year, chiefly near the extremity of the growths; therefore, an adequacy of the most promising must be left in pruning. Aged trees frequently have too many short, stunted growths with small foliage and indifferent fruit. By thinning the heads of trees in that condition, taking away the weakest growths, and leaving a sufficiency of the best, evenly placed, strong blossom is secured.

Temperature, Moisture, and Ventilation.—When the trees are grown in pots they are easily rested by moving them to a house with a temperature of 45° to 50° after the fruit is gathered, letting them remain a month or six weeks before starting them into growth again. Where the trees are planted in beds a winter temperature of 55° , falling 5° on very cold nights, with a day maximum of 65° from sun-heat, is suitable. About the middle of February gradually advance the night temperature from 55° to 60° or 65° on mild nights, rising to 70° or 75° with sun and air, and close the house for the day at about 2 P.M.

While the trees are in flower they must not be syringed, but a genial atmosphere may be secured by damping the house occasionally, admitting air rather freely to dry the pollen and secure a good set of fruit. When this is swelling syringe the trees, walls, and paths early in the morning, ventilating carefully before the sun acts powerfully on the house, to prevent the leaves scorching. Maintain a night temperature of 60° to 65° , 70° to 75° by day, and close early in the afternoon to obtain 85° with sun-heat. Syringe the trees well at the same time, and damp the house before nightfall. As the season advances, the night temperature may range from 65° to 70° , with an increase of 10° by day, closing early so as to rise to 90° and 100° in the afternoon, syringing and damping as before, except on dull or wet days. Ventilation should be continued freely throughout the summer months, leaving a little opening for air all night. Discontinue syringing when the fruit is changing colour, or the skin may be ruptured, and to further prevent this keep the trees rather dry at the roots, and maintain a buoyant atmosphere.

Trees of the St. Michael's varieties sometimes produce clusters of fragrant blossoms

whilst the fruit is turning yellow. It is better, however, to have the trees flowering in January, February, and March, as then the fruit has all the summer to swell and the autumn to ripen in, but the blossoms must be made the most of whenever they appear, and then ripe fruit may be had almost all the year.

When the days become short and dull, and the nights long and cold, say in November and December, let the night temperature fall to 55° ; maintain 65° by day, advancing 5° to 10° from sun-heat, and admit air freely when the external conditions are favourable.

Watering.—Sufficient water is required during the growing season to keep the foliage healthy. If the soil is too dry, the leaves will fall too soon; if too wet, the roots perish and the leaves drop. Less water will be needed in the winter than in the growing period, and comparative dryness is beneficial when the trees are at rest. Rain water is better than any other, but it should not be colder than the soil is in which the roots are established. Whether planted-out or grown in pots the whole of the trees do not need water at the same time, and their individual requirements must be ascertained by examination.

Feeding.—Liquid manure is less effective than top-dressings, and when used should be weak and clear. The following mixture is excellent for top-dressings:—Yellow fibrous loam, 1 bushel; cow manure, $1\frac{1}{2}$ peck, or deer or sheep droppings, 1 peck, dried and rubbed through a $\frac{1}{4}$ -inch sieve; steamed bone-meal, $\frac{1}{4}$ peck; powdered charcoal, $\frac{1}{2}$ peck; all level measure and thoroughly incorporated. Sprinkle a handful of the mixture thinly on a 13-inch pot, or that quantity to a foot superficial of the bed, when the fruit is set, say in April, and repeat two or three times at intervals of a month to six weeks.

Ripe Fruit.—Oranges will hang on the trees many weeks after they are ripe, and retain their juiciness and delicious flavour. The fruit may be gathered when ripe and placed in a cool room; but this is not a desirable plan, for it then has too much the appearance of imported; and to render home-grown oranges the most attractive, each fruit should be gathered with two or three deep shining green leaves attached, garnishing with a few sprays of blossom when obtainable. For this there is often a great demand, and superfluous sprays can usually be disposed of to advantage.

DISEASES AND ENEMIES.

Diseases.—There are few ailments to which the orange tree is liable in this country. Fungus at the roots, gumming at the root-crown and in the limbs, and “black smut” on the leaves and fruit, are the chief affections. Fungus at the roots arises from the

introduction of woody substances or other unsuitable matter in the soil, and commonly through the decay of roots occasioned by sodden or sour soil. The effect is seen in stunted growth, and the remedy is found in removing the offensive soil, trimming away decayed roots, and establishing the plants in sweet compost ; then plunging the pots in bottom heat, syringing and shading the trees, watering very carefully, and maintaining a genial atmosphere. In the course of a few weeks they recover, and are gradually inured to bear ordinary treatment.

Gumming is often induced by the pernicious custom of pouring water directly on

the stem, and having the collar sunk instead of a little higher than the surrounding soil level. When the evil occurs in a small branch, remove it ; if in the stem or a large branch, cut out the affected wood to the sound part, paint the wound with shell lac solution (shell lac dissolved in alcohol), and cover over with grafting clay to encourage the bark to spread over the wound. The best preventive is careful treatment all round.

“Black smut” is a fungoid growth that requires the exudations of insects to grow in, and can be prevented by removing its cause. The fungus causes the foliage to assume a yellow hue, and renders the leaves and fruit unsightly.

Enemies.—The orange scale (*Lecanium hesperidium*), Fig. 15, 1, 2, is a common

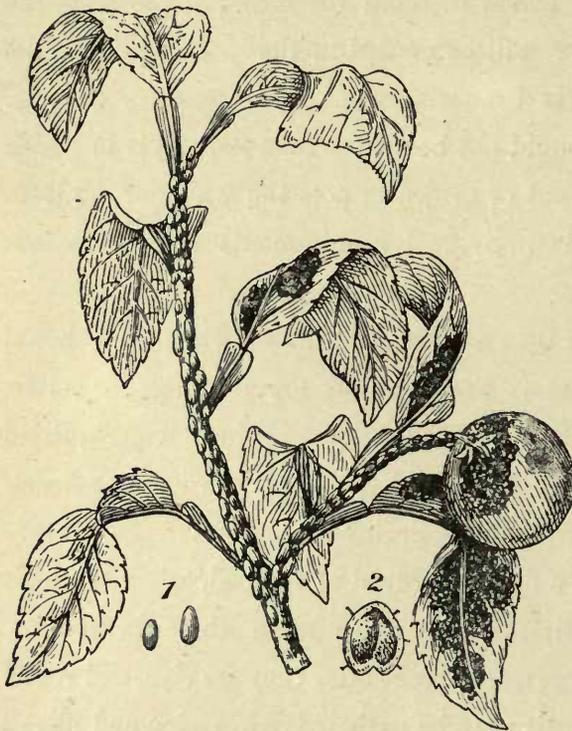


Fig. 15. SOFT ORANGE SCALE (*LECANIUM HESPERIDIUM*) ON ORANGE-TREE SPRAY.

References :—1, female, natural size ; 2, female, magnified.

pest of the Citrus and Myrtle families (*Eugenia* and *Guava*) all the world over, and its length is about $\frac{1}{4}$ -inch, colour dark brown. The scale collects in masses on the young wood, as well as on the leafstalks and the fruit (see spray Fig. 15), committing serious injury.

Thorough cleanliness is of the first importance in resisting insect invasions. Every year the house and trees should be cleansed. This is best done after the fruit is gathered, and when the trees are at rest. Dissolve 4 ounces of soft-soap in a gallon of hot water, and apply it to the leaves with a sponge, to the bark with a brush, leaving

no trace of scale or black fungus. If the scale is kept down there will be no black fungus; therefore lose no opportunity of combating the scale with the soapy solution. Washes are speedily applied, and generally efficacious, such as Coates's, Vol. I., page 260; resin compound and petroleum mixture, both in Vol. I., page 261; and these may be applied according to the instructions whilst the trees are in growth.

White scale (*Aspidiotus auranti*) and Oleander scale (*A. neri*) also infest the Citrus family. The first is about $\frac{1}{2}$ th inch in diameter, yellowish in the centre, and light brown at the margin. It causes the trees to have a sickly appearance, the leaves being blotched with yellow. The Oleander scale runs riot on lemon trees, sometimes almost covering the fruit. Methylated spirits will destroy it, but must be diluted with an equal quantity of water when applied with a sponge to the leaves or with a brush to the bark. This should be done in winter, following with the other remedies advised for *Lecanium*.

Mealy bug is sometimes found on orange trees. It is evidence of neglect either in selecting the trees or subsequent management. "Touch up" every part infested with the least possible quantity of spirits of wine, which, with syringing, will rid the trees of the parasite. Red spider may be prevented by properly syringing the trees, maintaining a genial atmosphere, and duly supplying the roots with water and nourishment.

PEACHES AND NECTARINES.

THE Peach (*Persica vulgaris*) is considered by De Candolle to be a native of China. It was known to Theophrastus, 322 B.C., and is supposed to have been introduced into Italy from the East during the reign of the Emperor Claudius, A.D. 41-54, but is not known to have been grown in England before 1541. Its cultivation is now more or less extensively practised throughout the warmer parts of Europe and the temperate regions of Asia and America; also in Australia and New Zealand.

The Nectarine originated as a sport from the peach, as both downy fruits (peaches) and smooth fruits (nectarines) have been produced on the same branch. The first recorded instance of this occurring is in a communication between Peter Collinson and Linnæus; the second was observed at Londesborough, then the residence of the Earl of Burlington; and there have been many other instances since. Trees have been raised in this country from peach seeds that bore nectarines, whilst those from nectarine stones produced peaches. This is, no doubt, due to cross-fertilisation. The same thing occurs now in America. "Nectarine stones usually produce nectarines again, but they occasionally produce peaches, while peach seeds occasionally produce nectarines" (Wickson).

The fruit of the peach is more or less round, having a delicate, downy skin, with a suture (seam) varying in breadth and depth in different varieties, issuing from the stem and proceeding along one side to the apex. Green peaches are used for tarts when a needle passes through the stones easily, or when they can be cut through readily with a knife. Ripe fruits, particularly of the firm-fleshed varieties, cut in halves, the stone taken out, and boiled in syrup, are excellent for dessert. The fruit is sometimes preserved whole. In America peaches are canned with great success, and sold at comparatively low rates. In this country the fruit is chiefly used for dessert, and, when properly ripened, is highly valued for its beautiful appearance, profusion of juice, lusciousness, and delicate flavour.

Nectarines, as a rule, are smaller and richer than peaches, each variety having its own peculiar flavour. A dainty fruit is the nectarine, its rich glow of colour and refreshing piquancy rendering it indispensable for dessert purposes.

VARIETIES.

Turner mentions peaches, red and white, in 1673. Parkinson, half a century later, enumerates twenty-one varieties. Ray, sixty years after Parkinson, mentions sixteen varieties. Miller, in 1750, describes thirty-one varieties. Loudon, 1822, enumerates fifty-three varieties; and Dr. Hogg, in his last edition of the *Fruit Manual* (1884), describes a hundred varieties, giving also a valuable list of synonyms. A supply of fruit grown against walls or in cool houses can be had over a period of three to four months, and, with sufficient means for forcing, ripe peaches can be had from April to October inclusive. The following selections are made to meet the requirements of the greatest number of cultivators:

I.—VERY EARLY PEACHES. Season: Mid July to Early August.

ALEXANDER.—Fruit large, round; skin bright deep red on the sun side; flesh yellowish white, melting, juicy, briskly flavoured, and sometimes adhering slightly to the stone. Tree hardy, and a free bearer; flowers large; glands on leaves round; an excellent very early variety raised in Illinois, U.S.A.; ripe in July against a wall, earlier in an orchard house.

* EARLY BEATRICE.—Fruit medium-sized, round; skin yellowish, almost covered with blotches of bright red; flesh nearly white, melting, and juicy, richly flavoured, and sometimes slightly adhering to the stone. Tree hardy, succeeding against a south wall; bears very freely; fruit ripe about the third week in July; flowers large; glands small and kidney-shaped.

* EARLY LEOPOLD.—Fruit medium-sized, round; skin pale yellow, marbled with red; flesh melting, juicy, and richly flavoured. Tree healthy, and an abundant bearer; flowers small, anthers laden with pollen, excellent to fertilise varieties deficient thereof, or liable to have the fruit split at the stone; glands small and kidney-shaped; fruit ripe towards the end of July.

* EARLY LOUISE.—Fruit medium-sized, round; skin greenish yellow, bright red on the sun side; flesh tender, melting, juicy, and richly flavoured, slightly adhering to the stone. Tree a free bearer; flowers small; glands small and kidney-shaped; fruit ripens about the third week in July.

* EARLY RIVERS.—Fruit large, roundish; skin pale straw, with a delicate pink cheek; flesh tender, very juicy and sweet. Tree healthy, and a good bearer; but the fruit is liable to split at the stone, the defect being overcome by fertilising its flowers with pollen from Early Leopold or Early Louise; flowers large; glands kidney-shaped; fruit ripe about the third week in July: the richest flavoured very early peach, but too tender for packing.

WATERLOO.—Fruit large, about 10 inches in circumference, round; skin pale green, marbled with red, very bright on the sun side; flesh greenish white, firm, juicy, with a rich vinous flavour. Tree hardy, and a free bearer; flowers large; glands round; fruit ripe at the middle of July; an excellent very early American variety, and from its firm flesh bears travelling well.

II.—SECOND-EARLY PEACHES. Season: Beginning to Middle of August.

À BEC.—Fruit large and roundish, blunt nipple at apex; skin lemon-yellow, with a crimson cheek; flesh white, tender, juicy, and deliciously flavoured. Tree tender, but excellent for second-early forcing; flowers large; glands round; fruit ripe at the middle of August.

* CONDOR.—Fruit large; skin bright crimson; flesh tender, juicy, piquant, and richly flavoured. Tree

an excellent bearer under glass; flowers large; glands kidney-shaped; fruit ripe early in August.

* DAGMAR.—Fruit large, round; skin very downy, pale straw, thickly strewn with crimson dots; flesh white, tender, with a rich vinous flavour. Tree healthy, and a free bearer; flowers small; glands kidney-shaped, sometimes round; fruit ripe the second week in August.

* **EARLY ALFRED.**—Fruit medium to large ; skin pale straw, mottled with crimson on the sun side ; flesh white, melting, juicy, and richly flavoured. Tree hardy, and a good bearer ; flowers large ; glands round ; fruit ripe early in August.

EARLY GROSSE MIGNONNE.—Fruit medium-sized, roundish ; skin pale red on the sun side ; flesh white, with red veins, juicy, and richly flavoured. Tree healthy, and a good bearer ; flowers large ; glands round ; fruit ripe about the second week in August ; one of the finest.

HALE'S EARLY.—Fruit medium-sized, round ; skin dark red on the sun side, otherwise suffused with crimson, streaked with darker crimson ; flesh yellow, melting, juicy, and deliciously flavoured.

III.—EARLY MIDSEASON PEACHES.

Season : Middle to End of August.

* **CRIMSON GALANDE.**—Fruit medium to large, roundish ; skin dark crimson, nearly black if well exposed to the sun, ground colour yellow ; flesh melting, very juicy, sprightly, and richly flavoured. Tree a free, healthy grower, and an abundant bearer ; flowers small ; glands round ; fruit ripe from the middle to the end of August.

* **DR. HOGG.**—Fruit large, round ; skin lemon, dotted with crimson, and with a flushed crimson cheek ; flesh firm, yet melting, with a brisk, rich flavour. Tree a fine grower, healthy, and an abundant

bearer ; flowers large ; glands kidney-shaped ; fruit ripe at the middle of August, sometimes a few days earlier, and bears carriage well.

* **MAGDALA.**—Fruit medium size, sometimes large ; skin creamy white, marbled and blotched with crimson, highly coloured on the sun side ; flesh melting, juicy, and exquisitely flavoured—a combination of the peach and nectarine. Tree healthy, and a good bearer, excellent against a wall outdoors ; flowers small ; glands kidney-shaped ; fruit ripe at the end of August.

IV.—MAIN MIDSEASON PEACHES. Season : Beginning to the Middle of September.

* **ALEXANDRA NOBLESSE.**—Fruit very large, round ; skin yellowish, with a few reddish dots on the sun side ; flesh white, very tender and melting, very juicy, and deliciously flavoured. Tree hardy, and a good bearer ; flowers large ; glands round ; fruit ripe early in September, sometimes earlier ; one of the best flavoured of the pale-coloured peaches.

BELLEGARDE (Galande).—Fruit large, round ; skin red, streaked with darker red ; flesh pale yellow, melting, very juicy, rich and vinous. Tree healthy, and a free bearer ; flowers small ; glands round ; ripe at the beginning to the middle of September ; one of the richest-flavoured peaches.

BELLE BEAUCE.—Fruit very large ; skin greenish yellow, mottled with red, sometimes highly coloured almost over the entire surface ; flesh tender, vinous, and deliciously flavoured. Tree not highly productive ; flowers large ; glands round ; fruit ripe in the middle of September ; one of the best for size and quality.

DYMOND.—Fruit very large ; skin mottled with red on the sun side, sometimes highly coloured ; flesh white, melting, very juicy, and highly flavoured. Tree hardy and prolific ; flowers large ; glandless ; fruit ripe early in September, sometimes at the end of August ; a very fine variety, either for out-door or in-door culture.

* **GOSHAWK.**—Fruit very large ; skin pale, sometimes faintly streaked on the sun side ; flesh very tender, juicy, and exquisitely flavoured. Tree healthy and, in firm soil, a good bearer ; flowers large ; leaves serrated, glandless ; fruit ripe early in September ; one of the best for quality.

GROSSE MIGNONNE.—Fruit large, roundish ; skin greenish yellow, mottled with red, and dark red all over on the sun side ; flesh pale yellow, melting, very juicy, vinous, and deliciously flavoured. Tree fairly hardy, and an average bearer ; flowers large ; glands round ; fruit ripe early in September ; one of the best peaches.

NOBLESSE.—Fruit large, roundish oblong; skin pale yellowish green, marbled and streaked with delicate red, yet a pale-coloured fruit; flesh yellowish white, very tender, remarkably juicy, extremely delicate, and very luscious in flavour. Tree healthy, and a fairly good bearer; flowers large; leaves glandless; fruit ripe early in September, sometimes late in August; one of the best flavoured.

ROYAL GEORGE.—Fruit large, round; skin pale, dotted and speckled with red, and deep red on the sun side; flesh melting, juicy, rich, and highly flavoured. Tree moderately hardy, and a very free bearer; flowers small; leaves glandless; fruit ripe early in September; one of the best and most popular

peaches, especially for growing under glass and forcing.

STIRLING CASTLE.—Fruit medium to large, roundish; skin pale-coloured, marbled with red, and well coloured when fully exposed; flesh white, melting, very juicy, and richly flavoured. Tree hardy, and an abundant bearer; flowers small; leaves glandless; fruit ripe early in September.

VIOLETTE HÂTIVE.—Fruit medium, sometimes large; skin greenish yellow, suffused with red, and dark red on the sun side; flesh melting, very juicy, and richly flavoured; excellent. Tree hardy, and a good bearer; flowers small; glands round; fruit ripe in the middle of September.

V.—LATE PEACHES. Season: Middle to End of September.

* **ALBATROSS.**—Fruit very large, round; skin pale yellow, mottled and streaked with dark crimson; flesh white, melting, rich, and well flavoured. Tree somewhat tender; average bearer; flowers large; leaves glandless; fruit ripe at the end of September.

BARRINGTON.—Fruit large, roundish ovate, with a prominent nipple at the apex; skin yellowish green, marbled with red, and deep red on the sun side; flesh whitish green, melting, juicy, vinous, and of the highest quality. Tree healthy, hardy, and a good bearer generally, but not always; flowers large; glands round; fruit ripe from the middle to the end of September; one of the best, and bears carriage well.

EXQUISITE.—Fruit very large, roundish oval, with a sharp nipple at the apex; skin deep yellow, mottled with dark crimson on the sun side; flesh yellow, melting, juicy, rich and vinous—a delicious fruit. Tree healthy, and average bearer; flowers small; glands round; fruit ripe in the middle of September; an American (Georgia, U.S.A.) variety of the highest excellence.

LATE ADMIRABLE.—Fruit very large, roundish oblong, with a swollen nipple; skin yellowish green,

marbled with red, and streaked with deeper red on the sun side; flesh yellowish green, melting, juicy, vinous, and richly flavoured. Tree healthy, and a good bearer; flowers small; glands round; fruit ripe at the end of September; one of the best late peaches under glass.

* **PRINCE OF WALES.**—Fruit very large, roundish; skin greenish yellow, red on the sun side; flesh greenish white, juicy, vinous, and richly flavoured. Tree a vigorous grower, and a profuse bearer under glass; flowers small; glands kidney-shaped; fruit ripe in the middle of September.

* **PRINCESS OF WALES.**—Fruit very large and round; skin cream-coloured, shaded with blush on the sun side; flesh melting and well flavoured. Tree healthy, and a good bearer; flowers large; glands round; fruit handsome, and ripe at the middle of September.

* **SEA EAGLE.**—Fruit very large, round; skin whitish yellow or lemon, flushed with deep red on the sun side; flesh melting, juicy, and well flavoured. Tree very healthy, and a good bearer; flowers large; glands round; fruit handsome, and ripe towards the end of September; one of the best late peaches.

VI.—LATEST PEACHES. Season: End of September to Middle of October.

* **COMET.**—Fruit large, roundish; skin orange-yellow, with a crimson cheek; flesh melting, sweet, and well flavoured. Tree healthy, vigorous, and a free bearer; flowers small; glands kidney-shaped; fruit ripe early in October.

* **GLADSTONE.**—Fruit large, roundish; skin yellowish green on shaded and bright red on the sun side; flesh solid, juicy, and deliciously flavoured. Tree hardy, and a good bearer; flowers large; leaves

serrated, glandless; fruit handsome, and ripens at the end of September; one of the best latest peaches.

* **GOLDEN EAGLE.**—Fruit very large, round; skin golden yellow, tinted with red on the sun side; flesh yellowish, tender, melting, piquant, and richly flavoured. Tree healthy, and a good bearer; flowers small; glands kidney-shaped; fruit handsome, and ripe at the end of September or early in October; one of the best late peaches.

* **LADY PALMERSTON.**—Fruit large ; skin greenish yellow marbled with crimson ; flesh pale yellow, melting, and well flavoured. Tree healthy under glass, and a good bearer ; flowers small ; glands kidney-shaped ; fruit handsome, and ripe at the end of September or early in October.

* **LORD PALMERSTON.**—Fruit very large ; skin creamy white, with a pink cheek ; flesh firm, and well flavoured. Tree healthy under glass, and productive ; flowers large ; glands round, sometimes kidney-shaped, but not always present ; fruit ripe at the end of September or early in October ; grown more for its large size than high quality.

* **NECTARINE PEACH.**—Fruit very large, ovate or conical, with a pointed nipple ; skin smooth, nectarine-like, yellow, mottled with bright red next the sun ; flesh firm, melting, brisk, and richly flavoured. Tree healthy, and a free bearer ; flowers large ; glands small, kidney-shaped ; fruit distinct ; bears carriage well, but the nipple is an impediment in packing ; ripe end of September or early in October.

* **OSPREY.**—Fruit very large, oblate ; skin creamy white, faintly tinged with red on the sun side ; flesh tender, melting, sweet, yet sprightly, and well flavoured. Tree healthy, and a good bearer ; flowers small ; glands round ; fruit handsome, and ripe at the end of September.

SALWEY.—Fruit large, round ; skin deep, rich yellow ; flesh yellow, sometimes melting, juicy, vinous, and pleasantly flavoured, but often dry, woolly, and only good in appearance. Tree healthy and productive ; flowers small ; glands kidney-shaped ; fruit handsome, and ripe from the middle of October to early in November.

WALBURTON ADMIRABLE.—Fruit large, round ; skin pale green, suffused with crimson, and mottled with darker crimson on the sun side ; flesh yellowish white, melting, juicy, rich, and excellently flavoured. Tree hardy, and a good bearer generally ; flowers small ; glands round ; fruit ripe at the end of September or early in October ; one of the best of the latest peaches.

* Varieties of peaches to which an asterisk is prefixed were raised at Sawbridgeworth.

SELECTIONS OF PEACHES FOR VARIOUS PURPOSES.

I.—TWENTY-FOUR OF THE BEST VARIETIES FOR GROWING AGAINST A SOUTH WALL, OR IN A COOL HOUSE ; NAMED IN THEIR ORDER OF RIPENING.

Waterloo.	Crimson Galande.	Noblesse.
Early Louise.	Condor.	Exquisite.
Hale's Early.	Dymond.	Bellegarde.
Early Alfred.	Goshawk.	Barrington.
Large Early Mignonne.	Grosse Mignonne.	Sea Eagle.
Early Grosse Mignonne.	Alexandra Noblesse.	Gladstone.
Rivers' Early York.	Stirling Castle.	Late Admirable.
Dr. Hogg.	Royal George.	Golden Eagle.

II.—SELECT VARIETIES FOR GROWING AGAINST A SOUTH WALL GENERALLY.

<i>Twelve.</i>		<i>Six.</i>		<i>Three.</i>
Waterloo.		Waterloo.		Hale's Early.
Early Louise.		Hale's Early.		Grosse Mignonne.
Hale's Early.		Crimson Galande.		Gladstone.
Dr. Hogg.		Stirling Castle.		—
Crimson Galande.		Bellegarde.		
Dymond.		Gladstone.		
Grosse Mignonne.		—		<i>Two.</i>
Alexandra Noblesse.		<i>Four.</i>		Hale's Early.
Stirling Castle.		Early Louise.		Stirling Castle.
Bellegarde.		Dymond.		—
Barrington.		Stirling Castle.		
Gladstone.		Gladstone.		<i>One.</i>
				Stirling Castle.

III.—SELECT VARIETIES FOR A WALL-CASE WITH A SOUTH OR SOUTH-WEST ASPECT.

<i>Twelve.</i>	<i>Six.</i>	<i>Three.</i>
Alexander.	Early Louise.	Hale's Early.
Early Rivers.	Dr. Hogg.	Royal George.
Hale's Early.	Grosse Mignonne.	Gladstone.
Condor.	Royal George.	—
À bec.	Noblesse.	
Grosse Mignonne.	Barrington.	<i>Two.</i>
Royal George.	—	Hale's Early.
Noblesse.	<i>Four.</i>	Grosse Mignonne.
Bellegarde.	Hale's Early.	—
Princess of Wales.	Grosse Mignonne.	
Gladstone.	Royal George.	<i>One.</i>
Golden Eagle.	Princess of Wales.	Royal George.

IV.—SELECT VARIETIES SUITABLE FOR FORCING.

<i>Very early.</i>	<i>Two second early.</i>	<i>Three.</i>
Alexander.	Hale's Early.	Nectarine Peach.
Waterloo.	À bec.	Walburton Admirable.
Early Beatrice.	—	Golden Eagle.
Early Louise.	<i>Midseason.</i>	<i>Two late.</i>
Early Rivers.	Dymond.	Gladstone.
Early Leopold.	Stirling Castle.	Golden Eagle.
—	Grosse Mignonne.	<i>Six forcing peaches.</i>
<i>Two best very early.</i>	Royal George.	Alexander.
Alexander.	Noblesse.	Early Louise.
Early Louise.	Violette Hâtive.	Hale's Early.
—	Bellegarde.	Stirling Castle.
<i>Second early.</i>	Late Admirable.	Royal George.
Hale's Early.	<i>Two midseason.</i>	Late Admirable.
Early Alfred.	Royal George.	<i>Two forcing peaches.</i>
Condor.	Grosse Mignonne.	Hale's Early.
Rivers' Early York.	<i>Late.</i>	Stirling Castle.
Dr. Hogg.	Princess of Wales.	<i>One forcing peach.</i>
À bec.	Sea Eagle.	Royal George.
Crimson Galande.	Gladstone.	

SELECT NECTARINES.

I.—EARLIEST VARIETIES. Season: End of July to Middle of August.

- * ADVANCE.—Fruit medium size; skin green, mottled with red; flesh green or yellowish, juicy, and richly flavoured. Tree healthy, and a free bearer; flowers large; leaves glandless; ripe about the end of July.
- * EARLY RIVERS.—Fruit medium to large, over 9 inches in circumference, weighs 8 ounces; skin yellowish green, bright red on the sun side; flesh greenish yellow, juicy, brisk, and richly flavoured. Tree free-growing and very prolific; flowers large; glands kidney-shaped; fruit brilliant, and ripe from the middle to the end of July.

- * GOLDONI.—Fruit medium size; skin orange-yellow, streaked and spotted with crimson on the sun side; flesh yellow, very juicy, and richly flavoured. Tree healthy, and an abundant bearer; fruit handsome, and ripe early in August.
- * LORD NAPIER.—Fruit large, ovate; skin yellowish green, mottled with red on the exposed side, and sometimes dark crimson; flesh white, melting, very juicy, and richly flavoured. Tree healthy, and a free bearer; flowers large; glands kidney-shaped; fruit ripe early in August.

II.—SECOND-EARLY VARIETIES. Season : Middle to End of August.

* **DARWIN.**—Fruit medium to large ; skin orange, flushed with red on the sun side ; flesh yellow, very juicy, rich and deliciously flavoured. Tree healthy, and a good bearer ; flowers large ; glands kidney-shaped ; fruit handsome, and ripe from the middle to the end of August.

HARDWICKE SEEDLING.—Fruit large, roundish oval ; skin pale green, dark purplish red next the sun ; flesh greenish, melting, juicy, and richly flavoured. Tree hardy and prolific ; flowers large ; leaves serrated, glandless ; fruit ripe at the end of August.

* **IMPROVED DOWNTON.**—Fruit large, roundish, oval ; skin pale green, deep red on the sun side ; flesh pale green, melting, very juicy, and deliciously flavoured. Tree a vigorous grower, and an excellent bearer ; flowers small ; glands kidney-shaped ; fruit ripe at the end of August ; a fine nectarine.

MURREY. Fruit medium-sized, roundish ovate ; skin pale, dark red next the sun ; flesh greenish white, melting, very juicy, and richly flavoured. Tree hardy, and a good bearer ; flowers small ; glands

kidney-shaped ; fruit ripe from the middle to the end of August.

* **RIVERS' ORANGE.**—Fruit large, roundish ovate ; skin deep orange, suffused and streaked with red on the sun side ; flesh deep yellow, very juicy, rich, and deliciously flavoured. Tree fairly hardy, and a profuse bearer ; flowers large ; glands kidney-shaped ; fruit ripe from the middle to the end of August.

* **RIVERS' WHITE.**—Fruit large, roundish ; skin white, with a faint flush of red next the sun, and covered with a delicate white bloom ; flesh white, melting, juicy, and deliciously flavoured. Tree tender, fruitful under glass ; flowers large ; glands kidney-shaped ; fruit ripe from the middle to the end of August.

* **STANWICK ELRUGE.**—Fruit medium to large, roundish oval ; skin greenish, with dark russet specks, and deep purplish red on the sun side ; flesh melting, juicy, and richly flavoured. Tree healthy and very prolific ; flowers small ; glands kidney-shaped ; fruit ripe at the end of August.

III.—MIDSEASON VARIETIES. Season : Beginning to Middle of September.

BALGOWAN.—Fruit large, roundish ovate ; skin pale green, mottled with red, and deep bright red on the sun side ; flesh greenish yellow, melting, very juicy, vinous, and richly flavoured. Tree vigorous, hardy, and an abundant bearer ; flowers small ; glands kidney-shaped ; fruit ripe early in September.

* **BYRON.**—Fruit large, roundish oval ; skin rich orange, mottled with crimson ; flesh orange, melting, very juicy, rich, and deliciously flavoured. Tree vigorous, healthy, and a free bearer ; flowers large ; glands kidney-shaped ; fruit ripe at the middle of September.

ELRUGE.—Fruit medium-sized, roundish oval ; skin greenish, pale, but deep red on the sun side, specked with darkish brown ; flesh melting, very juicy, and highly flavoured. Tree healthy, and an abundant bearer ; flowers small ; glands kidney-shaped ; fruit ripe early in September ; one of the best.

* **DRYDEN.**—Fruit large, sometimes very large ; skin greenish, deep red and purple on the sun side ; flesh white, melting, very juicy, vinous, and deliciously flavoured. Tree vigorous, healthy, and a profuse bearer ; flowers small ; glands kidney-shaped ; fruit ripe early in September ; one of the very best.

* **HUMBOLDT.**—Fruit large ; skin orange yellow, flushed and streaked with crimson faintly on the sun side ; flesh orange, tender, juicy, and very richly flavoured. Tree healthy and bears abundantly ; flowers large ; glands kidney-shaped ; fruit ripe at the beginning of September.

* **NEWTON.**—Fruit large, round ; skin greenish yellow, mottled and blotched with deep red on the sun side ; flesh greenish white, juicy, rich and deliciously flavoured. Tree vigorous and a good bearer ; flowers small ; glands kidney-shaped ; fruit handsome, and ripe from the beginning to the middle of September.

* **PINE APPLE.**—Fruit large, nearly oval, pointed ; skin deep orange, flushed and streaked with red on the sun side ; flesh deep yellow, very juicy, rich, yet sprightly, and deliciously flavoured. Tree healthy and a good bearer ; flowers large ; glands round ; fruit ripe early in September ; one of the best.

VIOLETTE HÂTIVE.—Fruit medium to large, roundish ovate ; skin yellowish green, dark purplish red next the sun, and mottled with brown ; flesh yellowish green, melting, juicy, vinous, and richly flavoured. Tree healthy, and a great bearer ; flowers small ; glands kidney-shaped ; fruit ripe early in September ; one of the best.

IV.—LATE VARIETIES. Season : Middle of September to Early October.

* MILTON.—Fruit very large, roundish oval ; skin greenish yellow, deep red on the sun side, sometimes nearly black ; flesh greenish white, melting, very juicy, rich, and deliciously flavoured. Tree healthy, and a free bearer ; flowers large ; glands round ; fruit handsome, and ripe from the middle to the end of September.

* PRINCE OF WALES.—Fruit very large, roundish oval ; skin greenish yellow, deep red on the sun side ; flesh greenish yellow, very juicy, vinous, and richly flavoured. Tree tender, but succeeds in warm soils and situations ; flowers small ; glands round ; fruit ripe from the middle to the end of September.

* SPENCER.—Fruit large ; skin greenish yellow, mottled with red and dark crimson on the sun side ; flesh light green, very juicy, vinous, and richly flavoured. Tree healthy, and a free bearer ; flowers large ; glands round ; fruit ripe about the middle to the end of September.

* VICTORIA.—Fruit large, roundish oval, flattened ; skin greenish yellow, crimson on the sun side ; flesh white, melting, very juicy, vinous and richly flavoured. Tree vigorous, and an abundant bearer, but requires a warm soil and situation ; flowers small ; glands kidney-shaped ; fruit ripe at the end of September and early in October ; the best late nectarine.

* Varieties to which an asterisk is prefixed were raised at Sawbridgeworth.

SELECTIONS OF NECTARINES FOR VARIOUS PURPOSES IN THEIR ORDER OF RIPENING.

I.—SELECT VARIETIES FOR GROWING AGAINST A WALL OUTDOORS WITH A SOUTH ASPECT.

<i>Twelve.</i>		<i>Three.</i>
Advance.	Dryden.	Lord Napier.
Lord Napier.	Victoria.	Hardwicke Seedling.
Goldoni.	—	Dryden.
Murrey.	<i>Six.</i>	—
Improved Downton.	Lord Napier.	<i>Two.</i>
Hardwicke Seedling.	Hardwicke Seedling.	Lord Napier.
Balgowan.	Elruge.	Elruge.
Elruge.	Violette Hâtive.	—
Violette Hâtive.	Dryden.	<i>One.</i>
Newton.	Victoria.	Elruge.

II.—SELECT VARIETIES FOR A WALL-CASE OR AN UNHEATED HOUSE.

<i>Twelve.</i>		<i>Three.</i>
Early Rivers.	Spencer.	Lord Napier.
Lord Napier.	Victoria.	Elruge.
Goldoni.	—	Victoria.
Rivers' White.	<i>Six.</i>	—
Rivers' Orange.	Early Rivers.	<i>Two.</i>
Elruge.	Lord Napier.	Lord Napier.
Humboldt.	Darwin.	Humboldt.
Newton.	Elruge.	—
Dryden.	Dryden.	<i>One.</i>
Milton.	Victoria.	Elruge.

III.—SELECT VARIETIES FOR FORCING.

<i>Very early.</i>	<i>Midseason.</i>	<i>Best midseason.</i>
Early Rivers.	Rivers' Orange.	Stanwick Elruge.
Advance.	Stanwick Elruge.	—
—	Violette Hâtive.	<i>Late.</i>
<i>Best very early.</i>	Goldoni.	Newton.
Early Rivers.	Pine Apple.	Milton.
—	Dryden.	Spencer.
<i>Second early.</i>	—	Victoria.
Lord Napier.		—
Rivers' White.	<i>Three midseason.</i>	<i>Best late.</i>
—	Stanwick Elruge.	Victoria.
<i>Best second early.</i>	Dryden.	—
Lord Napier.	Pine Apple.	<i>The best forcing nectarine.</i>
		Stanwick Elruge.

PROPAGATION AND CULTURE.

The peach and nectarine require the same cultural treatment in every essential detail.

Seeds are employed for raising new varieties; also for growing stocks whereon the approved varieties may be budded. Peach stocks, however, are not sufficiently hardy for employment in this country, the trees doing well only for a short time. Raising new varieties of peaches and nectarines from seeds is very uncertain and unprofitable, but interesting.

Budding is far the best method of perpetuating and increasing desirable varieties. The ordinary "shield" budding is practised in July or August, taking care to select and employ wood buds only. For instructions, see Vol. I., page 115.

Grafting is seldom practised, but it may be successfully performed in spring. The scions must be short-jointed and thoroughly ripe, taking them before the buds commence swelling and retarding them until the sap in the stocks begins moving. Whip-grafting is the most desirable method, preparing the scion with about $\frac{1}{2}$ inch of two-year-old wood at its lower extremity, and taking care that that part does not overlap the cut part of the stock. After operating in the manner described in Vol. I., page 122, soil may be heaped round the stocks over the junctions to keep them evenly moist.

Stocks.—The Plum stock is the most suitable and, all points considered, the Black Damask (Damas Noir) with the St. Julien may be regarded as the best stocks generally for peaches and nectarines.

OUTDOOR CULTIVATION.

Wall Aspects.—North of 53° north latitude, peach and nectarine trees require a wall with a due south aspect. The situation must be sheltered on the east and round by the north to the west. This is absolutely essential. Elevation and exposure are also important factors in peach and nectarine culture. Low sites tend to late growth and immaturity of the wood, rendering it liable to be damaged by frost in winter, and the blossoms to be destroyed in spring; but whilst elevation tends to harden the wood the diminution of temperature renders the cultivation of these fruits precarious in the north, where the altitude above sea-level much exceeds 150 feet.

South of 53° north latitude, walls facing due east or west, and not much exposed to winds or fogs, nor exceeding 150 feet above sea-level, may have peach and nectarine trees planted against them with every prospect of success, and in the warmer parts of the country up to 250 feet. The trees, however, on east aspects are liable to attacks of mildew, and those against west walls have a tendency to late growth and moderate bearing. South-east aspects are better than east, and south-west superior to west. South walls and efficient protection enable cultivators to produce fine peaches and nectarines in the southern parts of the country up to 375 feet above sea-level.

Soil.—The plum, on which peaches and nectarines are established, is a surface-rooting tree; consequently the soil requires to be of a substantial nature and stored with abundant mineral elements, namely potash, magnesia, and lime, also phosphoric acid. Light soils are deficient in potash, and the fruit of the peach contains more of this element than does any other fruit. Open-air peach and nectarine cultivation appears to be a lost art in too many gardens, but where due regard is had to the root requirements and the prevention of insects, the blossom being also adequately protected, as fine fruit is produced by trees against walls now as in former days. Insect infestations, arresting growth in the spring, and over-crowding of the shoots in summer are undoubtedly the cause of many failures.

Almost any open, loamy soil can be made to produce peaches and nectarines. Special borders are often very expensive and, though the top 3 inches of a pasture may effect wonders for a time, the medium lacks durability, and the trees fail prematurely. Properly prepared natural soil containing a good percentage of stones, grit, and loam to render it compact, is far better than the parings of an old pasture rich in nitrogenous matter, but deficient in mineral ingredients. Rich soil, without root restriction, promotes long-jointed, ill-ripened, and unfruitful wood. Light dry soil

should have clay marl mixed with it, and be made firm; in fact, a soil too light for peaches may be made suitable by no further trouble than ramming it hard, keeping it moist by a covering of manure, and supplying potassic and phosphatic top-dressings. Stiff clay is too stubborn, cold, and wet; but take off the top spit—more or less ameliorated—and lay it on one side, and then burn the next spit so that it crumbles, mix it with the whole, and the result is 2 feet in thickness of the very best soil for peach and nectarine trees.

Borders.—Without a wall with a favourable aspect, proper and sufficient depth of soil, and efficient drainage, peaches and nectarines cannot succeed in the open air generally. It is usual to provide borders as wide as the height of the walls, because such borders are useful for other crops, as well as the trees. Nothing is worse than to attempt to grow two crops and have neither good. Peach and nectarine trees, with their roots running riot in heavily manured vegetable borders, cannot produce other than unhealthy and fruitless growths.

An excavation 3 feet deep, parallel with the wall and not more than half its height, is ample. Place a 3-inch tile drain near the outside edge, but 6 inches lower than the bottom of the border, which should incline to the drain, this having a proper fall and outlet. Concrete the bottom if the subsoil is unfavourable, but this is seldom necessary, and cover the drain with clean rubble, level with the concrete. Place in 9 inches of rubble about the size of half-bricks, then 3 inches the size of road metal, preferably of old brick and mortar rubbish from a building, excluding pieces of wood and the finer particles by sifting. The surface of the drainage should be as fine as a gravel path, and covered with thin sods, to prevent its being choked with soil.

Peach borders are often made too rich and deep. Substantial loam is the best rooting medium, and 2 feet in depth ample. If the loam is considered too strong or deficient in calcareous matter, sufficient opening material must be added to render it porous. If the loam is deemed too sandy, supply enough marly clay, dried and pounded, as will make it properly retentive. Aim at porosity with compactness, the former being essential for the percolation of water, the latter for the retention of food elements and the division of the roots into numberless fibres. Charred rubbish or wood ashes, and crushed bones are useful additions to compost for peach borders.

The following formulæ for the preparation of a suitable compost will be useful to the inexperienced. 1. Yellow, hazel, or red loam, stiff and deficient in gravel or grit, and calcareous matter, four parts; burnt clay, one part; old mortar and brick rubbish,

crushed, and all pieces of wood picked out, one part, and the same of road scrapings, well ameliorated. 2. Sandy loam, three parts; clay, dried and pounded, two parts; old mortar or chalk, smashed or weathered, one part. 3. Gravelly loam, three parts; clay marl, two parts. Chop the turfy loam in pieces about 2 inches square, mix the ingredients well, after adding 1 gallon of wood ashes to every barrowful of the respective mixtures. If the loam in any case is poor, add one-fifth of reduced stable manure to heavy, and a similar proportion of farmyard manure to light, loam. Very rich soil, however, must be avoided, as it tends to over-luxuriance, ill health, and unfruitfulness.

Distance of Trees.—This will be determined by the mode of training. 1. Single cordons, to be trained diagonally, may be planted 2 feet apart; a border 3 feet wide suffices for these trees. 2. "U" system, two upright branches with bearing wood trained at an angle of 45°—moderate-growing varieties 4 feet, strong-growing varieties 5 feet apart; the border need not exceed 4 feet in width for trees on this method. 3. Fan-trained trees, 15 feet apart against a 12-foot wall, with a 6-foot standard between them; against a wall of 9 or 10 feet a planting distance of 18 feet is ample for the permanent trees, with 4½-foot standards between. The latter, known as "riders," are only intended to make the most of the space from the beginning, and as the dwarf trees advance the riders must be cut away.

Planting.—It is imperative that the trees selected be moderately vigorous, clean, short-jointed, with well-ripened wood, and no trace of gum anywhere. Home-grown trees, especially those that can be moved with balls, may be transplanted with advantage when the wood is hard and the leaves mature. Trees from a distance should have cast their leaves, except a few on sappy laterals. Root action and growth commence early, and the trees cannot be removed in spring without some check, but by planting as early in the autumn as is safe, the trees take to the soil at once, and are prepared to make responsive growth with the return of spring. Spread out the roots, cut off broken or bruised parts, and plant so that the uppermost roots will not be covered more than 2 inches deep when the soil is returned to its proper level. Allow a space of 4 to 6 inches between the wall and the tree. Firm the soil well, and give water if dry—not otherwise; cover the surface as far as the roots extend with stable litter; secure the branches very loosely to the wall, and do not attempt training until the spring or when the soil has properly settled. When a tree dies or becomes so unprofitable as to necessitate its removal, it is useless planting a young tree in its place and expecting it to flourish unless the old soil is removed at least a foot farther

than the roots extend, good drainage ensured, and fresh soil of a suitable nature provided.

Autumn-planted trees should not be pruned until the buds at the extremities of the branches begin to unfold in the spring, the extent of the pruning being determined by the condition of the wood (see "Training"). The trees may also need attention in watering and mulching to secure an early, free, well-sustained growth, and insure its thorough maturation. Spring-planted trees—those put in as soon after the middle of February as the weather permits—will require more than ordinary attention in watering and mulching during the first season; but over-watering, by keeping the soil cold and sodden, hinders root formation and must be avoided, the shortening of the shoots being deferred until they push new growths freely.

TRAINING.

Peach and nectarine trees may be trained in various ways, but the most useful methods are: 1, Cordon; 2, "U"-shaped; 3, Fan.

1. *Cordon*.—This useful French method admits of a wall being covered regularly and quickly. It is well adapted for walls of 6 to 3 feet in height, and with the roots of the trees restricted to narrow borders, periodically lifted, they remain fruitful for years. The trees must be planted aslant, 24 inches apart, at an angle of 45°. (See "Single Diagonal Cordon Training," Vol. II., page 25; also "Results of Depression," Vol. II., page 23.)

A maiden tree should consist of a single stem, grown from the bud the first season, with side growths or laterals. These should be cut off closely and the stem shortened to a good bud 18 inches above the junction of the scion with the stock, when the buds are swelling freely in spring. During the summer a leading growth must extend in continuation of the stem, and growths for bearing secured about 1 foot apart on each side, all others being rubbed off. The leader must be trained forward intact, pinching the laterals to one joint as often as produced, and in the spring of the second year the leading shoot may be cut back to 2 feet 6 inches or 3 feet, according to the strength of the tree and maturity of the wood. During subsequent years the side or fruiting branches are treated in the way to be presently shown under "Short Pruning." To avoid waste of space, the end trees must be trained with secondary branches at an angle of 45° (see Fig. 14, *G*, Vol. II., page 25). What is termed the "express" method of forming cordon peach and nectarine trees is not, as a rule, suitable for open walls in this country.

It consists in allowing maiden trees to remain their full length and securing the original laterals to the wall. With particular trees and in favourable positions the plan may answer, but it is not reliable.

2. "U," or Two-branch Training.—"This system," states Mr. Rivers, "which has

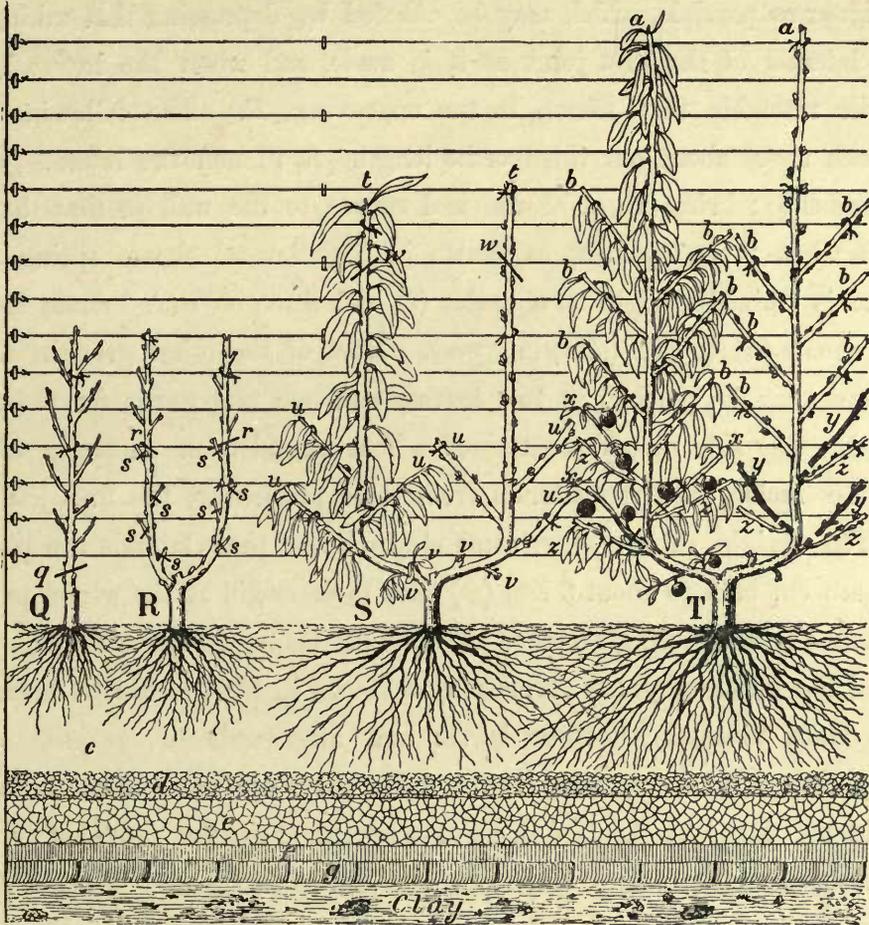


Fig. 16. "U" TRAINING APPLIED TO PEACH AND NECTARINE TREES.

References.—*Q*, maiden tree ; *q*, point of heading. *R*, one-year-trained tree ; *r*, point of shortening the main shoots ; *s*, point of cutting off the laterals. *S*, two-years-trained tree—left side shows it in summer, right-hand side when leafless ; *t*, upright on main shoots ; *u*, side of bearing shoots ; *v*, spurs ; *w*, point of shortening the main shoots. *T*, tree in the third year of training ; *x* and *y*, bearing shoots ; bars and detached shoots (*y*) indicate points of cutting out shoots that have borne fruit ; *z*, successional shoots for the following year's bearing ; *a*, continuation growths of the main branches ; *b*, shoots to supply bearing wood. Wall wired at 6 inches apart : *c*, border, 2 feet deep ; *d*, 3-inch layer of old mortar rubbish ; *e*, rubble, 9 inches thick ; *f*, concrete, 3 inches deep, and inclining from the wall to the 3-inch drain.

found such favour with Continental peach growers, is undeniably more simple and more productive than the fan-training in use in England." It is the double vertical cordon method, distinguished from the diagonal cordon in the stems being upright and the bearing wood from them trained at an angle of 45° .

To form the "U" tree, a maiden tree is headed at 9 inches from the ground (Fig. 16, *Q, q*). This gives rise to side growths; select two of the best as nearly on a level as possible, and take these to the right and left of the stem with a curve upwards, and rub off all the others. The point is to secure the shoots as nearly of equal vigour as possible, which may be effected by depressing that taking the lead. Pinch the laterals at the first joint as it is made, and when the leaves have fallen the tree will resemble that shown in the engraving, *R*. The following February cut back each shoot about one-third of its length (*R, r*), and the laterals (*s*) close to the main branches; bring these down and secure to the wall so that they will be 2 feet apart when taken upright, as shown in *S*. Several shoots spring from each branch; one is trained upright as a leader (*t*), and three on each branch are retained as bearing shoots (*u*) for the following year. Most of the other growths are rubbed off, but a few may be pinched at two leaves, and one afterwards for the production of spurs (*v*). The side shoots are trained a foot asunder, at an angle of 45° , and stopped at 15 inches, and the laterals from them pinched at the first joint as often as made. The upright shoots (*t*) are not stopped, but their laterals are pinched, and the leaders are cut back to about 3 feet (*w*) from their origin at the winter pruning, the summer-pinched laterals being removed at the same time. Fruit is borne on the side shoots (*u*) of the previous year's formation, as shown in *T, x*, a growth being retained above the fruit, pinched at three leaves and afterwards to one joint of growth. Immediately the fruit is gathered the bearing parts are cut out at the bars; also, as shown, in the detached shoots (*y*), basal growths (*z*) being provided to take their place for the succeeding year's crop. On the uprights, a shoot is taken forward in continuation (*a*); also side shoots (*b*) at 1 foot apart. The leading shoots, if thoroughly ripened to the points, may be left entire; otherwise shorten them to growth, not blossom, buds on well-matured wood.

3. *Fan Training*.—This is the old English method of training peach and nectarine trees, and is still the most popular in this country, also decidedly useful; but obviously fewer varieties of these fruits can be grown against a given extent of wall than by the foregoing methods. The main point of fan training is to prevent the vigour of the tree being expended on the upper part, and the lower branches consequently weakened. This is generally caused by allowing upright branches to take an undue lead whilst the tree is young, or disregard of a regular disposal of the branches, so as to secure an equal distribution of the sap. The main branches should not be numerous,

but equal in strength and regularly disposed, with bearing shoots trained between them at proper distances for affording a regular supply of fruit yearly. Too often we find the upper half of a wall covered with fruitful wood, the lower part very ill furnished, thus rendering a considerable portion of space profitless.

The young tree is mostly procured when it has been trained for one, two, or three

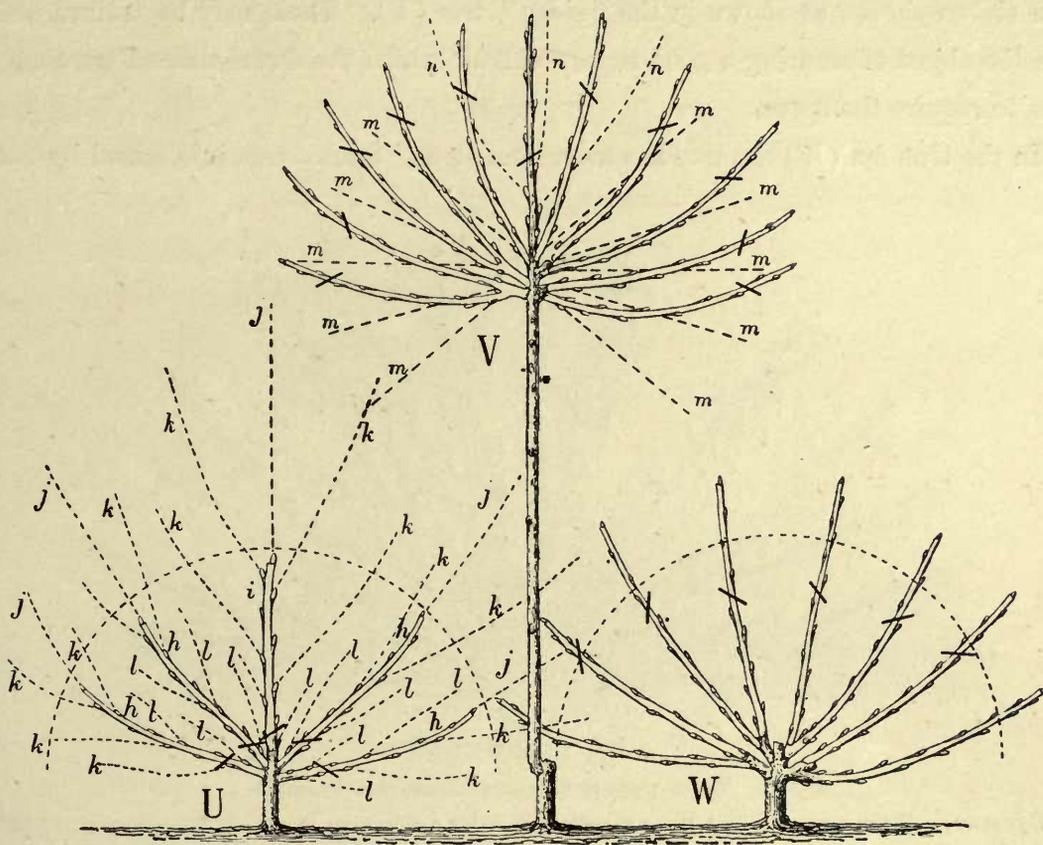


Fig. 17. ONE-YEAR-TRAINED TREE, WITH LEADER, STELLATE, AND FAN TRAINING.

References:—*U*, one-year-trained tree: *h*, side shoots; *i*, leader—dotted lines indicate shoots the result of non-pruning; *j*, leaders; *k*, subsidiary shoots; *l*, bearing shoots. *V*, result of pruning the tree *U* at the bars, shown in a “rider” tree: bars, points of shortening for stellate training; *m*, shoots trained stellate; *n*, shoots from leader to fill up the centre. *W*, old English fan-trained tree—result of cutting out the leader (*i*) and shortening the side shoots (*h*) in *U* to the bars; bars in *W*, points of shortening.

years in the nursery. A one-year-trained tree usually has three or five shoots; one with five is represented in the illustration, Fig. 17 *U*.

The tree (*U*) is not a true fan form, a fan having no leader, but a tree with five shoots spread out evenly their full length and not shortened. In good soil such a tree may make wonderful growth the first year and promise fruit the next; extensions (*j*),

subsidiary growths (*h*), bearing shoots (*l*). As will be seen, the tree has extended twice as much upwards as sideways—a sure sign that the lower branches will soon become too weak to bear fruit. The plan, however, is a fashionable one, and practised to cover space and obtain fruit quickly, irrespective of the appearance and durability of the trees. By shortening the tree (*U*) to the bars in the spring after planting, two shoots will be originated from each side branch and three from the central one; the result is a head with eleven shoots, as shown in the “rider” tree (*V*). These may be trained stellate with the object of securing a good supply of fruit whilst the dwarf-trained trees advance so as to require the space.

In the true fan (*W*) the tree has no central stem. Such a tree is obtained by cutting

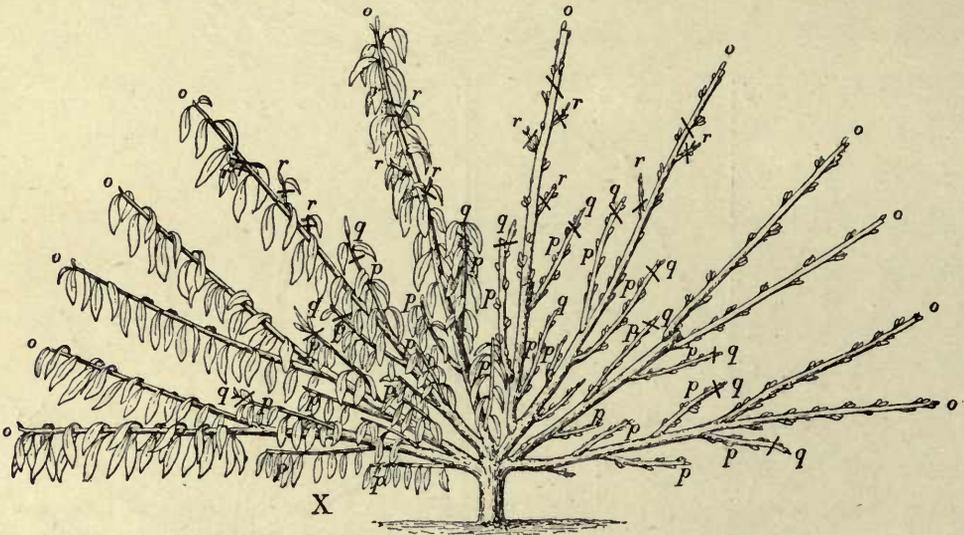


Fig. 18. THREE-YEARS-OLD ENGLISH FAN-TRAINED PEACH TREE.

References:—*X*, three-years-trained tree : *o*, extension shoots ; *p*, bearing shoots ; *q*, laterals after stopping the bearing shoots ; *r*, laterals from extension shoots : bars, points of winter pruning.

out the leader *i* in *U*, and shortening the side shoots (*h*) to the bars. The following summer two shoots extend from each shortened branch, these eight shoots forming the foundation of the future tree. Only the upper six branches are shortened the following spring, removing about one-third of their length, leaving the lower branches intact; but when the wood is soft or damaged the growths must be shortened to well-ripened parts, and just above a wood bud.

The following summer two shoots are taken forward from the two lowest branches on each side of the stem, but one only from each of the four upper branches of the tree, *W*, Fig. 17; all these growths are termed extension shoots (*o*), Fig. 18. Along the

wood of the preceding year, bearing shoots (*p*) are reserved, about 12 to 15 inches asunder, the back and fore-right shoots being rubbed off. The extension growths need not be stopped, but the bearing shoots should be pinched at 12 to 15 inches, and the laterals that issue from them or the extensions must be pinched to one joint as made. At the winter pruning the laterals (*q*) should be cut away to sound wood, and those (*r*) on the extensions cut off close to their base. The four upper branches merely require shortening about one-third to cause them to push strongly at the right place. The necessary pruning is indicated by the bars.

The tree portrayed in Fig. 19 has arrived at a fruiting age in the fourth year of

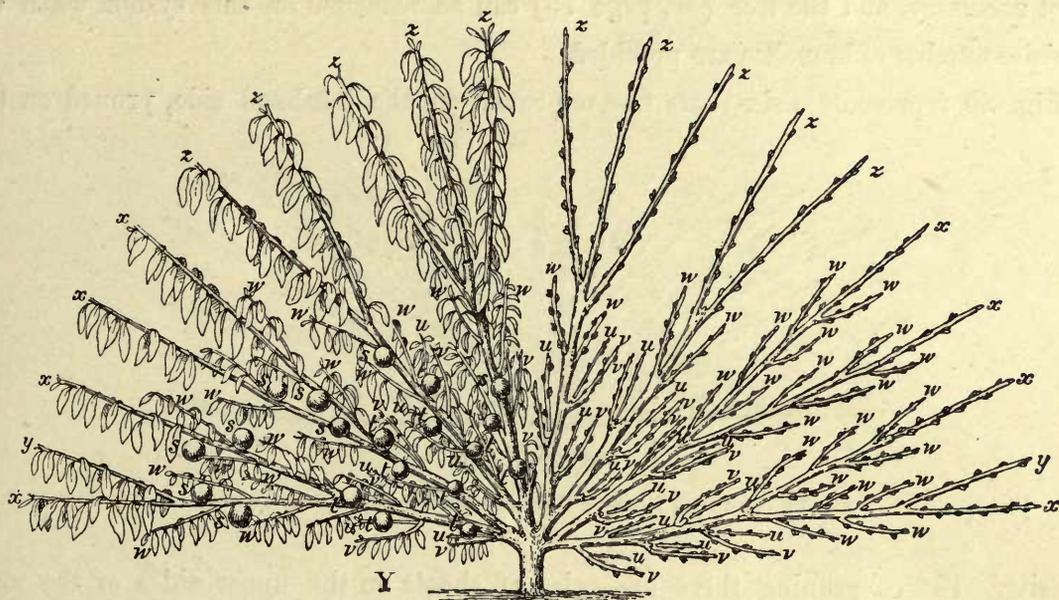


Fig. 19. FAN-TRAINED PEACH TREE IN FRUIT.

References:—*Y*, four-years-trained tree—left hand, tree in summer; right hand, tree leafless; *s*, fruit borne on previous year's extension wood; *t*, fruit produced on side shoots; *u*, growths above the fruit; *v*, basal shoots to supplant those fruiting; *w*, bearing shoots from previous year's extensions; *x*, continuations; *y*, subsidiary shoots; *z*, shoots originated by cutting back in early spring.

training. The tendency to produce laterals on the current year's growths without shortening them has departed, because the sap is concentrated on the formation of blossom instead of wood buds. Laterals are the result of superabundant sap, and the cause of their undue production is over-luxuriance—too rich and loose soil, and severe manipulations. To secure a sturdy growth, neither too strong nor too weak, comprises the whole art of fruit production. To prevent excessive growth, lifting and bringing the roots within 5 or 6 inches of the surface is often necessary to induce a fruitful habit in young trees. When the centre of the tree has been filled up, all the training necessary is

to prevent the side growths acquiring an undue ascendancy over the main branches. It is important to have these widely disposed, filling the space between them regularly, but thinly, with bearing shoots.

Seymour's mode of training peach trees has become almost obsolete, but its principle is still the leading feature of modern practice, namely, the bearing shoots are wholly reproduced yearly. Mr. Loudon declared this to be the most perfect in theory, and it certainly is the most excellent in practice, for the production of the finest fruit. The tree figured has a central stem, from which the main branches are taken obliquely upwards, and the bearing shoots are all on the upper side of them, but a central stem is not necessary, and the tree (*W*, page 73) can be managed on this system when the requisite number of branches are provided.

Fig. 20 represents a six-years tree unpruned on the left-hand side, pruned on the

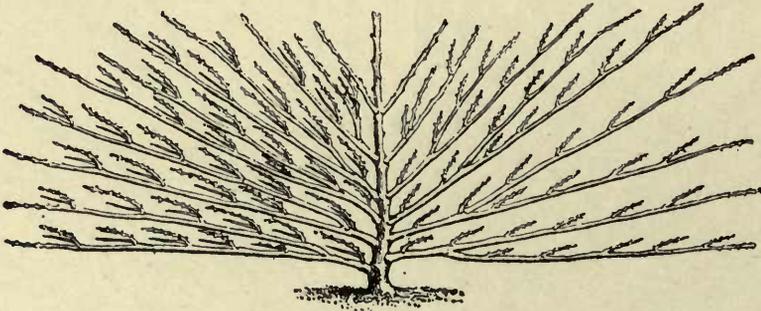


Fig. 20. SEYMOUR'S MODE OF TRAINING THE PEACH AND NECTARINE.

opposite. Before pruning there are pairs of shoots on the upper sides of the main branches. The lower shoot is that which has borne fruit, and is cut out immediately after this is gathered; and the other is brought into its place after shortening it to 12 inches, a little more or less, at the winter pruning, and always at a wood bud. Thus the tree bears only on the thoroughly ripened wood of the preceding year, and the fruit attains to the highest perfection, because the growths are fully exposed to light, derive full benefit from the warmth of the wall, and are in the direct channel of the sap. It is a pity that a system so good and easy to carry out is not more generally adopted.

Mode of Bearing.—The fruit of the peach and nectarine is principally produced from the one-year-old wood; but also on spurs. Both proceed from a single bud, but the growth differs. That in the continuation of a branch is termed an extension; that issuing from the side of a branch is called a bearing shoot; and that proceeding from

the base of a bearing branch is designated a successional bearing shoot. If the growth is short, and bears a cluster of leaves, in the axils of which blossom buds are formed, with a wood bud at the extremity, it is termed a spur. Such spurs are not, as a rule, desirable in trained trees; and reliance must be placed on successional bearing shoots, manipulated on the long-pruning system.

Long-Pruning.—This is applicable to trees trained on the Diagonal Cordon, "U," Fan, and Seymour's modes of training. To practise long-pruning successfully it is

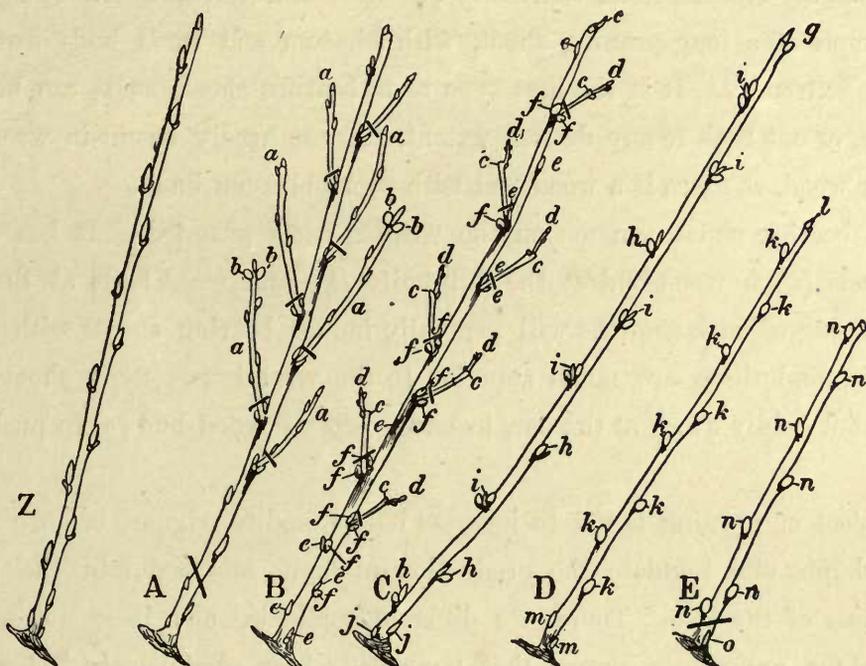


Fig. 21. CHARACTERISTIC GROWTHS OF THE PEACH AND NECTARINE.

References:—Z, young shoot, with wood buds only. A, over-luxuriant shoot with laterals (a) unpinched; b, blossom buds—all the others wood buds; bars, points of cutting off the laterals at the winter pruning. B, vigorous shoot, with the laterals pinched at the first joint (c); d, sub-laterals; e, wood buds; f, blossom buds; bars, points of pruning the laterals in winter. C, bearing shoot; g, terminal wood bud; h, double buds; i, triple buds; j, basal wood buds. D, bearing shoot with single blossom buds (k); l, terminal wood bud; m, basal wood buds. E, barren shoot (because containing no growth buds above the bar); n, blossom buds; o, wood bud; bar, point of winter pruning.

important to have a right knowledge of the distinctive characters of the buds and the shoots of peach and nectarine trees.

The shoot Z is the most desirable class of wood, medium sized, not so weak as to remain short, nor so vigorous as to push laterals; but short-jointed, brown, and hard. It can be left its full length as an extension, or be cut back to any bud desired.

The over-luxuriant shoot (A) is practically useless when unripe, and the only

sound part of it is that represented by the three buds below the bar, to which it is best shortened, and then, if root action is also checked, better growths will follow.

B is a similar shoot to *A* transformed into well-matured wood and fruitfulness by the careful management of the laterals. By pinching these at the first joint and to one afterwards, the buds at the base become round and plump—blossom buds, from base to extremity, yet with ample wood buds for supplying bearing shoots. It is an excellent extension, often 3 feet long outdoors, and sometimes 6 feet under glass, and when thoroughly ripened to its extremity bears the finest fruits. In *C* is represented a fair example of a long-pruning shoot, with blossom and wood buds from near the base to the extremity. It is the best type of a bearing shoot, as it can be laid-in its full length, or cut back to any desired extent. It can hardly be cut-in wrongly either for fruit or wood, as there is a wood bud with every blossom bud.

D is a bearing shoot common on the weaker parts of a tree. It has only single blossom buds (*k*), a wood bud at the extremity (*b*), and wood buds at the base (*m*). A free thinning of such growths will generally induce bearing shoots with double and triple buds, and these are much superior to the weaklings. Such shoots, as in *E*, should be cut boldly away at the bar, to encourage the wood bud (*o*) to push a bearing shoot.

The object of pruning is not to increase but to modify vigour, balance the several parts, accelerate and regulate the production of fruit, and maintain the health and profitableness of the tree. There are different methods, and it is not necessary to decry any, for experience proves that "which is best administered is best." Long-pruning is not difficult to practise. Its extreme simplicity is portrayed in the instructions on "U" and fan training, therefore, it is only necessary to treat of a few points that will be helpful to the uninitiated.

Winter Pruning is best deferred till the trees against walls are swelling the buds, say in February or March. Liberating the branches after the leaves have fallen, and securing them in small bundles a few inches from the wall, is admitted to have a considerable influence in retarding the opening of the blossom buds, and increases the probability of a crop. Inexperienced persons will have no difficulty in recognising the different buds, and time of pruning outdoor trees, from the illustrations, Fig. 22. Wood buds (*F*, *G* *p*, *H* *r*) are conical, pointed, scaled, and contain a growing point. Blossom buds (*J*, *K*, *L*) are ovate, become globose in swelling, and the scales enclose the petals, stamens, and pistil of the flower, also the fruit in embryo, but they do not

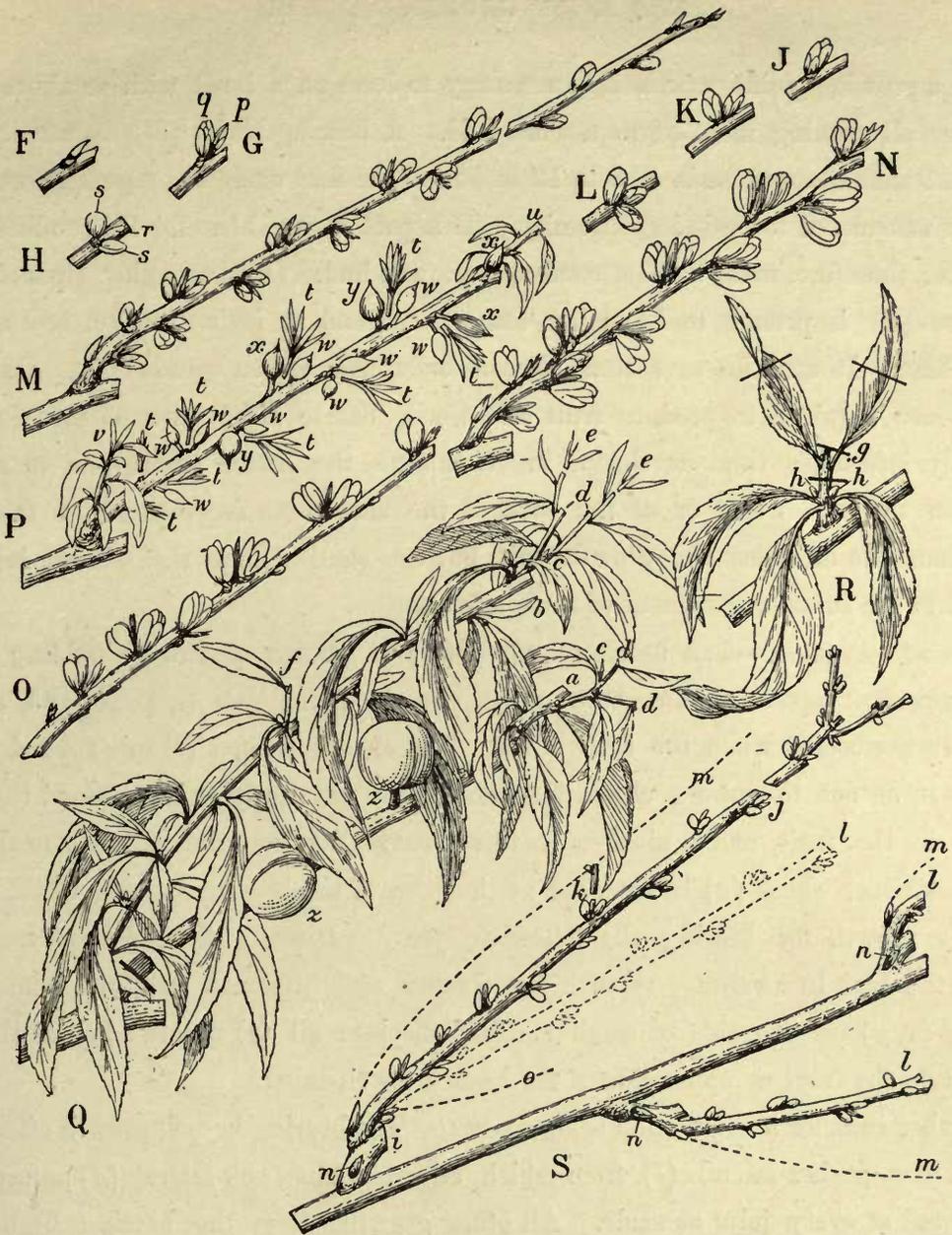


Fig. 22. PROPER AND IMPROPER PRUNING BUDS. DISBUDDING AND THINNING. WINTER AND SUMMER PRUNING.

References:—Proper pruning buds: *F*, wood buds; *G*, double bud—*p*, wood bud, *q*, blossom bud. *H*, triple bud—*r*, wood bud, *s*, blossom buds. Improper pruning buds: *J*, single blossom bud. *K*, double blossom buds. *L*, triple blossom buds. *M*, bearing shoot shortened. *N*, bearing branch with buds advanced and needing protection. *O*, bearing branch with buds removed from the under side. *P*, bearing branch after the fruit is set—*t*, disbudded shoots; *u*, growth to attract the sap to the fruit, pinched; *v*, successional bearing shoot; *w*, fruits removed at the first thinning; *x*, fruits removed at the second thinning; *y*, fruits left for the crop. *Q*, bearing branch and successional bearing shoot, showing—*z*, fruits stoned and leaves drawn aside; *a*, shoot above the fruit, pinched; *b*, point of stopping the successional bearing shoot; *c*, laterals pinched; *d*, sub-laterals stopped; *e*, part to be removed at pinching; *f*, lateral on the successional bearing shoot, stopped. *R*, lateral from extension—*g*, point of pinching; *h*, point of winter pruning. *S*, winter pruning, showing—*i*, point of removing the bearing branch when the fruit is gathered; *j*, point of shortening the successional bearing shoot; *k*, point of cutting off lateral; *l*, proper position for the bearing branches; *m*, right place for training the successional bearing shoots; *n*, latent basal buds; *o*, taking a second successional shoot from the base of a bearing branch—a bad practice.

contain a growing point, which it is necessary to have on a level with or above them, therefore, all pruning must be to a wood bud. A bearing shoot (*M*) is usually best furnished with blossom buds on 8 to 12 inches of the first made and ripest growth, and becomes attenuated towards its extremity. This part is worthless for the production of fruit, and therefore, must be shortened to a growth bud. On thoroughly ripened wood the shoot (*M*) is pruned to 12 inches, has a wood bud at its extremity, and another at its base. It contains seventeen blossom buds, and eleven wood buds. Only two of each are required to produce fruit and wood, but to make sure of these, all are generally left for a time as shown in *N*, though the better practice is to remove those on the under side or at the back of the branch as represented in *O*. This strengthens the blossoms and growths left, but we shall assume that all are left, and proceed to the summer treatment of such branch.

Summer Pruning.—The bearing branch (*P*) is shown at the disbudding stage. This important operation has been fully explained in Vol. I., page 186, and is generally performed when the fruit is set. The shoots marked (*t*) are rubbed off by degrees so as not to cause a check, but one at the extremity (*u*) is retained to attract the sap to the fruit, and is pinched to three leaves, not counting the two small basal leaves; another shoot (*v*) is reserved at the base of the bearing branch, which makes a sturdy growth for bearing the following year. Directly the best set fruits are taking the lead in swelling, remove the smaller and ill-placed (*w*), and when those retained (*x*, *y*) are the size of small marbles, displace all (*x*) but two (*y*) of the best situated on the front or upper side of the branch for ripening.

Further summer manipulation is shown in *Q*. The bearing branch growth after being stopped at *a*, pushes laterals (*c*), from which, after pinching, sub-laterals (*d*) proceed, and are stopped at every joint as made. All other growths from the bearing branch are suppressed, and when the fruit is gathered the branch is cut out at its base (the bar). The successional bearing shoot is trained-in, but when vigorous and certain to encroach on other growths it must be stopped about 14 inches from its base (*b*), subsequent growths (*c*) being stopped at one joint of growth, as shown, by nipping off the point (*e*). Other laterals may push as at *f*, but are more clearly shown in *R*, stopped at *g*, and if the shoots incline to grossness the leaves may be half shortened (bars), this assists the formation of blossom buds in the axils of the leaves (*h*), the point of winter pruning.

Under judicious summer management very little pruning is required in winter,

and the figure with references to *S* show all that is required. The main thing is to avoid over-crowding, which is ruinous to the trees.

In pruning full-sized or old trees, it is desirable to remove weak, bare, and misplaced branches, and train-in new and better wood. The disposal of the main and subsidiary branches is similar to that represented in Fig. 23, page 59, Vol. II. Sufficient space should be allowed in the shreds or ties for the proper swelling of the branches and shoots.

Protecting the Blossoms.—Cold wind and frost often cripple the flowers, young fruits, and foliage. If the blossoms are kept dry, frost is not so injurious. Various methods of providing efficient protection are given in Vol. I., page 193, but it may be reiterated that a moveable glass coping about $2\frac{1}{2}$ feet wide, or coping boards about 18 inches wide, fixed on brackets near the top of the wall during the time the trees are blossoming, and allowed to remain until the end of May or early in June, render the protection more effectual by throwing off rain and dew. A double or treble thickness of herring-nets may hang down from the edge of the coping, and remain until danger from frost and cold winds is past; but scrim canvas, wool netting, tiffany, frigi-domo or other material which excludes light must be removed on all favourable occasions. The too common mistakes made are (1) using the covering in mild weather, when the trees cannot be too fully exposed; (2) not employing it early in the evenings when there is a prospect of frost; and (3) in withdrawing it before the frost is gone in the morning. What is needed is safety from frost and cold, otherwise the less protection by opaque material the better. Protection must be employed when the blossom buds commence opening and before the petals break through, and it must be continued as occasion requires until spring frosts are gone.

Disbudding.—This has been referred to, both under “Training” and “Pruning,” but we wish to emphasise its importance here. Its object is to encourage the enlargement of the fruit, and make provision for the succeeding year’s crop by the removal of all superfluous shoots at an early stage. Over-crowding must also be prevented by pinching refractory laterals and unruly growths, so that the wood and fruit will receive the needful light and air to ripen them. (See “Disbudding,” Vol. I., page 186.)

Thinning the Fruit.—More fruits than it is advisable to allow to remain generally set on peach and nectarine trees. Thinning should commence when the best fruits approach the size of horse beans, again when about the size of marbles, and finally for

stoning when the size of pickling walnuts. These operations should be effected gradually, leaving the fruits thinner on the weaker parts of the tree, and more numerous on the stronger, always reserving those for the crop on the front or upper side of the branches. One fruit to a square foot of the surface covered by the tree is enough to leave for securing the finest specimens. Much, however, depends upon the variety. Royal George will bring to the highest perfection one-third more fruit than will Noblesse or Grosse Mignonne peach trees of corresponding size and vigour; while Elruge Nectarine carries twice as many fruits, on an average, as a similar tree of Pine Apple. These habits of bearing must have due weight with growers in thinning the different varieties of peaches and nectarines. The health and management of the trees also influence the crop materially. A vigorous tree will not be distressed by one-third more fruits than one of medium strength, or twice as many as a weakly tree. Two fruits to a square foot form a maximum crop of large peaches or nectarines, and more than three fruits of the medium-sized kinds to a superficial foot of surface ought not to be exceeded on healthy, well-supported trees to secure fruit of full size and high quality. Overcropping exhausts the trees quickly, therefore the cultivator must exercise judgment in thinning the fruit, acting in strict accordance with each tree's manifest condition. In removing the fruit, it is necessary to give it a twist and press it in the opposite direction, to avoid tearing the bark, as would be the case if it were pulled off towards the base of the branch. (See "Thinning Fruit," Vol. I., page 197.)

Routine.—Besides topping and thinning the shoots in summer, and securing those that remain to the wall or trellis, other essential matters to be attended to are moisture at the roots, and cleanliness of the foliage.

Trees against walls often suffer from a deficiency of moisture in the border. This should be frequently examined and water supplied whenever the soil is not decidedly moist. The amount of rain falling in autumn and winter is, in some years, inadequate to moisten the soil thoroughly, especially where it has been allowed to become and remain dry in late summer. In that case, the surface of the border should be loosened with a fork, formed into small ridges longitudinally with the wall, and the hollows filled and refilled with water till the border is thoroughly moistened. If the trees are weakly, follow with liquid manure, and subsequently level the soil. This should be done before the blossom buds unfold, but it is not sound practice to allow the trees to become dry at the roots at any season.

Syringing.—This is highly beneficial. It is the best means, combined with adequate

root moisture, of preventing attacks of mildew and red spider. When the fruit is set, and the weather bright, syringing should be practised occasionally early in the morning. After the weather becomes settled in June, syringing, or preferably washing the trees with the garden engine, may be practised between 4 and 5 P.M. on bright days, but must cease when the fruit commences ripening. After the crop is gathered and the wood that has borne fruit, and is not required for extensions, has been cut out, the requisite washings should be given to keep the foliage healthy, at the same time taking care that the border is not dry below while the surface may be moist as a result of the syringings.

Mulching.—A light covering of partially decayed stable manure applied to the borders in May or early June, and added to from time to time to keep it about an inch or two thick, will be valuable in preventing evaporation and encouraging surface roots. It is a bad practice, however, to apply the mulching before the soil has become warmed by the early summer sun. Avoid very thick coverings of manure, as they exclude air and induce fruitless growths. In the absence of stable manure, lawn mowings and vegetable refuse scattered on the borders lessen the need of waterings in dry periods, whilst nourishing the surface roots.

Top-dressings.—Mixtures of various kinds are termed top-dressings, and are as beneficial to outdoor trees, in narrow borders, as to trees grown under glass. Good loam from an old pasture, chopped up moderately small, three parts; decayed manure, one part; with a 9-inch potful of bone meal, and two 9-inch potsful of wood ashes to every 3 bushels of the loam and manure, mixed, form an excellent annual dressing for placing on the border after removing the remains of the mulching, and scraping off the loose surface soil when the leaves have fallen from the trees. An inch thickness of the compost is ample. The *débris* of the garden, such as grass-edge parings, potting-bench waste, vegetable refuse, hedge trimmings—reduced to ashes, and a 9-inch potful of Thomas' phosphate powder added to every 3 bushels of the mixture, may be used with good effect.

Manures and Feeding.—Peach and nectarine trees require potash and phosphoric acid largely, more magnesia than lime, and a little iron. Potash may be supplied in wood ash. This, from twigs and small wood, free from earth and kept dry, contains 8½ per cent. of potash and 2 per cent. of phosphoric acid, or, say, 4¼ pounds of potash and 1 pound of phosphoric acid per bushel. A peck per rod is a sufficient dressing, and may be applied in autumn or early in spring. Nitrogen, however, is indispensable, and may

be conveyed in blood meal (blood dried and then ground) at the rate of a $\frac{1}{2}$ -pint per square yard when the buds begin swelling, repeating when the fruit has stoned. This is recommended for rather weakly trees in light soils. For heavy soil substitute bone meal for the blood manure, and apply with the wood ashes at the rate above mentioned not later than February.

Wood ashes are not always available; therefore, other substances must be requisitioned. For a winter or early spring dressing, 5 parts of bone meal and 2 parts of muriate of potash, mixed; and 4 to 6 ounces employed per square yard, give good and lasting results. Kainit may be used instead of the muriate of potash, but it must be of the best quality. As a dressing to be applied during growth: 4 parts superphosphate of lime, 2 parts nitrate of potash, and 1 part gypsum, mixed. A good handful sprinkled on each square yard of border after it has been made moist, and then washed in, suffices to maintain the trees in health. The frequency of the applications must be determined by the condition of the trees and their crops; one dressing may be given when the buds swell, a second when the fruit is set, the third after thinning for stoning, and the fourth when the stoning is completed. Another dressing may be given after the fruit is gathered, to assist the trees to strengthen the buds if they are weakly and not disposed to late growth. Liquid applications are valuable in aiding the swelling of the fruit, and the draining of stables, cow-houses, manure heaps, and sewage may be applied for that purpose, but not so strong as to induce grossness in the trees.

Exposing the Fruit.—The fruit swells best, perhaps, in the shade, but its colour and quality depend on exposure to the sun. Fruits that are fully exposed to light from setting to ripening attain to the highest colour and flavour, and, on the completion of the stoning process, any leaves that shade the fruit should be drawn aside or shortened.

Gathering the Fruit.—When the crop is ripening, a net should be attached by one edge to the wall below the lowest fruit, and the other edge fastened to stakes driven in the ground about 2 feet from the wall, so as to form a "catch" clear of the ground. The fruit, however, is best when properly gathered. Noting the ripening tinge, the expert will take each fruit in the hollow of the hand, apply the thumb and fingers to the back or stem, and ascertain if it is ripe enough for removal. Peaches and nectarines require very careful handling, as the slightest bruise greatly impairs their appearance. The trees should be looked over twice a day, for securing the crops. The

fruit may be gathered in the hottest part of the day without deterioration, if placed in a room, and allowed to cool and become perfectly mature before sending to table. Fruit for packing should be rather under-ripe, yet if picked too soon will be uninviting in appearance and indifferent in quality.

CULTIVATION UNDER GLASS.

Structures for the cultivation of peaches and nectarines vary exceedingly. One form consists of upright sashes placed at a sufficient distance only from trees on walls to allow a person to attend to them. A better structure consists of front sashes, about 3 feet high, fixed upright, and opening half their depth outwards from the bottom, the whole length of the house; then sloping top lights, 2 feet deep, opening the whole length of the structure. (See Fig. 30, Vol. II., page 76.) The aspect of unheated lean-to houses should be south-east, south or south-west, though east and west aspects answer in favourable localities. It is a decided advantage to have the roof lights movable, in order that the trees may be subjected to full exposure, after the wood is thoroughly ripened and the leaves falling. This ensures the thorough moistening of the borders, and assists in retarding the blossom buds in spring. In some places there are no walls, and glass structures are employed instead, so arranged as to afford an agreeable promenade, as well as a supply of the choicest fruit in season. A somewhat steep-roofed span forms an admirable substitute for a wall, and is not more costly. (See Fig. 23, above).

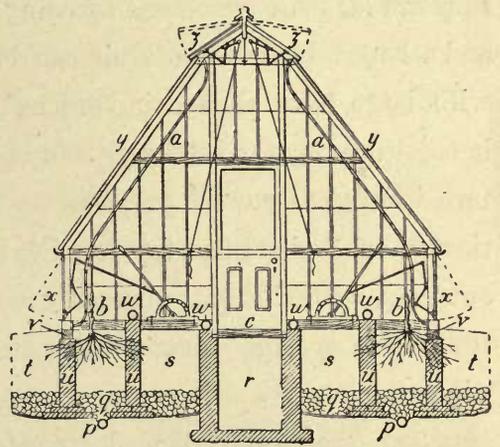


Fig. 23. SECTION OF STEEP SPAN-ROOFED PEACH HOUSE AS A SUBSTITUTE FOR A WALL. (Scale: $\frac{1}{8}$ inch = 1 foot.)

References:—*p*, drains; *q*, drainage; *r*, rain-water tank; *s*, inside borders; *t*, outside borders; *u*, 9-inch brick pillars; *v*, oak heads to over openings between the pillars; *w*, 4-inch hot-water pipes; *x*, side lights; *y*, roof lights, movable; *z*, top lights; *a*, trellises, 1 foot from the glass; *b*, trees; *c*, path.

A lean-to house, having a wall to absorb the sun-heat by day and radiate it at night, is less liable to have the temperature so reduced by spring frosts as to render the blossoms and young fruit unsafe than is the case in a narrow, span-roofed house; the latter, therefore, should be artificially heated, especially in cold localities. In warm and sheltered positions the frosts may not be so severe as to damage the blossom, provided

its expansion is retarded and the atmosphere dry ; or, at least, it may be preserved by covering the roof with blinds on frosty nights. If, perchance, the blossom should become frozen, the sun must not shine upon it, but the glass should be covered, and the trees syringed with cold water before the influence of the morning sun is felt, thereby gradually raising the temperature, and possibly saving the crop of fruit.

Training.—In respect to systems of training it may be stated, as a rule, that the finest fruit is borne on trees secured to trellises near the glass ; yet large crops of good fruit are produced by trees in standard, bush, or pyramid form, either planted in the borders or grown in pots. Potted trees are more under command than planted trees, but they are far more exacting in feeding, and more expensive all round. A greater variety and a longer succession of fruit can be had from them in a small house than is possible with large trees planted in borders, and amateurs who have time, and desire to employ it enjoyably, may do so by growing peaches and nectarines in pots. The house can be used in winter for other purposes, as the trees are better, after the growths are perfectly ripened and the autumn top-dressing is given, for being placed in a sheltered situation outdoors, with the pots plunged over the rims in ashes till the blossom buds commence swelling in spring. Young trees, and those with unripe wood, are damaged in severe winters.

Bush Trees.—If intended for pot culture, place a maiden tree in a 10- or 11-inch pot in November ; shorten it in February to a good bud 1 foot from the soil. Select seven of the best-placed and strongest shoots that push, and rub off the rest. Pinch the laterals at the first and every subsequent joint, and if the shoots have not ceased to elongate by the middle of August, pinch off their points. In the following February select four of the most promising branches for bearing, evenly disposed around the stem, and shorten them about one-third, leaving a dozen triple buds on each branch, but cut down the other three shoots to the basal wood buds to give two shoots each for bearing in the succeeding year, treating them in precisely the same way as those of the preceding season. The bearing branches will push shoots strongly near their extremities ; one of these should be allowed to grow 12 inches and then be shortened to 9 inches, say, early in June, pinching the laterals to one joint as made. Other shoots will spring from the branches ; reserve two or three only on each as there may be space for development. Those to form main branches should be about 1 foot apart, stopping them when they have attained that length. Other growths will push from the bearing branches ; if they bear a cluster of leaves on a short, stubby growth, they are spurs and must be left

intact, but if they are disposed to make several joints of growth, pinch them to two leaves, and to one joint afterwards. Suppress all laterals throughout the season, and carefully guard against overcrowding. Young shoots must be provided every year for affording fruit the next, the bearing branches being cut-in closely as soon as the fruit is gathered. Trees with a dozen to eighteen bearing branches will afford two or three dozens of fruit annually, and may be kept within moderate dimensions for many years. With judicious and timely attention to disbudding, stopping and pruning, the trees will be symmetrical, pleasing and profitable; neglect or mismanage them and they will become eyesores and disappointing.

Pyramids.—A maiden tree with a straight stem 3 to 4 feet in height, and well furnished with laterals from the base, is usually selected, and placed in a 10- or 11-inch pot in November. The laterals are pruned in the following February to two buds, and the immature wood at the top of the tree is shortened to a good bud on firm wood; the shoots that follow should be pinched at the sixth joint, and subsequent growths suppressed, but natural spurs must remain. When leafless, the tree will be furnished with shoots and spurs bristling with blossom buds. Thin the shoots early in spring, leaving them at regular distances—about a hand's breadth—apart every way, and as nearly equal in strength as possible.

In the second season remove superfluous growths by disbudding, leaving no more than can have full exposure to light for bearing fruit or furnishing the tree. After the fruit is gathered, such spurs or branches as can be dispensed with should be cut out, and little will remain to be done in winter beyond thinning the bearing shoots where they are too crowded. Care must be taken to keep the base of the tree well furnished with young shoots, removing over-luxuriant growths, so as to maintain an equality of vigour in every part.

Standards.—The standard tree is the most natural form, and very productive when planted in suitable soil in a large, lofty, light, airy structure, and given proper management. The origination of the head is the same for a tree with an 18-inch, 3-foot, or 4½-foot stem, which must be straight and upright, and shortened to 3 inches above the height of the stem desired. For an 18-inch stem the maiden tree should be cut down to 21 inches, and all the laterals cut off close. When the buds push, rub off all but five or six near the top, so that the growths from them may be equally disposed, and when these have extended a few inches, select three, if weakly, or five if vigorous, and pinch off the ends of all others. When the shoots that are to remain permanently have grown

to a length of 15 inches, take off their ends, and keep all laterals pinched. The main shoots may not grow in the right direction, but they can be brought into the required position by the aid of soft matting and stakes.

In the February following shorten the main branches to 15 inches, and cut out all other growths. If a branch incline downwards, shorten it to a bud that is growing from the upper side; if too much erect, cut to a bud on the lower side, and where the branches are unevenly divided, cut to buds on the side where the distance is greatest. When the new shoots have grown to a length of a few inches, select two or three of the upper ones on each branch. The tree will then form nine or ten main growths, which can be tied at equal distances round a willow hoop 15 to 18 inches in diameter. Pinch off the ends of the shoots when 2 feet long and by the close of the season the tree will be strong and symmetrically formed. The main shoots must be uniformly shortened to 18 inches in February of the third year. Two or three vigorous growths are wanted on each of the branches during the season, pinching all others, and when the shoots have made 24 to 30 inches of growth, nip off their points.

Prune the trees in the fourth February to 2 feet from the last cutting, and the side shoots, when growing too near each other, must be thinned, always cutting close to a bud so that the wound may be quickly covered. Allow two extension shoots from each branch and when 24 to 30 inches long pinch off their points; stop the longest side shoots, so that they do not interfere with those on the adjoining branches, and remove any that will not be wanted for the year's bearing.

Repeat the process another season and the tree will be 8 feet high. Keep the growths thin and the outer branches will be borne down by the fruits, admitting sun into the tree to colour and flavour them. Over-cropping must be strictly avoided by judicious thinning when the fruit is well set and swelling, leaving the most promising a good handbreadth apart for the smaller varieties, a little more for the medium, and two handbreadths should be given to kinds that produce the largest fruit. By removing enfeebled parts and encouraging fruitful wood a standard peach or nectarine tree will continue to bear large crops of excellent fruit for many years.

Short-Pruning.—M. Grin brought this system to great perfection. Its chief objects are—1, the transformation of laterals into close, vigorous spurs; 2, converting side shoots into cluster growths; 3, checking luxuriant extensions and providing a succession of bearing shoots. It is essential to correct procedure in manipulation to understand what

kind of bud is likely to be formed in the axil of a leaf. The engravings (Fig. 24, *T* to *C*) will prove helpful to learners.

A leaf like *T* is produced by a shoot a few inches in length, with wood buds at its

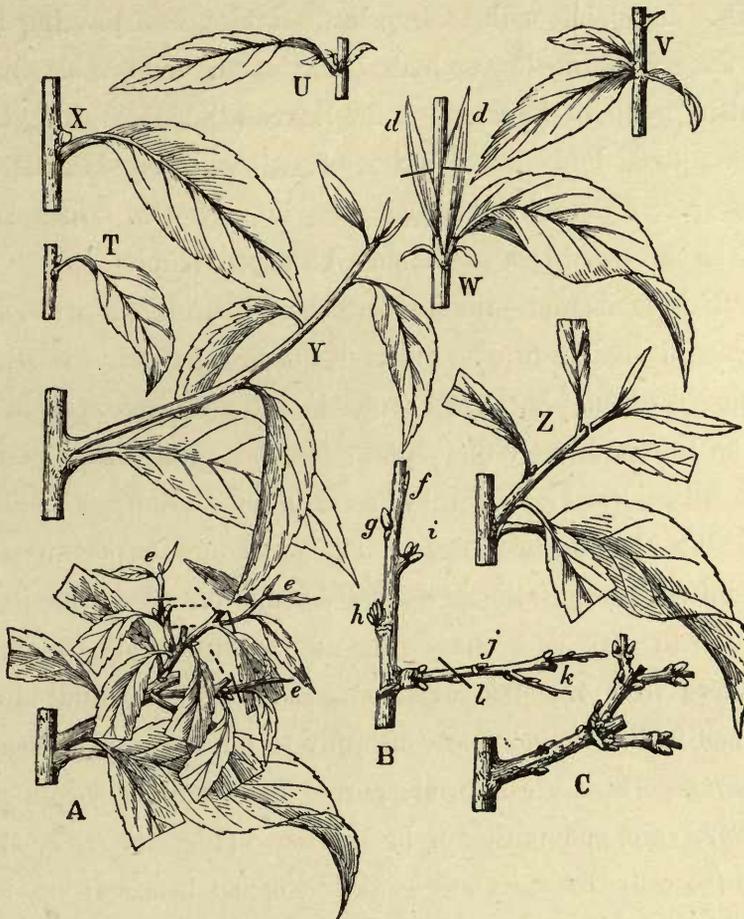


Fig. 24. CHARACTERISTIC JOINTS, LEAVES, AND LATERAL GROWTHS OF PEACH AND NECTARINE TREES

References:—*T*, joint and leaf of stubby shoot. *U*, joint and leaf of vigorous shoot. *V*, joint and leaves on sturdy, short-jointed shoot. *W*, joint and leaf on luxuriant shoot: *d*, lateral leaves—bars, extent of shortening. *X*, joint and leaf of gross shoot. *Y*, lateral from gross shoot. *Z*, pinched and leaf-shortened lateral from gross shoot. *A*, gross shoot lateral, showing—dotted bars, pinching sub-laterals; *e*, late sub-laterals—bars, points of winter pruning. *B*, characteristic buds formed at the base of the leaves; those of *T*: *f*, wood bud; *g*, blossom bud; of *U*: *h*, cluster buds; of *V*: *i*, triple buds—two blossom buds with a wood bud between; of *W*: *k*, lateral pinched at fourth joint; *l*, point of shortening lateral at the winter pruning. *C*, lateral from gross shoot transformed into spurs, leafless, and pruned.

base and one at its extremity. To stop such shoot is to prevent its bearing fruit the following season. Pinching short growths is a hazardous practice, and the cause of little fruit in proportion to the blossom through the bearing parts having had the growing points removed. When there are stipules at the base of a leaf, as in *U*, it is safe

to stop a shoot thereat, because growths will push by an excess of sap, and still have buds at the base. A large leaf and one or two smaller at a joint, as in *V*, is an excellent point for stopping, for there is a certainty of growth therefrom. No shoot is of value for fruit production without a wood bud on a level with or above the blossom buds. In a joint with a large leaf, stipules, and pushing lateral leaves, as in *W*, there is danger of the lowest buds being at an undesirable distance from the base, but by cutting off half the length of the leaves (*d*), and pinching the lateral above the fourth leaf, the basal buds form "nearer home," while sub-laterals afford an outlet for the sap, and prevent the lower buds starting into growth. Such lateral (*Bj*) may be left entire or be shortened to a wood bud (*l*), as space admits.

If the growth is exuberant—the leaf large and bud in its axil prominent, as in *X*, it will push a lateral similar to *Y*. Such shoots are generally worthless in outdoor culture if not under glass. M. Grin's principle is to transform them into usefulness by shortening the leaves, directly they appear, half their length, and pinch off the growing point at the fourth leaf (*Z*); then by treating the sub-laterals similarly the vigour is subdued and the blossom buds form. The procedure is portrayed in *A*, and the only pruning required is to cut the latest sub-laterals off close to their base (*C*). The following season fruit may be borne on the upper part, while successional bearing shoots are produced from the two wood buds at the base, and after the fruit is gathered the small-fruited branches are cut away to the successional bearing shoots.

Cluster Growths.—These are natural spurs—short, stubby shoots terminated by a wood bud in every case, and must not be shortened (Fig. 25, *D, E, F, G*, and *J t u*). Cluster growths (so called) signify any growth stopped before it has naturally ceased to elongate. This is called short-pruning, and the system is explained by the illustrations.

Short-pruning is an admirable system for trees under glass. There are several modifications of it; the most desirable is the half-way method between long and short pruning. This is quite as simple as and more profitable than the close-pruning plan, and is advised for trees planted in borders. Short-pruning is no remedy for exuberance, but pinching is useful in suppressing rampant growth, and equalising all the parts by dispersing the sap, yet concentrating it where desired. All side shoots on the short-pruning system are pinched at four leaves as soon as six full-sized leaves are developed, not counting the small basal leaves. This practice may be modified, but it is better to stop at five than shorten the shoot to three leaves. These leaves (numerals in *H n*,

I q, and *J y*) have each a bud or buds in their axils, and from one or more of the



Fig. 25. NATURAL SPURS. SHORT PRUNING. CLUSTER GROWTHS OF PEACH TREES.

References :—*D*, long natural spur in leaf. *E*, long spur leafless. *F*, short spur in leaf. *G*, short spur leafless. *H*, part of cordon tree under short-pruning: *m*, extension growth; *n*, bearing shoot: numerals, joints to be counted in stopping; dotted bars, points of pinching laterals and sub-laterals; bars, points of winter pruning; *o*, short bearing shoot. *I*, bearing branch (*p*), and successional bearing shoot (*q*): *r*, growth to attract the sap to the fruit; *s*, point of cutting off bearing branch when the fruit is gathered. *J*, cluster growths and spurring: *t*, stubby shoot in leaf; *u*, stubby shoot leafless; *v*, growths from last year's shortened spur, or cut-back shoot or branch; *w*, basal growths; *x*, strong shoot of the current year, shortened to the second leaf—leaves omitted; *y*, growths resulting from the shortening of the shoot (*x*).

uppermost second growths will burst. As soon as the second growth has made four

leaves it may be reduced to two (*J v*), but if the shoot is not strong, shorten it and subsequent growths to one leaf as soon as the point of the shoot is clear of the joint (*J y*).

All side growths should be closely pinched to form spurs, except those required for bearing shoots; these then grow strong, and if cut back to two good leaves, when they have made six or seven, two shoots will push, and these, if treated similarly to *J y y*, are available for next year's bearing.

This system of training the trees to trellises, when properly carried out, enables the fruits to receive light and air during the whole time they are swelling and ripening, then under good management they attain every essential fitness for table. Too close stopping, also too early and too late pinching, with overcrowding and over-cropping, must be strictly avoided. The application of the short-pruning system to bush, pyramid and standard trees is shown in Fig. 26.

Routine.—The cultural requirements of peach and nectarine trees under glass are identical with those grown against walls. They must not lack water at the roots, the crop should be well nourished, and the foliage ought to be kept clean and healthy by timely syringing, and the judicious use of fungicides and insecticides. Those matters are much influenced by the weather and the conditions of culture; but the trees always retain the same characteristics, so that it is necessary to well understand the various stages through which they pass in the annual course.

1. *Resting Season.*—This extends from the fall of the leaf until the swelling of the buds in spring. During that period the trees cannot be kept too cool, but they must not be dry at the roots. It is advisable to remove the roof lights directly the leaves have fallen, and the protection of the roots of trees in pots by placing them closely together and covering the pots over the rims with ashes, or cocoanut-fibre refuse. If the roof lights are not movable, keep the house as cool as practicable. Early in March the buds will commence swelling; then replace the lights. Houses with fixed roofs should be closed, as it is popularly termed, when the buds begin swelling, and potted trees be placed in their growing positions.

2. *Flowering Stage.*—It is important that the buds advance slowly, and gradually develop strong blossoms, then be accorded the essential conditions of fertilisation, and safety from frost. The soil, if somewhat dry, must be brought into a thoroughly moist condition, and always so maintained, but not made sodden and sour by needless applications of water. The ventilation cannot be too free until the anthers appear and the petals commence unfolding, provided care is taken to exclude frost. Previous to the

blossoms showing colour the trees may be syringed occasionally on fine days, but



Fig. 26. EXTENSION AND SUCCESSIONAL GROWTHS.

References :—*K*, part of a peach tree in growth, showing : leader extension, *z*, pinched ; *a*, growths from a last year's pinched lateral ; 1, bearing shoot pinched at the fourth good leaf ; 2, weak shoot, to be shortened to the bar at the winter pruning ; 3, spur, not to be pruned ; *b*, natural spurs with fruit at their base ; *c*, bearing shoot pinched at the fourth good leaf, not counting the basal leaves (4). Two-year-old lateral (*d*) in fruit ; *e*, successional shoot ; *f*, bearing branch ; bar, point of cutting away when the fruit is gathered ; *g*, unshortened shoot growth, to be cut back to latent basal buds (bar) after bearing. Forming fruitful wood (*h*) ; *i*, extension ; *j*, bearing shoots ; *k*, basal growth to be left entire unless over 6 inches in length ; *l*, short growth to be cut back to basal buds in winter. Result of shortening a shoot to two buds (*m*) ; *n*, bearing shoot to be retained ; *o*, shoot to be cut back to two buds in winter to provide successional bearing wood.

always sufficiently early to allow them to become dry before night. When the blossoms open syringing must cease, merely damping the floors and borders occasionally to

maintain a genial atmosphere. If the weather be sunny, the ventilators should be open all day and closed at night.

During the prevalence of cold, damp weather a little fire-heat is essential to a good "set." A temperature of 40° to 45° at night, and 50° by day, with a circulation of air, liberates the pollen for the fertilisation of the blossoms. On fine mornings the top ventilation should be increased between 40° and 45° , and at 50° the front or side ventilators may be opened, taking care not to lower the temperature. Close the house in the afternoon at 50° , first at the front or sides, afterwards the top lights. If the temperature advance 5° after closing it will not do any harm, but excessive sun-heat whilst the trees are in blossom is injurious. Sun-heat with air is a different thing, 60° to 65° not then doing harm. When the atmosphere is confined the sun increases its humidity, and the safety of the blossom depends greatly on the dryness of the atmosphere.

When the flowers are fully expanded, and the pollen is ripe, they may be fertilised. It is best done in the early part of a fine day, a short time after the house has been ventilated. Shaking the trees sharply every morning and early afternoon aids the pollen to disperse. A plume of pampas-grass drawn lightly over pollen-bearing blossoms soon becomes coated, and such pollen-laden plume may be used over flowers that are deficient in pollen, also varieties that are liable to have split stones. A rabbit's tail, mounted on a small stick, is also useful for brushing over the blossoms to distribute the pollen. The most certain process is to lightly run a camel's-hair brush over the anthers, and, when this is laden with pollen, apply it carefully to the stigma of each flower. The operation, by whatever means performed, must be attended to daily, from the first ripening of the pollen until all the blossoms are fertilised.

3. *First Swelling of the Fruit.*—This commences directly the fruit is set. To assist it in casting off the remains of the flowers, the trees may be syringed on fine mornings, also early in the afternoon, when the weather is bright, but anything approaching to a close, humid atmosphere must be strictly avoided. The house should be opened at 50° , and closed at that temperature; but if it is desired to advance the swelling and ripening of the fruit, earlier closing is permissible. In such case, admit air at 50° , and steadily increase the ventilation with the increasing heat, not allowing it to exceed 60° to 65° without the maximum amount of air, and gradually reduce the ventilation in the afternoon, closing at 55° . Ventilate cautiously during the prevalence of cold, sharp winds, admitting fresh air on the opposite side of the house to that of the wind, or modify the openings to secure free ventilation without cutting currents of air.

Peach and nectarine trees cannot have too sweet an atmosphere, success greatly depending on a free circulation of air.

Attend to the timely, gradual, and judicious disbudding of the shoots; also to thinning the fruits. A good watering should be given as circumstances require in different cases, say, trees in pots daily, and in narrow borders once or twice a week. Borders of sound materials may only require a supply of water at fortnightly, three weeks, or monthly intervals. Let the rule be to afford water or liquid nourishment whenever necessary—only then, and a thorough soaking every time.

4. *Stoning of the Fruit.*—During the first swelling the fruit should attain to the size of a small walnut, and after that the formation of the stone commences. The fruit then enlarges very gradually, and appears almost stationary for a time. Care must be taken during the stoning process to avoid undue excitement and checks. The chief points to be attended to are—1, the maintenance of an equable temperature by early, free ventilation, and no excitement by early closing; 2, the avoidance of large reductions of foliage; 3, proper but not excessive supplies of water to the roots, and a genial atmosphere. The opposites of those conditions, or any of them, may result in many or all the fruits being cast during the stoning process. Too strong fumigations with tobacco will also cause the fruit to turn yellow and drop, as may attacks of red spider; while overcropping is usually attended by a large percentage of prematurely cast fruits.

Syringing should be practised in the morning and afternoon during the stoning process. One good syringing is worth a dozen drizzles in freeing the trees of insect pests, and it is a mistake to keep the foliage nearly always wet—in fact, forethought and discretion must be exercised if success would be attained. The house may be ventilated at 50°, fully at 60° to 65°, and closed at 55° during the stoning process.

5. *Last Swelling of the Fruit.*—The fruit swells rapidly after the stoning is completed, provided the trees are well supplied with water and nourishing food at the roots, and the atmosphere is kept properly moist. Syringing should be continued in the morning and afternoon until the fruit begins to change colour for ripening; then maintain a genial atmosphere by sprinkling the paths and borders occasionally in bright weather. The completion of the stoning process can be ascertained by testing a fruit with a needle or knife; if stoned it will not be pierced or cut through; then, not before, the ripening of the fruit may be accelerated by a warmer and closer atmosphere, but it is advisable to ventilate at 60° to 65°, allow a free circulation through

the house at 70° to 75°, and close at the latter temperature, with plenty of atmospheric moisture.

6. *Fruit Ripening*.—Directly ripening commences keep the top and side ventilators open to ensure a free circulation of air constantly, and provide and maintain full ventilation at and above 75°. When the first fruits are ripe the remainder on the tree will generally ripen fast enough with the ventilators constantly open. In the case of late fruit it may be necessary to close the house at night, after reducing the ventilation early in the afternoon.

7. *Ripening the Wood*.—After the fruit is gathered the trees should be thoroughly washed with the syringe or garden engine to cleanse the foliage; if insects have obtained a footing they must be promptly extirpated, and an occasional forcible washing will be all that is afterwards required. The ventilators should remain open day and night, and water must be supplied as required to keep the soil moist. Weakly trees, and those that do not plump the buds in consequence of overcropping, may be assisted with liquid manure. If the wood does not ripen well, keep the house rather close by day, yet with sufficient top and side ventilation to allow the air to circulate freely, and open all the ventilators more fully at night. This will generally produce the desired effect in the course of a fortnight or three weeks. In cold localities it may be necessary to employ fire heat to ripen the crops and wood of late varieties. This should be afforded for the most part by day, with moderate ventilation, turning the heat off and allowing a rather free circulation of air at night. Continue this procedure until the wood is thoroughly matured; then ventilate freely day and night until the leaves fall. The roof lights should then be removed, or the house kept as cool as possible.

The foregoing general remarks on the cultivation of the peach and nectarine in cool houses complete the yearly cycle. Under ordinary circumstances the fruits in fully ventilated cool houses ripen only a few days in advance of those produced by trees against south walls, but by husbanding the sun-heat in the manner named, a gain of three to six weeks may be effected; therefore, utilising the sun-heat in light, well-ventilated, and properly constructed cool houses, are important factors, and especially in cold localities.

FORCING.

Structures.—An efficiently heated lean-to house, with a steep pitch, moveable roof lights and ventilators for the admission of front and top air, is one of the oldest

and still one of the best for early forcing, and where a wall exists it is the cheapest. The trees should be trained to a trellis fixed 1 foot from the glass, and they must be planted inside and preferably confined there, but the roots may be allowed to pass outside, as shown in the section (Fig. 27).

One of the greatest mistakes too often made is the small amount of piping provided; this necessitates highly heating the pipes, involving a great consumption of fuel, and inducing attacks of red spider. Ample provision for maintaining an equable and proper temperature is shown in the sections, the pipes never needing to be made hotter than the hand can bear, and sufficient ventilation—a vital matter—being provided. Narrow houses, especially those with steep roofs, derive the most benefit from the sun's heat, but they are liable to sudden fluctuations, and require more attention in ventilating than do wider structures with flatter roofs, desirable forms of which are shown in Fig. 28.

Roof trellises are the most suitable for early forcing, as trees a great distance from the glass are apt to become weak. Trees against the back wall bear fruit for a time, say, about six years, and by planting bearing trees there, the space, otherwise wasted, may be utilised, but when the roof is quite covered, trees on the wall are no longer profitable. This has led to other arrangements. The front trellis is either taken partly up the roof or a curvilinear trellis is fixed, so that in either case the whole of the back wall is available for peach or nectarine production. These arrangements (Fig. 29) are not advisable for early forcing, but they answer well for trees not started before February for affording midseason and late crops of fruit.

Span-roof houses with the ends north and south are unsuitable for early forcing, but they answer for midseason and late crops. With the ends east and west, or preferably north-east and south-west, we have the best arrangement for bush, pyramid, standard, or trained trees for supplying large quantities of fruit early in the season.

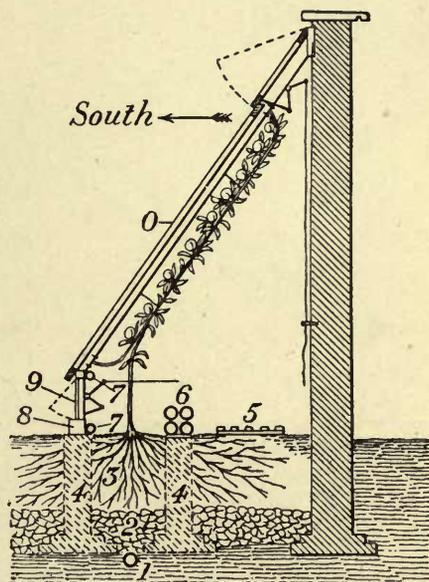


Fig. 27. LEAN-TO PEACH HOUSE FOR EARLY FORCING. (Scale: $\frac{1}{8}$ inch = 1 foot.)

References:—1, 3-inch drain; 2, drainage; 3, border; 4, 9-inch brick pillars; 5, batten pathway; 6, 4-inch hot-water pipes; 7, $1\frac{1}{2}$ -inch hot-water pipes; 8, oak sill; 9, wood ventilator opening the whole length of the house; 0, moveable roof lights.

Varieties for Forcing.—The selections (page 66) are reliable, but a few only are thoroughly adapted for general forcing, and the small-flowered varieties, as a rule, set, stone, and perfect the best crops. Alexander and Early Louise peaches, with Advance nectarine (this may be superseded by Early Rivers) are reliable for very early forcing, and ripen their fruit from four to six weeks before Royal George peach and Elruge nectarine in the same house. Hale's Early ripens about a fortnight before Stirling Castle, and three weeks ahead of Royal George peach. Lord Napier nectarine ripens simultaneously with Hale's Early peach, whilst Elruge nectarine is ripe at the same time as

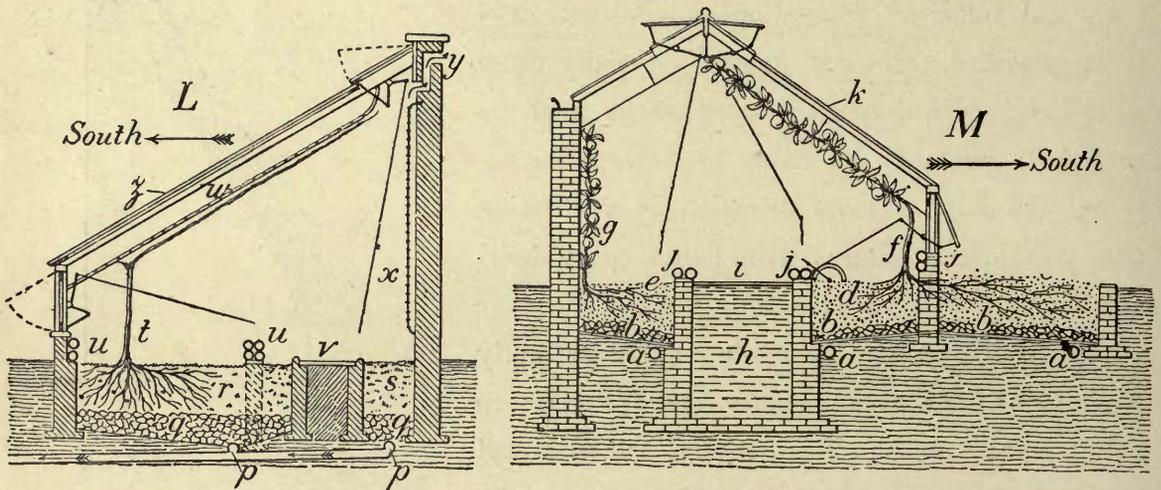


Fig. 28. LEAN-TO AND THREE-QUARTERS SPAN-ROOF PEACH HOUSES FOR FORCING. (Scale: $\frac{1}{8}$ inch = 1 foot.)

References:—*L*, lean-to house : *p*, 3-inch drains ; arrows showing 4-inch outlet drain ; *q*, rubble for drainage ; *r*, border for permanent trees ; *s*, back border for temporary trees ; *t*, trees for trellis, planted 15 feet apart ; *u*, 4-inch hot-water pipes ; *v*, path ; *w*, roof trellis ; *x*, wall trellis ; *y*, wall ventilators, 18 inches long and 6 inches wide, 6 feet apart, closed on the inside with shutters hung on pivots for opening when strong sharp wind faces the house ; *z*, moveable roof lights. *M*, three-quarters span-roofed house : *a*, 3-inch tile-drains ; *b*, rubble for drainage ; *c*, outside border ; *d*, inside border ; *e*, back border ; *f*, permanent trees ; *g*, temporary trees ; *h*, rain-water tank ; *i*, path ; *j*, 4-inch hot-water pipes ; *k*, moveable roof lights.

Stirling Castle and Royal George peaches. Dymond peach is a better forcer than Grosse Mignonne, and Dryden nectarine is a formidable competitor with Violette Hative. Late Admirable peach forces well, and so does the rather late Victoria nectarine.

Trees.—Those in a bearing state and proved true to name, also clean and healthy, are the most suitable ; if carefully taken up when the leaves commence falling, properly planted and attended to, they may be forced the first year, but not very early, and, if not brought forward too rapidly nor allowed to carry more than two-thirds of a full crop, the fruit will be good, and had without prejudice to the health of the trees. Trees

for early forcing must be well established, have completed their growth early, the wood well ripened, and the buds sound.

Arrangement.—A number of varieties in one house with a view to a long succession of fruit, as is practised against walls outdoors or in cool houses, is inadmissible in forcing. Suppose a house to contain a tree of the following class of peaches: earliest (Alexander), second early (Hale's Early), midseason (Royal George), and late (Late

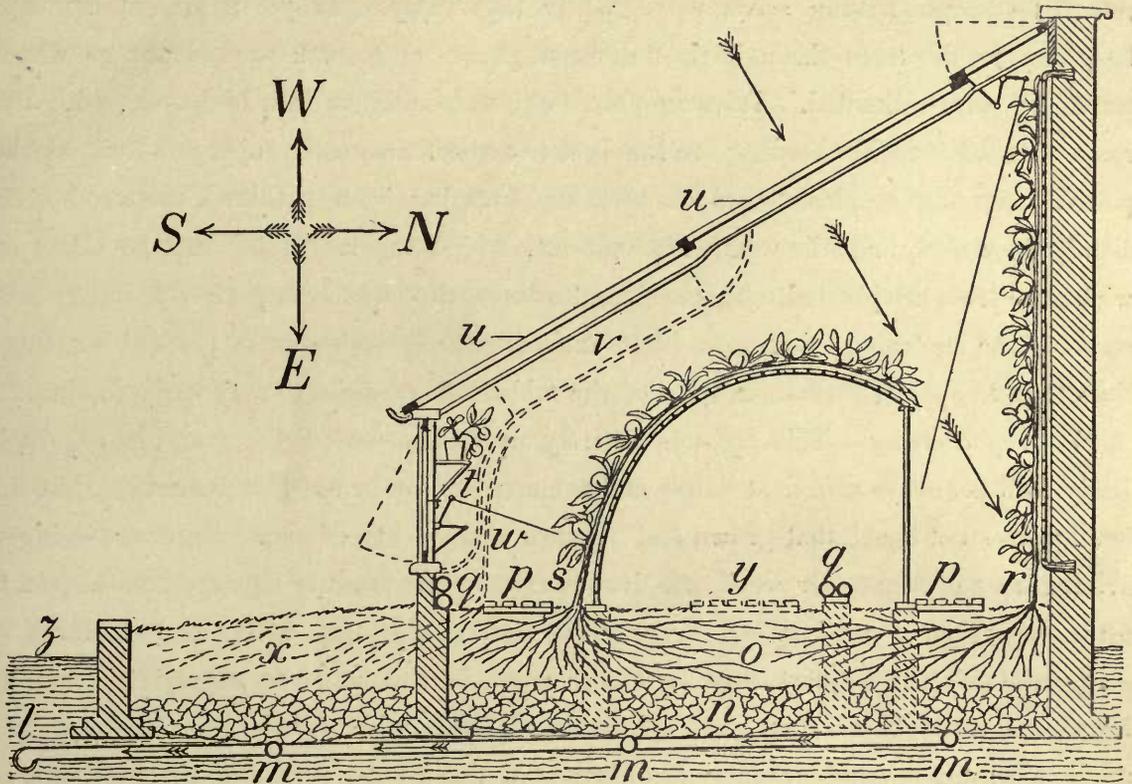


Fig. 29. LEAN-TO PEACH HOUSE. (Scale: $\frac{1}{8}$ inch = 1 foot.)

References :—*l*, main drain ; *m*, 3-inch border drains ; *n*, rubble drainage ; *o*, border ; *p*, batten paths ; *q*, 4-inch hot-water pipes ; *r*, back wall trees ; *s*, curvilinear trellis trees ; *t*, shelf for potted strawberry plants ; *u*, moveable roof lights. Another arrangement : *v*, front trellis ; *w*, trees with roots passing through openings in the front wall to the outside border (*x*) ; *y*, batten pathway ; *z*, ground level, the paths (*p*), shelf (*t*), and trellis (*s*), being omitted. The arrows show the direct ray of light for reaching the base of the back wall trees.

Admirable); started at the new year, the fruit will be ripe as follows:—Alexander, early in May; Hale's Early, end of May; Royal George, middle of June; and Late Admirable, early in July. Each variety affords a supply of fruit over a period of about three weeks; therefore the succession extends from early in May to late July. However desirable such arrangement may be as a means of supply it is culturably bad, because the ventilation must be free, and the moisture only moderate when the fruit of

the earliest variety is ripening, while, at the same time, the later sorts require a closer and moister atmosphere, which would prejudice the latest varieties in stoning, so that none receives the correct treatment, and the results are unsatisfactory.

Instead of aiming at a long succession of fruit in one house, there should be compartments large enough to supply fruit to meet the requirements of the establishment over a short period only, say, a month, and each house separately heated, the flow and return feed-pipes having screw valves where they enter. Proper treatment can then be given to the trees through their different phases of growth—an advantage which cannot be over-estimated. Trees in pots, or those planted in lean-to houses, with the roots confined to inside borders, are the best to force for an early supply of fruit, as the potted trees may be placed outdoors after the fruit has been gathered, the wood sufficiently hardened, and the weather propitious, whilst the roof lights can be taken off where the trees are planted. This invigorates them, the buds form perfectly, and growth starts at the customary time with little excitement. It is better to proceed on these lines than to subject permanent trees of the midseason varieties to very early forcing.

Time of Starting.—This depends entirely upon the season the fruit is required. Early fruit is always prized at table, and commands good prices in the markets, but the quality does not equal that grown and ripened with plenty of sun. Express forcing—driving trees of Alexander peach or Advance nectarine to produce ripe fruit in thirteen to fifteen weeks from starting, say, January 1st, to have ripe fruit at the end of March or early in April; or to start Stirling Castle peach in November to supply ripe fruit in March—is, apart from a display of cultural skill, inadvisable, for the trees make growth at the most unfavourable time and must rest at the hottest period of the year, this so exhausting their energies as to render the after-crops unprofitable. The early varieties require not less than four months, the second early four and a half, the midseason five, and the late sorts six months from the time of starting to the first fruits ripening. All should be given a fortnight more time, that is, the house should be closed, damped, and fire heat employed to maintain a temperature of 50° by day and prevent it falling below 35° at night. This gently promotes the activity of the sap and the swelling of the buds.

It is customary to calculate the time of the fruit ripening in any house from the time of starting by the standard of the surest forcing varieties, Royal George peach and Elruge nectarine, but other varieties are generally associated with them, such as Hale's Early peach and Lord Napier nectarine, to afford an earlier and longer

supply of fruit. To have fruit of these varieties ripe in May, start the trees into growth early in December; start with the new year for a supply of fruit in June; early in February for early July; and early March for mid-July; then the supply may be continued by allowing trees to start naturally, and with no more assistance from fire heat than is necessary to insure the safety of the crops which, of the choicest second early and midseason varieties, attain the highest excellence from early August into September; and from that period the succession is maintained into October by the late varieties naturally started, freely ventilated, and assisted only by artificial heat at blossoming-time, in cold periods, and at the ripening stage, if necessary. Unheated houses answer in warm locations, but not in the cold and low districts of the country, for a supply of late fruit.

The production of ripe peaches by late April or early May is rendered comparatively easy and less costly by relying on the early instead of the second early and midseason varieties. A house containing trees of the earliest varieties, started at the new year, will afford a supply of fruit at the time named under ordinary forcing conditions, and if the forcing is only gentle, the fruit will ripen early in June. This slight forcing is much better for the trees, and their regular cropping in consecutive years is more certain than when hard forcing is resorted to. If the early sorts are to be succeeded by the second early and midseason varieties, the house containing the latter must be started at the same time as that of the first, so as to maintain the succession unbroken. But the demand for ripe fruit—early, midseason, and late—varies in different establishments, so that no particular rule can be framed to meet all requirements; therefore, some judgment is needed to so employ the means as to insure the best supply of fruit at the time it is required.

Temperature and Ventilation.—No fruit tree, except the apricot, is more sensitive to heat than the peach and nectarine, and these must not be hurried during the early stages. Closing of the house, excluding frost at night and maintaining a temperature of 45° to 50° by day, are sufficient during the first two weeks, and these temperatures must not be exceeded without full ventilation. This is preparatory to forcing, and is essential to early-forced trees. It is an old and good practice to employ a heap of sweetened fermenting material on the floor of the house until the flowers expand, so as to maintain genial moisture and gentle warmth; but the work of turning the material and additions to it must be very carefully carried out after the blossoms show colour, otherwise the ammonia vapour may injure them. After the fortnight's inductive

process the temperature must be maintained at 40° to 45° at night, always with a little ventilation in closely-glazed houses, and 50° by day, with more ventilation until the flowers expand. The day temperature should then be 50° to 55° artificially, rising to 60° or 65° with sun, under free ventilation. Fertilisation should be daily attended to after the first expanded flowers have ripe pollen, and this is only effective when dry and the stigma viscid. A rather dry, not arid, but buoyant atmosphere, favours a good set of fruit.

When the blossoms fade, gradually raise the night temperature to 50° , and maintain 55° through the day by artificial means, admitting air from that point, always without lowering the temperature. Increase the ventilation with the sun heat, so as to have it full at 65° , reducing it from that point with the declining sun, closing at 65° , but not so early as to raise the temperature above 70° afterwards.

During the stoning process the temperature should be kept at 55° on cold nights, and 60° to 65° by day artificially, increasing the ventilation from 65° with sun heat, having a free circulation of air at 70° , not allowing an advance to 75° without full ventilation, and commence reducing it at 75° , yet not closing until the sun has declined in power, so as not to raise temperature above that point. Avoid a stagnant atmosphere and high temperature by artificial means on the one hand, and cold and dry atmospheric conditions on the other.

By the time the fruit has stoned, increase the night temperature to 60° — 65° , and that of the day to 70° — 75° artificially, ventilating from 65° so as to have a free circulation of air between 70° and 75° , and regulate the ventilators to maintain that heat during the day with an advance of 5° to 10° from the sun. Close early in the afternoon with plenty of atmospheric moisture; not, however, raising the temperature more than 10° to 15° above the artificial day mean, and allow it to fall to 65° at night.

As the ripening of the fruit commences more air is necessary, and temperatures of 60° to 65° at night, 65° on dull days, 70° to 75° when mild. A stagnant atmosphere is fatal to the development of the highest flavour. Under the conditions described the fruit will ripen satisfactorily, and with proper supplies of water at the roots the foliage will be preserved in health.

When the fruit is gathered the house should be freely ventilated, but not permitting the temperature to fall below 55° ; and not until the weather becomes sufficiently warm, say in June, can the ventilators be left open safely day and night. After the wood is sufficiently hardened and the buds prominent in the axils of the leaves, the roof

lights should be removed, as there is nothing so beneficial to the trees as exposing them freely to the natural atmosphere. Trees ripening their fruit in May will have the wood and buds matured for exposure by the middle of July, those cleared of their crops early in July may be exposed at the end of August, and so on successively. Where such exposure is impracticable, forced-peach houses should be left open day and night when the wood is properly matured.

The routine management of forced trees is similar to that given for those in cool houses, and the sooner they are pruned and dressed after the leaves fall the better. The house, also, ought to be thoroughly cleansed; the surface soil removed from the borders, and a top-dressing applied. The outside borders should be covered 3 or 4 inches thick with dry leaves and a little long stable-litter over them, in early winter where the trees are started before February; but a light mulch suffices for the borders of later houses.

Trees Casting their Buds.—Outdoor trees are not so prone to cast the blossom buds as those in cool houses, and those planted in borders are not so liable to this defect as are trees in pots. The chief cause of the misfortune is an insufficiency of water during the growing and resting periods. By the first the buds are imperfectly formed, and by the latter they are deprived of sap. Over-maturity of the buds is also a source of the blossom buds being cast in forced trees, and is best avoided by removing the roof lights directly the buds are fairly formed in early-forced trees. Varieties with large flowers, such as the Early York, Grosse Mignonne, and Noblesse races, cast their buds more freely than do the small-flowered peaches, such as the Early Albert, Royal George, and others. Bud casting is also induced by excessive bud formation, as occurs in Elruge nectarine, Bellegarde and Barrington peaches forced and borne so that weak wood is produced. If the dropped buds are examined they will be found defective. The preventives are:—1, adequate supplies of water and nourishment, with freedom from insects during the growing season, and properly moist soil during the resting period; 2, cutting out weak growths and encouraging sturdy, moderately long, and well-matured wood; 3, lifting refractory trees and making the soil firm about the roots in re-planting.

Fruit not Setting and Stoning.—These evils occur through immature wood and imperfect bud formation, having its outcome in blossoms with defective organs of fructification. Such flowers cannot set fruit; therefore, no effort should be spared to secure perfect blossom buds on thoroughly ripened wood. Stoning chiefly depends on the ripening of the wood; if the growths are strong or long-jointed there is more danger

of the fruit not stoning than when the wood is stout, short-jointed, and well ripened. Stoning may also be impeded by a deficiency of mineral substances in the soil, those most needed being silica and lime, but most soils contain enough of the first, and the latter is readily supplied in old mortar rubbish, or quicklime in heavy soils, or in clay marl to light soils. Where the borders (page 68) are properly made, there is seldom occasion to supply more lime than is given in top-dressings of bone meal or superphosphate, but where the soil is too rich, or becomes soapy by heavy applications of manure, a good dressing of quicklime, say 14 pounds per rod, equally distributed on the surface and lightly pointed in, will meet all needful requirements if subsequent half dressings are given annually in autumn or early in spring.

Fruit Splitting at the Stone.—This has been attributed to imperfect fertilisation of the flowers, but it is confined to a few varieties only, and fertilising those with the pollen of other flowers is strongly advised. An excessively rich soil, over-supplies of food, and a moist and close atmosphere during the last swelling of the fruit accelerates the malady. Lifting, firming light soil, and adding clay marl to sandy, silicious, and calcareous gravel to heavy soil, where either are too rich, are good remedial measures.

Lifting Unsatisfactory Trees.—If any trees fail to set, stone, and perfect their fruit they should be taken up carefully directly the growth is mature, the wood firm, and the leaves beginning to fall. Experts lift peach and nectarine trees whilst the leaves adhere firmly to the wood, afford shade, syringe the trees, and, if under glass, keep the house rather close until they are able to bear full ventilation with exposure to light. Experienced cultivators also lift indoor and outdoor trees after the buds commence swelling, even when they are in blossom, or have fruit set, with satisfactory results. Though it may be safe to move trees with fibrous roots at those times, it is disastrous to trees with strong roots and few fibres. If the trees have roots of the latter description lifting must not be attempted until the leaves are sufficiently mature to part readily from the wood, and then the roots must not be detached so near the stems as in trees that have abundance of fibres. When the trees have few and strong roots a trench should be taken out one-third the distance from the stem the growths extend, cutting through all the roots, and this trench may remain open a fortnight, watering the undisturbed part if the foliage becomes limp, even shading from powerful sun, and syringing, if necessary, to keep it fresh; then fill the trench firmly. This may be done with outdoor trees towards the close of September, about the same time with those in

cool houses or as soon afterwards as the fruit is gathered, and on forced trees about six weeks after they have been cleared of their crops. The effect is to check late growth, promote the ripening of the wood, concentrate the sap on the buds, and incite the emission of numberless fibres. When the leaves commence falling, carefully remove the soil from the strong roots, not disturbing the fibres, and supply fresh loam with a sprinkling of steamed bone meal, and make firm. This will induce fruitfulness without placing the trees in jeopardy, and another year they may be lifted entirely because they will have formed abundance of fibres, and any straight-down roots can then be safely shortened. Trees in houses should be treated in the manner described every second or third year, or every year whilst they are young, and disposed to make long and strong growths.

Complete lifting must be done with judgment. The roots must be kept as much from the air as possible whilst fresh drainage and compost is being brought in. This border renovation is very effectual in recuperating old and weakly trees, and if resorted to from time to time, as occasion requires, will keep the trees healthy for many years. A liberal watering should follow lifting operations to settle the soil about the roots.

AILMENTS.

Peach and nectarine trees suffer from morbid affections other than those directly attributable to disease, and may be usefully alluded to.

1. *Cankerous Affection of Stem and Large Branches.*—This must not be confounded with the canker of the apple and pear. The bark first becomes hard, then cracks, forming irregular patches, and exposes the wood. The injuries may arise from sunburn, blows, or severe frost, aggravated by ungenial soil, excess of water causing sappy growth, and, in some cases, too much iron. Soil defects must be remedied, and wounds on the stems pared smooth close to where the bark adheres to the wood, covering the bare portion, and surrounding the bark with a plaster of clay and fresh cow manure, which assists in covering the wounds with new bark.

2. *Excrescences on the Roots.*—In some instances, especially in gravelly soil, the roots form a number of wart-like knots and swollen rings at some distance from the stem. The protuberances often produce adventitious buds in clusters, and push suckers. These are attended by decreased vigour in the tree, which becomes stunted in growth. The only remedy is better soil, coupled with lifting the trees, and cutting out the worst affected parts, then replanting. The evil is most prevalent in outdoor trees,

especially where the borders are cropped, heavily manured, and the roots wounded in digging.

3. *Fungus on the Roots*.—This is generally the result of using manure or leaf mould that frequently contains woody matter, the mycelium of the fungus being introduced with those substances, and spreading to the roots of peach or nectarine trees, weakening or killing them. Drought at the roots also favours the development of the destructive mycelium, and should be guarded against. Flooding the border with lime water sometimes proves effectual, but in bad cases it is necessary to remove the trees and soil.

4. *Sunburn*.—Trees against walls and on roof trellises sometimes have the branches and trunks so dried by the sun as to become enfeebled and prevent the flow of the sap, the branches dying or falling a prey to "borers." The prevention of sunburn is important. It is best secured by keeping the trees so furnished with young wood and leaves as to shade the branches, young shoots being trained over naked limbs for that purpose. Strips of straw mat also shield the main branches.

DISEASES.

Blister.—This is caused by a fungus (*Exoascus deformans*, Fig. 30), and is chiefly confined to the leaves, but it also attacks young shoots and causes their malformation. The affected parts become swollen and distorted, and the leaf or shoot twists and curls into peculiar forms. A pale bloom appears on the attacked leaf, best seen on the under surface, and this under the microscope is found to consist of innumerable erect, slender cells containing eight spores each; these issue from the mycelium that derives its support from the tissue of the leaf, and destroys its functions. Ultimately the leaves affected with the fungus wither and fall prematurely. Blistered leaves and shoots are common on wall trees in cold springs, especially after frosts and cutting winds, and protection by some of the means described on page 81 is very desirable. Spraying the trees with precipitated carbonate of copper in suspension (Vol. I., page 241) once before the buds unfold, again when the fruit is set, and a third time three weeks afterwards, is also recommended for preventing attacks of the disease and hindering its spread. The remedy is to cut off and destroy the affected shoots and leaves, but this must be done gradually, removing some of the worst first, and so on at intervals of a few days until the whole are removed and burned; then, with genial weather, the trees will make clean, healthy growth.

Gum.—This is a common disease and very destructive to peach and nectarine trees under glass, as well as outdoors. It is caused by a fungus (*Coryneum Beijerincki*) figured and described in Vol. I., page 235. A condition of the trees favouring its attack is induced by rich soil, over-feeding, unripe wood acted upon by cold, excessive vigour, and sudden atmospheric changes, but the opposite extremes of poor soil, want of nourishment, and ill-condition promote gum disease. The best preventive is

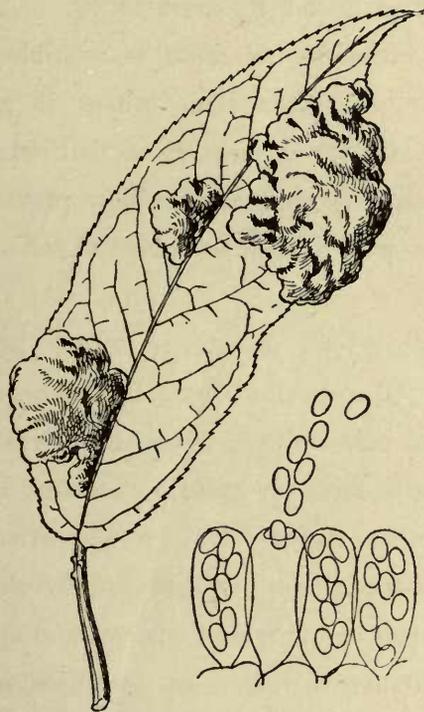


Fig. 30. PEACH BLISTER OR CURL (*EXOASCUS DEFORMANS*).

Showing affected leaf, and spores escaping from a cell (aseus) below, greatly magnified.

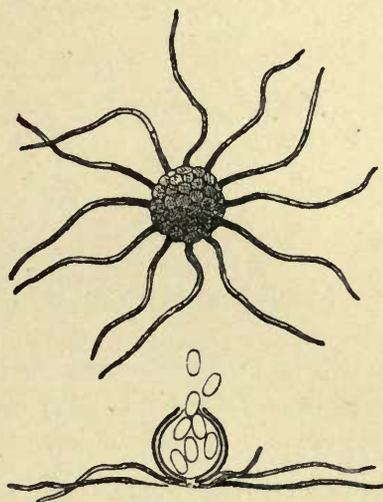
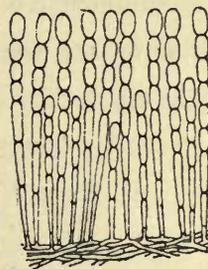


Fig. 31. PEACH MILDEW (*SPHÆROTHECA PANNOSA*).

"Fruit"—central figure. Section of "fruit" with sporidia escaping—lower figure. The *Oidium leuconium* or early condition—upper figure.

moderately rich soil and attention to the essential cultural conditions of health. As a remedy, lifting and cutting away the affected parts has proved most effectual. (See "Gum," Vol. I., pages 234—238.)

Mildew.—More than one species of *Oidium* attack the young shoots, leaves, and young fruits, but they are merely a stage in the growth of more highly-developed fungi. (See Vol. I., page 245.) The *Oidium* form of *Sphaerotheca pannosa*, namely, *O. leuconium* (Fig. 31, upper figure), form a dense greyish coat over the parts affected, and

living on the outer surface of the cells, the growth of the shoot, leaf, or fruit is arrested, and ultimately becomes brown or black, but not before the higher form has perfected (Fig. 31, central figure). The mildew causes the leaves to fall prematurely, damages the wood, and ruins the fruit. Prevention is an absolute necessity to secure undamaged growth and clear-skinned fruit. For preventive and remedial measures, see "Mildew," Vol. I., pages 245—250.

Downing, an eminent American pomologist, affirms that the serrate, glandless-leaved varieties are liable to, and those with good glands on the leaf-stems are free from, attacks of mildew. The engraving (Fig. 33) explains what is meant by these terms. That

certain varieties are more susceptible of attacks by mildew than others is well known, and the conclusion is that where the locality is cold and mildew prevails, varieties with glandless leaves should be avoided.

Spot.—This disease is caused by a fungus (*Glaeosporium læticolor*) and produces a pale salmon-coloured depressed patch or patches on half-ripe peaches and many other fruits. It generally attacks the finest and most delicate-skinned fruit at its apex or uppermost surface, and soon

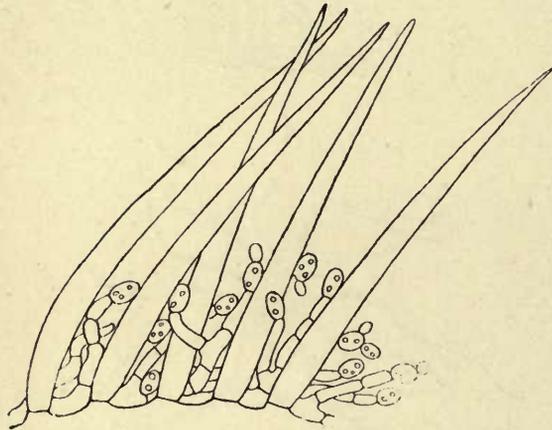


Fig. 32. SPOT FUNGUS (*GLEOSPORIUM LÆTICOLOR*).
Amongst the hairs of peach fruit, highly magnified.

renders it worthless. The fruit is most liable to attacks in low damp localities, and in close ill-ventilated structures, which may favour the fungal germs by the deposition of moisture on the upper surface. Glass copings affixed to walls and a free circulation of air in houses after the fruit gives indications of ripening are the best safeguards. In dull periods a gentle warmth should be maintained in the hot-water pipes, and if these are lightly painted with sulphur brought to the consistency of cream, the fumes will be inimical to the growth of the fungus. Attacked fruit should be burned so as to prevent the spread of the fungus (Fig. 32). As a preventive, spraying with sulphide of potassium, $\frac{1}{2}$ oz. to a gallon of water, is recommended after the fruit is the size of walnuts, repeating once or twice at fortnightly intervals.

Yellows.—The leaves of peach trees affected by the yellows are very pale in colour, almost devoid of green. When in that state the shoots do not form perfect buds nor

ripen, and the trees not infrequently die. The disease is, perhaps, due to bacteria, occasioned by a morbid condition of the sap, consequent on the absorption of unassimilable fluid by the roots, the soil not containing sufficient mineral food in available form. When the leaves of peach trees assume a pale greenish-yellow hue, an application of guano in liquid form, or house sewage (not too strong), has a good effect when the soil is sweet and the drainage efficient. Sulphate of iron at the rate of $\frac{1}{4}$ ounce to the square yard has been found beneficial by Mr. W. H. Divers—one of the best peach

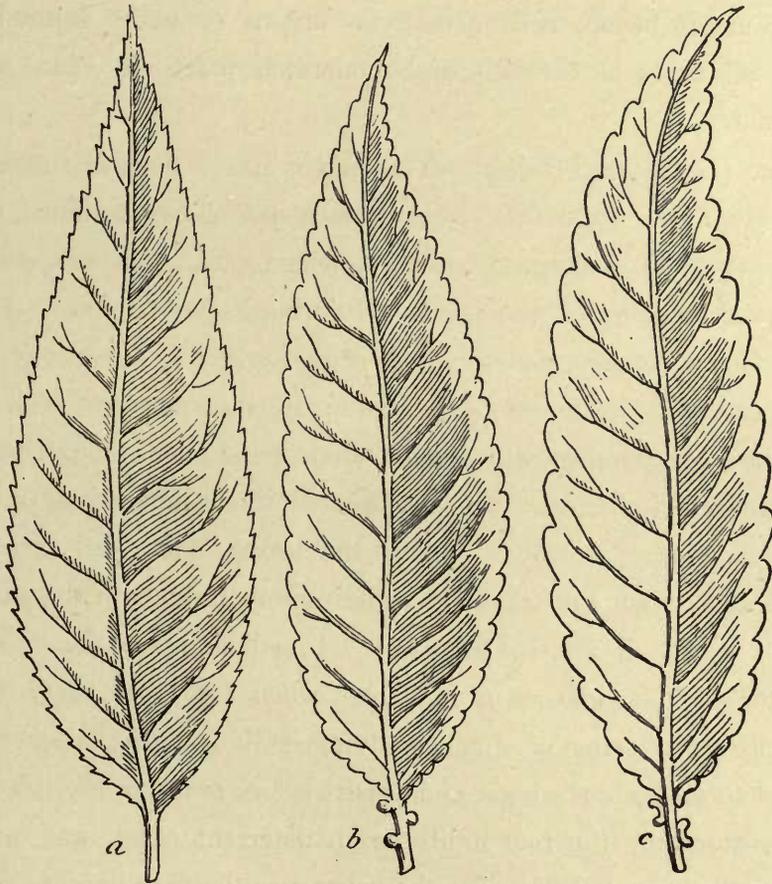


Fig. 33. CHARACTERISTIC PEACH LEAVES.

References :—*a*, leaf serrated and without glands ; *b*, leaf with small round glands ; *c*, leaf with large kidney-shaped glands.

growers in the kingdom—but it is not suitable for all soils. Where soil is close and sodden the trees should be lifted, the drainage rectified, and better soil afforded. An abundance of fibrous roots working freely in good and rather firm soil, containing an adequate amount of potash and lime, is the best cure for yellows.

ENEMIES.

Aphides.—Green fly (*Myzus Persicæ*) works great mischief on the young shoots and tender leaves. Its attacks are confined to the young growths. Brown fly (*Aphis Persicæ*) lives on peach trees throughout the year; when leafless, it clings to the young wood, and in spring attacks the opening buds, and attaches itself to the young growths and tender leaves, distorting and ruining them. Preventive and remedial means are given in Vol. I., pages 257—262. It is very important to have the trees perfectly clean before the blossoms appear, so as not to have any insects to destroy when the trees are in bloom, as the fructifying organs are easily injured, and fumigations must at all times be carefully and moderately practised. (See "Fumigation," Vol. I., page 303.)

Brown Scale (*Lecanium Persicæ*).—This insect has a general resemblance to Soft Orange Scale (Fig. 15, page 56). Its attacks are chiefly confined to trees under glass, but those on walls sometimes become infected. The pest adheres firmly to the young shoots and midribs of the leaves. By living on the juices the growths are weakened, the foliage clogged, and the fruit coated with the secretions of the insects, spoiling its appearance. Resin compound and petroleum mixture, Vol. I., page 261, are the best remedies during growth, prompt steps being taken to extirpate the pest on its first appearance, and after the fruit is gathered the compound or mixture may be applied at a temperature of 130°. Collect the leaves of infested trees as they fall, and burn them, then when the trees are leafless spray them with the caustic soda and potash solution named in Vol. I., page 251. Unnail or untie the trees, and syringe them with water at a temperature of 140°, and, when dry, wash them with a softsoap solution, 4 ounces to a gallon of water, applying with a clean, half-worn paint brush, taking care not to dislocate the buds, and repeat before securing the trees to the wall or trellis. The removal of the roof lights has a deterrent effect, and where these are fixed, syringing the trees and throwing the house open on frosty nights have been found useful.

Caterpillars.—The larvæ of the Figure-of-Eight moth (Vol. I., page 284), and others, occasionally infest the leaves of the peach and nectarine; they should be removed by hand picking, or the means recommended under "Caterpillars," Vol. I., page 283. The larvæ of the Wœberian moth also attacks the peach. (See Vol. II., page 44.)

Red Spider.—This is the greatest and most insidious enemy to the peach, and must

be kept down by a judicious use of the syringe or garden engine, also preventive and remedial means. (See Vol. I., page 269.) Thrips are seldom troublesome where due regard is paid to syringing the trees. For remedies, see Vol. I., page 274.

Weevils.—The leaves of the peach are often gnawed by several species of the genus *Otiorhynchus*, especially *O. ligustici* and *O. tenebricosus*. (See Vol. II., page 90.) Ants (Vol. I., page 255) are sometimes injurious to the blossoms, and often destructive to the ripe fruit, as also are earwigs (Vol. I., page 267), and woodlice (Vol. I., page 262).

PEARS.

THE Pear (*Pyrus communis*), though found wild in some parts of England, is a native of the temperate parts of Europe and Western Asia, and has been found in the Himalayas. Koch states that other wild species have had more or less to do with the origin of cultivated pears, but the probability is that most, if not all, the varieties in cultivation have originated from the common pear. Be that as it may, it is certain that the pear was cultivated by the Assyrians, Greeks, and Romans from a period of remote antiquity. Theophrastus, the "divine orator" of Greece, mentions the pear; also the Roman authors, Cato, Varro, Columella, Pliny, Virgil, and Palladius. Pliny describes many varieties; the names, Assyrian, Grecian, Alexandrian, and Tiberian, are proofs of popularity, and the last-named pear was the favourite variety of the Emperor Tiberias. The cultivated varieties are believed to have been introduced by the Romans into Gaul, and thence into England.

Chaucer, in the fourteenth century, names the pear, as does Shakespeare, but he has no eulogy for the fruit. There were, however, good pears in Parkinson's time (1629), including the Windsor (so called because grown on Windsor Hill), and a century later Batty Langley mentioned Autumn Bergamot, Brown Beurré, Crasanne, Épine d'Hiver (Winter Thorn), Hampden's Bergamot, Jargonelle, and Swan's Egg. Sir Thomas B. Hanmer, early in the eighteenth century, added twenty-seven varieties "out of France." Miller, in 1759, selected eighty varieties for description out of two hundred and fifty, and in 1831 Lindley enumerated one hundred and fifty dessert pears. In 1842 a list of four hundred and forty-two varieties was published by the Royal Horticultural Society, and in 1885 six hundred and fifteen reputedly distinct varieties were exhibited in the Society's Garden, Chiswick. Dr. Hogg's last edition of the *Fruit Manual* (1884) contains scientific descriptions of six hundred and fifty varieties; also much historical and useful information.

Although we have a few pears of English origin, due to the efforts of Knight, Ingram, Huyshe, Rivers, and others, the majority of the best varieties have been

raised in France and Belgium, and several excellent sorts in America. Some of these have proved superior in hardiness and quality to the older kinds. Many, however, are too tender for cultivation in this country as standards; hardier, freer cropping, and more generally useful varieties still being required.

The chief use of the pear is for the dessert, and "there are also varieties which are admirably adapted for baking, and for converting into compôtes and marmalades. They are also dried in ovens, and preserved during winter as an article of food on the Continent; and this use of them is as common in France as the making of apple-pies in this country. From the expressed juice a fermented liquor, known by the name of perry, is made, some of which is not inferior to many foreign wines, when particular attention has been given to the selection of the fruit and its manufacture. The fruits which are employed in the making of perry are austere, hard, and uneatable, yet those which are the least palatable always make the best liquor. The wood of the pear tree is heavy, fine-grained, strong, and compact, with a tinge of red in it. When green it weighs 75 pounds 5 ounces to the cubic foot, and when dry from 49 pounds to 53 pounds. It is much used by turners and pattern-makers, and the blocks with which the patterns on floor-cloths are printed are all made of pear wood. It is readily dyed black, when it so closely resembles ebony as to be scarcely distinguishable from it, and is then used for various articles which are dyed black in imitation of ebony. It makes excellent fuel, burns with a bright flame, and yields an intense heat. The leaves dye yellow, and may be used to give green to blue cloths."—(*Vegetable Kingdom*, p. 307.)

VARIETIES.

DESSERT PEARS.

ALEXANDRE LAMBRÉ.—Fruit medium, roundish obovate; skin smooth, shining, pale yellow, with russety dots and markings; flesh white, juicy, and richly flavoured; ripe November to January. Tree healthy, and a good bearer, succeeding on the quince.

ALTHORP CRASANNE.—Fruit medium, roundish obovate; skin pale green, slightly russeted, and tinged with brown on the sun side; flesh white, buttery, juicy, and perfumed; ripe October to December. Tree hardy, vigorous, and a good bearer; succeeds as a standard.

ASTON TOWN.—Fruit small to medium, roundish obovate; skin pale green, changing to pale yellow, thickly covered with russety spots; flesh yellowish

white, tender, buttery, and rich; ripe end of October and beginning of November. Tree hardy, and an abundant bearer; succeeds as a standard.

AUTUMN NELIS.—Fruit small to medium, obovato-turbinate; skin greenish yellow, almost entirely covered with brown russet; flesh yellowish, tender, melting, buttery, and richly flavoured; ripe in October, but decays quickly. Tree hardy, and a great bearer.

BARONNE DE MELLO.—Fruit medium-sized, pyriform; skin covered with dark brown russet on a greenish yellow ground; flesh yellowish, melting, juicy, vinous, and richly flavoured; ripe end of October and beginning of November. Tree hardy, productive, and succeeds well on the quince.

BASINER.—Fruit large, long pyriform; skin greenish yellow, much covered with pale russet; flesh yellowish white, crisp, juicy, and sugary; ripe end of May and beginning of June. Tree good bearer, and requires to be double grafted.

BEACON.—Fruit large, pyriform; skin greenish yellow, russety, but well coloured on the sun side; flesh greenish yellow, melting, and sweet; ripe in August. Tree healthy, and a capital bearer; excellent as a standard, and succeeds on the quince, but better double-grafted.

BELLE JULIE.—Fruit medium, long obovate; skin dull brown, with a reddish cheek on the sun side; flesh yellowish, tender, buttery, juicy, rich, and perfumed; ripe towards the end of October. Tree healthy, and a great bearer; excellent as a pyramid, and succeeds on the quince.

BERGAMOTTE ESPEREN.—Fruit medium, roundish, irregular turbinate; skin dark green changing to greenish yellow, with large brown russety dots; flesh yellowish, melting, very juicy, and rich, with a pleasing aroma; ripe in January to April. Tree healthy, and a free bearer, succeeding on the quince; requires a wall in cold situations.

BEURRÉ ALEXANDRE LUCAS.—Fruit medium to large, obovate; skin greenish yellow, dotted with russet, becoming yellow when ripe; flesh white, melting, and juicy; ripe in November. Tree a strong grower, and succeeds as a standard.

BEURRÉ D'AMANLIS.—Fruit large, obtuse pyriform; skin green, tinged with brown next the sun at first, but changing to yellowish green, flushed with reddish brown; flesh greenish white, tender, melting, and well flavoured; ripe middle of September. Tree an excellent grower and bearer; succeeds on the quince.

BEURRÉ D'ANJOU.—Fruit large, roundish obovate, handsome; skin greenish yellow, with patches of russet, and sometimes flushed with red; flesh white, tender, buttery, melting, and richly flavoured; ripe October and November, and continues in use some weeks. Tree healthy, and succeeds on the quince.

BEURRÉ D'AREMBERG.—Fruit small to medium, obovate; skin yellowish green, with veins, patches, and dots of pale russet; flesh white, melting, buttery, juicy, and agreeably perfumed; ripe in December and January. Tree hardy, and an excellent bearer, but the fruit is much better from wall trees than from pyramids or standards; it succeeds on the quince, and is an excellent variety.

BEURRÉ DE L'ASSOMPTION.—Fruit very large, pyriform, undulating, and bossed, handsome; skin pale yellow, with mottles and patches of fawn-coloured russet; flesh white, buttery, tender, melting, and perfumed; ripe middle of August to September. Tree healthy, and a good bearer, succeeding on the quince.

BEURRÉ BACHELIER.—Fruit large, irregular obovate, handsome; skin greenish yellow, strewn with russety dots; flesh buttery and melting, juicy, and aromatic, not richly flavoured, but good; ripe in December. Tree healthy, and a free bearer; succeeds well in the north and on the quince.

BEURRÉ BALTET PÈRE.—Fruit large and handsome, turbinate; skin greenish yellow, flushed with red on the sun side; flesh melting, very juicy, and richly flavoured; ripe in November. Tree healthy, and a free bearer, succeeding on the quince; a first-class variety.

BEURRÉ BERCKMANS.—Fruit medium, turbinate, handsome; skin bright lemon, strewn with russety specks; flesh white, tender, juicy, and richly flavoured; ripe in November and December. Tree healthy, and a good bearer; requires double-grafting for pyramids and cordons.

BEURRÉ BOSC.—Fruit large, long pyriform, handsome; skin yellow, covered with cinnamon russet; flesh white, melting, buttery, juicy, and aromatic; ripe in October and November. Tree healthy, and a good bearer; succeeds as a standard in warm situations on chalk soils, but requires a wall in cold localities, and must be double-grafted for dwarf trees.

BEURRÉ DE CAPIAUMONT.—Fruit medium, obtuse pyriform; skin pale yellow, covered with russet, and flushed with reddish brown; flesh white, melting, vinous, and sweet; ripe in October. Tree hardy, vigorous, and a free bearer, valuable in cold localities, makes good standards on the pear stock, and succeeds on the quince.

BEURRÉ CLAIRGEAU.—Fruit large, curved pyriform, very handsome; skin smooth, shining, orange red on the sun side, dotted with russet; flesh white, half-melting, and slightly perfumed; ripe in November. Tree healthy, and a good bearer; requires double-grafting for dwarf trees. The fruit should be gathered before quite ripe, but its beauty is its chief merit.

BEURRÉ DIEL.—Fruit very large, obovate; skin pale green, changing to yellow, covered with russety dots and markings; flesh yellowish white, tender but sometimes gritty, juicy, and of agreeable flavour; ripe in October and November. Tree hardy, vigorous, and an abundant bearer; handsome fruits are produced by trees against walls, and it thrives on the quince.

BEURRÉ GIFFARD.—Fruit medium, short pyriform ; skin greenish yellow, mottled with red next the sun ; flesh white, melting, juicy, vinous, and aromatic ; ripe middle of August. Tree healthy, and a profuse bearer on the quince ; one of the best early pears.

BEURRÉ HARDY.—Fruit large, oblong obovate, handsome ; skin yellowish green, covered with patches of brown russet ; flesh white, melting, juicy, sweet, with a rosewater aroma ; ripe in October. Tree healthy, vigorous, forming a beautiful pyramid, and bears best on the quince.

BEURRÉ DE JONGHE.—Fruit medium, pyriform, handsome ; skin dull yellow, covered with bright pale-brown russet, which imparts a golden appearance ; flesh yellowish green, buttery, melting, very sweet, juicy, and perfumed, most delicious ; ripe in December to January. Tree a slow grower, requires a wall, and to be double-grafted for dwarf trees.

BEURRÉ LANGELIER.—Fruit medium, obtuse pyriform ; skin greenish yellow, covered with small russety dots, and flushed with crimson ; flesh tender, buttery and melting, with a rich, vinous flavour ; ripe in December to January. Tree healthy, and succeeds on the quince ; excellent against a wall in the north.

BEURRÉ RANCE.—Fruit large, pyriform ; skin dark green, covered with brown russety spots ; flesh greenish white, melting, juicy, rich, vinous flavour ; ripe December to March. Tree hardy, when root-pruned, but requires a wall in the north, and to be double-grafted for dwarf trees ; one of the best late pears.

BEURRÉ STERCKMANS.—Fruit medium, short pyriform ; skin smooth, grass-green, dull red on the sun side, with a little russet ; flesh greenish white, melting, juicy, vinous, with a fine aroma ; ripe in January and February. Tree healthy, and an abundant bearer on the quince, but requires a wall in cold localities.

BEURRÉ SUPERFIN.—Fruit medium to large, obovate, bossed ; skin greenish yellow, becoming lemon at maturity, covered with small patches and veins of russet ; flesh yellowish white, buttery, melting, very juicy, and exquisitely flavoured, with a delicate aroma ; ripe at the end of September and beginning of October. Tree healthy, and a free bearer, succeeding on the quince ; one of the best autumn pears.

BISHOP'S THUMB.—Fruit large and oblong ; skin yellowish green, with numerous patches of russet, sometimes flushed with red ; flesh greenish yellow, melting, juicy, and well flavoured ; ripe in October. Tree hardy, an excellent bearer, and succeeds well as a standard.

BRITISH QUEEN.—Fruit medium to large, short pyriform ; skin smooth, thinly covered with cinnamon russet, and having a flush of rosy crimson on the sun side ; flesh yellowish white, buttery, melting, and richly flavoured ; ripe early in October. Tree healthy, and bears best double-grafted ; a rather uncertain variety, and not good in all soils.

BROCKWORTH PARK (Bonne d'Ezée).—Fruit large and handsome, oblong ovate ; skin smooth, pale yellow, streaked and flushed with crimson on the sun side ; flesh white, buttery, juicy, but not richly flavoured ; ripe in late September. Tree healthy and a free bearer.

BROWN BEURRÉ.—Fruit large, oblong obovate ; skin green, almost covered with thin brown russet, and faintly tinged with reddish brown on the side next the sun ; flesh greenish white, tender, melting, buttery, with a sprightly and rich musky flavour ; ripe in October. Tree hardy, but requires a wall in cold localities, and bears best double-grafted.

CAILLOT ROSAT (King Pear).—Fruit medium to large, pyriform ; skin greenish yellow, with a brownish red cheek, streaked with bright red ; flesh tender, melting, juicy, sweet, and agreeably perfumed ; ripe in August. Tree hardy, and an excellent bearer, succeeding as a standard.

CAROLINE HOGG.—Fruit small to medium, roundish or bergamot shape ; skin reddish brown on the sun side ; flesh tender, melting, juicy, vinous, rich and perfumed ; ripe in December. Tree healthy, and a good bearer.

CHAUMONTEL.—Fruit large, obtuse pyriform ; skin yellowish green, with russety spots, and brownish red next the sun ; flesh yellowish white, buttery, melting, rich, vinous, and perfumed ; ripe in November to March. Tree hardy, and a free bearer ; requires a wall with south or south-west aspect in most parts of the Kingdom.

CITRON DES CARMES.—Fruit small, obovate ; skin smooth, pale yellow when mature, strewn with grey dots, and tinged with brownish red on the sun side ; flesh yellowish white, juicy, sweet, and refreshing ; ripe in August, but soon turns mealy. Tree hardy, and a free bearer.

CLAPP'S FAVOURITE.—Fruit medium to large, pyriform, handsome ; skin greenish yellow, with stripes and flushes of bright red on the exposed side ; flesh white, buttery, juicy, rich and delicious ; ripe in August and September. Tree healthy, and an excellent bearer, double-grafted or on the quince ; an acquisition from America ; requires to be gathered before quite ripe, and eaten soon.

- COLMAR D'ÉTÉ.**—Fruit small, roundish obovate ; skin smooth, greenish yellow, mottled and freckled with dull red ; flesh yellowish, half melting, juicy, and sweet ; ripe early in September. Tree hardy, vigorous, and a profuse bearer, succeeding as a standard, and on the quince ; a pear for juveniles.
- COMTE DE FLANDRE.**—Fruit very large, pyriform ; skin almost covered with russety freckles ; flesh yellowish, melting, juicy, richly flavoured and perfumed ; ripe in November and December. Tree healthy, and fruitful on the quince ; also double-grafted.
- COMTE DE LAMY.**—Fruit small to medium, roundish obovate ; skin yellowish green, flushed with brownish red, and strewn with russety dots ; flesh white, tender, buttery, melting, sugary, and highly flavoured ; ripe in October. Tree hardy, a constant bearer, and succeeds on the quince ; considered by some connoisseurs to be the best of the autumn pears.
- CONFERENCE.**—Fruit large, long pyriform ; skin smooth, shining, dotted with russet ; flesh yellow, tinted with salmon, juicy and well flavoured ; a handsome and comparatively new pear, ripe early in October.
- CRASANNE.**—Fruit medium to large, roundish, and flattened ; skin greenish yellow, veined and dotted with grey russet ; flesh white, buttery, melting, tender, richly flavoured and finely perfumed ; ripe in November and December. Tree healthy and vigorous ; bears best on the extension system.
- CRAWFORD.**—Fruit small to medium, obovate ; skin greenish yellow, changing to pale yellow, and tinged with brownish red ; flesh white, buttery, juicy, with sweet refreshing flavour ; ripe in August. Tree hardy, vigorous, and an abundant bearer ; succeeds as a standard in cold localities.
- DANA'S HOVEY.**—Fruit small, obovate ; skin greenish yellow, dotted with pale russet ; flesh melting, juicy, and delicious ; ripe in November and December. Tree healthy and a neat grower, bearing well double-grafted. An American variety, and one of the sweetest of pears.
- DÉLICES D'HARDENPONT.**—Fruit medium to large, oblong obovate, irregular ; skin smooth, greenish yellow, with pale russety dots ; flesh white, tender, buttery, melting, with a perfumed flavour ; ripe in November. Tree tender, succeeds on the quince, and bears freely against a wall.
- DOYENNÉ D'ALENÇON.**—Fruit medium, oval ; skin greenish yellow, dotted all over with grey or green dots ; flesh yellowish, tender, buttery, melting, slightly gritty at the core, sweet, and highly flavoured ; ripe in December to March. Tree healthy and bears freely, succeeding on the quince.
- DOYENNÉ BOUSSOCH.**—Fruit very large, roundish obovate ; skin lemon, covered with russety dots ; flesh yellowish white, tender, melting, juicy, brisk, vinous, and agreeably perfumed ; ripe in October, but soon over. Tree healthy, and a good bearer, succeeding on the quince.
- DOYENNÉ DU COMICE.**—Fruit large, obovate, slightly bossed ; skin greenish yellow, flushed with russet ; flesh yellowish white, tender, buttery, melting, juicy, richly flavoured, and delicately perfumed ; ripe in October and November. Tree healthy, and a good bearer, succeeding on the quince ; one of the best late autumn pears.
- DOYENNÉ DEFAYS.**—Fruit small to medium, roundish obovate ; skin yellow, covered with cinnamon russet on the sun side ; flesh tender, melting, juicy, with a musky aroma ; ripe in October and November. Tree hardy, and a free bearer.
- DR. HOGG.**—Fruit small to medium, obovate ; skin patched with russet, brownish red on the exposed side, changing to bright red when mature ; flesh melting, sweet, but sometimes gritty at the core ; ripe in September. Tree very prolific.
- DUCHESSÉ D'ANGOULÊME.**—Fruit large, sometimes very large, roundish obovate, uneven, and bossed ; skin greenish yellow, changing to dull yellow, veined and freckled with pale brown russet ; flesh white, buttery, and melting, rich when well ripened, but frequently coarse, yet juicy and sweet ; ripe in October and November. Tree healthy, vigorous, bears freely, especially on the quince.
- DUCHESSÉ DE BORDEAUX.**—Fruit medium, roundish oblate ; skin yellow, almost entirely covered with pale brown russet, and sometimes flushed with brown ; flesh melting, juicy, and richly flavoured ; ripe in January. Tree a moderate grower and good bearer ; succeeds double-grafted.
- DURONDEAU.**—Fruit large and handsome, obtuse pyriform, and small at the stalk ; skin shining, yellow, flushed on the sun side with crimson streaked with darker crimson ; flesh tender, melting, juicy, sweet and agreeably flavoured ; ripe in October and November. Tree healthy, and bears freely on the pear or quince. A good pear for commercial purposes.
- EASTER BEURRÉ.**—Fruit large, obovate ; skin yellowish green, strewn with russety dots and patches, brownish tinge next the sun ; flesh white, buttery, juicy, and richly flavoured ; ripe in January to March. Tree hardy, and a good bearer ; succeeds double-grafted, and requires a wall in clay soils.

ÉMILE D'HEYST.—Fruit medium to large, oblong pyriform, bossed; skin yellow, with patches and veins of cinnamon russet; flesh tender, buttery, melting, juicy, sprightly, and richly flavoured, with a rose-water aroma; ripe at the end of October, but does not keep long. Tree hardy, free bearing, succeeds as a standard, and bears abundantly on the quince. One of the best autumn pears.

EYEWOOD.—Fruit small to medium, round or bergamot-shaped; skin greenish yellow, tinged with brown on the sun side, green on the shaded side, covered with russet dots; flesh yellowish, tender, melting, juicy, sprightly flavoured and highly perfumed; ripe in October and November. Tree hardy, vigorous, and bears abundantly; succeeds as a standard, and forms a pretty garden tree when double-grafted.

FERTILITY.—Fruit medium, obovate; greenish russet, flushed with reddish brown; flesh firm, moderately juicy, not highly flavoured; ripe in September and October. Tree vigorous, a constant and free bearer, succeeds as a standard, and is regarded as a good market pear.

FLEMISH BEAUTY.—Fruit large, obovate; skin pale yellow, covered with yellowish brown russet, reddish brown on the sun side; flesh yellowish white, buttery, melting, and richly flavoured; ripe in September. Tree hardy, and a great bearer; succeeds double-grafted. The fruit should be gathered before it is fully ripe, otherwise it is dry and mealy.

FONDANTE D'AUTOMNE.—Fruit medium, obovate; skin lemon tinged with green, marked with patches of yellowish-brown russet; flesh white, tender, melting, juicy, and delicious; ripe in September and October. Tree healthy, and a great bearer, succeeding as a standard; forms a handsome tree on the quince, and is worth a wall in cold localities. A good autumn pear.

FORELLE (Trout).—Fruit medium, oblong obovate, sometimes pyriform; skin smooth, shining, lemon, bright crimson on the side next the sun, covered with numerous crimson spots—the markings resembling those on a trout; flesh white, buttery, melting, vinous, and pleasantly flavoured; ripe November to January. Tree hardy, and a good bearer; requires double-grafting for dwarfs, and to be grown against a wall for producing highly coloured fruits.

GANSEL'S BERGAMOT.—Fruit medium to large, roundish obovate, flattened; skin greenish yellow, reddish brown on the exposed side, speckled with russet; flesh white, buttery, gritty, melting, juicy, and rich, with a musky flavour; ripe in October and November. Tree healthy, shy bearing on the pear, but produces freely when double-grafted, and needs thinning to have handsome fruit.

GENERAL TODLEBEN.—Fruit very large, irregular pyriform; skin yellow, with patches of brown russet and numerous dots; flesh tinged with rose, melting, somewhat gritty, yet juicy, rich, and perfumed; ripe in October and November. Tree hardy, and a free bearer, succeeding on the quince.

GLOU MORÇEAU.—Fruit large, obovate, irregular; skin greenish yellow, covered with grey russet dots; flesh white, tender, buttery, richly flavoured; ripe December to January. Tree hardy, and an excellent bearer; succeeds as a standard in favoured localities only, also on the quince, and produces fine fruit grown against a wall. One of the best winter pears.

HACON'S INCOMPARABLE.—Fruit large, roundish obovate; skin greenish yellow, with numerous russet spots and markings; flesh white, buttery, melting, vinous, and musky; ripe in November and December. Tree hardy, vigorous, prolific on the quince, and does well in the north.

HESSLE.—Fruit small to medium, pyriform; skin greenish yellow, dotted and freckled with russet; flesh tender, juicy, sweet, and pleasantly perfumed; ripe in late September and early October. Tree hardy, healthy, and an abundant bearer; forms a fine standard, and is excellent in the north.

HUYSHE'S PRINCE OF WALES (Huyshe's Bergamot).—Fruit large, roundish oval; skin lemon, covered with cinnamon-coloured russet; flesh yellowish white, tender, melting, juicy, richly flavoured, and perfumed; ripe in November and December. Tree healthy, but a shy bearer unless double-grafted.

JARGONELLE.—Fruit large, pyriform; skin smooth, greenish yellow, occasionally tinged with brownish red; flesh yellowish white, tender, melting, juicy, with a pleasant aroma; ripe in August and September. Tree vigorous, somewhat pendulous, and a good bearer; succeeds as a standard in favourable localities, and produces fine fruit against a wall in the north.

JEAN DE WITTE.—Fruit small to medium, obovate; skin green, changing to yellow when mature, dotted and marked with cinnamon russet; flesh yellowish, buttery, melting, richly flavoured and perfumed; ripe in December and January. Tree healthy, and an excellent bearer, especially when double-grafted or on the quince.

JERSEY GRATIOLI.—Fruit medium to large, roundish obovate; skin greenish yellow, covered with large russet spots, tinged with brown next the sun; flesh yellowish white, melting, vinous, and richly flavoured; ripe in October. Tree hardy, and a good bearer as a standard.

- JOSÉPHINE DE MALINES.**—Fruit medium, short pyriform; skin yellow, tinged with green, strewn with russety dots, and faintly flushed with red; flesh yellowish white, melting, juicy, rich, and sprightly flavoured, with a rose-water aroma; ripe January to April. Tree hardy and an excellent bearer; succeeds well double-grafted or on the quince. One of the best winter pears.
- JULES D'AIROLLES.**—Fruit medium, pyriform, regular; skin grey, flushed bronze, and with a red cheek; flesh white, melting, juicy, vinous, sprightly, and richly flavoured; ripe in October and November. Tree hardy, and a constant bearer, succeeding well in the north.
- KING EDWARD'S.**—Fruit very large, pyriform, uneven, and bossed; skin smooth, shining, yellowish green, covered with grey russety dots and flushed with bright brownish red; flesh half-melting, whitish yellow, slightly gritty, juicy, and semi-acidulous; ripe in September to November. Tree a strong grower, succeeding double-grafted or on the quince. Its size is its chief merit.
- KNIGHT'S MONARCH.**—Fruit medium, roundish; skin yellowish green, covered with russet and strewn with grey dots; flesh yellowish, buttery, melting, juicy, rich, and perfumed; ripe November to February. Tree hardy, and a good bearer double-grafted; the fruit must be well thinned to secure fine specimens, and prevent its being cast prematurely. One of the best-flavoured pears.
- LAMMAS (Huntingdon).**—Fruit medium, pyramidal, handsome; skin pale yellow, streaked with red, and a bright red cheek; flesh tender, juicy, and agreeably flavoured; ripe at the middle of August. Tree hardy, healthy, and an abundant bearer, succeeding as a standard.
- L'INCONNUE.**—Fruit medium to large, pyriform; skin greenish yellow, covered with large grey dots and patches of russet; flesh yellowish, firm, juicy, rich, and agreeably perfumed; ripe in January and February. Tree hardy and a good bearer, succeeding double-grafted. A fine winter pear.
- LOUISE BONNE OF JERSEY.**—Fruit large, pyriform, handsome; skin yellow, smooth, crimson on the sun side, dotted with deeper crimson and russet; flesh white, buttery, melting, brisk, vinous, and richly flavoured; ripe in October. Tree fairly healthy, a great bearer, and succeeds on the quince. One of the best autumn pears.
- MADAME ANDRÉ LEROY.**—Fruit large, pyriform; skin greenish yellow, with patches of grey russet; flesh white, melting, juicy, vinous, and well flavoured; ripe in October. Tree healthy and fruitful, and succeeds on the quince.
- MADAME MILLET.**—Fruit large, pyriform; skin yellow, almost covered with russet; flesh tender, juicy, and richly flavoured; ripe January to March. Tree healthy, succeeding on the quince; in cold localities requires a wall.
- MADAME TREYVE.**—Fruit large, obtusely obovate, bossed; skin greenish yellow, bright crimson on the sun side, strewn with grey russety dots; flesh white, melting, juicy, sweet, not highly flavoured, ripe in September. Tree hardy and prolific, succeeding as a standard in favourable situations, and on the quince.
- MAGNATE.**—Fruit large, pyriform; skin yellow, with dark brown russet, streaked with crimson; flesh yellow, melting, juicy, and richly flavoured; ripe in October and November. Tree hardy, robust, and free-bearing, especially on the quince.
- MARCH BERGAMOT.**—Fruit medium, roundish; skin light brown, slightly covered with russet; flesh yellowish white, buttery, sometimes gritty at the core, but richly flavoured; ripe in March. Tree hardy, and a good bearer, succeeding as a standard.
- MARÉCHAL DE COUR.**—Fruit large, oblong pyriform; skin pale yellow, covered with cinnamon russet; flesh white or yellowish, tender, melting, buttery, richly flavoured, and perfumed; ripe October and November. Tree hardy, vigorous, and a good bearer, succeeding as a standard, and on the quince, thriving on chalky soils.
- MARIE BENOIST.**—Fruit large, roundish; skin greenish yellow, covered with brown russet; flesh white, buttery, melting, juicy, sweet, and well flavoured; ripe in December to February. Tree healthy, and a free bearer, succeeding well double-grafted and on the quince. One of the best winter pears.
- MARIE LOUISE.**—Fruit large, oblong pyriform; skin smooth, pale green, changing to yellow when mature, thinly marked with brown russet, but much russeted on standard trees; flesh white, buttery, melting, vinous, and delicately flavoured; ripe in October. Tree hardy, vigorous, succeeds as a standard, also double-grafted, and produces fine fruit against a wall. One of the best autumn pears.
- MARIE LOUISE D'UCCLE.**—Fruit large, pyriform; skin greenish yellow, covered with russet; flesh buttery, melting, juicy, and well flavoured; ripe in October. Tree vigorous, hardy, and bears freely; succeeds as a standard in favourable localities, and produces fruit abundantly on the quince.
- MAUD HOGG.**—Fruit medium, oblong obovate; skin entirely covered with russet, with a glow of orange on the sun side; flesh yellowish white, buttery, tender, juicy, and richly flavoured; ripe in November and December. Tree hardy, and a free bearer.

- NEC PLUS MEURIS.**—Fruit medium, roundish turbinate, uneven, and bossed; skin rough, dull yellow, covered with dark brown russet; flesh yellowish white, buttery, melting, vinous, and richly flavoured; ripe January to March. Tree healthy, and a free bearer; succeeds double-grafted, but requires a wall in the north. A reliable late pear.
- NOUVELLE FULVIE.**—Fruit medium to large, pyriform, bossed; skin green, changing to yellow, dotted with russet, and having a crimson cheek; flesh melting, juicy, and richly flavoured; ripe in November to January. Tree hardy, free-growing, and a good bearer, succeeding on the quince.
- NOUVEAU POITEAU.**—Fruit very large, obtuse obovate or pyriform; skin greenish yellow, mottled and streaked with russet; flesh white, melting, buttery, juicy, with a pleasant flavour; ripe in November. Tree vigorous, and a good bearer.
- OLIVIER DE SERRES.**—Fruit medium, round or bergamot-shaped; skin covered with dark orange russet; flesh white, buttery, melting, juicy, vinous, richly flavoured and perfumed; ripe February and March. Tree vigorous, and a free bearer, thriving on the quince. One of the best late pears.
- PASSE COLMAR.**—Fruit medium, obtuse pyriform; skin green, changing to lemon, strewn with brown dots, russety brown on the sun side; flesh yellowish white, buttery, melting, juicy, rich, and aromatic; ripe in November and December. Tree hardy, and a good bearer; succeeds as a standard in light rich soils, also on the quince, but requires a wall in cold localities.
- PASSE CRASANNE.**—Fruit medium, roundish obovate; skin greenish yellow, covered with dark brown russet; flesh half-melting, somewhat gritty, brisk, vinous, rich, and aromatic; ripe in January to March. Tree healthy, a free bearer, and does well against a wall in the north. A good late pear.
- PITMASTON DUCHESS.**—Fruit large, irregular pyriform, handsome; skin smooth, pale lemon, covered with patches of cinnamon russet; flesh white, melting, juicy, vinous, but slightly acidulous and perfumed; ripe in October and November. Tree a good grower and free bearer, succeeds as a standard in sheltered situations, and on the quince, but better on the pear or double-grafted, and is much grown for market.
- PRINCESS.**—Fruit large, long pyriform; skin pale yellow, freckled with russet, flushed crimson on the sun side; flesh white, buttery, melting, brisk, vinous, and rich in flavour; ripe in October to December. Tree healthy, a free bearer, and succeeds on the quince.
- RED DOYENNÉ (Doyenné Gris).**—Fruit medium, obovate; skin greenish yellow, entirely covered with cinnamon russet, tinged with brown on the sun side; flesh white, tender, melting, juicy, refreshing and deliciously flavoured; ripe in October, and keeps best when gathered before fully ripe. Tree healthy, and a good bearer.
- SECKLE.**—Fruit small, obovate; skin yellowish brown, bright red on the sun side; flesh buttery, melting, juicy, very rich and highly perfumed; ripe in October. Tree healthy, and a free bearer, succeeds as a standard, and double-grafted. One of the richest flavoured pears.
- SOUVENIR DU CONGRÈS.**—Fruit large, pyriform, bossed; skin yellow, covered with cinnamon russet streaked with bright crimson and deeper russet on the sun side; flesh yellowish white, tender, melting, juicy, with a vinous, musky flavour; ripe in August and September. Tree healthy and free bearing, and succeeds double-grafted.
- SUFFOLK THORN.**—Fruit medium, roundish turbinate; skin pale lemon, dotted and spotted with grey russet; flesh yellowish white, melting, buttery, juicy, rich, and strongly perfumed; ripe in October and November. Tree hardy and prolific; succeeds double-grafted.
- SUMMER BEURRÉ D'AREMBERG.**—Fruit small to medium, turbinate; skin yellow, covered with reddish russet; flesh yellowish, buttery, melting, juicy, sweet, richly flavoured, and musky; ripe in September. Tree healthy and prolific.
- SUMMER DOYENNÉ (Doyenné d'Été).**—Fruit small, roundish turbinate; skin greenish yellow, strewn with grey dots, and a red blush on the sun side; flesh yellowish white, half-melting, juicy, sweet, and pleasantly flavoured; ripe end of July or early in August. Tree hardy, and an excellent bearer; succeeds as a standard and double-grafted. The earliest, but the fruit should be gathered before it becomes yellow.
- SWAN'S EGG.**—Fruit medium, roundish ovate; skin yellowish green, covered with pale russet, and brownish red on the sun side; flesh greenish yellow, tender, juicy, sprightly, sweet, and musky; ripe in October. Tree hardy, an excellent bearer, and succeeds well as a standard.
- THOMPSON'S.**—Fruit medium, short pyriform; skin pale yellow, strewn with russety dots; flesh white, buttery, melting, juicy, richly flavoured, with a pleasing aroma; ripe in November. Tree hardy, a good bearer; succeeds as a standard, and double-grafted, but requires a wall in cold localities. One of the best autumn pears.

TRIOMPHE DE VIENNE.—Fruit very large, pyriform ; skin yellowish green, covered with russety dots ; flesh melting, juicy, and highly flavoured ; ripe in September. Tree vigorous, prolific, and succeeds double-grafted. A fine late summer pear.

URBANISTE.—Fruit medium, oblong obovate ; skin smooth, pale yellow, dotted and marked with russet, and mottled with reddish brown ; flesh white, tender, melting, juicy, richly flavoured and perfumed ; ripe in October. Tree hardy, and prolific when double-grafted.

VAN MONS LÉON LECLERC.—Fruit large, uneven pyriform ; skin dull yellow, dotted and traced with russet, brownish red glow on the sun side ; flesh yellowish white, buttery, melting, juicy, rich, and vinous ; ripe in November. Tree hardy, a good bearer, succeeding as a standard in warm soils and situations, also double-grafted ; and produces fine fruit against a wall. A fine pear.

WILLIAMS' BON CHRÉTIEN.—Fruit large, irregular pyriform, bossed ; skin smooth, pale green changing to

yellow, tinged with streaks of red on the sun side ; flesh white, tender, buttery, melting, juicy, deliciously flavoured and perfumed ; ripe in August and September. Tree hardy, a good but irregular bearer, succeeds as a standard ; bears more freely on the quince. A favourite market pear.

WINTER NELIS.—Fruit medium, roundish obovate ; skin yellowish green, covered with numerous russety dots and patches of brown russet on the sun side ; flesh yellowish, buttery, melting, vinous, richly flavoured, and with a fine aroma ; ripe from November to February. Tree hardy, and a good bearer ; succeeds well on the quince. One of the best winter pears.

ZÉPHIRIN GRÉGOIRE.—Fruit medium, roundish ; skin greenish yellow, covered with russety dots and markings ; flesh yellow, buttery, melting, juicy, vinous, and rich, with a pleasant yet peculiar aroma ; ripe in December and January. Tree healthy, and a good bearer.

DESSERT PEARS ARRANGED IN THEIR ORDER OF RIPENING.

July or August.

Summer Doyenné.
Citron des Carmes.

August.

- * Beacon.
- Lammas.
- Crawford.
- Caillot Rosat.
- * Jargonelle.
- * Beurré Giffard.
- * Clapp's Favourite.

September.

- * Beurré de l'Assomption.
- Colmar d'Été.
- * Williams' Bon Chrétien.
- * Triomphe de Vienne.
- * Madame Treyve.
- * Souvenir du Congrès.
- * Brockworth Park (Bonne d'Ezée).
- Hessle.
- * Belle d'Ecully.
- * Beurré d'Amanlis.
- Dr. Hogg.
- Autumn Nelis.

- * Flemish Beauty.
- Summer Beurré d'Aremberg.
- Fertility.
- Andrew's.

October.

- * Beurré Superfin.
- * Fondante d'Automne.
- * Jersey Gratioli.
- Yat.
- Beurré Capiamont.
- * British Queen.
- Comte de Lamy.
- * Louise Bonne of Jersey.
- Brown Beurré.
- Seckle.
- * Doyenné Boussoch.
- * Madame André Leroy.
- * Beurré Hardy.
- * Jules d'Airolles.
- Urbaniste.
- * King Edward's.

October and November.

- * Gausel's Bergamot.
- * Marie Louise.

- Althorp Crasanne.
- Aston Town.
- Bishop's Thumb.
- * Maréchal de Cour.
- Eyewood.
- * Marie Louise d'Uccle.
- * Duchess d'Angoulême.
- * Beurré Bosc.
- Huyshe's Bergamot.
- Belle Julie.
- Délices d'Hardenpont.
- Red Doyenné.
- * Magnate.
- * Doyenné du Comice.
- * Durondeau.
- Suffolk Thorn.
- * Pitmaston Duchess.
- * Émile d'Heyst.
- Beurré Alexandre Lucas.
- Swan's Egg.
- * Beurré Diel.
- * Thompson's.
- * Beurré Clairgeau.
- * General Todleben.
- * Nouveau Poiteau.

November and December.

- Beurré Baltet Père.
Baronne de Mello.
- * Beurré Dumont.
- * Princess.
Dana's Hovey.
Comte de Flandre.
- * Beurré Berckmans.
- * Forelle.
- * Hacon's Incomparable.
Crasanne.
Doyenné Defays.
- * Van Mons Léon Leclerc.
Maud Hogg.
- * Beurré Bachelier.
- * Passe Colmar.
Alexandre Lambré.

- Beurré Langelier.
- * Glou Morceau.

December and January.

- * Beurré d'Anjou.
Beurré de Jonghe.
Caroline Hogg.
Beurré d'Arenberg.
Knight's Monarch.
Winter Nelis.
Zéphirin Grégoire.
Chaumontel.

January and February.

- Jean de Witte.
Duchesse de Bordeaux.
L'Inconnue.
- * Nouvelle Fulvie.

- * Beurré Sterckmans.
Nec Plus Meuris.
- * Marie Benoist.
Joséphine de Malines.

March and April.

- March Bergamot.
- * Bergamotte Esperen.
Madame Millet.
Beurré de Rance.
- * Easter Beurré.
- * Passe Crasanne.
- * Olivier de Serres.

April and May.

- Van de Weyer Bates.
Doyenné d'Alençon.
Basiner (*June*).

Varieties with an asterisk (*) prefixed are suitable for exhibition.

SELECTIONS OF PEARS NAMED IN THEIR ORDER OF RIPENING.

Twenty-four for high quality.

- * Jargonelle.
- * Williams' Bon Chrétien.
- * Beurré Superfin.
Louise Bonne of Jersey.
Beurré Hardy.
- * Marie Louise.
Comte de Lamy.
Gansel's Bergamot.
- * Maréchal de Cour.
- * Doyenné du Comice.
- * Émile d'Heyst.
- * Thompson's.
- * Beurré Baltet Père.
Van Mons Léon Leclerc.
Passe Colmar.
Glou Morceau.
- * Beurré d'Anjou.
Knight's Monarch.
- * Winter Nelis.
L'Inconnue.
Nec Plus Meuris.
Joséphine de Malines.
- * Bergamotte Esperen.
Doyenné d'Alençon.

Twelve for high quality have an asterisk prefixed.

Six for high quality.

- Williams' Bon Chrétien.
Marie Louise.
Doyenné du Comice.
Thompson's.
Beurré d'Anjou.
Winter Nelis.

Three for high quality.

- Beurré Superfin.
Doyenné du Comice.
Joséphine de Malines.

Twenty-four large or handsome varieties.

- Jargonelle.
- Williams' Bon Chrétien.
- * Clapp's Favourite.
Triomphe de Vienne.
Madame Treyve.
- * Souvenir du Congrès.
Louise Bonne of Jersey.
Madame André Leroy.
- * Doyenné Boussoch.
Marie Louise.
- * King Edward's.
- * Magnate.

- * Durondeau.
- * Pitmaston Duchess.
- * Doyenné du Comice.
- * Beurré Diel.
- * Beurré Clairgeau.
- * Beurré Baltet Père.
Princess.
Van Mons Léon Leclerc.
Glou Morceau.
- * Beurré d'Anjou.
Marie Benoist.
Easter Beurré.

Twelve are indicated by asterisks.

Six.

- Souvenir du Congrès.
Doyenné Boussoch.
Magnate.
King Edward's.
Pitmaston Duchess.
Beurré d'Anjou.

Three.

- Souvenir du Congrès.
Doyenné Boussoch.
Beurré Clairgeau.

SELECTIONS FOR DIFFERENT MODES OF CULTURE ARRANGED IN THEIR
ORDER OF RIPENING.

I.—WALLS.

Require walls in cold localities.

Brown Beurré.
Gansel's Bergamot.
Marie Louise.
Beurré Bosc.
Huyshe's Bergamot.
Doyenné du Comice.
Pitmaston Duchess.
Beurré Diel.
Thompson's.
Van Mons Léon Leclere.
Passe Colmar.
Beurré Langelier.
Glou Morceau.
Beurré d'Anjou.
Beurré de Jonghe.
Beurré d'Aremberg.
Knight's Monarch.
Winter Nelis.
Chaumontel.
Jean de Witte.
Nouvelle Fulvie.
Beurré Sterckmans.
Nec Plus Meuris.
Marie Benoit.
Bergamotte Esperen.
Beurré Rance.
Easter Beurré.
Olivier de Serres.
Doyenné d'Alençon.

*Twelve for high walls and
gables.*

* Jargonelle.
Triomphe de Vienne.
* Marie Louise.
* Magnate.
Durondeau.
* Beurré Diel.
Princess.
Passe Colmar.
* Glou Morceau.
* Beurré d'Anjou.
Winter Nelis.
Joséphine de Malines.

Six have asterisks prefixed.

Three.

Jargonelle.
Marie Louise.
Beurré d'Anjou.

*Twelve for south, south-east or south-
west walls.*

* Jargonelle.
Beurré Superfin.
* Marie Louise.
* Magnate.
* Doyenné du Comice.
Beurré Baltet Père.
Van Mons Léon Leclere.
Chaumontel.
* Glou Morceau.
* Beurré d'Anjou.
Beurré de Jonghe.
Bergamotte Esperen.

Six have asterisks prefixed.

Three.

Beurré Superfin.
Doyenné du Comice.
Beurré d'Anjou.

Twenty-four for east or west walls.

* Clapp's Favourite.
Beurré Giffard.
* Triomphe de Vienne.
Souvenir du Congrès.
Madame Treyve.
* Beurré Superfin.
Fondante d'Automne.
* Louise Bonne of Jersey.
* Marie Louise.
* Durondeau.
Beurré Bosc.
Maréchal de Cour.
Émile d'Heyst.
* Doyenné du Comice.
Thompson's.
Princess.
Passe Colmar.

* Glou Morceau.
* Beurré d'Anjou.
* Winter Nelis.
Nec Plus Meuris.
* Joséphine de Malines.
* Bergamotte Esperen.
Doyenné d'Alençon.

Twelve have asterisks prefixed.

Six.

Souvenir du Congrès.
Beurré Superfin.
Doyenné du Comice.
Beurré d'Anjou.
Winter Nelis.
Joséphine de Malines.

Three.

Beurré Superfin.
Doyenné du Comice.
Beurré d'Anjou.

*Twelve for east or west walls in the
north and in cold localities.*

* Jargonelle.
* Beurré d'Amanlis.
* Jules d'Airolles.
Beurré Hardy.
* Hacon's Incomparable.
Beurré Diel.
Beurré Bachelier.
Princess.
General Todleben.
* Beurré d'Anjou.
Winter Nelis.
* Joséphine de Malines.

Six have asterisks prefixed.

Three.

Madame Treyve.
Jules d'Airolles.
Beurré d'Anjou.

II.—BUSHES, CANDELABRA, CORDONS, ESPALIERS, PYRAMIDS, AND LOW STANDARDS.

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> * Summer Doyenné. * Citron des Carmes. † Beacon. * Jargonelle. † Beurré Giffard. * Clapp's Favourite. † Beurré de l'Assomption. † Colmar d'Été. † Williams' Bon Chrétien. * Triomphe de Vienne. † Madame Treyve. * Souvenir du Congrès. † Beurré d'Amanlis. † Summer Beurré d'Aremberg. † Fertility. † Beurré Superfin. † Fondante d'Automne. * British Queen. Comte de Lamy. † Louise Bonne of Jersey. * Brown Beurré. Seckle. † Doyenné Boussoch. † Madame André Leroy. † Beurré Hardy. * Urbaniste. * King Edward's. * Marie Louise. * Althorp Crasanne. * Bishop's Thumb. † Maréchal de Cour. * Eyewood. † Marie Louise d'Uccle. † Duchesse d'Angoulême. * Beurré Bosc. * Huyshe's Bergamot. † Belle Julie. † Délices d'Hardenpont. † Red Doyenné. † Magnate. † Doyenné du Comice. † Durondeau. * Suffolk Thorn. † Pitmaston Duchess. † Émile d'Heyst. † Beurré Alexandre Lucas. † Beurré Diel. * Thompson's. * Beurré Clairgeau. † General Todleben. * Nouveau Poiteau. | <ul style="list-style-type: none"> † Beurré Baltet Père. † Baronne de Mello. † Princess. * Dana's Hovey. † Comte de Flandre. * Beurré Berckmans. * Forelle. † Hacon's Incomparable. * Crasanne. † Doyenné Defays. * Van Mons Léon Leclerc. † Beurré Bachelier. † Passe Colmar. † Alexandre Lambré. † Glou Morceau. † Beurré d'Anjou. † Beurré d'Aremberg. * Knight's Monarch. † Winter Nelis. * Zéphirin Grégoire. * Jean de Witte. * Duchesse de Bordeaux. † Nouvelle Fulvie. * Nec Plus Meuris. † Marie Benoist. † Joséphine de Malines. † Bergamotte Esperen. † Madame Millet. * Easter Beurré. * Passe Crasanne. † Olivier de Serres. † Van de Weyer Bates. † Doyenné d'Alençon. <p style="text-align: center;">—</p> <p style="text-align: center;"><i>Twelve for small trees.</i></p> <ul style="list-style-type: none"> * Summer Doyenné. Colmar d'Été. * Summer Beurré d'Aremberg. * Comte de Lamy. Seckle. * Gansel's Bergamot. Belle Julie. * Dana's Hovey. Crasanne. Duchesse de Bordeaux. * Marie Benoist. Madame Millet. <p style="text-align: center;">—</p> <p style="text-align: center;"><i>Six have asterisks prefixed.</i></p> <p style="text-align: center;">—</p> | <p style="text-align: center;"><i>Three.</i></p> <ul style="list-style-type: none"> Colmar d'Été. Belle Julie. Crasanne. <p style="text-align: center;">—</p> <p style="text-align: center;"><i>Twelve for medium-sized trees.</i></p> <ul style="list-style-type: none"> * Beacon. * Madame Treyve. * Beurré Superfin. Madame André Leroy. Beurré Bosc. * Émile d'Heyst. * Baronne de Mello. Beurré d'Aremberg. Knight's Monarch. * Joséphine de Malines. Easter Beurré. Olivier de Serres. <p style="text-align: center;">—</p> <p style="text-align: center;"><i>Six have asterisks prefixed.</i></p> <p style="text-align: center;">—</p> <p style="text-align: center;"><i>Three.</i></p> <ul style="list-style-type: none"> Madame Treyve. Madame André Leroy. Joséphine de Malines. <p style="text-align: center;">—</p> <p style="text-align: center;"><i>Twelve for large trees.</i></p> <ul style="list-style-type: none"> * Jargonelle. * Triomphe de Vienne. * Fondante d'Automne. Beurré Hardy. * Maréchal de Cour. Thompson's. Princess. Pitmaston Duchess. * Passe Colmar. Glou Morceau. * Beurré d'Anjou. Winter Nelis. <p style="text-align: center;">—</p> <p style="text-align: center;"><i>Six have asterisks prefixed.</i></p> <p style="text-align: center;">—</p> <p style="text-align: center;"><i>Three.</i></p> <ul style="list-style-type: none"> Triomphe de Vienne. Beurré Hardy. Beurré d'Anjou. <p style="text-align: center;">—</p> <p style="text-align: center;"><i>Twelve for the north.</i></p> <ul style="list-style-type: none"> Summer Doyenné. * Clapp's Favourite. |
|--|---|--|

* Beurré d'Amanlis.
Bishop's Thumb.
* Comte de Lamy.
Red Doyenné.
* Althorp Crasanne.
Beurré Bachelier.

* Alexandre Lambré.
Beurré d'Aremberg.
* Zéphirin Grégoire.
Easter Beurré.

—
Six have asterisks prefixed.

Three.
Beurré d'Amanlis.
Comte de Lamy.
Althorp Crasanne.

An asterisk (*) indicates double-grafted ; a dagger (†), quince stock.

III.—STANDARDS OR LARGE BUSHES ON PEAR STOCK.

Summer Doyenné.
Beacon.
Lammas.
Crawford.
Caillot Rosat.
Jargonelle.
Clapp's Favourite.
Colmar d'Été.
Williams' Bon Chrétien.
Madame Treyve.
Hessle.
Beurré d'Amanlis.
Fertility.
Fondante d'Automne.
Jersey Gratioli.
Yat.
Beurré de Capiamont.
Comte de Lamy.
Louise Bonne of Jersey.
Seckle.
Doyenné Boussoch.
Marie Louise.
Althorp Crasanne.
Aston Town.
Bishop's Thumb.
Eyewood.
Marie Louise d'Uccle.
Beurré Bosc.
Belle Julie.
Red Doyenné.
Durondeau.
Suffolk Thorn.
Pitmaston Duchess.
Émile d'Heyst.
Beurré Alexandre Lucas.
Swan's Egg.
Beurré Diel.
Thompson's.
Beurré Clairgeau.
Baronne de Mello.
Forelle.

Hacon's Incomparable.
Van Mons Léon Leclerc.
Beurré Bachelier.
Passe Colmar.
Alexandre Lambré.
Zéphirin Grégoire.
Nouvelle Fulvie.
Nec Plus Meuris.
Joséphine de Malines.
March Bergamot.
Olivier de Serres.
Doyenné d'Alençon.

—
Twelve for good soils and favourable situations.

* Jargonelle.
Windsor.
* Williams' Bon Chrétien.
Fondante d'Automne.
* Louise Bonne of Jersey.
* Marie Louise.
Marie Louise d'Uccle.
Émile d'Heyst.
* Pitmaston Duchess.
Thompson's.
* Beurré d'Anjou.
Joséphine de Malines.

—
Six have asterisks prefixed.

—
Three.

Windsor.
Marie Louise.
Pitmaston Duchess.

—
Twelve for ordinary sites.

Summer Doyenné.
* Beacon.
Lammas.

Clapp's Favourite.
* Hessle.
Jersey Gratioli.
* Beurré d'Amanlis.
Fertility.
Eyewood.
* Aston Town.
* Althorp Crasanne.
* Swan's Egg.

—
Six have asterisks prefixed.

—
Three.

Lammas.
Hessle.
Althorp Crasanne.

—
Twelve for the north and cold situations.

* Crawford.
Clapp's Favourite.
* Hessle.
* Beurré d'Amanlis.
Fertility.
Beurré de Capiamont.
Aston Town.
* Comte de Lamy.
Émile d'Heyst.
* Althorp Crasanne.
Hacon's Incomparable.
* Swan's Egg.

—
Six have asterisks prefixed.

—
Three.

Crawford.
Hessle.
Comte de Lamy.

IV.—GENERAL CULTIVATION IN ALL FORMS.

<p><i>Twelve.</i></p> <ul style="list-style-type: none"> * Beurré Giffard. * Williams' Bon Chrétien. Fondante d'Automne. * Beurré Superfin. Louise Bonne of Jersey. Marie Louise. Maréchal de Cour. * Doyenné du Comice. Princess. 	<ul style="list-style-type: none"> * Beurré d'Anjou. Winter Nelis. * Joséphine de Malines. <hr style="width: 20%; margin: 5px auto;"/> <p style="text-align: center;"><i>Six have asterisks prefixed.</i></p> <hr style="width: 20%; margin: 5px auto;"/> <p style="text-align: center;"><i>Three.</i></p> <ul style="list-style-type: none"> Beurré Superfin. Doyenné du Comice. Beurré d'Anjou. 	<p><i>For small sweet fruit.</i></p> <ul style="list-style-type: none"> Summer Doyenné. Colmar d'Été. Seckle. Dana's Hovey. <hr style="width: 20%; margin: 5px auto;"/> <p style="text-align: center;"><i>One for open garden.</i></p> <ul style="list-style-type: none"> Comte de Lamy. <hr style="width: 20%; margin: 5px auto;"/> <p style="text-align: center;"><i>One late pear for wall.</i></p> <ul style="list-style-type: none"> Joséphine de Malines.
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BAKING AND STEWING PEARS.

BELLISSIME D'HIVER.—Fruit large, roundish turbinate, handsome; skin smooth, green changing to yellowish brown, flushed with vermilion on the sun side; flesh white, crisp, tender, sweet, with a musky flavour. Tree hardy, vigorous, and a good bearer, succeeding as a standard, and on the quince. One of the best.

BLACK WORCESTER (Pound Pear).—Fruit large, obovate; skin green, russeted, with dull red tinge on the sun side. Tree hardy and vigorous, bearing well as a standard. Dr. Hogg thinks this is the type of the Warden pears, as grown at the Cistercian Abbey at Warden in Bedfordshire, and commemorated in the old song, "The Friars of Orders Grey," one of whom "himself, by denial, did mortify with a dainty bit of a Warden pye."

CATILLAC.—Fruit very large, flatly turbinate; skin pale green changing to yellow, flushed with brownish red next the sun, and covered with russety dots; flesh white, crisp, somewhat harsh, with a musky flavour. Tree hardy, vigorous, and a good bearer, succeeds as a standard in sheltered situation, and produces fine fruit on the quince; one of the best culinary pears.

MARTIN SEC.—Fruit medium-sized, obovate; skin green, covered with cinnamon-coloured russet on

the shaded side, and bright red next the sun; occasionally ripens for dessert, but is excellent for stewing; tree vigorous. The Martins are considered the earliest pears grown in this country. They are mentioned among the fruits delivered into the Treasury by the fruiterers of Edward I. in 1292.

UVEDALE'S ST. GERMAIN.—Fruit very large, long pyriform, irregular; skin dark green, changing to yellowish green, dull red on the sun side; flesh white, crisp, slightly gritty, sweet, and well flavoured. Tree hardy, prolific, succeeding double-grafted. Owing to the size of the fruit—sometimes weighing over 3 pounds—shelter is desirable.

VERULAM.—Fruit large, obovate; skin dull green, covered with russet, and reddish brown on the sun side; flesh crisp, juicy, richly flavoured, highly coloured when cooked; season December to March. Tree hardy, strong grower, and a good bearer, succeeding well as a standard.

VICAR OF WINKFIELD.—Fruit large, pyriform; skin greenish yellow, tinged with red on the sun side; flesh white, half-melting, sweet, with a musky aroma; season November to January. Tree healthy, profuse bearer, and succeeds on the quince.

For stewing early in the season, firm unripe dessert pears may be used with satisfaction, and there are often more of some varieties than are required in a ripe state. For culinary purposes throughout the winter till late spring, the above-mentioned varieties are suitable, and often in considerable demand. We have known large, healthy, standard trees produce very profitable crops. As to selections, it only need be

said, if three varieties are needed : plant *Bellissime d'Hiver*, *Vicar of Winkfield*, and *Catillac* ; if only one variety, *Catillac*, the most certain cropping and generally useful of cooking pears.

PROPAGATION AND CULTURE.

Propagation.—This is effected by seeds, cuttings, layers, budding, and grafting.

Seeds are sown with a view to raising new pears, and to provide stocks whereon to bud or graft approved varieties. Efforts at raising improved pears in this country have not been very successful. Knight and Rivers originated varieties more suitable for our climate than did Ingram, Huyshe, and others. Raisers should strive for hardier sorts, having the colour, size, and excellence of the Continental varieties. This can only be effected by proceeding in a systematic manner, as set forth on pages 96–99, Vol. I. Seeds should only be saved from carefully fertilised flowers of the finest varieties. The seeds may be sown in pots, say 9-inch, well drained, and filled within an inch of the rim with loamy soil, covering the pots with panes of glass to exclude mice. If sown when taken from the fruits, and the pots are placed in a cool house, or in a sheltered position outside, the seedlings will appear in spring, when the panes of glass should be removed. The young plants may be transferred to the open ground the following autumn, and they may produce fruit in the sixth or seventh year. Seeds sown with the object of raising stocks should be of the hardiest varieties, and the manner does not differ from that adopted for the apple. (See Vol. I., page 114.)

Cuttings and layering are not desirable modes of propagating the pear. The methods are described on pages 99 and 102, Vol. I. Budding and grafting are much better modes of increasing the trees. See “*Budding*,” Vol. I., page 115 ; “*Grafting*,” Vol. I., page 120 ; also “*Double Grafting*,” Vol. I., page 128.

Stocks.—Fully treated on pages 112 and 113, Vol. I., it is only necessary to observe :
1. That the pear stock is the most natural, the trees upon it attaining the greatest size and age. Its roots are long, comprise few fibres, and they extend considerably in a horizontal direction, as well as penetrating deeply into the soil ; consequently trees on the pear stock do not transplant well after they become large. The deep-rooting habit gives the trees an advantage in hot, gravelly, and chalky soils, as they draw supplies of nourishment from sources that are practically sealed against a surface-rooting stock. In deep, rich, loamy soil, trees on the pear stock often grow too luxuriantly for affording profitable crops of fruit until they have lost the exuberance of youth ; hence arose the

axiom that "he who plants pears, plants for his heirs," a fact well known to Virgil, 31 B.C. 2. The quince, unlike the pear, forms fibry roots near the surface; therefore pear trees established on quince stocks transplant readily and safely when several years old; they are appropriate for shallow soil, damp situations, and where the subsoil is unfavourable. The quince, however, thrives best in a light, friable, rich, moist soil, but free from stagnant water; it does not answer in poor brashy soils without mulchings of manure and copious supplies of liquid nourishment in dry weather; nor in cold, wet, close clay soils—but these may be made free by a judicious admixture of calcareous gravel, drift sand, burnt clay, or brick and old mortar rubbish. Pears on the quince are dwarfer in growth, come earlier into bearing, and usually produce larger, better-coloured, and more abundant crops of fruit than on the pear; but there are exceptions. The varieties, Marie Louise, Gansel's Bergamot, and some others do not, as a rule, thrive satisfactorily when attached directly to the quince, but succeed admirably with a connecting link as is afforded in double-grafting. This consists in establishing on the quince, say Beurré d'Amanlis, and on this, after a season of growth, the variety desired to produce fruit, say Gansel's Bergamot, in the manner described in the illustration, page 129, Vol. I. It is remarkable that the intersection should exert such potent influence, but the fact is established, and still more remarkable since the wood of each retains its own characteristics, and is not changed by the union during any period in the life of the tree.

Soil.—All loamy soils, of good depth, with subsoils free from stagnant water, will grow useful pears. On the pear stock the pear tree thrives where the apple fails; in fact, the pear is not fastidious as to soil, but has a decided preference for a porous medium, such as alluvial and drift, provided water does not lodge within 6 feet of the surface. It likes to stand high and dry, and push its long roots deep into the earth to draw supplies of moisture, and this it does from a greater depth and distance than any other fruit tree, except the cherry. Therefore, the pear flourishes in a calcareous loam interspersed with gravel or flints over chalk; towers and bears abundantly on light oolitic soils underlaid by gravel or sand; and in light alluvial soils above the level of floods. This applies, however, to certain varieties of pear only, such as the Lammas, Hessele, Aston Town, and Swan's Egg, for all our "great" pears require a holding loam or its nearest equivalent—rich surface dressings. Except in a mere crust of ameliorated soil over stubborn clay, or where the ground is water-logged, the pear succeeds in almost all the soils found in cottage, farm, and other gardens. A yard

depth of stiffish loam, with sufficient small stones or rocky fragments to keep it open, yet with enough loam to render it compact, over gravel, produces the best trees and fruit. This points to the necessity of good fare and thorough drainage.

Pears are apt to "crack" in loam over clay, but when the clay is of a shattery texture, so as to let water percolate through it, the roots derive more essential food (potash) from it than any other, and the manures applied give the most profitable returns in heavy crops of clear-skinned, large, and luscious fruit. Moisture is all-important, but equally so is thorough drainage. Mechanical texture—a medium neither too light nor too heavy—renders all else practicable in pear culture. Where the soil is loose, deep, and rich, the trees make gross wood that does not mature, and their health and crops are unsatisfactory. Such soils are, however, exceptional, as are those which require more than ordinary preparation—draining, trenching, and ameliorating, to fit them for the growth of pears. Seldom is it necessary to make expensive borders, the majority of soils being rich enough without any addition to sustain the health and fruitfulness of the trees. Most pear trees are ruined by too little space for the heads in proportion to the spread of the roots and the resources of the soil, as may be seen in sterile trees against walls. Extension is the chief factor in promoting fruitfulness of pear trees on the pear stock. Many trees which were kept formal against walls or house-ends, and barren all the while, bear heavily when allowed to extend their growth, and thus restore the lost reciprocal action between the roots and branches which is essential to profitable fruit production. This is mentioned so that those having a wall with a south, east, or west aspect may not be discouraged on account of the soil being apparently too poor for the sustaining of a pear tree or trees. All that is necessary in most cases is to dig out a space a yard across and 2 feet deep, loosen the bottom, and fill with good soil, breaking down the sides of the excavation as the work proceeds. This will give the tree a start, and when it gets a grip of the natural soil it will usually find enough nourishment, even beneath a hard path or a paved yard, to meet its requirements in growth and fruit production. The above remarks apply to trees on the pear stock.

Pear trees on the quince require a generous soil, and it is a mistake to conclude that because the quince grows naturally in springy ground, or along the banks of streams, that pears established will answer equally well on it in such positions. Climate exerts great influence in the question of suitability or otherwise of trees to different soils. We have not found pears on the quince to succeed in wet soils or in cold clays; many

of the roots perishing in winter, and the trees failing in consequence, the fruit being scabbed, cracked, and worthless. The trees prefer a well-drained soil, and thrive only in that which can be freely worked. The soil of well-tilled gardens answers to this description, and the quince roots being fibry, concentrated, and situated near the surface, any tendency to exuberance in growth is easily checked, and fruitfulness induced by judicious lifting and root-pruning. Thus pear trees on the quince produce fruit early and abundantly, in soils and positions where those on the pear stock would grow too vigorously; consequently a much longer time must elapse before these arrive at a profitable bearing state.

Situation.—Success in growing pears largely depends on the adaptability of varieties to localities. Only the hardiest sorts succeed as standards in orchards in northerly and cold districts, and there they require shelter (Vol. I., page 65—70). In level and not bleak lands in the north and midlands they produce fruit abundantly, and in the south the hardiest varieties may be usefully employed on the outsides of fruit plantations as shelter, for which their upright habit is peculiarly appropriate. Objection may be taken to the hardier varieties on account of the smallness, but it should be remembered that both the populace in town and country much prefer ten small juicy pears for a penny to one showy fruit, and no pear is more refreshing in harvest time than Lammas, while few surpass in richness, which means sugar (food)—the luscious Hessle, Eyewood, Aston Town, and Swan's Egg. There is no reason why pear trees should not be substituted for scrubby thorns and useless apologies for timber trees growing near homesteads as shelter. Few objects are more beautiful than pear trees in blossom, and they are not less admired when bearing good crops of fruit.

The larger, but not always better, pears require sheltered, warm situations, and some of them succeed in orchards (Vol. I., page 82), suitable varieties for which are given in the selections, page 124. These, as a rule, are preferably grown in the fruit garden on the quince or double-grafted, as dwarf standards, pyramids, bushes, espaliers, and cordons, as standards on the pear in good situations only. (See "Fruit Garden and Orchard," Vol. I., page 75.)

Around most rural and suburban homes there are outbuildings and walls whereon the choicest of pears may be grown. Stable and farm-building walls may be clothed with pear trees having stems 6 to 8 feet in height, so that the foliage is beyond the reach of animals, and the fruit not handy for pilfering. The trees attain to an enormous size on the pear stock. A specimen will easily cover 500 superficial feet of wall space

if there is a height of 24 feet. Such noble trees, if well managed, bear splendid fruit—Marie Louise and Glou Morceau nearly a pound, and Beurré Diel and Pitmaston Duchess over that weight each. Perhaps the largest and most highly coloured fruits are produced by trees against walls facing the south, but east and west walls are profitably covered in many places, yet there are miles of wall surface eligible for pear production but wholly destitute of trees. Northern aspects, in most situations, are too cold for the pear.

All points considered, pear trees on the quince or double-grafted are best for gardens, whatever the style of training may be. It is essential that the site be open so that air and sun can reach the ground between the trees. Boundary walls and boarded fences 5 to 7 feet in height, also walls of 12 to 15 feet in height, with south, east, or west aspects, and with free exposure to sun, may be utilised for training pears on the dwarfing stock. There are thousands of pearless gardens, both in rural and suburban districts, in which a supply of delicious fruit may be grown for the household, and, in many instances, some to spare. Varieties suitable for planting in the different sites will be found in the selections, page 122.

Planting.—Before planting, the ground should have undergone due preparation. That for trees intended for sheltering orchards should be treated as advised in Vol. I., pages 83—85. Essential particulars for preparing soils will be found on pages 36—41, and borders, pages 72—75. In unfavourable soils and low sites the ground may be thrown up in ridges, as shown in Fig. 29, page 144. For guidance in choosing, taking up, time and manner of planting, see pages 144—154, all the references given applying to Vol. I. of this work.

Distances between the Trees.—On pear stocks in ordinary soils standards may be planted 24 feet apart; in rich, deep soils, 30 feet asunder, for forming orchards on grass (see Vol. I., page 82). Where the ground is cultivated, the space between the permanent trees can be utilised by planting temporary ones, as shown in the plan, Fig. 14, page 89, Vol. I. Pyramids have a fine effect along the sides of the principal walks in gardens. They should be planted 12 feet apart in rich soil, and not less than 9 feet in any case, always half the distance from the path the trees are apart. Temporary trees can be planted between them for utilising the space, and subsequent removal. Espalier trees are the most economical of space, and succeed admirably in borders along the sides of paths, as shown in Fig. 10, page 73, Vol. I., but the fence should be 6 feet high for trees on the pear. This admits of each tree having six branches on each side.

If several rows are arranged on an open space of ground, it is usual to have them 12 to 15 feet apart, with a view of cropping the ground between. The rows should extend from north to south. When a line of espalier is formed along the sides of a walk it ought to be 3 feet from the edge, planting the trees on the side next the walk. Small-growing varieties may be planted 15, medium 18, and strong 24 feet apart.

Wall trees on pear stocks, horizontal or fan-trained, should be placed 24 feet apart when the wall is not more than 10 feet high, 21 feet when the height is 12 to 15 feet, and 18 feet for walls exceeding the last-named height. Upright-trained trees are excellent for covering high walls and house-ends. Between the dwarf trees planted against long walls over 10 feet in height "riders" should be provided to cover the upper part of the wall, and cordons may be employed to utilise the lower part until the permanent trees require the space, and there should be no obstacles to their free extension.

On quince stocks or double-grafted, dwarf standards may be planted 12 feet apart; pyramids and bushes 6 feet apart for the small, 9 feet for the medium, and 12 feet for the large growers; and lifting, if necessary, must be periodically resorted to for keeping them within those limits. Suitable distances for horizontal espalier trees are 15 feet for large-growing, 12 feet for medium, and 9 feet for small-growing varieties. Upright-trained trees with three branches (toasting fork) plant 3 feet; five-branched, 5 feet; six-branched, 6 feet asunder.

Cordons for espaliers or walls: vertical—single plant, 15 inches; double, 2½ feet; diagonal—single, 18 inches; double, 3 feet asunder. Cordon trees are sometimes planted 2 to 3 feet apart, according to the vigour of the variety, along the sides of paths. They have a charming effect when 6 to 9 feet high, and bear abundantly. Each tree should be properly staked. Horizontal cordons for edgings to paths: single plant at distances of 6 feet; double, 12 feet asunder. These should be trained to a stout galvanised wire fixed 18 inches from the ground. Horizontal and fan-trained trees for walls over 7½ and not exceeding 10 feet in height: strong growers, 12 feet; medium, 9 feet; small, 6 feet; for walls under 7½ feet the distances given for horizontal espalier trees. It is important that the trees be planted so that the branches of each may extend sufficiently to cover the space. The planting distances named of trees on the quince effect that in a reasonable time, and their after well-doing is assured by judicious management.

TRAINING PEAR TREES.

The pear is trained in more forms than any other fruit tree, and the shapes must accord with the purpose and position for which the trees are required. Standards worked on pear stocks are only eligible for orchards or market gardens, where the ground between is cropped with bush fruits. Dwarf standards on the quince or double-grafted are very suitable for kitchen gardens. Quince stocks must be worked as closely as possible to the soil; if grafted much above ground, the pear would probably enlarge faster than the stock, forming an unsightly thickening, and the tree not thrive satisfactorily. No part of the quince should be exposed to the air. The training of standard trees is fully treated in Vol. II., pages 26—28, and shown in Fig. 15, *L—O*, page 26.

Pyramids.—Handsome specimens over 15 feet high are occasionally seen in gardens. Those on the pear grow the largest, but trees on the quince or double-grafted are the best for gardens, if space is limited. The pyramid form is naturally assumed by many varieties. Instructions for training trees in this shape are given in Vol. II., pages 1—10, and examples from the smallest planting trees to those of fruiting size in Figs. 1—4, *A—L*.

Bushes.—Varieties of diffuse habit, and which produce large fruit, are best grown in this form. On the quince they produce fruit freely, and are ornamental. They are specially suited for small gardens, and are both useful and easily managed. For their training see pages 10—13, and Fig. 5, *M—O*, page 11, Vol. II. Varieties of erect habit succeed excellently in cup form—page 179, and Fig. 45, *D—J*, Vol. I. Perhaps no system of training is more pleasing and appeals more to the taste and requirement of the amateur than the goblet-shaped bush, page 13, Fig. 6, *P—S*, Vol. II. Trees in this form on the quince stock may be planted 6 feet apart, and be kept at any required height. When in full bearing they are ornamental and profitable.

Columnar Trees.—This form has a general resemblance to the Open-Bush, Figs. 7—8, page 14, Vol. II. Though the habits of pears differ somewhat from those of apple trees, the same principles apply in originating and training the growths, and it is well to permit each variety to assume its natural form. Such trees are suited for fields or gardens, especially when the cultivators cannot devote much time to the shaping of their trees. Characteristic pear trees in bush, pyramid, and columnar form are shown in the engravings, page 133.

Neither the columnar nor the bush form has a central stem, but a series of branches originated by heading the maiden tree, as shown in Fig. 47, *P*; the treatment in the second

year being represented in *Q*, and the result in foundation is a tree resembling *R*—all on page 183, Vol. I. Subsequent training is restricted to shortening irregular and removing superfluous growths during the summer, only allowing those to extend for forming branches, regularly disposed at 12 to 18 inches asunder, keeping these free from useless spray so that light can penetrate to their base. Blossom buds and fruiting spurs will then be bound to follow all over the trees, but will not do so if the growths are crowded.

Fan-shaped Trees.—This is the oldest and still one of the best modes of training

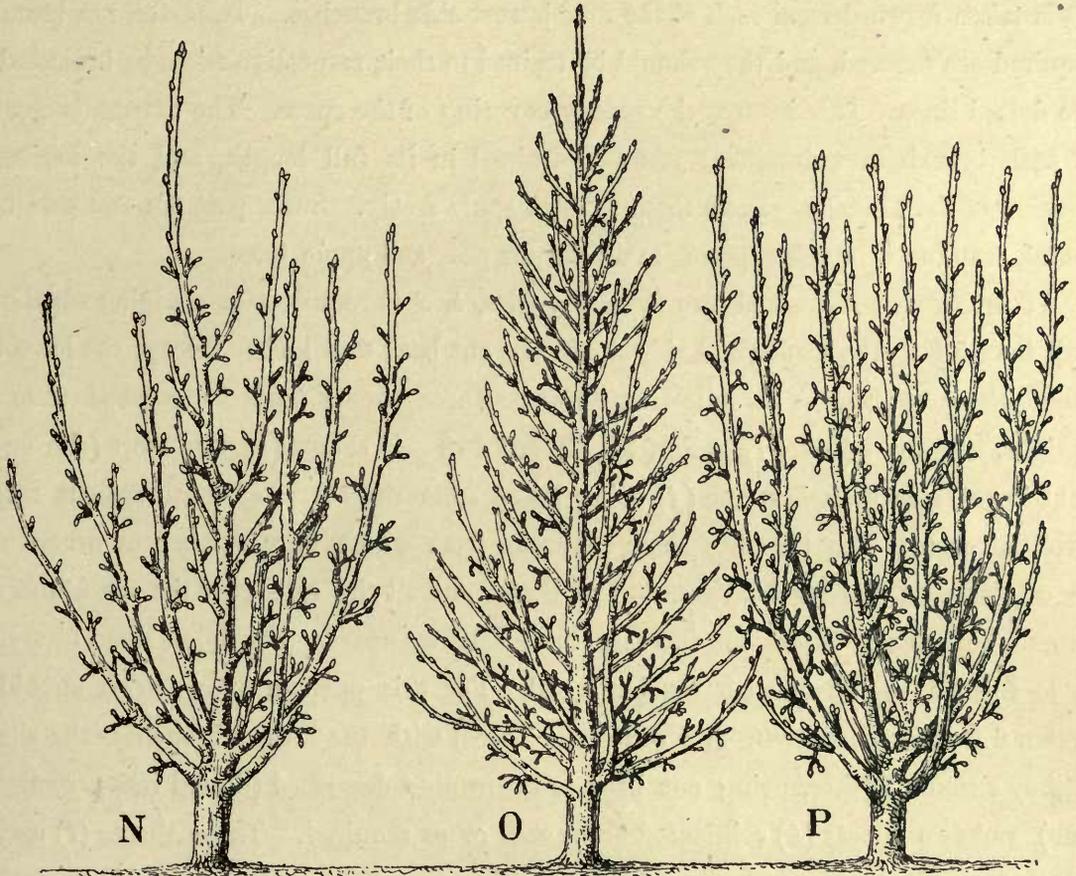


Fig. 34. BUSH (N), PYRAMID (O), AND COLUMNAR (P) PEAR TREES.

pears for espaliers and walls. The maiden tree intended to be trained in fan shape should be cut down as advised for the horizontal tree, page 16, Vol. II., and treated in the first year exactly as is there portrayed in Fig. 9, *W*. In the autumn the three shoots should be cut back to 6 inches, and three growths secured on the upright stem, also two each from the side branches the following summer, training the leader upright, and the side growths at an angle of 45° , all others to be stopped at the third leaf, and to one afterwards throughout the season. The growths may be secured to an improvised stake

trellis. The tree has now six young branches and a leader, and is termed a two-years-trained fan as received from the nursery. Assuming that the tree is intended for an espalier, say of five wires 1 foot apart, and is planted in the autumn when the leaves have fallen; the leader (*a*) (Fig. 35, *Q*) and the two upper side shoots (*b*) are cut back to 6 inches, as shown in their detachment, the two lowest (*c*) on each side of the stem being trained as represented. Two growths (*d*) should be secured from the upright branch in the following summer, and two (*e*) from each of the upper side branches, whilst a shoot (*f*) is taken forward from each of the four lowest side branches. Thus the ten branches required are secured, and they should be trained to their respective wires as indicated by the dotted lines. This insures the speedy covering of the space. The extremity growth of each branch in subsequent years is trained in its full length, and the horizontal position of the branches causes them to form spurs freely. Such, part fan and part horizontal, training is much superior to all fan for pear and apple trees.

If the two-years-trained tree (Fig. 35, *Q*, *a*, *b*, *c*) is required for a higher espalier or wall than 5 feet, the leader and side shoots are cut back to 6 inches, except the lowest on each side as shown. The following summer three shoots must be secured from the upright, namely, a leader (*g*) (Fig. 35, *R*), and two side shoots (*h*), two more (*i*) from the next lower side branches, one (*j*) being taken from the other, as continuations respectively of each. The tree has then branches from which any number of others may be originated to cover the space. The leader and all the side growths are allowed to extend, but as the extensions increase their distance apart, other shoots must be trained in to furnish the space with bearing wood. For this purpose a semicircle should be drawn 6 feet in diameter from a centre on a level with the lowest branches, the shoots, if they extend farther, being cut back to the radius described (dotted inner semicircle line), and two shoots (*k*) originated from each or as required. Three shoots (*l*) may be taken from the leader, and where there is only room for a continuation (*m*) no forking should be attempted. To insure the regular disposal of the branches, another semicircle should be drawn 3 feet from the first, and the half-radius divided into feet, commencing at the horizontal branches (*m*), then proceeding upwards as indicated by the crosses, where the branches can be doubled so as to give the requisite number.

Fan training can be practised by the least initiated in gardening matters. Its principle is training in a shoot so as to cover the trellis or wall space regularly in every part with branches at a proper distance asunder, and so disposed as to admit light equally. The great defect of fan training consists in the upper part of the branches growing more

than the lower, this giving a preponderance of wood, interfering with the productiveness of the tree. To obviate this defect, when the leaders of the branches reach the semi-circle they may be trained horizontally, as shown in Fig. 35, *S*, thereby concentrating the vigour on the parts producing the finest fruit.

Horizontal Training.—This popular method is appropriate for espalier or wall trees. An espalier fence on which to train pear trees may be formed by straining wires horizontally 1 foot apart, on a framework 6 feet high. The tree is trained with an upright stem, and six branches on each side. Supports for the trees are often formed of wood posts and rails, or stout upright stakes. Horizontal training is extensively practised with

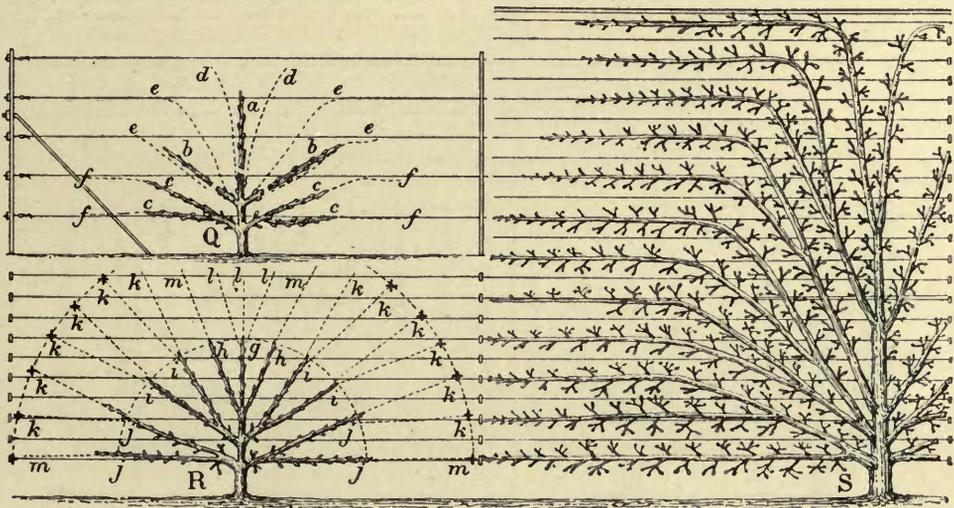


Fig. 35. FAN TRAINING FOR ESPALIER AND WALL TREES.

References:—*Q*, two-years-trained tree for espalier, showing pruning: *a*, leader; *b*, side shoots; *c*, unpruned side growths; *d*, shoots originated from leader; *e*, growths from side branches; *f*, continuation growths. *R*, three-years-trained tree for wall, showing: *g*, leader; *h*, last year's side shoots from the stem; *i*, shoots from shortened side branches; *j*, continuation growths from unpruned branches; *k*, branches forked at the radius; *l*, shoots originated from the leader at 3 feet from the lowest branches; *m*, continuation growths of branches; +, division of second radius into feet. *S*, tree on 12-foot-high wall with the branches trained partly fan and partly horizontal.

pear trees on walls, and is fully described on pages 15—19, and shown in Figs. 9—10, Vol. II. When the walls are high, riders, planted midway between the permanent trees, may be trained as circumstances admit. This utilises the space, but they must be cut away when the other trees require the space.

"Toasting-Fork" Trees.—A three-branched tree has received this fanciful appellation. It is formed by cutting a maiden tree to 1 foot from the ground, reserving three of the growths that push, and rubbing off the rest. The central growth should be topped at 9 to 12 inches about midsummer, but not the two side growths, and of the shoots that

push afterwards the uppermost should be trained upright, pinching others to one leaf. This will cause the two main side shoots to become longer and stronger, which is very desirable, so that when they are brought into a horizontal position to the extent of about 9 or 10 inches, and then trained upright about 1 foot on each side of the central shoot, the ends of the three branches composing the "toasting-fork" tree will be as nearly as possible on the same level. The chief thing to aim at in these trees is equality of vigour, this being effected by stopping the strongest of the three leaders at about 12 inches of growth, training one of the shoots that push as an extension, suppressing all side growths at the third leaf and to one afterwards. It is a useful form for piers or

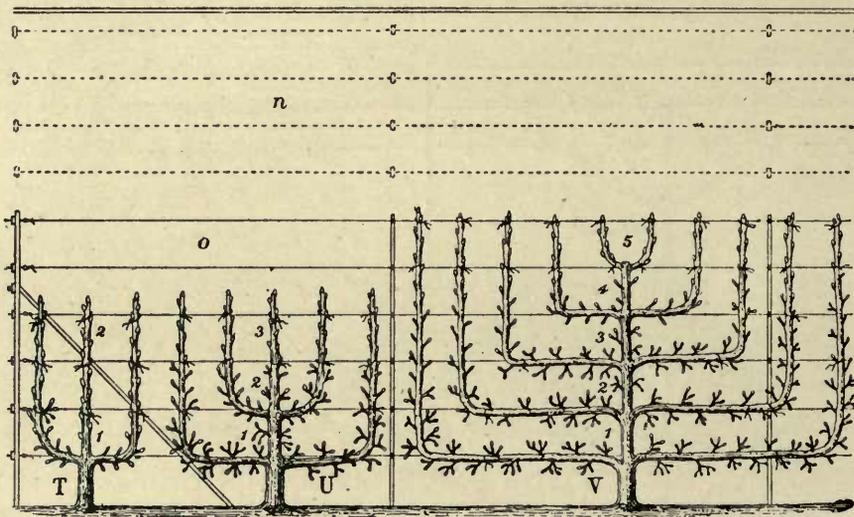


Fig. 36. TOASTING FORK (T), CANDELABRA (U), AND PALMETTE VERRIER (V) TRAINED PEAR TREES.

References:—*n*, wall, 10 feet 6 inches high; *o*, espalier, 6 feet in height. The numerals refer to the years of training.

pillars, also for limited space, or where variety is required on low walls or espaliers, and is shown in Fig. 36, *T*.

Candelabra.—This form represents the horizontal and upright modes of training combined. The branches are originated and trained in the first instance on the principles above described. When the first pair of horizontal branches have extended 2 feet from the stem they are trained upright, and the second tier of horizontal branches are trained upright, 1 foot on each side of the stem or leader, as in the "toasting fork," taking care to have all the extremities on a level. Such is the candelabra tree of five branches, Fig. 36, *U*.

Palmette Verrier.—In this form of tree the branches are originated and trained similar to the horizontal until sufficient tiers are obtained to ultimately cover the allotted

space with uprights at 1 foot asunder, as shown in Fig. 36, *V*. It is a pleasing and productive form for espaliers and walls.

Upright Training.—Pear trees may have one stem (Single Vertical Cordon, Fig. 13, *A, B, C, D*, page 23, Vol. II.), a stem to a height of 1 foot, then a head of two branches (Double Vertical Cordon, Fig. 11, *B*, page 20, Vol. II.), or several branches equidistant on each side of a stem about 1 foot in height, a quartette having four, and a sextuple tree having six, branches. The latter form is shown in Fig. 11, *C, D*, page 20, Vol. II., and details of training are given on pages 19—21. Trees in the forms mentioned are good for espaliers, trellises, or walls.

Cordons.—These may be Single Horizontal (Fig. 12, *E—K*, page 22, Vol. II.), or

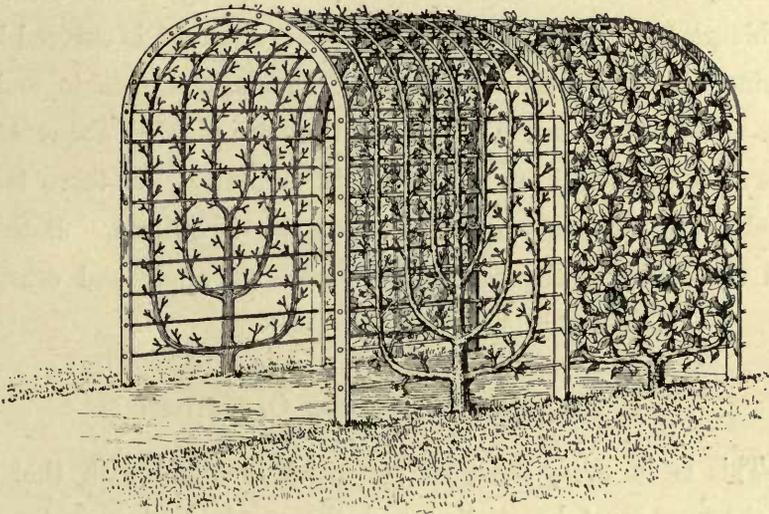


Fig. 37. ARCHED TRELLIS FOR PEAR TREES OVER GARDEN WALK.

Double Horizontal (Fig. 12, *I*), but with an upright instead of an inclined stem. Particulars for forming these admirable forms for edgings to garden paths are given on pages 21—23, Vol. II. The Single Vertical Cordon is shown in Fig. 13, *A—D*, and details essential to its formation will be found on pages 23—25, Vol. II. A Double Vertical Cordon has two branches (Fig. 11, *B*, page 20, Vol. II.); otherwise the formation is the same as that of the Single Cordon. Both are excellent shapes for walls or espaliers. Diagonal Cordons are the most suitable forms for low walls or espaliers. Single Diagonal Cordon training is represented in Fig. 14, *G—K*, and fully explained on pages 25 and 26, Vol. II. Double Diagonal Cordon trees have two instead of one leading branch, the principles being otherwise identical.

Pear Walks.—A portion or the whole of the main walk in a garden covered with pear

trees, trained to an arched trellis, provides a shady promenade and utilises the space. Galvanised-iron bars, $1\frac{1}{4}$ inch wide by $\frac{5}{16}$ inch thick, fixed 3 feet apart, span the path, and horizontal bars, $\frac{7}{8}$ inch diameter, 1 foot apart, form the trellis. The sides should be perpendicular, not less than 5 feet in height, and the rise of the archway be half the width of the walk. Therefore an arch over a 4-foot path would have the span in the centre 7 feet, and that of a 6-foot walk 8 feet above the pathway. The trees are planted against the outside of the trellis, at the distances named for espaliers or walls, and may be trained in any form.

Pear Arbours.—These consist of the arched portion of a pear walk, that part only being provided with horizontal bars, and covered with the branches of the trees planted at each side, training them with clean stems to the spring of the arch. Trees on the quince or double-grafted answer admirably. When the roof is covered by the trees the walk is charming when they are in blossom, the shade agreeable, and the depending fruit attractive whilst it remains. If pyramid trees are planted about $4\frac{1}{2}$ feet from the walk and midway of the openings, the effect is delightful, as there is the advantage over a pear walk of a look-out, whilst the walk space is utilised. Both the pear walk (Fig. 37) and the arbour walk are as appropriate for apple and other fruit trees as for pears.

PRUNING AND ROUTINE OPERATIONS.

Pruning.—This is in every essential particular identical with that of apple trees. The habits of the trees must be studied, and the manipulations performed according to their individual condition, having strict regard to the axioms set forth on page 29, Vol. II.

Trees trained in pyramid, bush, goblet, fan, horizontal, upright, or modifications of the last three forms, namely, combined fan and horizontal (Fig. 35, *S*, page 135), toasting-fork, candelabra, and palmette verrier (Fig. 36, *T, U, V*, page 136), and cordon forms, are pruned on the restrictive system. "Summer Pruning" is given in Vol. I., pages 163—165: illustrations, page 164; "Winter Pruning," pages 169—170; "Pruning Spurs," pages 170—172: illustration, page 171. "Lifting Fruit Trees," pages 172—173, has special application to trees on the quince and those limited to space. Trees in the cup form, Vol. I., pages 179—180; forked, pages 180—183; open bush, Vol. II., pages 14—15; low standard or standard, pages 26—28; also those in bush, pyramid, and columnar forms (Fig. 34, *N, O, P*), are pruned upon the principles given

under "Open Bush," Vol. II., page 14; and root-pruning, as applicable to these forms on what is termed the extension system, is given in Vol. I., pages 174—178). This system is mostly practised on trees grown for commercial purposes in fruit plantations,

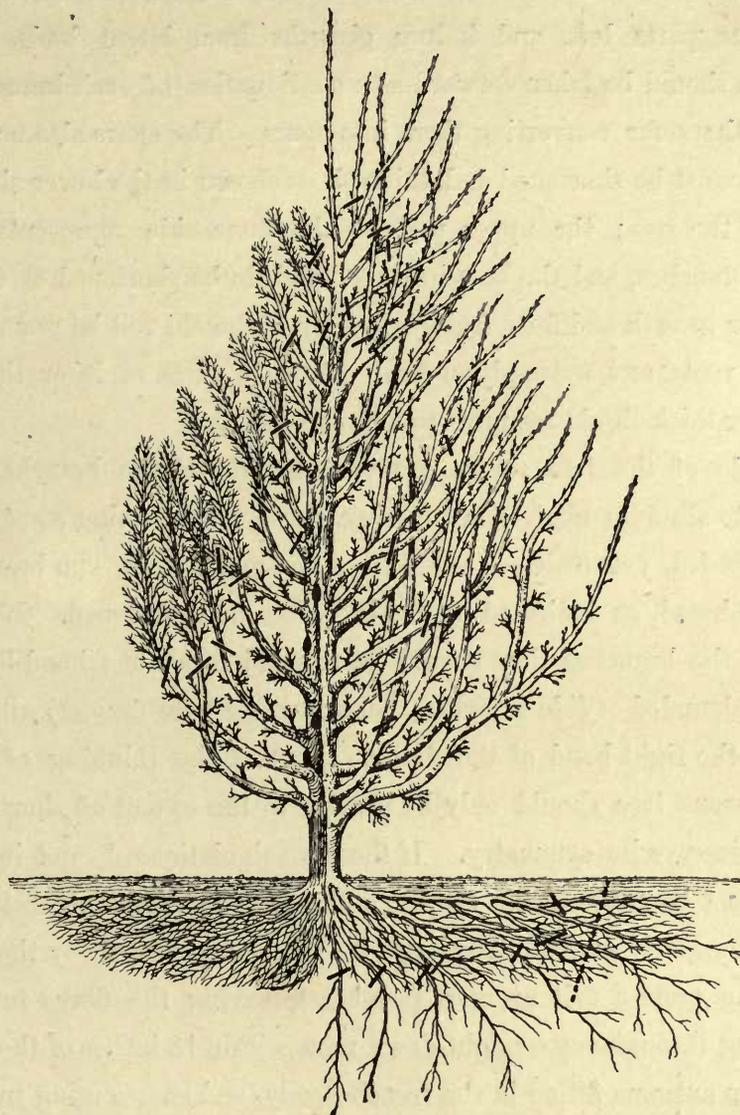


Fig. 38. RESTORING AN ENFEEBLED TREE TO VIGOUR, AND TRANSFORMING A LUXURIANT TREE INTO A FRUITFUL ONE.

but it is suitable for trees in gardens where space can be allowed and the cultivator cannot devote much time to the pruning of his trees.

Limited as trees in gardens are to space, the restrictive method better utilises a small area; yet the trees often become stunted masses of closely-set spurs, prolific only in weak blossoms and small leaves. To avoid this outcome of severe branch and root

restriction the spurs should be severely thinned, so as to secure stouter blossoms, a surer setting of the fruits, with larger leaves, and the concentration of energy on fewer parts. When a tree gets into the condition of enfeeblement shown (Fig. 38, page 139) on the left hand above the bars, it is advisable to thin the branches, cutting them back to strengthen the parts left, and induce growths from latent buds. One of the resultant growths should be taken forward as a continuation of each branch, disbudding or stopping the others for converting them into spurs. The spurs also on the parts of the branches left must be shortened and thinned, as shown in the lower six branches on the left hand of the tree; the upper part on the same side represents the crowded condition of the branches, and the bars indicate those to be shortened or cut out. This will result in freer growth and finer fruit, especially if the old soil be removed from over and amongst the roots, and a supply of fresh added in place of it, or the soil may be enriched by rather thick liquid manure applied in winter.

The right side of the tree shows a crowded state of the branches, not due to stuntedness, but to absolute neglect in thinning, the growths being somewhat long and the spurs not crowded, yet fruitless, for lack of air and light. The branches in such cases should be thinned, as indicated by the bars, but not shortened. If the spurs are closely placed on the branches they should be thinned to about a hand-breadth apart; then a branch so denuded of side growths (that are worse than useless) will resemble the lowest branch on the right hand of the figure. Beyond the thinning of the branches and spurs a vigorous tree should only be pruned to the extent of shortening irregularities so as to preserve its symmetry. If those manipulations do not induce fruitfulness, a trench must be made about the same distance from the stem that the branches of a pyramid or bush tree extend, detaching the roots as indicated by the outline; also shorten the strong roots a foot or more (see bars), leaving the fibres intact inside the trench, and cutting through any straight-down roots within 18 inches of the surface. This is best done in the autumn, filling in the trench firmly, and encouraging surface roots by a light mulching of lumpy manure from the stem to the outside of the branches. By the means described enfeebled trees may be restored to a healthy profitable bearing condition, whilst those which have a tendency to produce timber instead of fruit may have their vigour subdued and consequently be rendered more productive.

Manuring.—Under “Applying Manures,” Vol. I., pages 51—56, special reference is made to this subject. Pears require similar nutrient elements to apple trees, but are more exacting of potash and phosphoric acid, also lime. The pear, however, succeeds

on a siliceous or calcareous gravelly soil, where the apple does not thrive without free mulchings of stable or farmyard manure, and flourishes better than any fruit, except the cherry, in comparatively poor soils. Pear trees in gardens are often unfruitful through the soil being made too rich by heavy dressings of stable or farmyard manure, whilst trees in orchards produce heavy crops of small and inferior fruit. This is mentioned so that a due apportionment of the available manure may be supplied to orchard trees instead of surfeiting those in the garden with it. When a tree is in good growth it will not require nitrogenous farmyard manure, and if stimulants to fruiting are desired care should be taken to supply phosphatic and potassic elements, with a due proportion of lime. Instead of coating the ground once a year with stable or farmyard manure, and digging it in about fruit trees that produce little beyond spray, the soil should not be disturbed, and the manure go elsewhere, whilst a dressing of Thomas's phosphate, $\frac{1}{2}$ ton per acre, 7 pounds per rod, 4 ounces per yard, should be applied in the autumn or when the buds commence swelling in spring. Where the trees have a tendency to late growth and immaturity of the wood, supply lime, $\frac{1}{2}$ bushel per rod, 80 bushels per acre, in the autumn or spring, pointing it in lightly.

Trees in poor soils, or when exhausted by bearing, should have some decomposed manure, 40 cartloads (30 bushels each) per acre, $7\frac{1}{2}$ bushels per rod, 1 peck per yard, spread on the surface and left there, or be merely pointed in early in the spring. Such a dressing is sometimes necessary annually where the trees bear heavy crops of fruit yearly, and make little growth. In good soils about half the quantity of manure suffices, and in many cases is only needed every second or third year, according to the condition of the trees.

Of chemical manures, the following mixtures are recommended for pear trees:—

1. Kainit and bone meal in equal parts by weight, mixed, 2 ounces per square yard, $3\frac{3}{4}$ pounds per rod, 5 hundredweights per acre, spread over the ground under the branches and a foot beyond their extension, in the autumn, and lightly pointed in.
2. Superphosphate of lime, 9 pounds; nitrate of soda, 6 pounds; mix, and supply $1\frac{1}{2}$ ounce per yard, $2\frac{3}{4}$ pounds per rod, $3\frac{1}{2}$ hundredweights per acre, when growth begins in spring, and if the trees set a heavy crop of fruit another application of the mixture may be given when the pears are about a quarter grown.
3. In light soils, mixture No. 1 may have the kainit increased, say kainit 3 parts, bone meal 2 parts, to be applied in the autumn; then supply nitrate of soda when growth begins in spring, again when the fruit is set, and a third time before it is half grown, $\frac{1}{2}$ ounce per yard, 15

ounces per rod, 150 pounds per acre, at each dressing to trees carrying full crops. Trees that produce little fruit and make enough wood do not require nitrate of soda; therefore, the cultivator must be guided by the growth and the crops. Soils that contain enough potash, as most strong loams do, should be treated with No. 2 mixture only; where the soil has become deficient in potash by the prolonged annual heavy crops of fruit, No. 1 mixture should be applied in autumn, and be supplemented by No. 2 mixture in spring.

Mulching.—This is a great aid to the health of the trees, and the perfecting of their crops in light, shallow soils. It should be applied soon after the fruit is set, and be added to from time to time through the summer until September. Heavy soils only require mulching on the setting in of dry, hot weather to conserve the moisture, and prevent parching and cracking of the surface. An inch thickness of lumpy material is all that is necessary in ordinary seasons, too heavy mulchings doing more harm than good. (See "Mulching," Vol. I., page 57.)

Watering and Feeding.—Watering pear trees is little practised, but it is a necessity for those on the quince in hot and shallow soils, also for trees in hot and dry positions, for instance, on walls and fences. Judicious waterings in periods of drought secure large juicy fruit; neglect to supply them, and the fruit becomes mealy or swells indifferently. Water should be given before the soil becomes too dry for healthy growth, affording adequate supplies from June to September inclusive. (See "Watering," Vol. I., page 57.) Liquid manure should be given in the early stages of the fruit swelling, and continued as occasion requires, until it is full grown. Rich liquid materially assists trees carrying full crops. It is best given after the soil has been moistened by watering or rain, for when poured on parched and cracked soil it is simply wasted. (See "Liquid Manure," Vol. I., page 56.)

Syringing.—Except in suburban gardens and on land adjoining dusty roads, pear trees do not require washing with the syringe or garden engine, for with proper supplies of water and nourishment the foliage seldom suffers from red spider. In the locations named, copious washings with clear water refresh and cleanse the leaves and fruit in dry periods, but they must not be practised too often, once or twice a week being all that is necessary to keep the foliage free from sooty and dusty accumulations, so that it may duly perform its functions.

Preserving the Buds.—Although bud-destroying birds pay less attention to pear buds than those of other fruit trees and bushes, they sometimes commit great havoc,

especially the bullfinch and great titmouse, with occasionally the assistance of sparrows; and the means given on pages 191—192, Vol. I., must be had recourse to in proper time.

Protecting the Blossom.—Pear blossom expands so early in spring and in many varieties is so tender as to be damaged by frosts; hence the crops are frequently thin and sometimes absent. Nothing less than efficient protection of the blossoms against frosts can insure constant and full crops of fruit. Various means of affording shelter to the blossom, adaptable to the several forms of pear trees, are given in Vol. I., pages 193—197.

Thinning the Fruit.—Growers like to see their trees heavily laden with fruit. This may be of three kinds:—1, an overcrop of worthless fruit exhausting the trees; 2, a heavy crop unthinned, and the fruit of second or third-rate quality; 3, a full crop thinned, all the small and ill-shapen fruits removed early, so that those left attain a full, even size. There is no reason why English pears should not be at least equal in size and quality to those of other countries. It is only a question of thinning and culture. It is sheer folly to leave a bushel of fruit on a tree that is only capable of bringing a peck of the choicest to perfection without prejudice to the succeeding year's crop. One reason why imported pears are large is because thinning has been attended to, while home-grown fruits are absurdly small because thinning has been neglected. To secure fine fruits the number left on each tree must be adjusted to its strength and the assistance the grower gives in bringing the crop to perfection. As to the number of fruit to leave, 1 pound per square foot of wall surface may be taken as a maximum crop, that is, six to eight fruits of the small, three to five of the medium, two or three of the large, and one of the very large varieties. Quality is the cardinal property in a pear, and two or three well-grown fruits are more profitable than a dozen small ones of the same variety.

In thinning, the fruits should be cut off with scissors, and in removing all from a cluster, care must be taken to preserve the leaves, for these small, long, narrow leaves have incipient buds or spurs nestling around their base, and, thus relieved of feeding the fruit, their energies are concentrated on those buds, plumping them so as to insure a good prospect of fruit the following year. Moderate cropping means perpetuating fruitfulness.

Protecting the Fruit.—Special care must be taken of the fruit as it approaches maturity, especially the summer and autumn varieties, for birds are addicted to pecking the stem end of the fruit when the ripening process commences and often spoil the best part of the

crop in a short time. A method for protecting pears is given in Vol. I., pages 200—202. A strip of cotton wool tied loosely round the stem end of the fruit acts as a deterrent. Wasps also are destructive to summer and autumn pears, and should be destroyed by the means described on page 279, Vol. I. Pecked pears will not keep, and the small holes made by wasps cause the fruit to decay. Some growers enclose specimen pears in coarse muslin bags, and thus preserve them from injury.

Large pears are liable to be blown down by the wind, or some drop naturally before the whole are ready to be gathered; their falling to the ground is prevented by small net bags, fitting moderately close, as the pear is not suspended so well if the bag is too large.

Gathering.—This important work is treated in Vol. I., pages 202—203. Summer pears, such as Summer Doyenné, Clapp's Favourite, Beurré Giffard, Jargonelle, Williams' Bon Chrétien, indeed all that ripen before October, are better in quality if gathered before they are quite ripe, but they must not be taken too soon or the fruit will shrivel. When the fruit shows indications of ripening, and if gently lifted, parts readily from the tree, it will usually be full-flavoured, juicy, and sound after a few days' maturing in a cool room. Autumn pears require similar treatment, not waiting until the fruit drops, for bruised pears will not keep. Late pears must not be gathered too soon, or they will shrivel; at the same time they must not remain to be frozen, or their quality will be impaired, but a "touch" of frost does no appreciable harm, and after it the fruits are more easily detached at the nodes of the footstalks. From the middle of October to the early part of November is the usual period for gathering late pears, but locality and season must be taken into consideration. Choice pears should only be handled by the stalk in gathering, so as to preserve the bloom, and thus laid on trays or in padded baskets in a single layer, carrying them at once to the store-room. Market pears cannot be too carefully gathered; shaking them off the trees causes more loss from decay than would suffice to cover the cost of proper gathering twice over.

Storing the Fruit.—This subject has been liberally treated on pages 203—214, Vol. I.; therefore it must suffice to remark here that the long and sound keeping of pears depends on a cool, regular, moderately dry, dark atmosphere, too much moisture causing the fruit to speck and decay, while a dry and light place either results in shrivelling or premature ripening. The cooler and more air-proof it is kept, the longer the fruit will remain sound, a temperature of 40° to 45° being suitable, but freedom from frost is absolutely necessary. For further particulars of storing and ripening, see the pages above quoted.

CULTIVATION UNDER GLASS.

Splendid fruits are produced by trees grown in pots, flowered, and kept in a cool house until the weather becomes settled in June, when they are placed in a sheltered yet sunny position outdoors, plunging the pots to the rims in ashes to keep the trees steady and save watering. A crop of high-quality pears is secured by this method almost with certainty. Surface feeding is an absolute necessity for trees in pots,

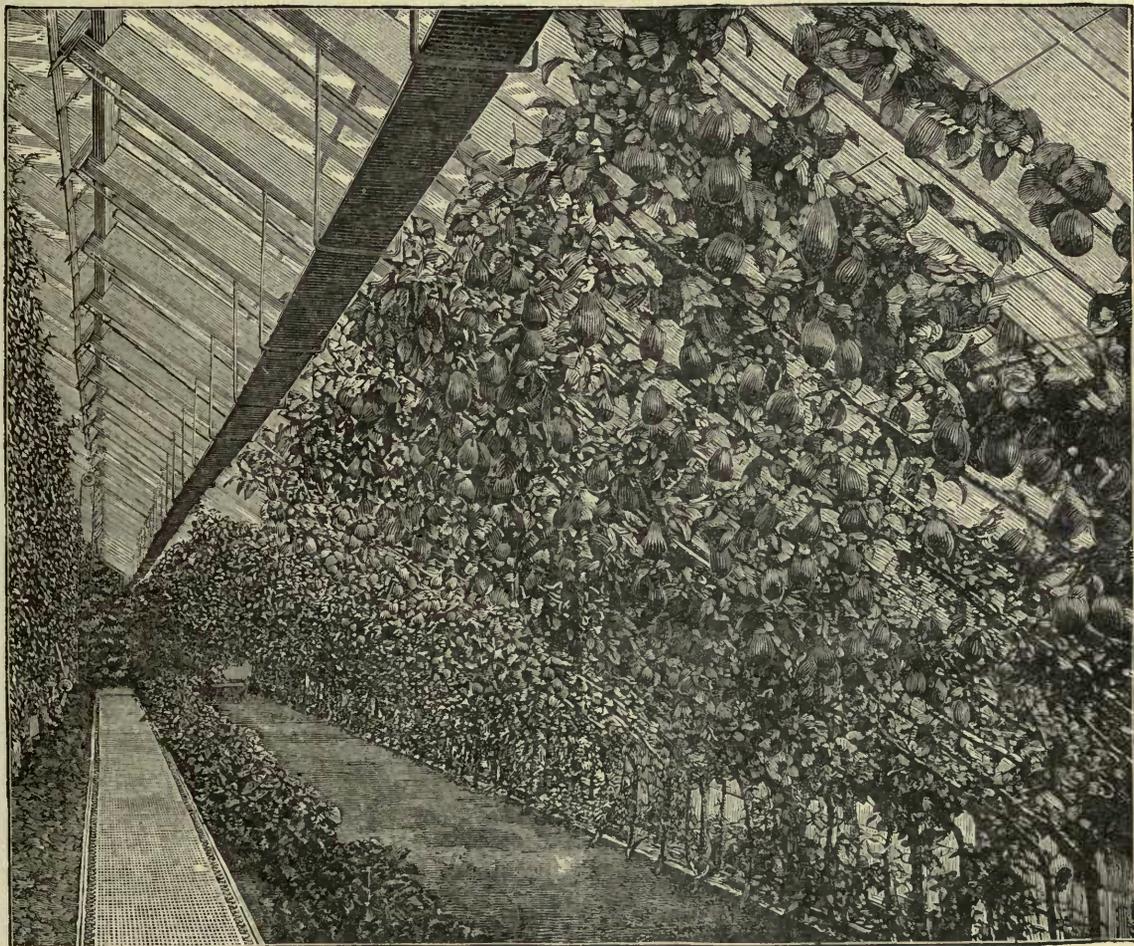


Fig. 39. PEAR HOUSE AT LAMBTON CASTLE GARDENS. (From the *Journal of Horticulture*.)

manure and turfy loam being placed on the surface and retained by zinc collars about 4 inches deep placed inside the rims, or strips of slate inserted round the edge of the pot. This considerably enlarges the rooting area, the trees and fruit receiving more nourishment accordingly. Mr. J. Hunter, of Lambton Castle gardens, has grown a fruit of the *Beurré Diel* pear which weighed 36 ounces, gathered from a potted tree. The

manurial dressing is repeated once or twice in the summer, and cleared off with all the small roots in it in the autumn, a partial renewal of the soil, also clean drainage, being given at the same time. By that practice a pear tree will bear well in a 10-inch or 12-inch pot for many years. During the winter the trees are quite safe outdoors, plunged over the rims of the pots in ashes, placing them in an unheated glasshouse before the flowers expand in the spring. The house cannot be too freely ventilated, except when frost prevails, and in June the trees are placed outside as above stated. In addition to the surface dressings of manure, the trees should be supplied with liquid manure twice or thrice a week, and have a sprinkling of chemical manure occasionally, superphosphate of lime, soot, and guano being useful; also the mixtures given on page 141. They must be kept free from red spider and other insect pests.

In cold districts and near large towns, where dust and sooty deposits interfere with the production of clear-skinned fruit, pear growing is easy under glass. A lean-to house facing south-east to south-west, sufficiently high and wide to admit of a pathway at the back, and provided with a trellis 1 foot from the glass, is suitable. By employing cordon trees planted 15 inches apart inside the house a great variety and long succession of fruit can be had from a small house, the trees being trained up the trellises like vines. Lean-to houses 12 feet or more in width may have trees planted at the front, training them if desired to a curved trellis, so as to favour trees on the back wall, which may be occupied with either pears, peaches, or nectarines as shown in the illustration (Fig. 29, page 99). Strawberries in pots may also be well grown on a shelf near the roof in the same house.

The pear house (Fig. 39), facing south-east, is 324 feet in length, but only about 125 feet are shown. Mr. Hunter, the grower of the pears, writes:—"No fire heat is employed, nor is it necessary for pears under glass, as closing the house in the afternoon is sufficient to get them large enough for all purposes. The bulk of the pears are from 15 to 30 ounces in weight, and the flavour is much improved by giving plenty of time and air in ripening. I find all the gritty section of pears, such as Beurré Diel, greatly improved by a little heat; they do well in a midseason peach house, and for ten years I have a tree that has never missed its crop. . . . These last two years we have gathered pears in June from trees in pots. These are started in February in one of our vineries, and allowed to remain there until the foliage of the vines deprives them of the amount of light necessary for their well-being, when they are shifted into a cooler house. Our first fruits are afforded by Blanche Claude, Citron des Carmes, Summer Doyenné, Dr. Delafosse, and Dr. Jules Guyot; earliness is the principal consideration.

“For *August*, in our cold house, Jargonelle, Beurré Giffard, Clapp’s Favourite, and Beurré de l’Assomption are grown. In *September* we have Williams’ Bon Chrétien, Summer Beurré d’Aremberg, Beurré d’Amanlis, Beurré Superfin, and Souvenir du Congrès. *October*, Louise Bonne of Jersey, Fondante d’Automne, Jersey Gratioli, Beurré Hardy, King Edward’s, Thompson’s, and Brown Beurré. *November*, Doyenné Boussoch, Marie Louise, Maréchal de Cour, Beurré Bose, Brockworth Park, Grégoire Bourdillon, and Van Mons Léon Leclerc. *December*, Baronne de Mello, Glou Morçeau, Pitmaston Duchess, Doyenné du Comice, General Todleben, Durondeau, Duchesse d’Angoulême, Marie Louise d’Uccle, Émile d’Heyst, Prince Consort, Beurré Clairgeau, Beurré Diel, Beurré Bachelier, Beurré d’Anjou, Beurré d’Aremberg, Passe Colmar, and Princess. *January*, Winter Nelis, Marie Benoist, and Knight’s Monarch. *February*, *March*, and *April*, Passe Crasanne, Bergamotte Esperen, Napoleon, Easter Beurré, and Beurré Rance. For cooking purposes I grow Bellissime d’Hiver, Catillac, and Uvedale’s St. Germain. These are all planted out, as the engraving represents, although many more are grown in pots.”

Many of the handsome specimens seen at shows are grown under glass. An amateur carries off the chief prizes for pears at a local show by growing his trees in 10-inch pots, placing them under a verandah at night when in blossom and there is a prospect of frost, standing them outside in the daytime when mild, and when frosts are gone the pots are plunged in a warm situation outdoors, where they remain until the following spring. Another amateur grows his prize pears in a similar manner, sheltering them in an outhouse in spring, and plunging the pots in summer in a warm garden with a south aspect, and secures handsome, juicy, full-flavoured fruits. Many other amateurs may do likewise.

For large supplies of fruit a house similar to that shown, Fig. 17, page 33, Vol. II., may be employed, and the forms in which the pear trees are grown is a matter of taste. Guidance, however, on that point, and the routine management of apple trees planted in borders or grown in pots are given in Vol. II., pages 32—36, and pears require exactly the same treatment. All the varieties of pears named for exhibition may be cultivated with great advantage under glass.

DISEASES OF PEARS.

Canker.—The form caused by the fungus, *Nectria ditissima*, is less prevalent in pear than apple trees, and has been fully treated in Vol. I., page 229. Other cankerous

affections afflict both apple and pear trees, the smaller branches and twigs having scaly swellings partly or wholly encircling them. These swollen parts may be caused by the poison of a gall-producing insect, the ravages of fungi, or a chemical change in the nature of the sap. Canker is generally attributed to ill-nutrition, cold, wet, and heavy soils. Whatever is amiss with the soil and the management must be rectified before improvement can be looked for in the trees. (See "Canker," Vol. I., page 229.)

Spot on Shoots and Leaves.—This is caused by a fungus, *Roestelia cancellata*, Reb. (see Fig. 40). Its appearance on the leaves consists of large raised spots or patches, yellow at first, but soon becoming red, and visible on both surfaces. The peridia,

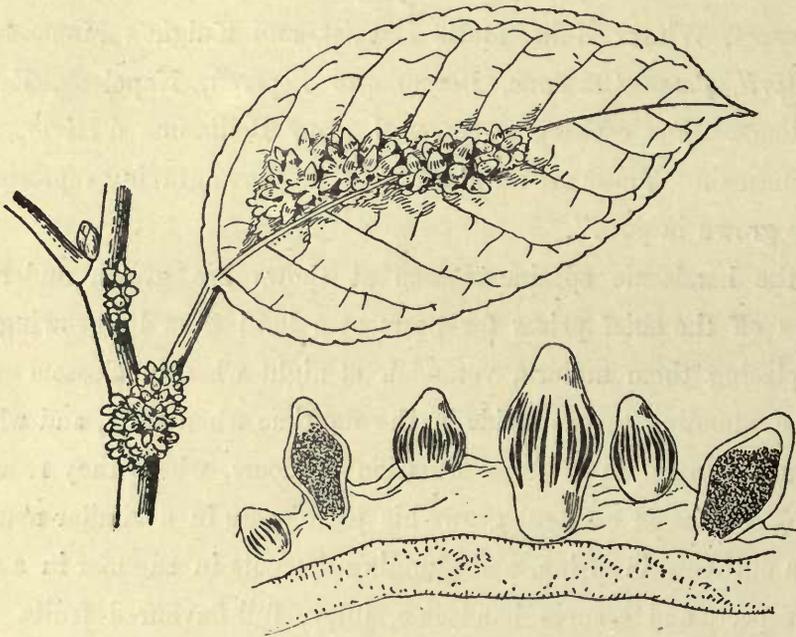


Fig. 40. ROESTELIA CANCELLATA ON PEAR LEAF AND STEM. SECTION OF LEAF BELOW, WITH PERIDIA ENLARGED—FOUR IN ELEVATION, TWO IN SECTION.

situated on the lower surface, contain minute spores, which escape when mature. These spores are believed to be the cause of the fungus (*Gymnosporangium Sabinæ*) found on savin (*Juniperus Sabina*), and the spores of the latter fungus give rise to the *Roestelia cancellata* on pear growths. Savin, therefore, ought not to be grown near pear trees. All diseased pear leaves should be removed directly they become spotted or blotched with red, and burned. This must be done before the spores are dispersed. The only preventive is to spray the trees as advised for "cracking in pears."

Cracking in Pears.—The typical form of the fungus causing "cracking" in apples is *Cladosporium* (*Fusicladium*) *dendriticum*, and is fully described in Vol. I., page 238.

The form now under consideration is far more disastrous to pears than to apples. It is called *C. dendriticum pyrinum*, and shown in Fig. 41.

Efforts must be directed to prevention. Cultural treatment with that object should consist of efficient drainage, improvement of the soil's staple, and careful lifting of the trees. Those liable to attacks of the fungus ought to be sprayed when the trees are dry with a solution of sulphate of copper, 1 pound to 25 gallons of water, just before the blossom buds commence swelling. When the trusses of bloom appear, and before the flowers expand, the trees should be sprayed with Paris green, 1 pound to 260 gallons of water, in which enough limewash, made by slaking quicklime in a tub, and forming into a rather thin whitewash, has been stirred to give it a slightly milky appearance. If the mixture be employed on apple trees it must be diluted to 320 gallons. The spraying should be repeated as soon as the fruit is set, again a fortnight afterwards, and another treatment given in three weeks. Three sprayings suffice, as a rule, for apples, as the fungus does not attack them so early nor so malignantly as it does pears. The Paris green mixture is equally a preventive and curative of insect pests that feed on the foliage and young fruits.

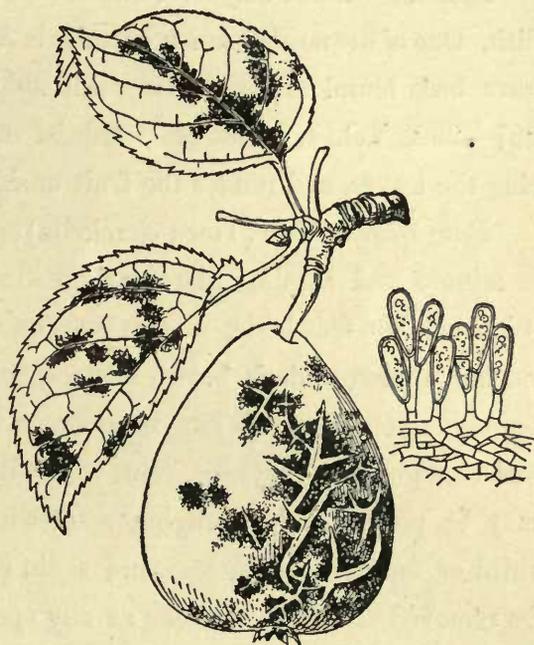


Fig. 41. FUNGUS (*CLADOSPORIUM DENDRITICUM PYRINUM*) ON PEAR LEAVES AND FRUIT. MYCELIUM AND "FRUITS" OF FUNGUS ON THE RIGHT, ENLARGED.

Speck.—Described on pages 36—38, and illustrated on page 37, Vol. II. Further reference to this fungus (*Oidium fructigenum*) need only be made to its sometimes appearing after the spraying against cracking has been relaxed, and to point out a method for preventing attacks. This consists in spraying the trees with a minim Bordeaux mixture, made by dissolving 4 ounces of copper sulphate in about 4 gallons of water in one vessel, slaking 4 ounces of freshly burned lime in another, forming a thinnish limewash, then pouring it through a hair sieve into the vessel containing the copper solution, mixing thoroughly, and diluting to $7\frac{1}{2}$ gallons altogether. This and all such mixtures should be tested for free copper by Dr. G. Patrigeon's method: Dissolve $\frac{1}{2}$ ounce of ferrocyanide of potassium in 2 or 3

ounces of water, place in a bottle, and keep corked. A few drops of this solution added to the Bordeaux mixture immediately give it a brown colour if it contain free copper, and it is then unsafe; but if there be no reaction when the ferrocyanide solution is added, the mixture may be safely used. The mixture is equally efficacious against other fungi. For "speck" it need not be employed after the first week in August, and only then on late pears.

PEAR INSECTS.

Aphides.—These may be so abundant as to entirely cover the foliage and fruit with filth. One of the most common enemies is *Aphis pyraria*, but *A. lentiginis* and other species have been found on pear trees. All aphides succumb to the treatment given on pages 257—262, Vol. I. The pests subsist on the juices of the young wood and foliage, clog the leaves, and render the fruit unsightly.

Pear Blister Moth (*Tinea clerckella*) appears at the end of May or beginning of June, is minute and shining like pearly satin, wings orange, spotted with black and other colours. The female deposits its eggs on the foliage, and the larvæ penetrate the leaves, raising numerous dark brown blisters, continuing to feed on their substance till September, when the grub lets itself down to the ground, spins a cocoon on a fallen leaf, and changes to a chrysalis, from which it emerges as a moth in early summer. Attacks may be prevented by spraying them with petroleum emulsion (Vol. I., page 261), the third or fourth week in May and again early in June. The worst infested leaves may be removed and burnt as soon as any spots appear in August, not, however, excessively defoliating the trees. Remove and burn all the fallen and dead leaves in autumn.

Pear Chermes (*Psylla pyrisuga*—Först.; syn: *P. pyri*—Schmidb.).—This and other species infest the young shoots and leaves of pear, also apple trees, and live on their juices. The insect closely resembles *P. mali*, Fig. 19, page 39, Vol. II., has a similar life history, and may be destroyed by the agents named for apple chermes, Vol. II., pages 38—40. The larvæ are most destructive, and may be extirpated by Mr. C. Lee Campbell's preparation, page 296, Vol. I., applying it before the blossom buds unfold, and again just before the blossoms expand. The first application prevents the larvæ eating the buds, and the second hinders their depredations on the flowers. The treatment may be again repeated as soon as the fruit is set, and it is good against all insects that suck the juices or eat the foliage and tender fruits.

Pear Gall Mite (*Phytoptus pyri*).—The leaves of pear trees often have blistered spots

in them, small, yellow at first, then changing to red. In bad cases the blisters extend almost over the whole surface of the leaves, and greatly impair the health of the tree. The blisters or galls are caused by mites, which enter by a small hole on the under-side of the leaf, and pass in and out freely. A section through a blister shows the cellular tissue to be loosened and the surfaces of the leaves pushed farther apart; between and under this part are found the eggs and mites. The mites are white in their young state, and easily seen with a pocket lens near the mouth of the gall when this is disturbed. They are shorter than the currant-bud mite (Fig. 52, *I*, page 165, Vol. II.), and shelter

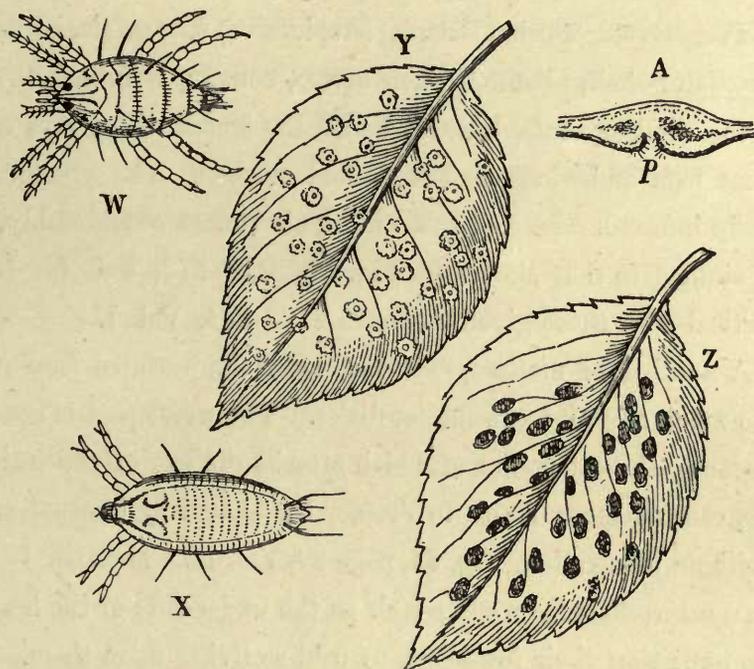


Fig. 42. PEAR GALL MITE, ATTACK ON PEAR LEAVES, AND SECTION OF LEAF GALL.

References:—*W*, winter form—eight-legged mite found on buds in spring. *X*, summer form—four-legged mite found in galls. *Y*, pear leaf showing early attack of mite. *Z*, leaf with black (mature) galls. *A*, section of leaf gall; *p*, opening of gall.

themselves in the crevices of the young wood during winter, and are then a dirty slate colour, with six or eight legs. Directly the buds open the mites enter them, and produce the swelling in the leaf before described, and shown in Fig. 42.

The eggs are deposited and the young brought forth in the galls, so that prevention is the only safe means of combating the mites. Trees liable to the attacks of mites should be sprayed with bisulphide of calcium (Vol. I., page 248) before the buds commence swelling early in spring or in late winter. The soft soap, sulphur, and soda wash (Vol. I., page 270) is equally destructive and distasteful to the mites. If the

trees are sprayed with the bisulphide (2 ounces of soft soap being added to each gallon of the diluted bisulphide, and properly dissolved) when the fruit is set, and repeated once or twice, the last time early in June, the mites will be destroyed. Trees sprayed with Campbell's preparation (Vol. I., page 296), as advised for pear chermes, do not suffer from gall mites even if they have been badly infested the previous year.

Sawfly.—The larvæ of *Selandra atra* (Fig. 48, page 149, Vol. II.), called Slugworm, is the most hurtful; for an account of the injuries done by it, and remedies, see pages 148—150, Vol. II. The Apple Sawfly (*Tenthredo testudinea*) often attacks pears, covering the fruit when about quarter grown (see page 41, Vol. II.).

Scale.—The Pear Oyster Scale (*Diaspis (Aspidiotus) ostreæformis*) has the appearance of a minute oyster-shell, about $\frac{1}{16}$ inch across, convex, wrinkled, grey or reddish, but that is only the shell or scale, beneath which the female lives, lays eggs, and dies. The male only has legs and wings, and it is seldom seen. The younger branches of the pear are chiefly infested. In bad cases the fruit suffers considerably, the effects of an attack being similar to that shown in Fig. 81, page 273, Vol. I. Its history and remedies are identical with those given on pages 272—274, Vol. I.

Tortricina.—A number of moths producing caterpillars called Leaf-rollers live on pear trees, and do much mischief in some localities. The worst pest is the Apricot Moth (*Tortrix angustiorana*), the caterpillar of which attacks the eye of the fruit and feeds on the tender tissue, causing many fruits to drop. Its history and remedies are given on pages 88—90, with an illustration, Fig. 34, page 89, Vol. II. The Oak Leaf-roller Moth (*Tortrix quercana*) caterpillars form a fine web on the under-side of the leaves, ultimately rolling them up, impairing their functions, as well as living upon them. Birds devour these pests, which let themselves down by a fine thread when disturbed, and are easily captured. For remedies see "Apricot Moth," page 88, Vol. II.

Caterpillars.—The greater part of the larvæ that eat the leaves of pear trees belong to the moths described and figured on pages 283—289, Figs. 86—91. Remedies for the several pests are given under each, with special measures for meeting invasions of caterpillars on pages 293—296, Vol. I. The Red-bud Caterpillar often does great injury by feeding on the buds (see page 88, Vol. II.).

Weevils.—These insects prey on pear leaves while young, and their larvæ feed on the fruit or young shoots. Apple weevil (*Rhynchites bacchus*) larvæ burrow in the fruit of pears and cause them to fall prematurely; *R. alliarie* larvæ live in the stalks and midribs of the leaves; *R. cupreus*, after preying on the young shoots and buds,

deposits an egg in each young fruit selected; and *R. betuleti* folds one or more leaves together to form conical homes for the larvæ. The remedies for these pests will be found on pages 40—41, Vol. II. *Otiorhynchus raucus* feeds on the young leaves of pear trees, and the larvæ fatten on the roots; for remedies see "Apricot Weevil," pages 90—92, Vol. II.

Trunk and Branch Infections.—Beetles of various species burrow in the stems and limbs of pear trees, especially those parts that have been injured by blows. For description and remedial treatment see pages 263—265, Vol. I. Goat Moth (*Cossus ligniperda*) larvæ occasionally infest the trunks; preventive and remedial measures will be found on page 43, Vol. II. The most prevalent attack made on pear-tree trunks and limbs is that of the larvæ of the Leopard Moth (*Zeuzera æsculi*). The moth is white, semi-translucent on the wings, spotted thickly with lustrous black; larva yellowish white, with glossy black spots, and a blackish head. The larva feeds on the wood, making considerable burrows, and may be destroyed by the methods advised on page 43, Vol. II. Red-belted Clearwing Moth (*Sesia myopœformis*) larva feeds on the wood of the smaller branches, causing them to collapse suddenly in bad attacks. Preventive and remedial measures are described on page 166, Vol. II.

Ants, page 255; woodlice, page 262; earwigs, page 267; and wasps, page 279, Vol. I., prey on the fruits of pears.

PINE APPLES.

THE Pine Apple (*Ananas sativus*) is a native of tropical America. It passed from Brazil to the West, and thence to the East, Indies. In some of the hot parts of Asia and Africa the pine apple has become naturalised, and it is cultivated extensively in some tropical countries for exportation, the importations of ripe fruits, chiefly from the Azores, to this country having been considerable within the last twenty-five years.

Evelyn in his *Diary*, under the date of August 9, 1661, says: "I first saw the famous queen pine brought from Barbadoes, and presented to His Majesty [Charles II.]; but the first that were ever seen in England were those sent to Cromwell four years since." John Nieuhoff, who was secretary to an embassy returning to this country from China, accurately describes the pine apples brought thence as a present to Oliver Cromwell in 1657. John Rose, gardener to the Duchess of Cleveland, grew and ripened the first pine apple in England, 1665 and 1672, at Dorney Court, about 2 miles from Eton. This fruit was presented to Charles II. by Rose, which is commemorated in a picture at Kensington Palace, and an engraving of it is given in the *Journal of Horticulture*, Vol. XXIV., New Series, page 58.

Rose's pine apple culture was short-lived, for neither Evelyn, Loudon, Wise, Rea, nor Switzer speaks of the pine as an object of cultivation. "About the middle of the seventeenth century it was brought to Holland by Mr. La Court, a merchant, and cultivated at Driehoek, his seat, near Leyden; and from thence it was imported into this country, and first fruited by Sir Matthew Decker, at Richmond, about 1715 or earlier." —(Loudon.)

Bradley says Mr. La Court began growing his pines without bottom heat, as dry stove plants, but afterwards had recourse to low pits and tanner's bark. Sir M. Decker also adopted pits; and soon after (1730), pine stoves or larger and more commodious pits were found in most of the chief English gardens, and some also in Scotland, where the pine apple was first fruited by Mr. Justice at Crichton, near Edinburgh, in 1732. By 1718 Mr. H. Telende, Sir M. Decker's gardener, had forty fruiting plants, of which the smallest fruit was 4 inches, and the largest 7 inches in length. According to Bradley,

the suckers were planted in August, they bloomed in April, and the fruit was ripe in five months from the time of its first appearance.

The pine apple holds the highest position on the dinner-table, and heads the lists at fruit shows as a dessert fruit, its noble appearance, beautiful colour, superb aroma, luscious juice, and rich sprightly flavour well sustaining its claim to the designation, "king of fruits." Home-grown pine apples still hold the foremost place as the finest and best, but their cultivation has been relinquished in many gardens in consequence of imported fruits arriving in much fresher and higher condition than formerly, only first-class British pine apples taking precedence in the markets.

SELECT VARIETIES.

BLACK JAMAICA.—Fruit oval or pyramidal; pips medium, flat (when well grown), brownish or bronzy yellow; flesh yellow, firm, juicy, rich, and excellently flavoured; weight 3 to 5 pounds; plant rather tall and spreading. The best winter fruiting variety for high quality; keeps well.

CHARLOTTE ROTHSCHILD.—Fruit large, cylindrical or slightly barrel-shaped; crown medium; pips large, flat, golden yellow; flesh yellow, juicy, and richly flavoured; weight 7 to 10 pounds; plant robust. An excellent variety, either for summer or winter fruiting, but requires strong heat, plenty of light, and a dry atmosphere when ripening; keeps longer than Smooth-leaved Cayenne.

ENVILLE.—Fruit pyramidal, handsome; crown small; pips broad, flat, deep yellow or orange; flesh pale yellow, juicy, well flavoured in summer, with a fine perfume; weighs 3 to 6 or 7 pounds; plant free, sturdy, and fruits early; an excellent pine apple for market. Raised at Enville Hall from imported seed.

HURST HOUSE (Fairrie's Queen).—Fruit pyramidal; pips prominent, pale yellow; flesh melting, juicy, and richly flavoured; weight variable, but remarkable for the size of the plants—when these are in good condition the fruit will weigh 5 to 7 pounds; plant dwarf, compact, occupying little room—about 18 inches square; useful where space is limited for summer and autumn, but does not mature in winter. Raised at Hurst House, near Liverpool, by Mr. Durden, and the stock was purchased by Mr. Fairrie.

LADY BEATRICE LAMBTON.—Fruit conical or pyramidal; crown medium; pips broad, flattened, orange, yellow furrows; flesh pale yellow, juicy, and richly flavoured; weight 6 to 9 pounds (Mr. Hunter, Lambton Castle gardens, has grown a fruit of this variety weighing 11 pounds 7 ounces); valuable for winter or general fruiting. It was raised by Mr. Stevenson at Lambton Castle gardens, Durham, in 1860, from seeds of Montserrat.

LORD CARRINGTON.—Fruit long-pyramidal; pips medium, nearly flat, dark orange; flesh pale yellow, tender, juicy, rich, and highly flavoured; weight 4 to 7 pounds; flowers purple; plant rather tall, less so than Black Jamaica, to which section it belongs; an excellent variety for winter fruiting. Brought into notice by Mr. Miles, Wycombe Abbey gardens, Bucks.

MONTSERRAT.—Fruit pyramidal, sometimes cylindrical; crown medium to large; pips medium, prominent, flattened in the centre, dark orange; flesh pale yellow, juicy, richly and highly flavoured; weight 2 to 5 pounds; plant rather tall and spare, fruiting earlier than Black Jamaica, with which it is sometimes confounded.

PRINCE ALBERT.—Fruit conical, small; neat crown, very handsome; pips rather broad, flat, reddish yellow; flesh yellow, melting, juicy, and richly flavoured; weight 6 to 7 pounds; plant a free grower, excellent for summer and autumn. First brought into notice by Messrs. Thomson, who state that "when better known, this pine apple will displace the Enville and Providencæ."

QUEEN.—Fruit cylindrical; pips prominent, medium, nearly flat in well-swelled examples, rich deep yellow; flesh pale yellow, very juicy, sweet, and pleasantly flavoured; weight 3 to 4 pounds generally—8 pounds in fine specimens. It only keeps about three weeks after it is ripe. The oldest and best pine apple for summer and autumn use generally. There are many sub-varieties.

SMOOTH-LEAVED CAYENNE.—Fruit large, cylindrical or slightly barrel-shaped; crown medium to large, handsome; pips large, flat, orange yellow; flesh pale yellow, juicy, rich, and highly flavoured; weight 6 to 9 pounds; plant rather tall, produc-

ing suckers sparingly; one of the best for winter and early spring fruiting. It was introduced into France from Cayenne about 1840, and since that time has been in great request; the English fruit-ers obtain their principal supplies of this variety from the Azores from autumn till May.

WHITE PROVIDENCE.—Fruit very large, oval or pyramidal; crown medium, handsome; pips broad, flat, reddish yellow; flesh pale, juicy, sweet, not rich, but pleasantly flavoured, with a fine aroma; weight 4 to 15 pounds; plant stout and rather tall; chiefly grown for the magnificent appearance of the fruit, which swells well in summer.

SELECTIONS.—For general purposes: summer—May to October, Queen; winter—October to May, Smooth-leaved Cayenne. For highest quality: summer, Queen; winter, Black Jamaica. For summer fruiting: Enville, Prince Albert, Queen with its sub-varieties, and White Providence. For winter fruiting: Black Jamaica, Charlotte Rothschild, Lord Carrington, Lady Beatrice Lambton, and Smooth-leaved Cayenne.

Propagation is effected by seeds, crowns, gills, dormant buds, and suckers. Cultivated pine apples seldom form perfect seeds. They may be sown when taken from the fruit in shallow pans of light sandy soil, placing them in a bottom heat of 85° to 90°. Crowns, the plant-like appendages of the upper part of the fruits, are only rooted when there is a scarcity of suckers.

Gills, small sucker-like offshoots produced on the stem, just below the fruit, are only utilised in the case of rare varieties, and the same may be said of raising plants from buds which form at the base of the leaves. This is done by removing the leaves, cutting the stems into lengths of 2 or 3 inches, splitting and laying the pieces in boxes of soil on a warm bed.

Suckers.—Young plants springing from the base of a plant arrived at the fruiting stage are generally employed for perpetuating or increasing the stock. The Queen and its sub-varieties produce suckers freely, and, as a rule, strong enough for detaching and potting by the time the fruits are cut. Some varieties push few suckers and tardily, but they grow quickly after the fruits ripen, and when those are cut, the plants should be encouraged to produce suckers, leaving them on the stools till they are 12 to 18 inches high. The suckers must be carefully detached, by taking hold of them close to the base and gently twisting until they come off. They should then be prepared for insertion, for it is not a good practice to allow detached suckers to lie in a cool dry place with the object of drying them, or only for a short time; cut the rugged base smooth with a sharp knife, and remove the small short leaves which cluster round the base, but not any

higher up the stem than where the embryo roots are of a slightly brownish hue. Divide the suckers into two sizes, the larger, stronger, and healthier for establishing in 7- or 8-inch pots, and the smaller and weaker for placing in 5- or 6-inch pots. New pots must be soaked, old pots should be well washed. Provide efficient drainage, clean crocks, with a thin layer of the most fibry part of the loam over them, and on that a sprinkling of fresh soot, which acts as a barrier against worms, and a stimulant to the plants. In potting the suckers place them sufficiently deep in the pot to keep them steady, and press the soil as firmly as it can be made with the hand, leaving it about $\frac{3}{4}$ inch from the rim of the pot, so that watering may be easily effected. The suckers are then ready for placing in a pit previously prepared for their reception, which will have attention presently.

STRUCTURES.

The situation should be well sheltered from north, east, and west winds, but the sheltering objects must not interfere with full exposure to sun. The structures must also be so constructed as to admit as much light as practicable. Lean-to houses have the advantage of more direct sunlight during winter than span-roofed, and are more economical and better for the swelling of the winter fruits. For summer growth and fruiting, preference may be given to span-roofed houses running north and south. Excellent pine apples are grown in three-quarters span-roofed houses facing the south; also in span-roofed structures with their ends running east and west.

A small lean-to pit is the oldest and still the best for suckers. It may be simply a deep pit for holding leaves, with hot-water pipes for top heat, and then used for propagating only, without a pathway inside—the pit then holding two or three more rows of suckers, than when there is a pathway at the back. The latter, however, is a great convenience, and the pit is available for young stock at any time. Both forms are indicated in the section, Fig. 43, *B*, a simple pit sunk in the ground, the roof lights (*q*) sliding up and down, and the pit (*s*) extending the whole width; the other with a path (*t*) at the back, and a narrower pit (*s*) in the front.

Grand pine apples were first (and still are) grown in pits, suckers, succession, and fruiting plants together in one house, bottom heat being furnished by leaves or tan, the pit being about level with the ground, as shown in *C*, dotted line *o*; top heat in that case is supplied by the pipes in the path at the back, and others fixed at *y*. There are no front lights, but a wall, and no front path. The roof lights are so contrived as to lift up easily in front for watering the plants on that side, and for removal when

it is necessary to renew the fermenting bed. Top ventilation may be effected by lights, or as shown, and bottom ventilation can be given by lifting the lower lights. The small plants are arranged in the front, the succession next, and the tallest fruiting plants, which are easily attended to from the path at the back, behind. More plants are accommodated by this method than where there is a pathway around a central bed. Pine plants do well, as a rule, in these sunk houses or pits, but it is not practicable to have such in some places on account of water, and a path all round the house is very convenient. The house (*C*) may be used for succession or fruiting plants, the bottom heat being furnished by leaves or tan, or by hot-water pipes in a chamber below the plunging bed, as shown in the span-roof (*D*).

Simple span-roofed pits, partly sunk in the ground, without glass at the sides, with a

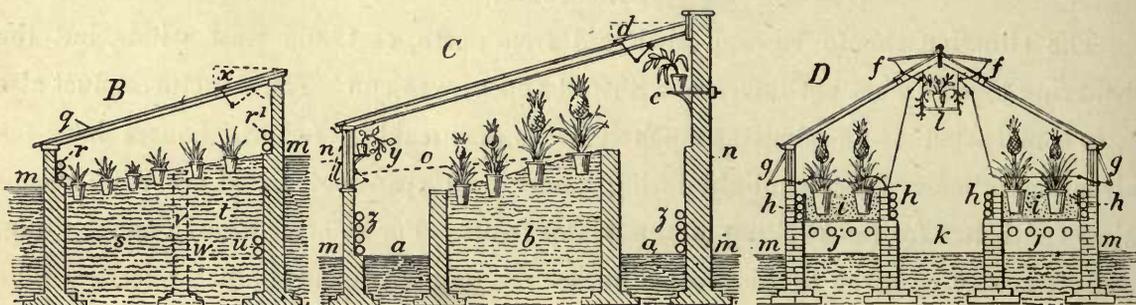


Fig. 43. LEAN-TO PIT, LEAN-TO HOUSE, SPAN-ROOF HOUSE. (Section through *M2*, Fruiting Pines, Ground Plan, Vol. I., page 71.) (Scale: $\frac{1}{4}$ inch = 1 foot.)

References:—*B*, lean-to pit: *q*, movable lights; *r*, 4-inch hot-water pipes; *s*, pit for leaves or tan—if with a path (*t*) at the back, the pipes *r* to be fixed at *u*; *v*, 9-inch wall; *w*, floor; *x*, light the whole length of the pit for ventilation. *C*, lean-to house: *y*, shelf; *z*, 4-inch hot-water pipes; *a*, paths; *b*, pit for leaves or tan; *c*, shelf; *d*, top lights; *e*, front lights. *D*, span-roofed house: *f*, top lights; *g*, side lights; *h*, 4-inch hot-water pipes; *i*, plunging beds; *j*, hot-air chamber with 4-inch hot-water pipes; *k*, path; *l*, shelves; *m*, ground levels. If *C* have not a front path—*n*, ground level; *o*, bed level outline.

glazed roof and top lights for ventilation, a pathway up the centre and beds at the sides, are excellent for nursing and succession plants. Bottom heat may be furnished by leaves or tan, but preferably by hot-water pipes in a chamber, and it is economical to provide plenty of pipes for top heat. Even fruiting plants may be grown in such structures and the fruits ripened well, for pine apples are no more exacting, and certainly not so difficult to grow as melons. Nevertheless a span-roof house is advantageous, that represented in the section, *D*, answering for all—suckers, successional, and fruiting plants.

Where pine apples are required throughout the year separate compartments are essential. The best form of structure for either summer or winter fruiting is the three-

quarters span-roof, with the ends running east and west. A small house, with a plunging bed along the front and a path at the back, as in *B*, answers well for propagating and growing the plants till shifting them to the fruiting pots; then they should be transferred to the succession house, a three-quarters span-roof not so wide and high as for fruiters, with a central bed, and front and back paths, as in *E*, Fig. 44, dotted outline. When starting the successional plants into fruit, they require the larger structure, *E*. Provision is made in this and all the structures for supplying the heat at a low temperature as compared with that usually given, and this we find better for the plants and the most economical. Where oak, Spanish chestnut, or beech leaves, or tan are easily obtainable, they may be advantageously utilised for supplying bottom heat, but it is

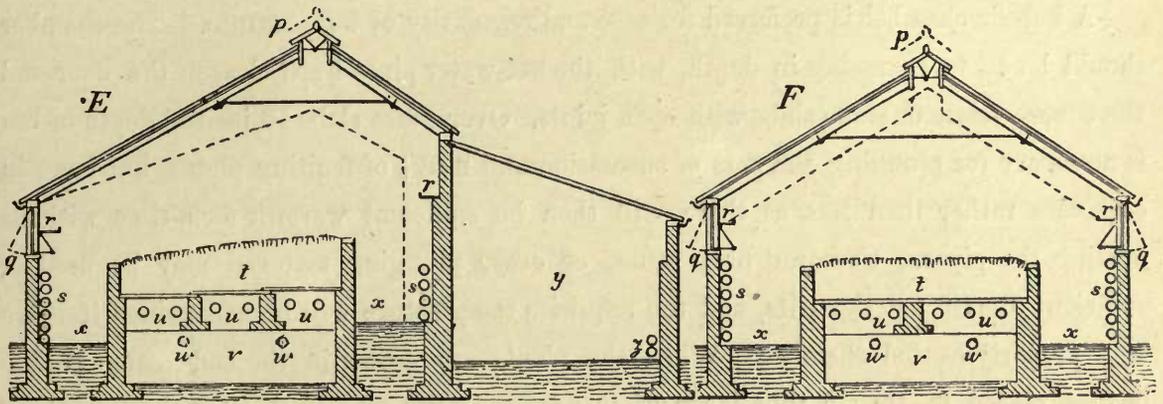


Fig. 44. THREE-QUARTERS SPAN-ROOF AND SPAN-ROOF FRUITING HOUSES. (Scale: $\frac{1}{8}$ inch = 1 foot.)

References:—*E*, three-quarter span-roof fruiting house: *p*, top lights; *g*, front lights; *r*, shelves; *s*, 4-inch hot-water pipes for top heat; *t*, plunging bed; *u*, hot-air chamber, with 4-inch hot-water pipes; *v*, pit—if bottom heat be had by leaves or tan, *u* being omitted—and 4-inch hot-water pipes; *w*, provided to augment the bottom heat; *x*, paths; *y*, potting shed; *z*, hot-water pipes. *F*, span-roof fruiting house; references the same as *E*.

advisable to provide hot-water pipes in a chamber (*w*) to maintain the heat when that of the fermenting material declines, especially in the case of fruiting plants. A heated shed (*y*) is a necessary adjunct for having the potting material in proper condition, and preventing checks to plants when removed from the beds.

If the plants are grown in span-roof houses, the successions require a lower one than the fruiters by about 18 inches, as shown in the outline in Fig. 44 *F*, 2 feet narrower, yet with front and back passages, and a central bed. The house, *F*, will accommodate the larger—all fruiting plants.

Top and Bottom Heat.—The pine apple requires a high temperature during the greater part of the year, particularly in some of its stages of growth, and the means

of affording the top and bottom heat should be efficient and completely under control. For atmospheric heat, hot-water pipes are essential.

A fermenting bed made of oak or beech leaves, with a sufficiency of tan on the surface to plunge the pots in, answers for bottom heat. The pit should be $4\frac{1}{2}$ feet deep for succession and 6 feet for fruiting plants, and the leaves moderately moist. It is scarcely possible to put them together too firmly, and they should be allowed to settle before the tan is placed on the surface; it should not be less than 1 foot deep for succession and 18 inches for fruiting plants. The customary times for forming and renewing the beds are in autumn or spring, or when the plants are disturbed for potting or starting. Tanner's bark, turned and sweetened, may be used instead of leaves, and in this case the pits may be 18 inches less in depth.

A hot-air chamber is preferred for ease and regularity of temperature. The chamber should be 12 to 18 inches in depth, with the hot-water pipes fixed clear of the floor and the covers—slate or stone slabs with open joints. Over these slabs 18 inches' depth of tan is necessary for plunging the pots of succession and 2 feet of fruiting plants, but more in each case rather than less, as there will then be sufficient warmth for a time without heating the pipes. Coconut-fibre refuse or other plunging material may be used of sufficient depth for the pots, and the requisite temperature will be maintained if there is a properly heated chamber. When the plants are grown in the beds, some rubble is first placed in, then a thin layer of turves, and over all about 10 inches' depth of soil for planting in.

Suckers should stand clear of each other until they are rooted and ready for a shift into larger pots. They then become succession plants and require space according to their size; 18 inches suffice for Queens, but robust-growing varieties should be placed 2 feet apart. Fruiting plants will be accommodated at 2 feet for such varieties as the Queen and Enville, but strong-growing sorts, such as White Providence, require $2\frac{1}{2}$ feet distance every way. Always place the tall and robust-growing plants at the back of a lean-to or in the middle of the central bed of a span roof, and each succeeding row graduating to the front or sides.

The space required to produce a certain number of fruits annually may be easily calculated from the foregoing. Allowance must be made in all cases for casualties—about one-sixth more plants being started as suckers than the number of fruits expected. To produce a hundred fruits annually one hundred and twenty-six suckers should be started each year. These require a nursing-house, Fig. 44, *E* or *F* outline, with a

central bed $7\frac{1}{2}$ feet wide, which, holding seven rows of plants, should be $22\frac{1}{2}$ feet length of bed. A house to contain the same number of succession plants in five rows at 18 inches' distance apart will need a bed $37\frac{1}{2}$ feet long. The fruiting plants, being the same in numbers, will require, in four rows, 65 feet length of the bed shown in Fig. 44, *E* or *F*.

These arrangements are represented in the ground plan, Fig. 45, which in practice will enable the grower to fruit at least fifty more plants than the estimated number—one hundred—in consequence of the fruiting plants occupying their places considerably less than twelve months in the fruiting house. For that reason it is desirable to have a part of the fruiting house partitioned off, so that when fresh plants are started for fruiting, those which have not ripened their fruit may be brought together in the smaller compartment, and receive the treatment best suited to their requirements. By means of a

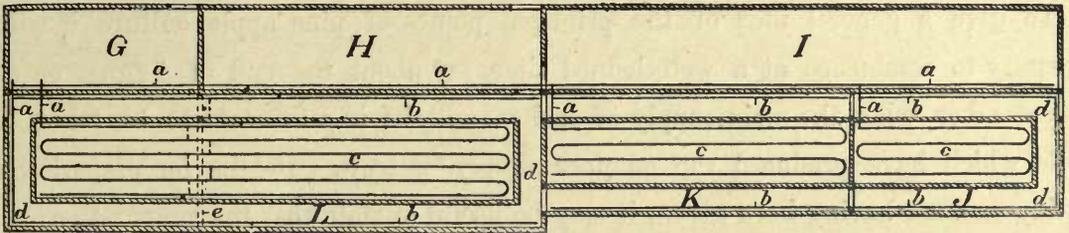


Fig. 45. GROUND PLAN OF PINEERY. (Scale: 1 inch = 24 feet.)

References:—*G*, boiler house. *H*, potting house. *I*, sheds or fernery. *J*, nursing house. *K*, succession house. *L*, Fruiting house: *a*, service hot-water pipes; *b*, hot-water pipes for top heat; *c*, beds and hot-water pipes for bottom heat; *d*, paths; *e*, partition in fruiting house.

small lean-to or other low house or pit for propagating and forwarding the suckers to the potting stage, considerably more pines may be cut annually than the numbers stated, for the nursing pit or pits can be utilised for successional plants, and several of the Queen or other dwarf-growing kinds may be fruited in either or both of the compartments, *J*, *K*. Growers, therefore, must exercise judgment according to the means at disposal.

Where all the plants—suckers, succession, and fruiting—have to be grown in one house, say a span-roof, Fig. 43, *D*, the suckers and successional plants should be placed on one side of the path and those that are to fruit on the other. The beds must be heated separately, command being had of them by valves, as the plants swelling and ripening their fruits in autumn and winter require more bottom heat than do suckers and successions.

SOIL AND CULTIVATION.

A friable turfy loam, sandy rather than clayey, is the best medium for pine apples. The top 2 or 3 inches of an old pasture—the herbage eaten off close by penning sheep upon it—should be collected when in good workable condition in autumn, and stacked in an open place. This will answer for the pottings, and it should be placed under cover a month or six weeks to become tolerably dry and quite warm previous to its being used. It may be chopped with a spade, or torn in lumps with the hand, and of sizes convenient to the pots, rejecting the dust or fine soil, and adding a 9-inch potful of bone meal, another of dry soot, and a third of charcoal dust to each barrow-load, thoroughly incorporating. It should be mentioned and remembered that the more fibrous the loam the more active and healthy the roots. Anything likely to form a soapy mass, such as manure, is inimical to free root action, healthy growth, and superior fruit.

To give a general idea of the principal points of pine apple culture it will be necessary to commence at a well-defined time, say about the end of August or early in September, when the main supply of suckers will be in a fit state to be taken from stools which have produced the summer supply of fruit. Details for preparing and potting suckers having been given, it may be useful to state that the preparation of the fermenting bed must commence ten days or so before it is required.

Assuming the pit is ready and the suckers potted, let them be plunged to the rim, and if the heat does not exceed 90° at their base, press the tan compactly round the pots, placing them so that they stand clear of each other, for crowding the suckers causes them to become drawn and weakly, and they seldom make good plants. Shade from the sun during the hottest part of the day till it is found that they are making roots, as they will in ten days or a fortnight, and when the shading is removed in the afternoon the plants should be lightly syringed. Discontinue the shading and syringing by degrees, ceasing both when the roots reach the sides of the pots, and then give enough water to moisten the soil throughout. Air should be given early in the day when the plants commence growth, and a moderately moist atmosphere secured by damping twice a day. Over-much moisture or heat at the roots or in the atmosphere, or a deficiency of light and ventilation, are fatal to the plants wintering well and throwing up fine fruits.

During September and until the middle of October the night temperature should range from 60° to 65°, 70° by day, with 10° or 15° more from sun heat. The

temperature may gradually decrease to its minimum for the winter by the end of November, namely, 55° at night and 60° by day artificially, with a rise of 10° to 15° from sun heat, effecting a change of air by ventilation above 65° . The bottom heat ought not to exceed 85° after the roots reach the sides of the pots, and during October it must not be higher than from 75° to 80° ; after that time 70° to 75° is quite sufficient for the winter, as all that is wanted is to keep the roots healthy during that period. From November to March (not inclusive) the atmosphere should be dry rather than otherwise, and the pots will generally derive enough moisture from the tan or other fermenting material for keeping the roots in a healthy state during that period.

The plan above described is that usually followed where the object is to secure strong healthy plants for transferring to large pots in spring to make the best stocks and fruit by the following autumn. But some growers shift the strongest plants into their fruiting pots—9- or 10-inch for Queens, and 11-inch for others of stronger growth—as soon as the suckers have filled the pots with roots and before they have become matted together, keeping them gently growing all the winter in light, well-heated houses, with 5° to 10° higher temperature; also more moisture at the roots and in the atmosphere than the other plants wintered in their first pots. Only the most forward suckers are suitable for growing through the winter to be rested in April and May previous to their being started for winter fruit.

Re-potting must not be done till the roots have formed round the sides of the pots sufficiently to keep the ball of soil together. Such will be the condition of the September suckers at the end of February or the beginning of March, when they should be placed in the fruiting pots. If the plants have become root-bound, the ball should be partially broken with the hand, but they ought not to get into that condition. A watchful eye should be kept on all young plants, shifting them in winter or summer before they become hard-matted at the roots. The plants should be watered (if dry) about a week before the potting, so that the soil may be moderately moist. If shifted when the balls are difficult to moisten, the plants are liable to “bolt”—start into fruit prematurely.

The pots must be perfectly clean inside and outside, and the drainage thorough. Ordinarily 9- or 10-inch pots suffice for Queens, but a few of the largest plants in 8-inch pots may be shifted into 11-inch for the production of the finest fruit, whilst those in 7-inch may be placed in 10-inch and those in 6-inch pots in 9-inch. Any plants in

5-inch pots, or that are not satisfactory for transferring to the fruiting pots, should be shaken out, have the roots trimmed a little, and be placed in 7-inch pots, treating them similar to suckers, and shifting them into the fruiting pots in the course of six or eight weeks. These will form a good succession to the others. One shift is all that is necessary for the pine plant, as a rule, from its sucker state to ripening the fruit.

In preparing the plant for potting, a few of the lower leaves should be stripped off, as high up as brown roots are protruding from the stem, the crocks taken from the bottom part of the ball, all loose soil on the surface removed, the sides loosened, and the roots disentangled without breaking the ball. The plant when placed in the pot should be 2 or 3 inches deeper than it was before, and the soil can hardly be made too firm when it is in proper condition.

Plunge the pots in a warm bed, temperature 85° , and keep the house rather close and the atmosphere moist, until the roots are working freely in the fresh soil. A temperature of 60° to 65° at night is sufficient for March, admitting air at 70° in the daytime, not seeking growth until the days are longer, and the soil is well permeated by roots. Give water only when the soil becomes dry, examining it occasionally, and erring, if at all, by sparing rather than by over-watering. Supply water only to the plants really needing it, then moisten the soil through to the drainage. This rule applies to watering pine plants in all stages of growth.

By the end of April the night temperature should be raised to 70° , and the plants pushed forward under the influence of the increased light. Air must be admitted soon after the sun reaches the house in the morning, and the amount regulated through the day to maintain the temperature at 85° or more from sun heat, closing early so as to retain the maximum some time, damping the walls and paths with the syringe. The evaporation troughs may also be filled every day with a solution of guano, 1 pound to 20 gallons of water. Where evaporation troughs are not used the floors should be sprinkled in the morning and evening. A light dewing over the plants may be given on the afternoons of very hot days, but excessive syringings induce soft, unfruitful growth.

The bottom heat should be ascertained by a plunging thermometer with the "bulb" as deeply in the fermenting material as the base of the pots, and it should indicate a steady temperature of 85° to 90° . If the heat is too high raise the pots, or shake them from side to side for the escape of surplus heat. When the heat declines the tan can be pressed to the sides of the pots. When the temperature is too low a

little fresh tan should be mixed with the top 18 inches of the old, but it is very undesirable to have to disturb the plants just as they commence growing freely.

About the middle of May more air and atmospheric moisture, also more water at the roots, will be required, the latter being given at 85° with guano in it as advised for filling the evaporation troughs; damp the house in the morning and at closing time; admit a little air about 7 A.M., and gradually increase it with the sun heat to about 11 A.M. It is desirable to dispense with front or side ventilation as far as practicable. Fire heat will only be necessary to maintain a night temperature of 75°, falling 5° during the night, and 70° to 75° by day in dull weather, turning off the heat early on fine mornings.

During May a shading of some light material—such as scrim canvas—may be necessary for a few hours on very bright days, to prevent scorching in the leaves, but only employing the shading where absolutely necessary, and until the leaves are inured to bear the sun's rays without being browned.

By midsummer the weather may be so warm that the temperature of succession pine pits may be maintained by early closing in the afternoon where fermenting material is employed for bottom heat without having recourse to fire. In that case, ventilate rather freely in the early part of the day, and husband the sun heat to maintain a temperature of 70° to 75° till late at night. In cold periods, where bottom heat is derived from hot-water pipes, and in cold localities, fire will be required more or less through the summer months to maintain a night temperature of 65° to 70°, and 70° to 75° by day.

When fire heat is dispensed with, or reduced to its lowest amount, and the syringe is used freely, Queens throw up suckers from the lowest leaves in abundance. They should be removed at once with a pair of long-handled pincers, gripping them near their base and twisting them out of their sockets. Suckers should not be allowed on successional pine plants, especially Queens.

By the middle of August the plants will have made and matured sturdy growth. If intended to ripen their fruit in May and June they must be cautiously watered from the beginning of September, but the soil must not be kept very dry nor the atmosphere extremely arid, or the plants will throw up "buttons" instead of fine "shows." If they are kept growing until late in the season there is little chance of starting them into fruit early. By the end of September the plants will have hardened their growths, and by the middle of October be in a state of rest, the temperature

having been gradually brought down to 60° at night, and 65° by day artificially, with free ventilation from that point, and the bottom heat to between 70° and 75°. During the next ten weeks the night temperature must not exceed 60°, air being afforded moderately on all favourable occasions, the atmosphere kept dry, and water only given at the roots to keep them fresh. Plants that were disrooted in the spring, returned to sucker pots, and afterwards transferred to the fruiting pots, will not complete their growth until September, when they must be subjected to similar treatment (only later) to those intended to supply fruit in May and June.

Starting.—To insure the satisfactory starting of pine plants into fruit at a given time they must have well filled their pots with roots, completed sturdy growth, and had a period of rest, as advised. To have ripe fruit by the beginning of June, plants of the Queen should be started about the New Year, the bed in the fruiting house having been prepared by adding fresh material, where the bottom heat is derived from leaves or tan, to insure a steady temperature of 85° to 90°, or placing in fresh plunging medium where the bottom heat is supplied by hot-water pipes. Select the most promising plants for starting—that is, those with a stout base somewhat open or without small leaves in the centre, and their pots full of healthy roots. Strip off a few of the bottom leaves and supply a top-dressing of turfy loam, firmly pressed to the stems and round the sides of the pots, after removing any loose surface soil, leaving sufficient space for holding water. Plunge the pots perfectly level, having special regard to the heat of the bed, which must not be more than 90° at the base of the pots, as the roots are mainly there and at the sides. It is a safe plan to plunge partially until the bottom heat declines to the proper temperature, otherwise the plants may sustain irreparable injury by too much heat. The pots can be plunged deeper as the heat becomes favourable. Water will be required twice for properly moistening balls of dry soil.

The temperature of the house should be 65° at night, 5° more by day, 75° to 80° with sun. Admit a little air in the early part of the day, and close early in the afternoon, sprinkling the paths. The soil must be neither over-dry nor excessively wet, the first condition stunting the embryo fruit, and the latter preventing the free root action that is so necessary for the support of the plants. Gradually raise the temperature to 70° at night by the early part of February, from which time to the end of the month the plants will show fruit; then when the soil is dry enough use liquid manure. During March the temperature should range between 70° and 75° at night, and the moisture be moderated whilst the plants are in flower, but after that atmospheric moisture should be

freely afforded and the plants sprinkled on fine afternoons. Close about 2 P.M., so that the heat may rise to 90°—100°; then with plenty of atmospheric moisture the fruit will swell rapidly. It must be sustained by careful watering, including guano water when the plants need a supply, pouring it into the sockets of the lower leaves, as there are roots there for appropriating the food supplied. Gills which appear on the stems under the base of the fruit should be promptly removed, and the suckers springing from the base of the plants be reduced to one or, at most, two on each plant. This is necessary to secure strong suckers and perfectly developed fruits.

When the fruits show the least signs of turning yellow at the base, an increased amount of air and a decrease of atmospheric and soil moisture must gradually take place in order to secure fine flavour, and by the time the fruit is perfectly ripe the soil should be dry. If the fruit is not immediately required, the plant may be removed to a cool, shady place, where it will keep for weeks in the summer season. When more fruits commence ripening than are necessary to supply the demand, a portion of the plants should be removed to a cooler house, such as a vinery where the grapes are ripe and air is freely admitted. The fruits will there ripen gradually and possess excellent flavour. Fruit cut with a portion of stem—enough in all cases to handle it by—before it is quite ripe, and laid in a dry, airy fruit room, will keep a considerable time in good condition. Such is the treatment of the Queen pine and its sub-varieties to supply ripe fruit early in June. To supplement these and continue the succession of fruit until early autumn, some plants should be started in late February or early in March and others in April.

Winter and spring fruiting plants usually consist of Black Jamaica and Smooth-leaved Cayenne. Their treatment as suckers, successions, and fruiting plants is not materially different from that given for summer fruiting varieties, but they require more moisture at the roots and in the atmosphere, with more shading in early summer than Queens, and they are kept growing longer in the autumn. To insure a supply of fruit from October to May, robust yet sturdy plants, having had over a year's growth, should be started by the middle of July, and others by the middle of September.

For the late winter and spring supply of fruit, the plants that have been wintered in 7- or 8-inch pots and shifted into the fruiting pots in March are the best, encouraging them to fill their pots with roots, and to make a good growth. They will then start into fruit after being kept freely ventilated and cool for a few weeks.

Charlotte Rothschild is considered a somewhat difficult variety to manage well. As it is valuable for autumn and winter use, and requires the same treatment as Smooth-leaved

Cayenne, the following particulars of Mr. Coomber's mode of culture in producing the fruit figured below must suffice for both. "Sturdy suckers were taken from old stools and placed in pots in April, 1885. Being plunged in a brisk heat (a bed of decayed leaves with pipes beneath), they readily filled their pots with roots, when they

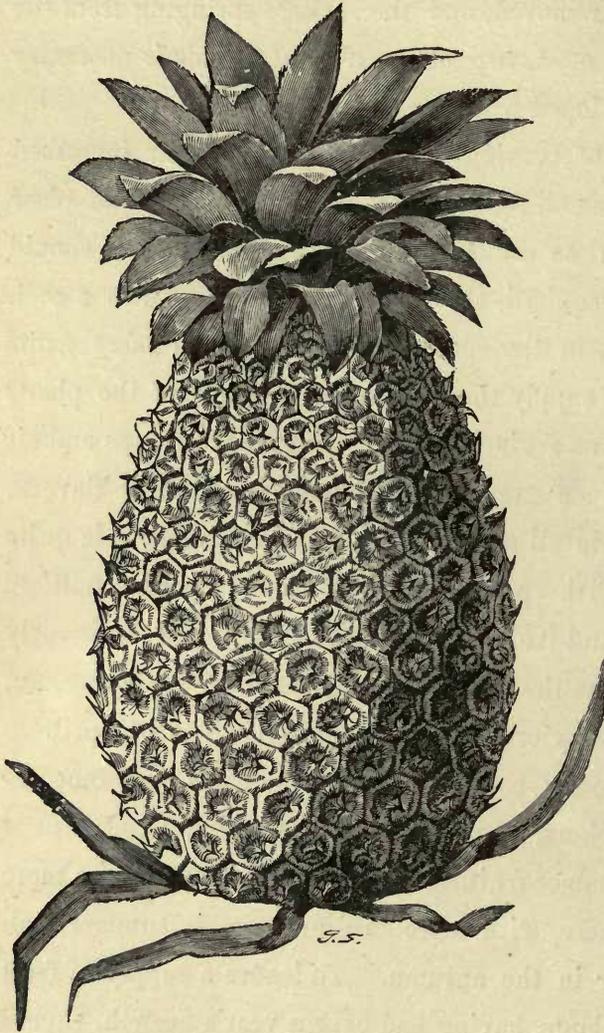


Fig. 46. CHARLOTTE ROTHSCHILD PINE APPLE.
(From the *Journal of Horticulture*.)

were at once shifted into pots 12 inches in diameter, and firmly and finally re-plunged in a bed having a temperature of 85° , accompanied with the usual atmospheric conditions. After this they were sparingly supplied with clear tepid water, until their roots had well permeated the fresh soil, from which time until they were rested (from the beginning of November until March) they were more liberally treated. During the resting period the atmospheric temperature varied, according to external conditions, from 55° to 60° at night, with a rise of about 5° during the day, while the bottom heat was maintained at 75° . In March and April the heat was gradually raised, until that in the bed reached 85° , and the atmosphere 70° at night, or a trifle more in mild weather, with the usual increase in the day, close attention at all times being paid to the indispensable daily duties, ventilating, syringing, and shading. A

portion of the plants pushed up their fruits by the end of April; the remainder made growth previous to showing fruit, and produced the finest, those exhibited [at South Kensington in December] being some of them."

The Planting-out System.—By this method low pits are employed for propagating, 2 feet of tan or 3 feet of oak leaves (firmly trodden) supplying bottom heat, and 4 inches

of fibrous loam the rooting medium. The suckers are inserted in rows thinly rather than crowded, the soil rammed firmly about them, and kept close in a temperature of 70° to 80°, shaded from bright sunshine, and sprinkled two or three times a week till rooted; then the plants are gradually inured to air and light. Suckers inserted in August or September are kept comparatively cool during the winter, and the following February are transplanted into the fruiting beds, consisting of 10 inches of good loam over efficient drainage, with as many roots intact as possible. Queens, Enville, and similar varieties are allowed 2 feet distance apart from centre to centre, strong-growing kinds being placed 6 inches farther asunder. The plants make good growth by August, when means are taken to mature it by the end of September, from which time the plants are rested till December or the New Year, when they have a few of the lower leaves stripped off, a top-dressing of turfy loam supplied, and are started to provide fruit in June. Smaller plants kept growing about six weeks later, rested from October, and started in April, supply fruits till the autumn. Some growers insert very strong suckers at proper distances in the fruiting beds, and cut fine fruits from them in fifteen to eighteen months. Among other places splendid pines are produced by planting in pits in Her Majesty's gardens at Frogmore, and Mr. Owen Thomas, the accomplished gardener there, has exhibited a handsome ripe fruit cut thirteen months after the sucker was inserted.

As to the merits of the planting out as compared with the potting system, opinions differ. The former is, no doubt, the simpler and more natural, but where the means are confined to fermenting beds, and a regular supply of fruit is required from a small amount of accommodation, the pot system may be best, for the plants are available at all times for being moved, either to force forward or retard the fruit. Open-bed cultivation is an admirable method where large quantities of fruit are required at given times and the requisite number of suitable structures provided. There is then no question as to the advantages of the planting-out system, through the lessened danger of checks, the greater range for the roots, and the least amount of labour involved all round.

DISEASES AND INSECTS.

The pine apple is singularly free from maladies. Some fruits are black in the centre. This is considered by some persons to be a disease. We have not detected any organism; but the fruit soon becomes attacked by fungi—that is, it will not keep. The defect is caused by too vigorous growth, too much moisture at the roots and in the atmosphere, with a deficiency of air. The preventives are a drier and well-ventilated atmosphere,

the avoidance of excessive feeding, and brisker bottom and top heat. It is during the swelling that the defect is induced that causes the fruit to be black in the centre when ripe; therefore, care must be taken in the above respects previously.

Insects.—The brown scale, mealy bug, and white scale prey on pine-apple plants. All are very destructive, and, therefore, it is necessary to exercise the greatest care when procuring plants to have them perfectly clean, and persons working amongst stove plants infested with any of those insects ought not to be allowed to work at the same time amongst pine plants, for the pests are easily transported on clothes. A sharp look-out should be kept, and whenever any insects are detected, prompt measures must be taken to eradicate them.

Mealy bug (*Coccus adonidum*) is the most objectionable, and if allowed to spread soon spoils the fruit, a house thoroughly infested being extremely difficult to cleanse. If the mealy bug is touched with a small brush dipped in spirits of wine, and this is done frequently, the pest will be destroyed. Methylated spirits may also be used against mealy bug, as well as brown and white scale, diluting in the latter case with an equal quantity of water, and removing the scale with a brush dipped in the solution. By constant watchfulness and prompt early action, much injury by insects may be averted.

When a house is infested with mealy bug, the plants should be removed from the bed, laid on their sides, and syringed thoroughly in every part with petroleum, a wine-glassful to 3 gallons of water at 120°, the mixture being applied by one person, while another keeps it thoroughly agitated. The plants must be turned over so as to wet every part, and when the whole have been gone through, they should be syringed with pure water at a temperature of 130°. The house ought also to be syringed in every part with a similar mixture at 140°. At a suitable time clear out all the plunging material, limewash the walls after scalding them, and again syringe the house with the petroleum mixture. Introduce fresh plunging material, and syringe the plants with the mixture, cleansing them with clean warm water before placing inside the house. In bad cases it may be necessary to use petroleum at the rate of a fluid ounce to a gallon of water at 130°, which is effectual both against white scale and mealy bug.

PLUMS AND DAMSONS.

OUR cultivated varieties of plums are considered to have been derived from the Wild Plum (*Prunus domestica*). It is believed to be a native of Asia Minor, and was probably introduced to Greece from Syria. It is mentioned by Theophrastus in the fourth century B.C., and by Dioscorides, a native of Cilicia and a Greek physician, in the first century of the Christian era. From Greece it passed to Italy, and from thence to France and the other parts of Europe. It is naturalised in our hedges and copses. The Green Gage is supposed to be a native of Greece; it was mentioned by Parkinson in 1629, under the name of Verdoch, and, from the way he spoke of it, seems to have been not at all new or even rare. Various sorts of plums are known to have been introduced into this country from Italy and France during the fifteenth century, but the date of plum cultivation is uncertain and remote. Damsons are simply oval and improved forms of the Bullace (*Prunus insititia*), found wild in many parts of Great Britain. It has a wider range than the Sloe (*P. spinosa*), for, according to Hooker, "the sloe is confined to Europe, the bullace extending to North Africa and the Himalaya."

The plum is the hardiest of our stone fruits, and the crop is, next to the apple, the most useful. Its season extends—in a fresh state from July to November; preserved or dried, throughout the year or indefinitely. Dried plums (prunes) have long formed an important export of France, and some varieties can be profitably dried in this country.

Ripe plums are wholesome and nutritious. The choicer varieties are prized at dessert, and also for culinary purposes. The best dessert plums are the most economical (in sugar) for preserving; yet sub-acid plums and semi-acrid damsons are the most popular for that purpose.

SELECT VARIETIES.

I.—GAGES.

True gage plums consist of three well-defined types: 1, Green Gage; 2, Purple Gage; 3, Transparent Gage; all marked by the same characteristics of form, flavour, and the flesh parting from the stone. Their sub-varieties differ only from the type in being earlier or later; their characteristic divergences will be noted. Varieties that have

been raised from the types, and retain their form or only slightly modified, with the rich flesh and high qualities of the gages, are now classed as gage plums for cultural purposes, and some have the serious defect of the flesh adhering to the stone. Varieties of gage plums but not "true" gages have an asterisk (*) prefixed. Exhibition varieties are preceded by a dagger (†).

† * DENNISTON'S SUPERB.—Fruit large, short oval, or round; skin greenish yellow, slightly blotched and dotted with purple, and covered with bloom; flesh yellow, firm, juicy, vinous, and richly flavoured; ripe in the middle of August; tree hardy and a free bearer, succeeding as a standard, pyramid, cordon, espalier, or wall tree. A delicious plum, of American origin.

† GREEN GAGE (Reine Claude—French; Verdochia—Italian; it has many synonyms).—Fruit medium, round, and flattened; skin yellowish green, clouded and dotted with crimson, and covered with thin grey bloom; flesh greenish yellow, tender, juicy, delicious, and exquisitely flavoured; one of the richest of plums; ripe at the end of August and beginning of September; tree vigorous, moderately hardy, and an excellent bearer, especially when root-pruned; succeeds as a standard in favourable localities, pyramid, cordon, espalier, or trained against a wall. The following are sub-varieties of Green Gage:—† Boddaert's, larger than the type, but a shy bearer, ripe at the end of August. † Brahy's, very large, ripens before Green Gage. † Bryanston, large, ripening about the middle of September; tree hardy and prolific. Jodoigne, large, ripe in the middle and end of September. July Gage, about the size of Green Gage, ripens at the end of July or early in August; tree small and prolific, suitable for a pyramid or wall. † Reine Claude de Bavay, large, rich, ripe in the beginning of October; tree hardy, and an abundant bearer, but requires a good climate and season to ripen well.

† * GUTHRIE'S LATE GREEN.—Fruit large, roundish oval; skin yellowish green, covered with a thin grey bloom; flesh yellow, firm, juicy, rich, and excellent; ripe at the end of September; tree hardy and productive, but the fruit is often ruined by wet in cold localities.

† * McLAUGHLIN.—Fruit large, roundish oblate; skin greenish yellow, dotted and mottled with red, and covered with a thin grey bloom; flesh yellow, firm, juicy, and rich, with a pleasant perfume; ripe middle to end of August; tree hardy, and an excellent bearer. A handsome and delicious plum of American origin.

† * OULLINS GOLDEN.—Fruit medium to large, roundish oval; skin bright greenish (sometimes rich) yellow, dotted with crimson on the sun side, and covered with a thin whitish bloom, very handsome; flesh yellow, juicy, and rich; ripe beginning to the middle of August; tree hardy and robust, requires firm soil and frequent root-pruning in gardens, and as a standard does not bear well until the trees gain age.

PURPLE GAGE.—Fruit medium, round, flattened, with a shallow suture; skin reddish purple, marked with deeper purple, dotted with yellow, and covered with a beautiful pale bloom; flesh greenish yellow, firm, juicy, rich, delicious, and exquisitely flavoured; ripe the beginning of September; tree hardy, and a good bearer. The following are sub-varieties of Purple Gage:—Boulouf, red, dotted with purple; ripe the end of September. Count Althann's Gage, late, red, ripening the middle of September, freestone, and of excellent flavour. Reine Claude Rouge (Van Mons' Red), or Red Gage, late, rich and good.

† TRANSPARENT GAGE.—Fruit large, round, flattened, with a shallow suture; skin thin and transparent, greenish yellow, dotted and marbled with red; flesh greenish yellow, transparent, rather firm, very juicy, rich, luscious, and exquisitely flavoured, ripe in the beginning of September; tree vigorous, moderate bearer, but when root-pruned bears freely as a cordon, or on walls, and is fine for pots. One of the richest and most delicious of plums. The following sub-varieties are worthy of attention:—Early Transparent (Rivers'), fruit very large, round, greenish yellow, dotted and blotched with crimson; flesh firm, very juicy, and richly flavoured, equal to the Green Gage, and ripe ten days before the Transparent Gage; tree robust and an abundant bearer. Rivers' Golden ripens about the end of September, very rich and good. Rivers' Late, fruit large, round, greenish yellow, changing to purple according to exposure; flesh firm, juicy, and fully equal to the Green Gage; stone very small. This is a valuable addition, as it ripens fully ten days after the Transparent Gage; tree of dwarf habit, and very productive.

II.—DESSERT PLUMS.

Flesh tender, juicy, rich, and deliciously flavoured, but without the vinous quality of the gage, each being characterised by its peculiar flavour.

ANGELINA BURDETT.—Fruit medium, round; skin thick, dark purple, almost black, spotted with brown, and covered with blue bloom; flesh yellowish, juicy, and highly flavoured, a smack of gage, freestone; ripe at the beginning of September; tree hardy, and a moderate bearer. If the fruit is allowed to hang until it shrivels, it forms a perfect sweetmeat.

† COE'S GOLDEN DROP.—Fruit large, oval, with a short neck; skin pale yellow, with dark red spots; flesh reddish yellow, juicy, rich, and delicious, clingstone; ripe in the end of September, tree healthy, and an abundant bearer; usually requires a wall, but succeeds as a pyramid in favoured localities; excellent for pot culture. One of the best, either for eating or preserving the fruit; hangs late, and keeps well wrapped in tissue paper, in a dry room.

DECAISNE.—Fruit large, oval; skin bright yellow, dotted with red; flesh reddish yellow, juicy, and richly flavoured, clingstone; ripens in the beginning of September; tree hardy, and a good bearer.

EARLY FAVOURITE.—Fruit medium, roundish oval; skin purple, covered with a thin bluish bloom; flesh greenish yellow, juicy, and agreeably flavoured, freestone; ripens in the middle of July against a south wall. The earliest of all, and on that account valuable.

EARLY MIRABELLE.—Fruit small, the size of a bullace, oval; skin yellow, spotted with red; flesh yellow, juicy, rich, with a delightful aroma, freestone; ripe about the end of July; tree healthy, and a free bearer. Makes a delicious preserve (Rivers).

GOLDEN ESPEREN.—Fruit large, oval; skin thin, golden yellow on the sun side, dotted with crimson, greenish on the shaded side; flesh yellow, juicy, and richly flavoured, freestone; ripe in the end of August or beginning of September; tree vigorous, and a moderate bearer.

HULING'S SUPERB.—Fruit large, roundish oval; skin greenish yellow, covered with a thin bloom; flesh richly and briskly flavoured, clingstone; ripe about the end of August; tree vigorous, and a moderate bearer.

ICKWORTH IMPÉRATRICE.—Fruit large, roundish oval; skin purple, marked with yellow streaks; flesh greenish yellow, tender, juicy, rich, and excellently flavoured, clingstone; ripe in October, hanging till shrivelled; tree healthy, and a good bearer; succeeds as a pyramid, but generally requires a wall.

† JEFFERSON.—Fruit large, oval; skin golden yellow, spotted with red; flesh yellow, firm, juicy, rich, and deliciously flavoured, freestone; ripe in the beginning and middle of September; tree healthy, and an abundant bearer; succeeds as a standard, pyramid, or cordon, and against a wall. An American plum of great excellence.

† KIRKE'S.—Fruit large, roundish oval; skin dark purple, covered with a dense blue bloom; flesh greenish yellow, firm, juicy, and richly flavoured, freestone; ripe the middle of September; tree hardy, and an abundant bearer against a wall, shy as a standard, and requires root-pruning as a pyramid. One of the finest.

LAWSON'S GOLDEN.—Fruit medium, roundish oval; skin deep yellow, dotted with crimson; flesh yellow, tender, juicy, and richly flavoured, clingstone; tree healthy, and a good bearer.

DE MONTFORT.—Fruit medium, roundish; skin dark purple, covered with blue bloom; flesh greenish yellow, tender, syrupy, and richly flavoured, quite a sweetmeat when it hangs till it shrivels, freestone; ripe the middle of August; tree healthy, and a good bearer against a wall. An improvement on Royale Hâtive.

PERDRIGON VIOLET HÂTIF.—Fruit medium, roundish oval; skin purple; flesh greenish yellow, juicy, richly and excellently flavoured, freestone; ripe in the middle of August; tree hardy, and bears abundantly.

ROYALE HÂTIVE.—Fruit medium, roundish; skin purple, dotted with fawn colour, and covered with blue bloom; flesh yellow, melting, juicy, and rich, freestone; ripe the end of July and beginning of August. A good early variety.

YELLOW IMPÉRATRICE.—Fruit medium to large, roundish oval; skin deep golden yellow, slightly streaked with red; flesh yellow, juicy, and richly flavoured, clingstone; ripe the middle of August; tree a good bearer, but requires a wall.

III.—CULINARY.

Flesh too firm, too briskly flavoured, or not rich enough for eating raw ; cooked excellent ; grand preserved ; some first-rate when dried.

- † **ARCHDUKE**.—Fruit large, oval ; skin purple, almost black ; flesh close and richly flavoured ; ripe in the beginning of October, and useful for dessert ; tree a good grower, hardy, and prolific.
- AUTUMN COMPÔTE**.—Fruit very large, oval ; skin bright red, handsome ; flesh amber when preserved, juicy, and pleasantly flavoured ; ripe in the end of September ; tree moderately vigorous, and an abundant bearer ; good as a pyramid.
- BELGIAN PURPLE**.—Fruit medium to large, roundish oval ; skin deep purple, covered with blue bloom ; flesh greenish, juicy, and richly flavoured, semi-freestone ; ripe in the middle of August ; tree healthy, and a great bearer ; succeeds as a standard, pyramid, or cordon, and produces fine fruit against a wall. A valuable market kind, and useful for dessert.
- BELLE DE LOUVAIN**.—Fruit very large, long oval, handsome ; skin reddish purple, covered with a fine bloom ; flesh yellow, firm, cooking well, and agreeably flavoured, clingstone ; ripe at the end of August ; tree vigorous, hardy, and a free bearer.
- BELLE DE SEPTEMBRE**.—Fruit large, roundish oval, handsome ; skin reddish purple, dotted with yellow, and covered with a blue bloom ; flesh yellowish white, firm, juicy, and aromatic, clingstone ; ripe in the beginning of October ; tree an upright grower, and great bearer. An excellent cooking or preserving fruit, giving a crimson syrup.
- BLUE IMPÉRATRICE**.—Fruit medium, oval ; skin deep purple, covered with a thick blue bloom ; flesh greenish yellow, firm, richly flavoured, clingstone ; ripe in October ; tree moderately vigorous, and a free bearer, requires an east wall ; useful for dessert, and an excellent plum for preserving.
- † **CZAR (Rivers')**.—Fruit large, roundish oval ; skin red, becoming reddish purple when ripe, covered with a thin blue bloom ; flesh yellowish, tender, juicy, and agreeably flavoured, freestone ; ripe at the beginning of August ; tree hardy, robust, and a good bearer, succeeding as a standard, pyramid, or wall tree. A valuable market plum ; the fruit is not liable to crack.
- † **DENBIGH, or COX'S EMPEROR**.—Fruit large, roundish oval ; skin bright dark red, strewn with grey dots, and covered with thin bluish bloom, handsome ; flesh yellow, rather rich, and pleasantly flavoured ; ripe in the beginning of September ; tree a strong grower, and a good bearer. Excellent for cooking, and useful for dessert ; superior to Orleans.
- DIAMOND**.—Fruit very large, oval ; skin dark purple, nearly black, covered with blue bloom ; flesh deep yellow, firm, and briskly yet agreeably flavoured, semi-freestone ; ripe in the middle of September ; tree very vigorous, hardy, and an excellent bearer ; succeeds well as a standard, and produces enormous fruit against a wall. One of the best cooking and preserving plums.
- EARLY PROLIFIC (Rivers')**.—Fruit medium, roundish oval ; skin deep purple, covered with thin bloom ; flesh yellowish, juicy, sugary, with a brisk acidity, freestone ; ripe about the end of July ; tree hardy, a moderate grower, very prolific and constant. The earliest market plum, and excellent for cooking and preserving ; useful for dessert.
- GISBORNE'S**.—Fruit small to medium, roundish oval ; skin greenish yellow, changing to amber ; flesh yellow, firm, briskly yet agreeably flavoured, freestone ; ripe in the middle of August ; tree a sturdy grower, and a profuse bearer, succeeding as a standard, even in the north. A good market variety, rivalling the Pershore plum.
- GOLIATH**.—Fruit large, roundish oblong ; skin reddish purple, with a thin blue bloom ; flesh yellow, juicy, brisk, and well flavoured, semi-clingstone ; ripe at the end of August ; tree vigorous, and a good bearer, but requires a warm soil.
- † **GRAND DUKE (Rivers')**.—Fruit very large, oval ; skin purple, with a fine bloom ; flesh yellow, firm, finely flavoured, clingstone ; ripe in the middle of October ; tree sturdy, and a free bearer, succeeding as a pyramid or cordon, also as a standard, and grown against a wall. Useful for dessert, and valuable for market.
- HERON (Rivers')**.—"Fruit very large ; purple and red ; freestone ; a culinary plum of great excellence ; tree an abundant bearer ; ripe early in August."
- MITCHELSON'S**.—Fruit medium, oval ; skin dark purple, nearly black, covered with a blue bloom ; flesh yellow, tender, juicy, with a pleasing damson-like flavour, freestone ; ripe at the end of August or early in September ; very prolific, bearing in clusters. Much grown for market.
- † **MONARCH (Rivers')**.—Fruit very large, roundish oval ; skin dark purplish blue, with a fine bloom ; flesh greenish yellow, firm, and close, excellent flavour when cooked, freestone ; ripe in September and not liable to crack in wet weather ; tree robust, and an abundant bearer ; succeeds in standard, pyramid, cordon, or wall tree forms. Valuable for market.

ORLEANS.—Fruit medium, round, flattened; skin dark red, purplish when ripe, covered with blue bloom; flesh yellowish, tender, rather coarse, juicy, and agreeably flavoured, freestone; ripe in the middle of August. An old useful plum, much grown for market, but being superseded by the Czar.

PERSHORE, OR YELLOW EGG.—Fruit medium, oval, narrow at the stalk; skin yellow; flesh tender, moderately juicy, with an agreeable sub-acid flavour, clingstone; ripe about the end of August; tree vigorous, and a profuse bearer. Much grown in the Vale of Evesham, and the fruit is said to be in demand for apricot jam.

† **POND'S SEEDLING.**—Fruit very large, oval, narrow at the stalk; skin red, and covered with a thin bluish bloom; flesh yellowish white, juicy, and briskly flavoured, clingstone; ripe in the beginning and middle of September; tree a somewhat spreading grower, and a free bearer. The largest plum, and valuable for market.

† **PRINCE ENGELBERT.**—Fruit very large, oval; skin deep purple, thickly covered with grey bloom; flesh yellow, firm, juicy, brisk yet richly flavoured, clingstone; ripe in the end of August; tree moderately vigorous, upright, and a profuse bearer, succeeding as a pyramid or cordon, and hangs late on wall trees, the fruit being then useful for dessert. A fine variety for market.

PRINCE OF WALES.—Fruit medium to large, roundish oval; skin bright reddish purple, covered with blue bloom; flesh yellowish, with a fine brisk flavour, freestone; ripe in the beginning of September; tree healthy in well-drained soil, but liable to collapse in rich, deep loams. Well ripened from walls, the fruit is excellent for dessert, and is greatly prized for tarts.

RED MAGNUM BONUM.—Fruit large, oval; skin deep red, with a blue bloom; flesh greenish, firm, and briskly flavoured, freestone; ripe in the middle of September; tree vigorous, hardy, and a good bearer.

STINT.—Fruit small; skin red or reddish purple; flesh juicy and richly flavoured, freestone; ripe in July and early August; tree dwarf, slender, and very productive. Useful for dessert.

SULTAN.—Fruit large, round oval; skin deep red, with a blue bloom; flesh yellowish, juicy, and excellent in flavour, clingstone; ripe about the middle of August; tree strong and regular bearer, succeeding as a standard.

† **VICTORIA.**—Fruit large, roundish oval; skin bright red, pale on the shaded side, covered with a thin bloom; flesh yellow, juicy, and pleasantly flavoured, freestone; ripe at the beginning and middle of September; tree healthy, and very productive, succeeding as a standard, pyramid, cordon, and against a wall. Useful for dessert, and one of the most profitable market plums.

† **WASHINGTON.**—Fruit large, roundish ovate; skin yellow, clouded with green, changing to deep yellow, and marked with crimson dots, with a bluish grey bloom; flesh yellow, firm, and richly flavoured, freestone; ripe in the middle of September; tree vigorous, a moderate bearer, unless root-pruned; excellent for a wall, and useful for dessert.

† **WHITE MAGNUM BONUM.**—Fruit large, oval; skin pale yellow, covered with thin bloom; flesh yellow, firm, with a brisk sub-acid flavour, clingstone; ripe at the middle of September; tree strong and vigorous, bears well, especially against a wall. A valuable cooking and preserving plum.

WINESOUR.—Fruit small to medium, oval; skin dark purple, covered with darker specks; flesh greenish yellow, red next the stone, agreeably acidulous, clingstone; ripe in the middle of September; tree hardy, vigorous, forming a spreading tree, and succeeds in limestone districts. Much esteemed for preserving.

WYEDALE.—Fruit small to medium, oval; skin dark purple, covered with blue bloom; flesh greenish yellow, juicy, and agreeably flavoured, freestone; ripe in the middle of October to November; tree hardy, healthy, moderately vigorous, and prolific, succeeding in cold localities. An excellent preserving plum.

IV.—BULLACES AND DAMSONS.

The bullaces are round, and are more austere in flavour than damsons; both are excellent on the outside of orchards or fruit plantations for shelter.

ESSEX BULLACE (New Large).—Fruit small, yet larger than the common bullace, round; skin yellowish green; flesh juicy, acid, not so austere as the common bullace; ripe the end of October and beginning of November; tree very prolific, and forms a handsome pyramid.

ROYAL BULLACE.—Fruit large, about an inch and a quarter in diameter, round; skin yellowish green, with a thin grey bloom; flesh green, briskly flavoured; ripe in the beginning of October, and continues to hang till November. Esteemed for tarts; tree an enormous bearer.

WHITE BULLACE.—Fruit small, round ; skin yellowish white, mottled with red on the exposed side ; flesh firm, juicy, sub-acid, sweetish when well ripened ; ripe in October and November.

The following seven varieties are Damsons.

BLUE PROLIFIC.—Fruit medium ; skin purple, with a blue bloom ; flesh juicy, and agreeably flavoured, a mixture of damson (most) and plum ; ripe in the beginning of August, and lasts until the second week in September ; tree a profuse bearer.

BRADLEY'S KING.—Fruit large ; skin deep purple, dense blue bloom ; flesh juicy, brisk, and sweet ; ripe in the end of September and beginning of October ; tree productive. A favourite with market growers.

CRITTENDEN, or FARLEIGH PROLIFIC.—Fruit medium, roundish oval ; skin black, covered with a fine blue bloom ; flesh juicy, and full damson flavour ; ripe in the middle of September ; tree free in growth, and an enormous bearer ; fine for standards.

FROGMORE.—Mr. Bunyard describes this as a distinct grower and a valuable fruit ; as sweet as a green-gage, and a good cropper ; early.

PRUNE (Cheshire, Shropshire).—Fruit large, oval ; skin black, with a blue bloom ; flesh greenish yellow, juicy, and well flavoured ; ripe in the middle to the end of September ; tree free and upright, a moderate bearer until aged. The Herefordshire prune has longer fruit, smaller foliage, and is slenderer in growth, and the Worcester has oval fruit of excellent quality.

RIVERS' EARLY.—A seedling from the St. Etienne plum ; the raiser regards this as a valuable addition to damsons because of its excellence in quality and earliness, the fruit ripening in August.

WHITE.—Fruit large, roundish oval ; pale yellow, covered with thin bloom ; flesh juicy, with an agreeable acidity ; ripe in October ; tree a great bearer.

THIRTY-SIX SELECT PLUMS NAMED IN THEIR ORDER OF RIPENING.

End of July and beginning of August.

- Early Favourite.
- Early Prolific.
- Czar.

Middle to end of August.

- Oullins Golden.
- De Montfort.
- Denniston's Superb.
- Early Transparent Gage.
- Gisborne's.
- Orleans.
- Sultan.
- Belle de Louvain.
- Belgian Purple.
- Mitchelson's.
- Green Gage.

September.

- Victoria.
- Jefferson.
- Prince Engelbert.
- Bryanston Gage.
- Purple Gage.
- Pond's Seedling.
- Transparent Gage.
- Angelina Burdett.
- Winesour.

- White Magnum Bonum.
- Washington.
- Kirke's.
- Diamond.
- Autumn Compôte.
- Coe's Golden Drop.
- Late Transparent.

October and November.

- Monarch.
- Reine Claude de Bavay.
- Archduke.
- Ickworth Impératrice.
- Grand Duke.
- Wyedale.

Twelve for high quality.

- *†Denniston's Superb.
- Early Transparent Gage.
- McLaughlin.
- * Green Gage.
- Purple Gage.
- *†Jefferson.
- * Transparent Gage.
- Lawson's Golden.
- * Kirke's.
- Late Transparent.
- *†Coe's Golden Drop.
- Reine Claude de Bavay.

Twelve for dessert or culinary.

- *†Czar.
- * Belgian Purple.
- Sultan.
- Prince of Wales.
- Denbigh.
- *†Victoria.
- * Prince Engelbert.
- Washington.
- *†Monarch.
- Archduke.
- Blue Impératrice.
- * Grand Duke.

Twelve for culinary.

- *†Early Prolific.
- Heron.
- Orleans.
- Belle de Louvain.
- * Gisborne's.
- Mitchelson's.
- *†Winesour.
- Pond's Seedling.
- White Magnum Bonum.
- *†Diamond.
- Autumn Compôte.
- * Wyedale.

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