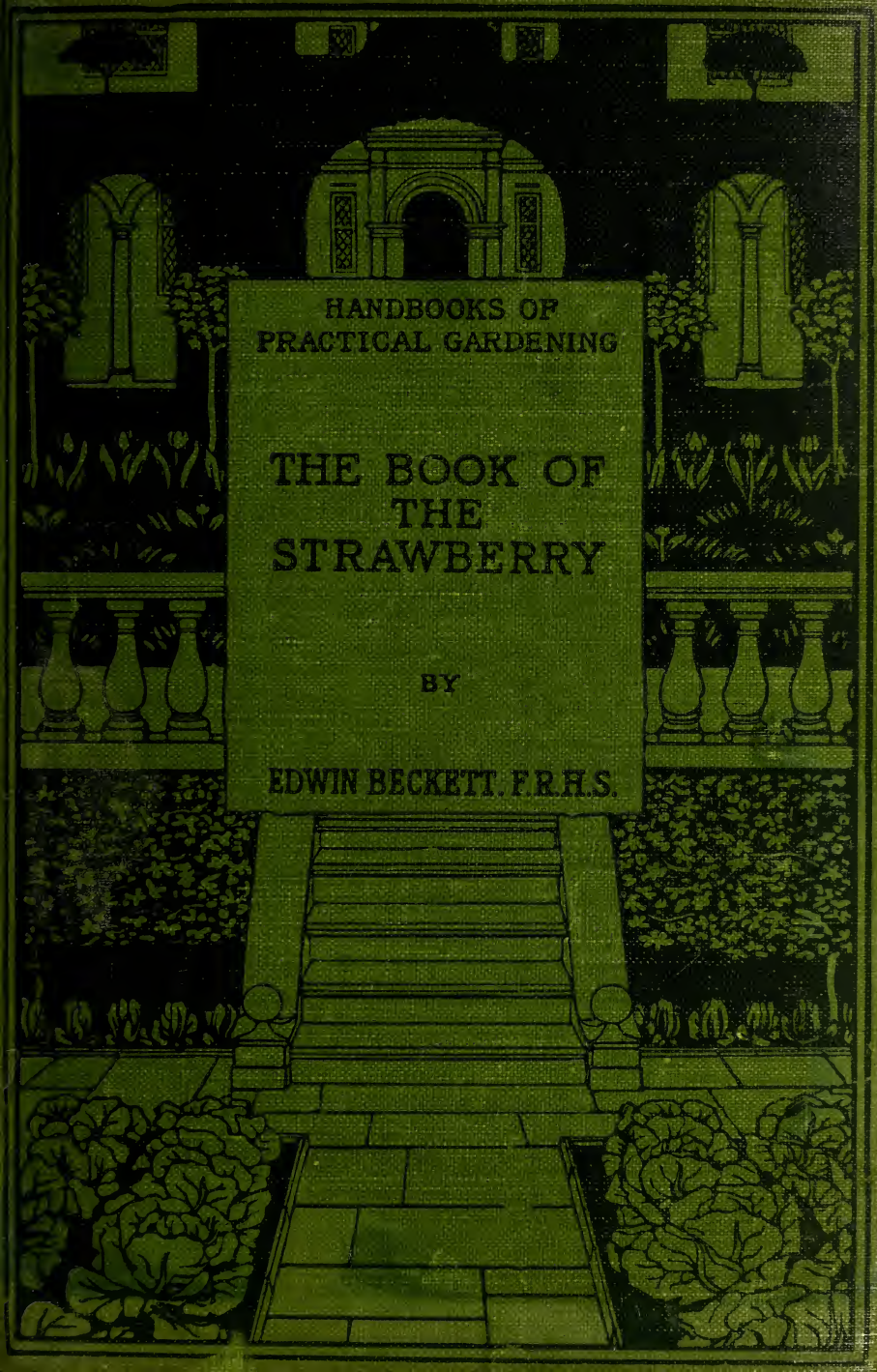
HANDBOOKS OF
PRACTICAL GARDENING
THE BOOK OF
THE
STRAWBERRY
BY
EDWIN BECKETT, F.R.H.S.

HANDBOOKS OF PRACTICAL GARDENING—IX
EDITED BY HARRY ROBERTS

THE BOOK OF THE STRAWBERRY

STUDY OF THE WILD STRAWBERRY

THE BOOK OF THE STRAWBERRY

BY

EDWIN BECKETT, F.R.H.S.

HEAD GARDENER TO LORD ALDENHAM

WITH SECTIONS ALSO ON THE RASPBERRY, BLACKBERRY, LOGAN BERRY, & JAPANESE WINEBERRY

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EDITOR'S NOTE

Mr Edwin Beckett's name is so well known to all who take the smallest interest in gardening affairs that he needs little introduction to the readers of this book.

For very many years he has been a most prolific and valued contributor to our leading gardening papers, and, since he was seventeen years old, he has been a very successful exhibitor at flower, fruit and vegetable shows of every grade. Like many another gardener of distinction, Mr Beckett comes of a race of earth lovers, for both his father and grandfather were gardeners before him. He was born at Henley-on-Thames, and educated at the grammar school in that town. On leaving school he started practical work in the gardens of Sir Dudley Marjoribanks. Thence he proceeded to Wolseley Grange, Esher, where, although only in his seventeenth year, he held the post of foreman. In 1884, Mr Beckett obtained the appointment of head-gardener to Lord Aldenham, at Aldenham House, Elstree, which post he still occupies.

The number of medals and other prizes which have fallen to Mr Beckett at the exhibitions of the Royal Horticultural Society and elsewhere is probably greater than that of which almost any other gardener can boast.

He is a member of the Fruit and Vegetable Committee of the Royal Horticultural Society, and is the author of a very useful little book on "Vegetables for Exhibition."

The Editor desires to express his thanks to those ever courteous florists, Messrs Kelway, of Langport, for assistance in illustrating the Logan Berry, *Rubus sorbifolius*, and the Japanese Wineberry.

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STRAWBERRIES

Introductory

If in the olden days, when such strawberries as we now have had not come into being, a worthy man believed and said, that "Doubtless God could have made a better berry than the strawberry, but doubtless God never did," how much more shall we at the dawn of the twentieth century agree with the old doctor's sentiments. We have such delicious and free cropping varieties, and have arrived at such a successful system of culture, that if the future holds as much advance in strawberries and strawberry culture as the past half a century has seen, one can hardly help hoping to live on for another five decades, provided that the years do not bring "labour and sorrow," or a cessation of desire.

The strawberry is the earliest of our hardy fruits to ripen, and on this score alone it claims our attention, but added to this are delicious flavour and refreshing juiciness, coming at a season when the hot summer days commence and we are best able to appreciate them. Fortunately the strawberry is easily grown, and it is a good subject for town and suburban gardens; but as the town-dweller has little room or time to cultivate a plot, the market-grower a few miles away has undertaken to supply him. On the whole the market-gardeners are to be congratulated upon their success with strawberries, for those who visited the larger centres of industry during the strawberry season of 1901 could not but be struck

with the high quality of the fruit—Royal Sovereigns especially—sold at stalls or from costers' barrows at 4d. and often 3d. per lb. These prices cannot leave a very large margin of profit to the grower, but it must be remembered that they only obtain in good seasons, and are paid only for second quality fruits, surplus stock, or some belated consignment that has missed the early and most profitable market customers.

While in so many other fruit industries foreign competition has to be considered, the strawberry grower has not to face it; for though France sends a few tons of early strawberries each season, these come at the tail end of the forced crops, and just before the earliest from out of doors; and, moreover, the quality is not good, proving that such soft fruits lose flavour during even a brief sea voyage. The market season of forced strawberries is during April and May, and the districts from whence these early fruits come are Worthing, Belvedere, Bromley, Swanley, Bexley Heath, Twickenham and Hampton. A moderate amount of fire heat is used for the earlier crops, but the later ones are produced in houses that are only heated when the weather is severe. Crops vary in quantity with the skill and conveniences of the grower. They may average as high as 4 ozs. per plant or as low as 1½ ozs., and while it is questionable whether the latter gives any profit at all, it is quite safe to say that 2½ ozs. and upwards per plant pays very well. Some growers force as many as 50,000 plants each season.

The agricultural returns do not specify the area under strawberries alone in the United Kingdom, but it is quite evident that the large increase in small fruit culture is due not a little to the growing strawberry industry. While naturally there are many hundreds of acres devoted to the supply of local demands, scattered up and down the land from Penzance to Aberdeen, yet, as in so many other industries, the growers for the big markets

are found settled in districts, and to these districts the name of the despatching centre is generally given. The earliest large district for outdoor strawberries is the South Hampshire one of Botley and Sarisbury, known in market parlance as the Southampton district. Mr Bear states that in a recent good year the district sent away about 7,000 tons of strawberries. This at the average of 2 tons per acre means 3,500 acres under this crop, but this is a far larger area than the official returns give for the whole acreage under small fruits, consequently one is compelled to assign a much higher average crop to the successful Hants growers, and put the area down as considerably under 3,000 acres.

From around Penzance, in Cornwall, and Exeter, in Devonshire, small supplies of early out-door strawberries come, preceding those of Hampshire by a few days.

The Kent districts come next in chronological order and follow about ten days after those of Hampshire. The chief centres are Swanley, from whence 75 tons have been despatched by rail in one day, and 600 tons within one month, independent of road-borne consignments, Crockenhill, St Mary Cray, Sevenoaks and Maidstone. Surrey does not contribute strawberries largely, but in Middlesex, around Feltham, Cranford and Teddington, there are large areas under the crop, as also there are round Cheshunt, in Hertfordshire. In Cambridgeshire, especially around Willingham and Wisbech, strawberries are extensively grown, and one firm has been known to send away 40 tons on one day. And so the season progresses right up the country, Bedford, Gloucester, Hereford, Worcester, Yorkshire all contributing to the great and extended demand. Round Alnwick, in Northumberland, a large industry in late strawberries has grown up in recent years, while farther north, Scotland has its strawberry districts at Perth and Aberdeen.

History of the Garden Strawberry

Every season, with a regularity that has become quite irritating, some one or more persons—and often such as should know better—set out to give a history of the garden strawberry. The opportunity taken is usually that of opening a local flower-show in summer, or the holding of the local Society's Annual Dinner, and the whole thing is beautifully simple, for the would-be expert states that our wild, wood strawberry (*Fragaria vesca*) was the original from which our present race of varieties has been evolved.

Such statements stir up a little patriotic feeling, and, in view of what has been done in the evolution of many native plants, they have an air of probability, but, unfortunately for speakers and audiences, they are untrue.

From whence then have come our strawberries? They have come, chiefly, from the intercrossing of the Virginian (*Fragaria virginiana*) with the Chilian strawberry (*F. chiloensis*). The latter has a variety (*F. chiloensis grandiflora*) that has had a good deal to do with the fine flavour of many strawberries; it is the Pine strawberry, a large flowered form that Decaisne considered to be of hybrid origin.

The Greeks and Romans, strangely enough, do not seem to have grown strawberries in their gardens, though the wild *Fragaria vesca* is widely diffused throughout Europe, and must have been well known to them; and, indeed, Virgil and Ovid both referred to it in terms of eulogy:—

> "*Contentique cibis nullo cogente creatis*
> *Arbuteos fœtus montanaque fraga legebant.*"

The old street cry, "Strabery rype," at first referred to fruit gathered wild, for strawberries do not appear to have been cultivated in English gardens until

the fifteenth century. Holinshead reports that they were then grown in the stately and "ample" gardens of the Bishop of Ely, on the ground now known as Hatton Garden. He quotes the Duke of Gloucester as saying to the Bishop of Ely: "My lord, you have very good strawberries in your garden in Holborn. I require you to let us have a mess of them." This speech was copied almost verbatim by Shakespeare in the third act of *King Richard III.*

The garden strawberries at that period were but transplanted wildlings, and plants were to be purchased at fourpence a bushel. In his advice for September Tusser wrote:—

> "Wife, into thy garden, and set me a plot
> With strawbery rootes of the best to be got:
> Such growing abroade, among thornes in the wood,
> Wel chosen and picked, prove excellent good";

and Thomas Hyde, at the commencement of the sixteenth century, said: "They grow in gardens unto the largeness of a mulbury"; whilst Platt, in his *Garden of Eden*, wrote: "Strawberries which grow in woods prosper best in gardens." Shakespeare's references are all to the wild species, which he says "grows underneath the nettle"; and Ben Jonson speaks of "a pot of strawberries, gathered in the wood, to mingle with your cream." Gerard said: "Strawberries grow upon hills and valleys, likewise in woods and other places which be somewhat shadowie. They prosper well in gardens."

It is not very easy to follow the introduction of exotic strawberries into this country. Gerard (1597) refers to the Wood strawberry, and the Hautbois (*Fragaria elatior*), the latter an European, but continental species. Sir Hugh Platt in the book already referred to, regards the Virginian strawberry as of less value than the wild native one, and Parkinson (1629) mentions Wild, Hautbois, Virginian and Bohemian strawberries, but with

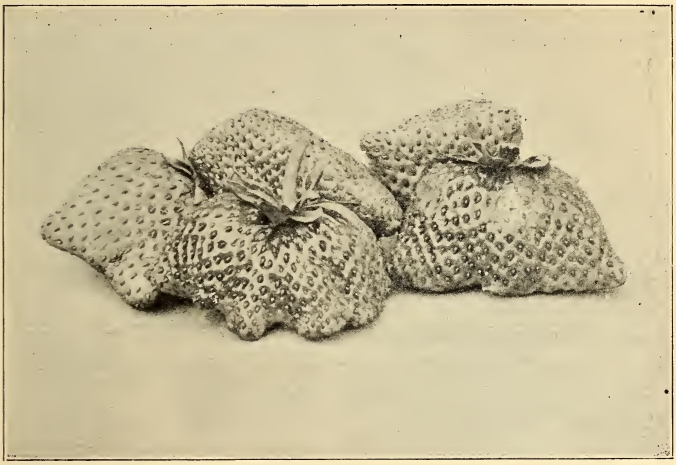
these latter he had no success, though he doubtless was near the mark in saying, "I think the reason thereof to be the want of skill or industry to order it aright." Philip Miller appears to have been about the first to appreciate the usefulness of the Virginian strawberry, as he praises its flavour and earliness. In 1727 this famous old gardener brought from Holland plants of the Chilian strawberry which he described as frequently having deformed flowers and fruits, and as a bad bearer in most places where it had been cultivated.

Regarding the introduction of the Pine strawberry, it can only be said that this occurred not later than 1759. Miller obtained it from a friend in Holland, who in turn secured it from Surinam, and it may be inferred that *Fragraria chiloensis grandiflora* was a form of the Chilian strawberry cultivated in this Dutch settlement.

More success attended later efforts to cultivate both the Chilian and the Virginian strawberries, with the result that in each case some amount of variation arose. One of the earliest to commence the hybridisation of strawberries was Mr Thomas Andrew Knight, a president of the Royal Horticultural Society, who, in 1818, contributed an interesting paper on the "Variations of the Scarlet Strawberry," to the Society's literature. He considered all occidental forms to be "varieties of only one species," and to them he added the then known large-fruited garden forms, excepting the Hautbois. By crossing White Chili with the Black strawberry (probably a form of *F. virginiana*), Mr Knight obtained a seedling that gave "a fruit weighing 274 grains." The colour of the fruit was scarlet, the form conical, and not at all flattened or deformed.

We come then, down to more modern times, and, in the words of the late Shirley Hibberd, we find "that the strawberries of Europe are mostly descended from the Chilian and Virginian stocks; while those of the

United States are the progeny of the Virginian stock almost exclusively. And there is no shadow of whim or taste in the matter, for the South American race suits the European climates, and the North American race suits the North American climates; for in those States in which strawberries are in the greatest demand, the winters are too cold and the summers too hot for the



STRAWBERRY, LATEST OF ALL

progeny of Fragaria chiloensis." This probably is the reason why American varieties of strawberries seldom attain any large degree of popularity in this country, and *vice versa*.

In our own times many have raised seedling strawberries, but success has been only to the few. Mr J. Douglas raised Loxford Hall Seedling, but it is now seldom grown; Keen raised Keen's Seedling, a variety that still finds a place in many gardens; and Bradley

was the fortunate raiser of Sir Joseph Paxton, still widely grown for market. And then there came that greatest of all strawberry-raisers, the late Mr Thomas Laxton of Bedford, whose three greatest achievements were the very early Noble, the omnipresent Royal Sovereign —*the* strawberry of the present day—and Latest of All. He has been followed by his sons, whose output includes Trafalgar and Mentmore, but these will be surpassed by their new variety, The Laxton, a splendid strawberry, the result of crossing Royal Sovereign with Sir Joseph Paxton. It has firmer, deeper coloured, and finer flavoured fruits than the former, while it possesses all the robustness and freedom of that popular sort. It ought here to be stated that Mr Thomas Laxton early formed an opinion that good would result from inter-crossing the best American with selected British varieties, and this he tested by first acclimatising some good American sorts. The first result was Noble, but it was from a natural, and not from an artifical, cross between Forman's Excelsior and Sharpless seedling. Through Noble quite a number of varieties have been in a small degree Americanised for it is one parent of Mentmore, Scarlet Queen, Leader, Laxton's No. 1, and Latest of All.

Mr Wm. Allan, the able gardener to Lord Suffield, at Gunton Park, Norwich, has raised several strawberries that combine fine appearance with excellent flavour and abundant crops; their names are Lord Suffield, Empress of India, Gunton Park, and Lady Suffield, and they are of such excellence that wherever the soil and climate suits them they are extremely difficult to beat as high-class dessert varieties.

The well-known firm of Messrs James Veitch & Sons, Chelsea, has raised and distributed some delicious strawberries during recent years; notably, Veitch's Prolific, a white-fleshed variety derived from British

Queen and Empress of India; Lord Kitchener, a cross between Waterloo and British Queen; and Veitch's Perfection, which has the same parentage as the latter.

Nor must one omit to mention the work of Mr Carmichael among strawberries, for his varieties are well known in the south of Scotland; the best are Wm. Carmichael, Prince of Wales, Princess of Wales, and Queen of Denmark.

Soil and Situation

Strawberries do not flourish equally well in all kinds of soils, but, fortunately, they yield good crops in most kinds, provided reasonable attention is paid them. In pure sand or solid clay no one would dream of making plantations, but those who are ever blaming the soil with which they have to deal should remember that light and hot mediums may be improved by the addition of some clay, farm-yard manure, and decaying vegetable matter; while, on the other hand, a cold clayey soil generally needs only to be drained, exposed to sun, frost and wind by rough trenching (or ploughing, in the case of fields), and manured with stable litter to become fertile. An ideal strawberry soil is a fairly deep, strong loam, sufficiently drained, either naturally or artificially, to keep it from becoming cold or water-logged during the wettest season, and yet sufficiently retentive to bring good crops to maturity even in a season of drought. On such a soil as this the necessity of manuring is considerably reduced, while the profitable duration of the plantation is also extended.

As regards situation the private gardener has generally not a very wide choice, and his crops have to be grown in the prescribed area of the kitchen garden; but, where experience and intelligence are brought into play, he can, by the selection of various sites, secure a regular

crop over a long season. In low-lying districts, especially near a stream, lake, or river, the grower is frequently at a very great disadvantage, for it is in such situations that the late May frosts do so much damage. The spring sunshine early starts the plants into growth in such moist localities, with the result that when the earlier sorts are nicely in flower or have just set their fruits, they are in a condition to suffer terribly from the sharp ground frosts that are peculiar to such districts about the third week in "the merrie month." The gardener may have no choice of situation, so far as escaping such disasters is concerned, and all he can do is to lighten the soil, afford good drainage, raise the beds, and lastly, but by no means of least importance, he should keep a few loads of long dry litter, rough hay, or similar material close at hand, so that when thermometer and barometer indicate a smart lowering of the temperature, this may be lightly shaken over the early plantation, and thus a crop may be saved. Where the strawberry bed is not a large one it is by no means a difficult matter to erect a low light framework over it to carry canvas blinds (on rollers) for placing over the crop at night until all fear of harm by frost has passed.

When it can be selected, the situation should be one sufficiently elevated to escape late spring frosts, and sheltered from the north and north-east by the upward slope of the ground or by trees. No shade is needed by cultivated strawberries, notwithstanding that wild strawberries flourish in shady or semi-shady spots.

Preparation of the Soil

In my own case I have a heavy soil to deal with, and this leads me to consider the preparation of heavy soils first. Assuming that the land has been drained, wherever this seems necessary, the next step is trench-

ing. Autumn is the time to commence operations, forking up the ground in as rough a manner as possible as soon as the previous crop has been cleared off, and leaving it in this condition, exposed to all the fertilising and ameliorating effects of the elements, until at the end of February or early in March the weather permits one to carry out the real work of trenching. The aim should be to secure two feet or two-and-a-half feet depth of good soil, and if the land has been previously well worked, there need be no fear of untoward results, even if the lower soil is brought to the surface. Break up the bottom of the trench with a fork, and on it place a good layer of the roughest and greenest manure, adding the refuse from green crops if available. About a foot from the surface place a layer of half-decayed manure, with which road sidings, verge trimmings, spent hotbeds, and similar rich and fairly light material, may advantageously be mixed. Leave the surface rough, allowing the soil to settle naturally, for on such land the question of providing a firm strawberry bed presents no difficulties. Surface feeding follows after planting, as a matter of course.

Wherever possible, whether on light or heavy soils, the ground for strawberries should not be occupied by any other subject between planting time and the previous crop. But, as in these days of big demands the resources of the garden are frequently severely taxed, it may be as well to mention that small-growing crops, such as onions, lettuce, radishes, etc., may be grown on the strawberry plot during the first year, provided the strawberries have the first consideration, and the catch crops are sown or planted so as not to interfere with the more permanent one. Such practice presents some difficulties, or rather, inconveniences, but these are by no means insurmountable, and there are compensating advantages.

It has also been my fortune to have to deal with light, and what are known as "hot" soils, and with such the preparation necessary to success differs somewhat from that already noted. Where these soils exist the grower should arrange so that the plot for strawberries can be trenched early in autumn, using rich farmyard manure, if it can be obtained—at any rate, using rich retentive material—in the process, as already described for heavy soils. In no case should trenching be deferred until the New Year, or the ground will not become sufficiently firm or fertile for the production of good strawberries.

Propagation

Not only are strawberries fertile in a fruit-bearing sense, but they are prolific propagators. Left to their own resources they push out runners, along which, at intervals, are joints or nodes, from which young plants quickly form. What the botanists would call "continuity of species" is well illustrated by strawberries, for the runners are pushed as far as possible out from the parent crown, so that even the plantlet nearest home has unoccupied soil in which to establish itself, while the later-formed ones are placed still further afield, and not one comes into direct competition with any other on the same runner.

Propagation by runners is the general method of increasing stock, and certainly it is the best one, being both natural and profitable. Simple as the operation is there are quite a variety of ways in which to conduct it, but there are, however, a few points to be observed in each and every case. The earliest plant formed by the runner, that is, the one nearest the parent, should be secured, and none be allowed to form beyond it: this enables the grower to obtain strong, early plants, that

may be planted out where they are to fruit, during August or early September. The advantages of such practice are many and obvious, the chief being that in the following season a fair crop is obtained, as the system is only a slight modification of that followed for forcing strawberries.

Other points to be specially remembered are to propagate only from fertile plants, and further, to propagate only from strong healthy stock, and not from old and well-nigh worn-out plantations. These points may seem trivial to those who know how freely runners are produced, but are not in a position to fully appreciate the advantages secured when they are observed. Comparisons are frequently odious, but they have to be made all the same, and if gardeners who have not hitherto tried the early planting of early runners from young plants not allowed to fruit, and compared the crops subsequently obtained with those from late-planted runners secured from a fruiting plantation, would but make the comparison, we should hear much less of unsatisfactory results. If the strawberry were less hardy and less easy to grow, more pains would be taken with it, but as it is one of the most good-natured subjects in the garden it too often, even in these days of splendid varieties and big crops, suffers because of a neglect of apparently small, but really most important details.

It always pays in private gardens annually to plant a few strong young plants, from runners, for stock purposes alone. It is an essential matter when the forcing of strawberries has to be carried out on a fairly large scale, as I shall presently show, and it is distinctly good practice for out-door crops. Pinch out the flower trusses from these stock plants as soon as they can conveniently be removed, so that all the energy may be thrown into runner production.

As soon as the first bud on the runners shows signs of forming a plant, prepare a sufficient number of sixty-sized pots, by placing one good crock over the drainage hole, adding a little rough soil, and filling firmly to within half-an-inch of the rim with good sound loam in moderately fine condition. The soil should be moist but not wet. Group the pots, as far as this is possible, between two rows of stock plants (to economise labour in watering), and peg one runner into each pot by means of a carnation or verbena peg, or by a small peg such as can be cut from the twigs of a stubby birch broom. The peg must not be forced down so as to injure the connection between plantlet and parent, but be so placed that it keeps the base of the plantlet firmly in the soil, enabling it to take root readily. If there is no fear of its being moved, a small stone will be sufficient to keep the runner in position, but pegging is the better and less risky practice. As layering is completed give a good watering, and subsequently see that no check is administered through lack of moisture. When the layered or pegged plantlet pushes forth another runner as a sort of continuation of the runner-stem, this must be pinched off.

Another method is quite frequently practised in some districts, and consists of pegging the runner to the centre of a piece of new turf. Where good close turf is readily obtainable this method is a good one, provided the runners are severed from the parent early and planting is also done early; but if this is neglected the roots pass through the turf, enter the soil beneath, and so have to be broken at planting time. Cut the turf into three-inch cubes, and place these in groups (grass side down) as advised for the pots.

An altogether easier plan and one that is largely practised by market-growers, especially those in the famous Botley district of Hampshire, is to simply loosen the

soil round the parent plants to the depth of an inch or so, and into this peg or otherwise fix the early runners. Sufficient room is allowed every runner, so that at planting time each one may be lifted with a good ball of soil and roots, and at once be transferred to the new plantation. Some amount of artificial watering is necessary if the best results are to follow, and it is obvious that the less time there is allowed to elapse between the lifting and the planting of the rooted runners the better.

Propagation by division is now seldom practised, except when it is necessary to increase the stock of some new or expensive variety. It is easily managed, however, and consists merely in splitting up a plant into as many pieces as there are crowns, each crown having a portion of stem and a few roots attached. Careful replanting in suitable soil, with the provision of moisture as necessary, are matters that admit of no neglect when increase by division is, for some reason or other, carried out.

If the grower has an experimental turn of mind he will probably try his hand at the improvement of strawberries, for every experienced cultivator has a distinct idea of what an ideal strawberry should be. It must have a good constitution, be prolific, handsome, medium to large in size of berry, of fine flavour, luscious, and firm enough in flesh to suffer conveyance over a long railway journey without damage. The only way by which that ideal can be obtained is by the cross-fertilisation of varieties that are nearest perfection; but if anyone thinks that the finest new varieties are thus easily secured, I would remind him that it frequently takes several generations of cross-breds to reach anything like a first-rate variety, and quite a number of the newer sorts are the combination, in varying degree, of half-a-dozen or more good strawberries.

Cross-fertilisation can only be successful when the stamens of the flower on the seed-bearing parent are removed before the anthers are ripe, to prevent self-fertilisation by the escaping pollen. Enclose the emasculated flower in a fine gauze or muslin bag to prevent pollination by insects, and then, when the tip (stigma) of the pistil is in a receptive condition, apply to it pollen from the other selected parent, conveying it on a soft camel-hair brush.

Presuming that cross-fertilisation has been effected, parentage recorded, and the fruit ripened, the next business is to save and sow the seed. The seed may be separated from the flesh by shaving off the outer and seed-bearing surface of the berry, and spreading it on blotting paper, where, in sunlight, it will soon dry. Or the whole fruit may be pulped and the flesh washed away from the seed.

Sowing may take place either as soon as the seed is saved, or may be deferred until spring-time, the former for preference. Prepare a bed of light rich soil in a sheltered part of the garden, and in such a position that a cold frame may be placed over it during the winter. Sow thinly and regularly so that the seedlings may remain until the following spring, when they may be planted out. Some few may flower the same season, but it will not be until the year after they are planted that they will fruit in a characteristic manner. In some cases it will be easier to manage the seedlings if seed is sown in February or March, in pans of light soil placed over a gentle hot-bed in a frame or pit. Prick out the tiny plants, as soon as they can be conveniently handled, into boxes of good loam and leaf-mould, allowing them room to develop. As soon as established in boxes, proceed to harden off the plants, so that by about midsummer or July they will be ready to put out where they are to fruit the following year. Watering, weeding, hoeing,

mulching, and the removal of runners must be practised as in the case of established varieties.

Some of the seedlings are almost sure to be worthless, and these with the second-raters had best be rooted up and burned as soon as their rank has been determined. Promising plants should be retained and well-treated, and it is a good plan to layer a couple of runners of each, planting these out early to give them every chance of distinguishing themselves the next year. Only first-raters should be kept for trial side by side with well-known and standard sorts. A good seedling may not always be quite good enough for distribution, but it may well serve as one parent for another generation of cross-breds, or possibly, if the grower has patience enough, it may be improved by selection. This consists in selecting the finest fruits from self-fertilised flowers, and sowing only the best seeds, subsequently making a rigid selection of the resulting seedlings.

Planting

No matter what the nature of the soil, it is a matter of the greatest importance that planting should be done as early as possible. If the runners are strong enough, and are well rooted by the end of July, then plant them out at once, but in any case get the work done before August is over, or the yield the following summer will be either nil or very poor. Planted in July or August, and supplied with water as necessary, strawberries give a very fair crop the next year, and on good land the fruits will be of high quality, practically all of them being suitable for dessert.

Considering all that has been written anent strawberry culture in the horticultural press and in fruit manuals, it would seem at first sight a mere waste of words to give

directions as to the way to plant strawberries. But one cannot travel far in any part of the country without discovering that many failures with strawberries are due to the ignorance or carelessness of planters. Some simply dibble the rooted runners in, clamping the roots all together in a narrow hole, and not infrequently "hanging" the plants. And yet these good folk are surprised that the crop does not work out at something between two and three tons per acre; it would be a surprise if the crop did more than pay for gathering. Others deem it sufficient to scoop out a hole with a trowel and stuff the plant into it, no matter whether it be more than half deep enough, and the result is that the plant's head is not much above the level of its toes, the roots being almost doubled up.

Some do not sin so badly in the matter of planting, but while they take care that the roots are given ample room, and even go to the trouble of spreading them out in the case of purchased rooted runners, they plant either too deep or too high. By "too deep" I mean that when planting is finished the crown or central bud of the strawberry plant is below the soil; and by "too high" I mean that the crown is left well above the surface, and the neck or collar of the plant is exposed.

The correct method is to make a hole sufficiently large, in well firmed soil, to accommodate the whole ball of soil and roots in the case of home layered plants, or large enough to admit of the regular distribution of the roots of imported runners. Press the soil firmly about the roots, and gauge the depth of the hole so that when the work is finished the crown of the plant seems to be resting on the surface. If the crown is buried the plant is stifled. If it is left right above the soil the neck or collar suffers from exposure, and the surface roots that would otherwise be produced therefrom have no chance whatever.

It is a good plan to leave a slight depression round each plant so that all the water given may directly benefit it. Be sure to practise firm planting, and follow it by a good watering.

Spring planting has not much to recommend it, except in very exposed localities where summer planted strawberries might suffer during the first winter. The advantages of this method are that it allows a longer time for ground preparation, the strawberries may follow a winter crop, and they have a longer season in which to become established before winter. The disadvantages are that the young plants have to be kept about so long in small pots—for rarely are they potted on from the 60s.—and they become more or less starved owing to the mass of roots and the poverty of the soil, the latter being caused by the frequent applications of water and subsequent loss of plant food by drainage.

The distances at which to plant must vary somewhat with the strength of the variety, the condition of the soil, and the length of time the plantation is to remain. My own practice is to allow two feet six inches between the rows, and two feet from station to station in the rows, putting out three plants at each station. By this method we are able in our strong land to obtain heavy crops for three years in succession. When set out singly a good general rule to follow is to place the rows two feet apart, and the plants eighteen inches apart in the rows. Very strong growers may advantageously receive more room, while, on the other hand, smaller growers succeed with less.

Hoeing and Weeding

New plantations pay for surface cultivation, whether it be by means of a Planet Jnr. machine or a Dutch hoe, while older plantations are benefited by surface hoeings

when there is no mulching to be interfered with. It is scarcely necessary to remind readers that weeds do not pay to keep, and that by hoeing and hand weeding every other growth but that of strawberries must be kept off the plantation. On well-manured ground weeds grow apace, but as they take a large amount of plant-food from the soil their presence must not be tolerated.

Manuring, Mulching and Watering

As a rule a strawberry plantation bears well for three years, but after that period deterioration sets in, and even in the third season the yield is rather a matter of quantity than quality. To keep the plants strong and vigorous enough to produce a profitable crop it is necessary to feed them. After the crop has been cleared and the runners removed, it is a good plan to dress the plantation with burnt garden refuse, and if the soil is fairly well supplied with humus a dressing of lime will be useful. As soon after the middle of February as possible spread some thoroughly well decayed manure around the plants, but if this is not over plentiful a not less beneficial dressing can be made by using half manure and a quarter part each of leaf-mould and burnt garden refuse, mixing the whole well together. Such a dressing encourages surface rooting, and induces new roots to form on the elongating "collar" of the plants.

Directly the fruits have set, an application of nitrate of soda at the rate of 2 lbs. per sq. rod will materially help the crop, but liquid from yard manure given twice a week, from fruit setting to the commencement of colouring, will prove even more beneficial, though, unfortunately it cannot always be obtained in sufficient quantities. Where autumn manuring cannot be managed, a mixture of equal parts of kainit and bone meal, applied

STRAWBERRY BED, ONE YEAR AFTER PLANTING

(*Showing method of netting six feet above bed*)

at the rate of 4 cwts. per acre, or say, 3 lbs. per sq. rod, will give a good return.

The spring mulching should serve a double purpose. In the first place it should have some manurial value, and in the second should serve to protect the fruit from mud-splashes during rains. If long, strawy stable litter, stained with manure and urine, be placed two inches thick around the plants as soon as the flower spikes appear, it will (a very dry season only excepted), be washed quite clean by the time the fruits ripen, and form a soft bed for them as well as keep them clean. This mulching should be placed close up to the crown of the strawberry plants and should cover the whole soil surface of the bed; it will then serve to reduce evaporation. Move the litter on one side when applying liquid manure.

In dry seasons and especially on light soils watering becomes an absolute necessity if good crops are to be obtained. It is always a good plan to examine the soil just previous to the spring mulching and if it is at all dry to give a good watering at once. A soaking with clear water just before the fruits ripen is frequently desirable to wash the litter quite clean. On all well-drained plantations liquid manure is not by any means wasted if given once or twice during the winter.

Forcing

Even in these days of advanced horticulture somewhat of mystery seems, in the minds of the uninitiated, to surround the production of very early strawberries, and the occasional very high prices (32s. per lb.) secured for a limited number of fruits has served to increase the mystery. And yet the whole business is simple enough and success follows according to the amount of attention

paid to a few important details, always provided that the grower has the necessary appliances and selects suitable varieties.

In the first place it is essential that strawberries for forcing, to secure the best results, should be layered early and from uncropped plants (*see* Propagation), and the earlier in the season the whole batch—whether it be 200 or 50,000 plants—can be layered and potted up, the better. By far the best plan is to layer into small pots and shift on into the 32-size as soon as the roots show at the drainage hole. I shall not go so far as to say that this method is essential, but it certainly is the most profitable, because the crop is more certain and the fruits finer than in the case of late layered plants from fruiting plantations.

The market-grower who forces strawberries largely does not, as a rule, find it profitable to produce ripe fruit until almost the end of April, but then he follows a different method and one which has the merit of economising labour. This method is to layer the earliest runners on an ordinary plantation direct into the pots in which they will be fruited, using 5-inch pots for the earliest and 6-inch pots for the later batches. Some go a step further in their desire to save labour, and having filled a sufficient number of pots and stood them in blocks where they can be readily watered and shaded, bring the runners from the field, cut them up, and peg one plantlet in each pot. It is no wonder that the cry is frequent "it does not pay to force strawberries," when such an unnatural and unreasonable mode of procedure is followed.

Let us presume then that early layers have been secured as advised, and that the time has arrived for potting into the fruiting pots. The best compost consists of fairly heavy loam that has been stacked a few months, roughly pulled to pieces and mixed with not

more than a fifth part of old mushroom bed manure or similar material, adding a large 60-sized potful of bone meal, soot and wood ashes to each bushel. Thoroughly mix together and arrange that the compost is moist without being at all wet or pasty. The best sized pot is the 6-inch or 32-size, for though the large 48 or 5-inch pot is suitable for batches that are to be started early in the winter, I prefer the larger size all through. The pots must be clean and well drained, that is, one large crock (concave side down) must well cover the hole and over it must be placed smaller potsherds until there is about an inch of drainage material. Over the drainage sprinkle a few crushed bones and then add a little of the roughest of the compost, making it firm; the young strawberry plant is then inserted keeping it in the centre and placing sufficient soil beneath its roots to bring its crown three-quarters of an inch below the pot rim. Proceed with the potting, adding the soil regularly all round the ball of roots and ramming it firm with a blunt pointed hard-wood stick. When the work is finished there should be ample space for affording water, and while the roots are well covered no part of the crown or leaf stems must be buried.

To some the work of potting may seem rather complicated, but it really is not so, and when reasonable preparations are made it is surprising what a large number of plants can be potted in a few days. One other point must not be forgotten, and that is to water the young plants a few hours before potting, for if the ball of roots be dry when potted the probabilities are against its ever becoming properly moistened; while, if too wet, it is not pleasant to handle, and the soil next it becomes pasty, and, in the case of clayey loam, will form a sort of basin round the roots. The evils of either practice are obvious.

After potting, stand the plants on a hard ash base in

an open position, and give water as necessary. Some protection from direct sunshine is desirable for the roots, and this may be provided by partial plunging in ashes, or by standing boards edgeways against each row of pots. Keep each variety separate, labelling the corner plants in each batch.

Subsequent summer treatment consists in keeping the plants clean, well supplied with moisture and free from weeds and runners. Clear and weak soot water, given occasionally after the plants are well established, will assist in the formation of good crowns and keep the foliage a good colour. Sprinkling overhead through a fine rose, during evening, after hot days, will promote robust health. One other point to be observed is that only one crown per plant should be allowed, and consequently, when secondary crowns commence to form, as they will do in a greater or less degree during the early part of September, they must be removed, but in such a manner that no injury is done to the central crown or to the bases of the leaf stalks.

In due rotation the next point to be considered is that of housing and wintering. Early batches ought to be placed in shallow frames in October, plunging the pots in leaves, and allowing sufficient head room for the plants. Only during wet or very severe weather should the lights remain on the frames, and even then some air must be admitted. The frames should be in a light position, otherwise thorough ripening of the crowns will not follow. Batches for later forcing should be plunged up to the rims of the pots in ashes, selecting an open and well-drained site; the middle of November will be early enough for this work in most cases, but whether it had better be done earlier or later must be governed by the climate of the district. The aim is to protect both pots and roots from hard frosts. Handy to the strawberries plunged outside there should be a

shed containing dry litter or bracken for laying over the plants when there are sharp frosts, but it must not remain in position longer than is absolutely necessary. As the plants in the frames are passed on into the houses, their places may well be filled from those out of doors.

Just before the forcing process commences it is a good plan, and one generally followed in private establishments, to give the plants a little special attention in the way of cleaning and top-dressing. Remove the surface soil with the aid of a label, and pull away any decayed leaves; then wash the pots clean, and, if thought necessary, dip the foliage in a mixture of liver of sulphur (1 oz.) and water (3 gals.). Top dress with a somewhat finer and richer compost than that used for potting, previously making sure that the drainage is clear and that there are no worms among the roots.

The first stage of forcing is the introduction of a batch into a temperature of 45° to 50°, allowing a fall to 40° or 45° at night. Select a light position such as a shelf in a lean-to house facing south or south-east, and do not raise the temperature for a fortnight or three weeks unless there are special reasons for so doing, as in strawberry forcing one's motto ought to be "Make haste slowly." Gradually increase the temperature 5° more by day and night, even permitting a 10° rise on bright days, admitting a little air when the flowers commence to open, but in such a manner that the strawberries are not subjected to cold draughts or to sudden fluctuations of temperature.

This stage is a very critical one, for in it all the previous work may be undone, while if safely passed it is comparatively easy to bring a crop to perfection. A close, moist atmosphere, such as is technically known as a "stagnant" or "stuffy" one, must be avoided, as also must excessive firing, for these cause blackened stamens

and damaged pistils, in other words they kill or damage the organs of fructification so that fruit either does not set at all or is small and badly shaped. Everyone will understand what a buoyant atmosphere is like, and it is the kind to be secured by careful ventilation and heating during the time strawberries are in flower. Distribute the pollen about mid-day by gently brushing the flowers with a rabbit's or hare's tail, continuing the work daily until a good set has been secured. Advantage may be taken of sun-heat to close the house early in the afternoon, but before dark a little ventilation must again be given.

When the fruits have set it is time to raise the temperature again, gradually increasing the warmth until at the end of a fortnight the thermometer registers 60° at night and 65° by day; increase also the atmospheric moisture and continue to raise the temperature steadily to 65° by night and 75° by day, or even a few degrees more during warm or bright weather. As the season advances, 85° or 90° by day will often be reached, but the higher temperatures obtained by sun-heat may be taken advantage of to give a little extra ventilation, remembering also that early closing on all such occasions is of the greatest importance. To further assist the swelling of the fruit, careful liquid feeding is necessary, using liquid cow manure or guano water at moderate strength, giving one or the other every alternate day when watering is necessary. Never allow the plants to want for moisture, and as the season advances water will be needed by them twice or thrice a day. Only in very bright weather should the later batches be stood in saucers of water.

From the commencement of forcing up to the time the flowers expand, strawberries will benefit by being lightly syringed twice a day, except in very dull weather, the latest syringing being given sufficiently early to allow

the foliage to dry before dark. The damping of stages and floors is necessary, but must be done with discretion. After the fruits have set, liberal dampings and syringings are essential to the steady development of the crop, but the latter must entirely cease and the former partially as soon as the berries commence to colour. Feeding must also cease at the same period of growth, and during the final ripening process clear water must only be afforded in sufficient quantities to prevent flagging. A still further change must be made when the most forward fruits are colouring, and it consists in reducing the temperature to from 70° to 75° by day and 60° to 65° by night, increasing the ventilation when the weather tends to raise the temperature above these figures.

But I am proceeding a little too fast. If all the fruits that set were allowed to remain, there would be only a fair number of small ones, but as strawberries are forced solely for dessert use, it is desirable that every fruit shall be large enough for that purpose. Hence there is a necessity for thinning the crop, and no better advice can be given than to reduce the crop down to the six most promising and best placed fruits on each plant. Some support is also necessary or the spikes will be bent over by the weight of the fruit and the flow of sap be checked. Birch branches form admirable supports if shortened back to stubby twigs, and it is generally an easy matter to provide a suitable supply from the remains of a well used birch broom.

In the foregoing remarks the idea of carrying out the whole process of forcing strawberries in one house has been followed, and while this is really the practice in some establishments, it by no means follows that it is essential to success. The various batches may, of course, be moved from one house to another as their stage of growth demands; but as the most suitable temperatures have been detailed as well as the best atmospheric con-

ditions for starting, flowering, swelling, and ripening, there will be no difficulty, in the majority of establishments, in adapting one's resources to the end in view. Grand crops are annually grown on the shelves in peach-houses, early vineries, cucumber and melon pits, fig-houses, orchard-houses, etc.

Second Crops from Forced Plants

The fact that the same strawberry plants may, by careful management, be induced to yield two crops of fruit in one year, is good evidence of their vitality and good nature. The method is as follows:—After strawberries have been forced and the crop gathered, thoroughly cleanse them and proceed by a gradual process to harden them, so that eventually they may be stood in cold frames, and later on out of doors altogether. From eight to ten weeks after gathering the crop, these forced plants must be repotted, removing a considerable portion of old roots and soil, and returning them to similar sized pots to those which they have previously occupied. Use a generous compost, and pot firmly, returning the plants to frames or standing them in the open according to the season. The earliest batches need not be potted, for if planted out somewhat close together in June, they will give most useful crops of fruit during August and September; but later batches are best potted at the end of June, in July, and early August. Subsequent treatment must be liberal, and cold frames and cool houses will have to be requisitioned for housing the plants and ripening the fruits. Those placed in frames in September, and promoted to warmer quarters in October, should fruit in November, while those housed in October will with a little care carry the strawberry season well on into January. Crops from these latest batches will not be large, but then an abund-

ance of fruit is not expected during the winter months. The chief points to be remembered are that strong heat will mean failure, but on the other hand, the fruits will be lacking in flavour unless placed in a temperature of about 60° or 65° to swell up and ripen. Liquid stimulants will need to be carefully supplied at this time of year, liquid cow manure and guano water proving suitable if given somewhat weak.

Alpine Strawberries

The wild Alpine strawberry is a native of many parts of the European Alps, and one of its chief characteristics is that it continues to flower from spring to autumn and on into winter if the weather permits. It is thus a perpetual fruiting strawberry, differing from our own native strawberry, which has but one season of flowering and fruiting. Duchesne shows that Alpine strawberries were cultivated round London about the middle of the eighteenth century, having been introduced from Northern Italy; from England the culture spread to Holland.

To the cultivator who has to provide strawberries over as long a season as possible, the finer forms of this Alpine race are almost indispensable, and were indeed quite so until the introduction of the larger-fruited perpetual varieties. Alpine strawberries are easily and quickly cultivated, and the most common method is to sow seed obtained from a reliable source, in February or March, in a warm house or pit. Prick out the seedlings into light rich soil as soon as they can be handled readily, and when re-established proceed to harden them off, finally placing them in cold frames until June, when they should be planted out in beds of rich but light soil. Such plants fruit freely during autumn, especially if the

earliest formed trusses are pricked out. If no runners are required for stock, none should be permitted to grow, but if the earliest are layered and planted about

AN ALPINE STRAWBERRY

(*From a drawing by Ethel Roskruge*)

the beginning of August they will give good crops of delicious little fruits early the succeeding summer.

Seed sown out of doors in May or June gives plants that will fruit well the following summer; but the chief use of Alpines is as autumn fruiters, and for this purpose the first-mentioned method of culture is recom-

mended, and after the weather proves too cold to ripen the fruits, the plantation should be cleared. Large supplies of water will be needed in dry weather, while hoeings, good mulchings, and doses of liquid manure will all materially assist the production of a really useful, delicious, and exceedingly pretty crop.

Varieties that have proved successes in this country are Quatre Saisons, Alpine Red, Alpine White, and Gunnersbury Alpine. Belle de Meaux and Berger are other good Alpine strawberries.

Perpetual Strawberries

Quite a new and distinct race of strawberries has been produced during recent years, by crossing the Alpine with the large-fruited garden varieties. Such a race had long been in the minds of many Continental hybridists, and not a few crosses were made, but they never succeeded. Experiments were also made in America. At last the Abbé Thivolet, of Chenoves, Saône-et-Loire, produced a hybrid, and named it Roi Henri; but its fruits were so poor, that it was only looked upon as a curiosity, and, in the words of M. Henri de Vilmorin, "It would scarcely deserve to be mentioned but for one important fact, viz., that it was the first production of the man who was to originate, some years later, the first really good perpetual strawberry." The Abbé "persisted in sowing seeds of his strawberry, both self-impregnated and crossed with other large-fruited kinds," until at last his efforts were rewarded with Robert Lefort and Leon XIII., and, in 1893, there came St Joseph, the leader of the perpetuals. Oregon, an American perpetual, lacks the constitutional vigour of St Joseph; but the newer St Antoine de Padoue is a distinct and valuable addition. Louis

Gautier really belongs to this class, but it has little of the decided perpetual character of St Joseph; and, though it crops heavily in summer and has large, highly-flavoured fruits, it has the demerit of poor colour.

The perpetual strawberries are so called, because, if allowed, the parent plant flowers in May and fruits in June, at the same time putting forth runners that quickly take root and soon come into flower. Not only does the earliest runner-plant flower and fruit, but other runners made from and beyond it do the same, giving a succession of fruits as long as the temperature is high enough to keep up the vitality and productiveness of the plants. It is, however, a short-sighted policy to allow the parent to flower and fruit, supposing, of course, that it is in the autumn that fruits are desired. As summer fruiters, St Joseph and St Antoine de Padoue are surpassed by the leading and popular large-fruited varieties grown especially for that purpose, consequently it is not profitable to bring them into competition with these. A far better plan is to remove all the flower trusses that form in May on the parent plant so that all possible vigour may be thrown into the runners, of which very few should be retained. A plantation managed in this way, and treated liberally as regards manuring and watering, should give a fair crop of good strawberries right up to the time when the decline in temperature causes the latest fruits to be lacking in flavour.

Sufficient runners must be taken to provide for the next season's crop, as the best plan—paradoxical though it may seem—is to treat the perpetual varieties as annuals, planting in autumn for the succeeding year, and rooting up the fruiting plantation as soon as frosts appear.

Strawberries as Annuals

Where, for garden-parties and other large social functions, considerable quantities of fine fruits are required at the beginning of the strawberry season, it pays, especially on light and hungry soils, to treat a portion of the crop as annuals. This method has long been practised, but only of late has it been extensively carried out. The system is extremely simple. The earliest runners from uncropped stock, as used for forcing, are planted in July on a warm border from whence early potatoes, early peas, or other crops have been secured. Given reasonable attention, the plants give a good crop early the following summer, and almost every fruit is of large dessert size. Immediately after the fruit has been gathered, the plants are cleared, and the land at once planted with some winter crop. Royal Sovereign is a suitable variety for this method.

Strawberries in Barrels

The method of cultivating strawberries in barrels seems to have been first adopted in the United States, and certainly it has the merit of novelty. It consists in using barrels about the size of sugar or paraffin barrels, making drainage holes in the bottom, and boring small circular holes in tiers from near the top to within a foot of the base. The holes should be made so that only those in alternate rows come into the same perpendicular line, thus allowing each plant the utmost room for development.

A zinc, iron, or earthenware pipe is placed upright in the centre of the barrel, and in its sides a few holes are made, so that water poured in will moisten the roots of the lowest plants after the barrels are filled.

A little drainage material is necessary at the bottom, filling up the barrel with good loam mixed with a little decayed manure. Six plants will be enough for each circle, unless the barrel be very large, and three or four of these circular rows will be enough, the plants being put into position early in the new year, and

STRAWBERRY—KEEN'S SEEDLING

during the process of filling up the barrel. A few plants are planted on the top of the barrel.

Stand the barrels on a few bricks, or other solid foundation, so as to raise them slightly above the surrounding level. Water liberally, and give liquid manure when the fruits have set. If it is desirable that the fruits should ripen at about the same time, then arrangements must be made for turning the barrels every day or two, so that all the plants receive the

same aggregate amount of warmth and sunshine. This system is scarcely likely to come into general use, but it is just the sort of thing to interest amateurs, and there is no question but that a barrel of well-grown and well-fruited strawberries presents a pleasing picture.

SELECTIONS

A.M. = Award of Merit; and F.C.C. = First-Class Certificate of the Royal Horticultural Society. Asterisks indicate the very best in each section.

Early Varieties

Auguste Nicaise, A.M., crimson, deep red flesh.

*Empress of India, large, bright scarlet, firm, British Queen flavour.

John Ruskin, dark red, light red flesh, rich.

Keen's Seedling, crimson, firm, rich, free cropper; still a good forcing sort.

*King of the Earlies, dark scarlet, firm, rich, very early.

Laxton's No. 1, (Noble × May Queen), another very early variety, probably the earliest out of doors

Leader, F.C.C., (Noble × Latest of All), crimson, pale flesh.

*La Grosse Sucrée, deep red, paler flesh, juicy, good flavour, useful for forcing.

Noble, light scarlet, very early, heavy crop, now easily surpassed for flavour.

*Royal Sovereign, F.C.C., the most popular strawberry, crimson scarlet, pink flesh, very free, good flavour.

Steven's Wonder, F.C.C., rosy red, pale flesh, somewhat soft, heavy cropper.

*Scarlet Queen, (Noble × King of the Earlies), very bright, free cropper.

*The Laxton, (Royal Sovereign × Sir Joseph Paxton), crimson, fine crop, grand flavour.
*Viscomtess Hericart de Thury, bright red, pale red flesh, rich flavour, good forcer.

Main-Crop Varieties

A. F. Barron, (Sir Joseph Paxton × Sir Charles Napier), red, juicy, rich.
Auguste Boisselot, F.C.C., heavy crop, melting flesh.
*Countess, F.C.C., good colour, free crop, fine fragrance and flavour.
Dr Hogg, F.C.C., pale red, whitish at tip, grand flavour, closely resembling British Queen.
Edouard Lefort, F.C.C., delicious flavour.
Fillbasket, (Royal Sovereign × Latest of All), large, bright scarlet.
*Gunton Park, dark crimson scarlet, firm, British Queen flavour.
Lucas, crimson, pale flesh, firm, rich, compact grower.
Mentmore, A.M., (Noble × British Queen), bright, refreshing, rather soft flesh.
*Monarch, F.C.C., large, clear scarlet, firm, good flavour, and good cropper.
*President, a well-known old sort, crimson, firm, good flavour.
Reward, A.M., scarlet, good flavour.
Sir Charles Napier, scarlet, white flesh, firm, rich.
*Sir Joseph Paxton, very good variety, crimson, salmon-red flesh, rich; mildews rather badly some seasons.
*Veitch's Perfection, F.C.C., (British Queen × Waterloo), dark crimson, sweet and rich.
*Veitch's Prolific, F.C.C., (Empress of India × British Queen), bright red, firm, fine flavour.
Wonderful, A.M., bright red, good cropper, tapering fruit.

Late Varieties

Aberdeen Late, fair crop, useful in the north, not first-class flavour.

*British Queen, the finest flavoured of all strawberries, but not one of the easiest to manage, it links mid-season with late varieties.

Climax, (Latest of All × Waterloo), large, bright red.

Elton Pine, bright crimson, firm, brisk and refreshing.

*Frogmore Late Pine, large, deep red, rich and juicy.

Hēlène Gloede, red, soft flesh, rich.

*Lady Suffield, F.C.C., (Lord Suffield × Empress of India), dark crimson scarlet, firm, rich flavour.

*Latest of All, F.C.C., heavy cropper, one of the best of its section.

*Lord Suffield, (British Queen × Countess), crimson, firm flesh, splendid flavour, good cropper.

Lord Kitchener, A.M., (Waterloo × British Queen), dark red, firm, fine flavour.

Louis Gautier, large fruit, good flavour, pink.

Newton's Seedling, rather small, but of good quality.

*Trafalgar, (Latest of All × Frogmore Late Pine), very full, good colour and flavour.

*Waterloo, fine flavour, good crop, purple-crimson colour.

Forcing Varieties

Early.—La Grosse Sucrée, Viscomtess Hericart de Thury.

Second Early.—Keen's Seedling, Royal Sovereign, Empress of India, President, Viscomtess Hericart de Thury.

Midseason.—Royal Sovereign, Sir Joseph Paxton, Gunton Park, Scarlet Queen.

Late.—British Queen, Lord Suffield, Scarlet Queen, Waterloo.

Strawberries for Preserving

Sir Charles Napier.
Elton Pine.
Scarlet Queen.
Grove End Scarlet.
Stirling Castle.
Newton's Seedling.
Viscomtess Hericart de Thury.

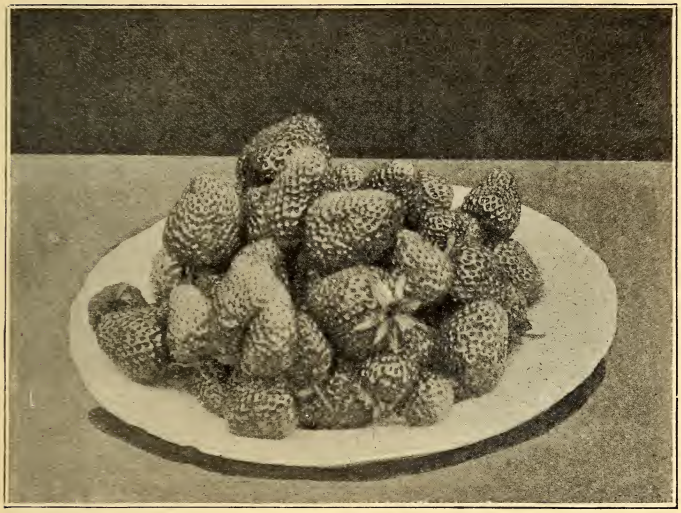
Culture for Market

There have been great developments in the culture of small fruits during the last twenty years, but in no case is such development so well shown as in the culture of strawberries for market. Many thousands of acres are devoted to this crop, and it has been found that, given good soil, suitable varieties, and high culture, strawberries pay well in spite of the high cost of production.

The methods followed by the market-growers differ only in degree from those found successful in private gardens. A deep, rather heavy loam is selected, if possible, and failing this the nearest approach to the ideal is selected, the more moist lands being well drained, and the lighter ones heavily manured. New land is seldom put under strawberries as a first crop (though in the Swanley district some rough woodland was so treated with success), but a common method is first to secure a good tilth by planting with a strong growing, heavy cropping potato, which also serves to clean the land of weeds. During autumn or winter the land is deeply ploughed (sometimes both ways), from thirty to fifty tons of manure per acre being worked in. About a fortnight before planting, the surface is fined down with heavy and light harrows, worked lengthways and

crossways of the field. Whether the ploughing is done by steam or horses, it will be obvious to anyone that the larger and more open the area, the less will be the cost per acre.

Market-growers are fully alive to the importance of early autumn planting as followed in gardens, and where



STRAWBERRY—SIR JOSEPH PAXTON

labour and the water supply will permit this plan is followed, and results in a fine crop the following summer. The difficulties of securing sufficient early rooted runners, and of supplying water to newly planted areas in hot dry weather are very real to the large grower, and so there are very many who plant at the end of March, when the danger of severe frosts has passed away. The runners are either dibbled or planted

with a trowel, a spiked wheel being used to mark out the stations sixteen or eighteen inches apart, in rows about two and a half feet apart.

Catch crops are frequently taken from between the strawberries during the first season, but where early autumn planting takes place the order is somewhat reversed, the catch crop being put in early—onions, for instance—in rows very wide apart, and the strawberries subsequently planted between them. Hand hoeing is necessary in such cases, but the cheaper method of horse hoeing prevails where strawberries alone are grown.

Other items include autumn ploughing with a shallow-set mould-board plough, between the rows, as this earthing-up process protects the plants, and at the same time serves to carry off superfluous moisture. These ridges are levelled with the horse hoe in March or April, and another hoeing is given just before flowering and preparatory to laying down oat or barley straw (this goes farther than a similar weight of wheat straw) at the rate of from one to one and a half tons per acre, to keep the fruits clean. After the crop has been gathered the straw is raked up for other uses, dead foliage, old flower stems, and runners being trimmed off with a hook, raked out and burned. Where, however, there is a cattle-yard, straw and trimmings may well be raked out together, and used as litter. This is followed by horse hoeing, and, if necessary, an application of about twenty tons of manure per acre, or a few tons less on very good soil.

The cost of production varies with soil and locality, but planting, with purchased runners, will cost £8 to £10 per acre, while the annual cost of manuring and cultivating will reach another £10 per acre, and then there will be the cost of picking and marketing. Picking costs from 4d. to 6d. per 12 lbs., or £3, 10s. to £5 per ton, according to the crop and size of the

berries. Dessert fruit, picked and placed in punnets, naturally costs more, owing to the extra time and care needed.

Crops vary between one ton and five tons per acre, the latter being an exceptional yield. Mr Lewis R. Castle, in his Prize Essay read before the Royal Horticultural Society, states, "Strawberries planted two feet apart will take nearly 11,000 to the acre, and at an average of half a pound per plant for four years, the total annual return will be two and a quarter tons. About 10 per cent., or say, a quarter ton, of early selected fruits may realise 4d. a lb., or at the rate of £36 the ton; the remaining two tons being sold at 2d., or £18 the ton, brings the total up to £45. If the general crop is early and the fruit fine much higher prices can be ensured, and established thriving plants will yield one pound to two pounds of fruit each."

Another authority gives the average return as two tons per acre, and the average price as £20 per ton, but also confesses that these are low estimates, and I am inclined to fully agree with him. The prices for jam fruit are naturally much lower, ranging from £15 to £18 per ton, and for this purpose the fruits must be "strigged," *i.e.* the sample must contain no stalks or calyces.

Varieties of strawberries most suitable for market culture are:—Royal Sovereign, Viscomtess Hericart de Thury, Sir Joseph Paxton, President, Stirling Castle, and Latest of All. For jam making, such sorts as Stirling Castle and Scarlet Queen are in demand, as they are of fine colour, and the fruits do not pulp during the process as do those of some sorts.

Packing the Fruit

There are many methods of packing strawberries, and where the finest fruits have to be sent long distances a

somewhat elaborate system has to be followed. In the case of forced fruits it is a good plan partly to wrap each in a piece of leaf, packing them close together in a single layer in a shallow, well-made box. There should be a layer of cotton-wool in the bottom and along the sides of the box, but the fluffy side must be downwards if the sheets have been opened. All the fruits should point the same way, and be slightly inclined, so as to appear partly to overlap each other. Cover them with strawberry leaves, so that when the box lid is fixed down, the contents do not move about during carriage.

The earliest and finest outdoor fruits can be suitably packed in round or square punnets, placing two or three strawberry leaves at the bottom and sides. For supplying town houses, or sending to market, a convenient method is that of packing the punnets in light boxes made to hold one, two, three, or even five layers, each layer consisting of a dozen punnets, and divided from its neighbour by strips of wood supported at either end. Needless to say, the punnets must just fit the box, and the strawberries must not be heaped up in the punnets. For supplying the market the aim should be to fill each punnet with the same weight of fruit, as this facilitates business. Punnets vary in price from 2s. to 4s. per gross, according to size and quality.

Later in the season pecks are extensively used, and when the fruit is picked dry and ere it is fully ripe, it travels remarkably well in these wicker baskets ; indeed, the bulk of the fruit sold so cheaply in London and other large centres comes from the growers in these receptacles. One reason why firm strawberries travel so well in pecks is that they have ample ventilation.

The more tasteful and honest the packing the better are the prices realised, and it always pays to grade the fruits, even in the case of such a soft kind as strawberries.

Yet another method has come into use, suggested probably by the Jersey fruit growers. It consists in the use of small cross-handled baskets, containing about seven pounds weight of fruit, the idea being that the strawberries shall reach the consumer as packed by the grower, while the cross handle reduces liability of damage.

Diseases of the Strawberry

Mildew.—Curiously enough, the fungoid attack known as Mildew flourishes alike under the opposite conditions of too wet or too dry an atmosphere. Cold draughts, in the case of forced plants, will also conduce to an attack. Fortunately, if as soon as the slightest glaucous—whitening of the foliage, the sign of fungus growth, is seen, proper steps are at once taken to remove it, the pest is easily combated, but if allowed to remain undisturbed it increases so rapidly under suitable conditions that much damage is soon done. For plants under glass the remedy for Mildew is dusting with flowers of sulphur, or painting the hot-water pipes with a mixture of flowers of sulphur and milk, and making them hot in the evening, so that the sulphur—fatal to most fungi—is given off into the atmosphere of the closed house or pit.

The best remedy for Mildew in out-door strawberries is good cultivation, but even when this is provided the fungus sometimes puts in an appearance in untoward seasons. It always pays to keep the foliage clean and healthy, no matter what the time of the year, and certainly, to keep it clear of fungus pests there is nothing better than spraying with a solution of sulphide of potassium (liver of sulphur), using one ounce of the latter to each three gallons of water.

Strawberry Leaf-Spot (*Sphoerella fragariae*).—In

some seasons this disease is prevalent in strawberry growing districts, and it has proved most destructive in some parts of America. The first evidence of this fungus is found in dull spots on the strawberry leaves, these spots frequently running together to form irregular blotches. Presently these discoloured patches turn grey in the centre, soon becoming almost white, with dull red borders. Later in the season the spores (ascospores) are produced, while in the fading and infested leafage the mycelium of the fungus forms bud-like bodies, known technically as sclerotia. Both the spores and sclerotia are capable of germination the following season.

The effect of Strawberry Leaf-Spot is so to weaken the plants that the crop is more or less injuriously affected. A somewhat drastic method of getting rid of the pest is to cut away all the leafage immediately after the crop has been gathered, burning it, as well as the straw or litter that has been placed between the rows. Another method is to remove all flower spikes, old and badly diseased leaves, and runner growth, as soon as possible after gathering the fruit, burning all together; following this by spraying the plantation with Bouillie Bordelaise about once a fortnight until winter begins. In spring, directly the new leaves begin to arise, commence spraying again, and continue at regular intervals until the strawberries begin to flower.

Insect and other Enemies of the Strawberry

Although there are several pests that attack strawberries more or less viciously, none assume the proportions of a plague unless the situation or the cultural conditions provided are very much at fault. It is when grown under glass that strawberries soon become

infested with green fly or red spider, unless preventive measures are adopted, and it is always well to bear in mind that these need be only the light application of fumigation or vapourisation, or weak insecticides, to keep down the pests, whereas if insects are allowed to increase and remedies have to be applied, these must needs be strong to effect a clearance and in that condition frequently check the plants and reduce the quantity and quality of the crop.

The following are the principal strawberry pests.

Cuckoo Spit (*Aphrophora spumaria*).—This little pest is sometimes a great nuisance, settling on young leaves and expanding flower trusses, and exuding a frothy matter that has the appearance of spittle. The insect hops briskly when clear of the moisture. But hand crushing is a good way of reducing an infestation. Another method is to syringe the crop with a warm tobacco solution, following this shortly after with clear water.

Eelworm (*Aphelenchus fragaria*). — Fortunately this is not a common enemy of the strawberry, for it is not an easy one to combat. It is a member of the group of Stem Eelworms, and when it attacks plants it entirely alters the appearance of the flower-spike, making this, in the case of the strawberry, assume an appearance that suggested to Miss Ormerod the name of "Cauliflower Disease" for the infestation. Raw animal manures in quantity seem to induce eelworm, and as an alternative a good dressing composed of four parts phosphates, three parts sulphate of ammonia and two parts sulphate of potash is recommended.

Green Fly.—It is seldom that Green Fly (*Aphis*) does any harm to outdoor strawberry crops, but during the process of forcing it is almost sure to put in an appearance when the new leaves arise and the flower-spikes are pushing from the crown. This being so it follows that

the grower must keep a careful watch upon his plants, advice that is the more necessary as in the majority of private establishments and not a few market ones, strawberries are grown upon shelves suspended near the roof-glass, or on the top shelves of a high back-staging—positions in which they do not come so directly under the eye of the grower as they would on the ordinary plant stages.

Fumigation with tobacco paper or tobacco rag was formerly practised, but it was ever a somewhat risky and certainly a most unpleasant operation, and it was difficult for any but the most experienced to fumigate sufficiently to kill green fly without injuring the tender growth. But we have advanced considerably during late years, and there are now on the market several vaporising compounds that have displaced tobacco rag, for if used according to directions given with them they kill green fly and do not harm the plants. Added to these advantages is one that all practical gardeners appreciate, *i.e.*, that it is unnecessary to remain in the house or pit while these nicotine compounds are being vaporised.

If lightly fumigated or vaporised once a fortnight, after forcing commences, strawberries can be kept free from green fly. On no account treat them while in flower, but as soon as the crop has well set fumigate again, but in no case must this be done after the fruits commence to colour or their flavour will be impaired.

Ground Beetles.—There are a number of quite small ground beetles that may attack strawberries from the time the fruits begin to swell until all have ripened. Of these, three or four have become perfect plagues to market-growers in some few localities, though they can scarcely be considered as common pests. These are *Harpalus ruficornis*, *Pterostichus vulgaris*, *P. madidus* and *Calathus cisteloides* The first-named has wings and flies very strong about

July; the others are wingless. These little pests—for the longest scarcely exceeds half an inch in length—burrow in the inch of soil nearest the surface, and work through the mulching material in such a manner that they come out just under the fruit trusses. They eat holes in the strawberries causing green fruits to wither and ripening ones to rot.

Many may be caught by working over the surface soil with a trowel or small hand-fork a little after the fruits have well set. Another method, recorded by the late Miss Ormerod as having been successfully practised by the Messrs Laxton, of Bedford, is to sink glazed basins into the soil, so that the rims are flush with the surface, baiting these with sugared-water and pieces of lights, or fat mutton. If the basins are placed pretty liberally over the plantation and the baits frequently renewed, quantities of the little pests may be captured. In any case, it is a good plan to skim off and burn, gas-lime, or deeply bury the surface soil, after an infestation, as soon as the crop of fruit has been harvested.

May Bug or Green Rose Chafer.—Among the many sins for which the handsome Green Chafer (*Cetonia aurea*) has to answer is that of attacking newly-opened strawberry blossoms and eating out pistil and stamens, thus preventing fructification, or, at least, causing the fruits to come small and distorted. Where these chafers abound, the best plan is carefully to pick out and destroy the large rose-coloured grubs that are frequently turned up during the processes of digging and trenching. Excepting where strawberries are grown in conjunction with bush and orchard fruits, the chafers do not, as a rule, do much mischief to the crop we are now considering.

Slugs and Snails.—These always do a little damage to strawberry plantations, either by biting

through the young flower-spikes, severing the runners (not always an evil), eating unripe fruits, or spoiling ripe ones by either eating parts of the flesh or seeds or leaving a trail of slime over them. Where surface hoeing is regularly practised these enemies give little trouble; but, before the mulching of long litter or straw is given, it is necessary to sprinkle soot over the surface of the bed, and especially close round each plant.

Strawberry-leaf Button Moth (*Peronea comariana*). —This is a tiny little moth that—in the caterpillar stage, during May and June—feeds on strawberries, drawing leaves or flower-stems together by means of a web, and eating the green parts. If surprised, the tiny caterpillars drop, by means of a long thread, to the ground. It is not often that this pest attacks young and healthy plantations, but those over two years of age are not infrequently infested. The best way to cope with this pest is to skim off the surface soil after gathering the crop, burning or gas-liming it so that caterpillars and chrysalids are killed.

RASPBERRIES

Introductory

The common stock from which our race of garden raspberries has sprung is a native plant found growing abundantly in many a wood, delighting in a soil composed largely of vegetable matter, and in a position where it is protected from strong winds, and where also it has partial shade. This plant (*Rubus Idaeus*) is found wild in most European countries. It is shrubby, deciduous and perennial, but its stems are biennial, growing one season, fruiting the next, and dying down after their mission is fulfilled. In what are known as autumn fruiting varieties, a change has been brought about by cultivation, indeed, their stems are treated as of annual duration, being removed after fruiting, the growths made in spring and perfected in summer, bearing fruit the same autumn. But for the system of culture adopted, these varieties would, no doubt, soon revert to the more natural biennial character.

It is scarcely necessary to "show cause" why raspberries should be grown in our gardens, as the delicious and refreshing fruits are more or less known to everyone. Their varied usefulness can scarcely be exaggerated, and is known only to the most accomplished of chefs. For pies and puddings, jellies and ices, flavouring creams and confectionery, for preserves and bottled whole, for wine and for vinegar, for syrups and sweetmeats, to make liqueurs and to perfume and flavour

spirits, the raspberry is available. Consequently, it seems only reasonable that good plantations should be made in every garden. But it will probably be urged that almost every garden, including the cottage garden and the allotment, has its row of raspberries. That this is so, is readily granted; but how often are the raspberries thoroughly well grown? Soils and situations affect raspberries, as other crops; but, even when

RASPBERRY—SUPERLATIVE

allowances are made for these, it is by no means often that raspberries are grown to perfection—that is, they are all too seldom accorded the position or the feeding they deserve, and, as a result, the berries are fewer and smaller than they ought to be, their flavour is not of the finest, and the crop is soon over. Allow me to enter a plea for more generous treatment of the raspberry, for I am confident, if such be given for a couple of seasons, there will be no going back to the old methods afterwards.

Mons. Charles Baltet estimates that Paris alone consumes 5,000,000 kilos = about 4922 tons of raspberries annually, and that this quantity is grown in the neighbourhood of the French capital, but the varieties differ from ours. In Burgundy the raspberry has practically supplanted the black currant, as it is extensively used for the manufacture of light wines, and in some cases is exported to London preservers. In Lorraine, raspberries are largely distilled, and M. Baltet says that the most popular variety is River's Hornet, because it has abundant bright-coloured juice.

Soil and Situation

Unquestionably the best land for raspberries is a deep loam. If this overlies a clayey subsoil there will be no reason to fear that the crop will give out prematurely during a dry season, but, on the other hand, it must be remembered that if the situation is a low one, some disadvantages will become obvious in a wet season. If a deep soil, containing a fair amount of vegetable matter, can be provided, and it is well drained and the situation is such that spring frosts do little or no harm, then raspberries may be relied upon to do well. It may be urged that as raspberries are surface-rooting subjects, such a deep rooting medium is not essential. I do not argue that it is essential, but where large quantities of high-class fruit have to be provided, and there is but a limited supply of labour, water, and liquid manure, the difficulties of securing a good crop are reduced to a minimum when the grower has a deep, fertile soil to deal with. Every garden soil can be improved by trenching, adding large dressings of farmyard manure to those of lighter texture, and road grit, ashes, burned refuse, etc., to tenacious land. Fairly good crops of

raspberries *can* be produced on light, shallow soils, but only at the expense of heavy manuring and mulching, followed by a large expenditure of labour in supplying water and liquid manures. Many gardeners have to grow quantities of raspberries on land upon which a market-grower would never think of planting, and so it will be seen that the quantity and quality of the fruit supplied is not always a matter entirely in the hands of the gardener.

It is only stating half a truth when raspberries are said to be surface rooting. A very casual observation will show that besides its surrounding circle of surface roots each plant has a strong, deep central root that serves not only to anchor and support the part above ground, but is useful in conveying soil-moisture (and consequently food also) from below—a point that is a decided argument in favour of a deep soil.

Planting

Assuming that the site has been chosen for the plantation, and that the ground has been previously well prepared as already indicated, then the work of planting the canes should be carried out as early as possible after the leaves have fallen from the canes. It is not even necessary to wait for the fall of the leaf, provided growth has ceased and the foliage is turning colour; such early planting can, of course, only be carried out where the planting canes are produced in the same garden or at a very short distance from it. Early planting is in any case a distinct advantage, as the warmth in the soil encourages new root action, with the result that the plants are soon established.

Cut back all injured roots to healthy portions. Spread the roots out as far as possible, and distribute them

equally around the crown, but do not cut back the central or anchor root, as this will never assume that tap-root character that in apples, pears, etc., leads to gross growth and unfruitfulness. Have ready a quantity of fine material composed of old potting soil, wood ashes, burnt refuse, and road grit, well mixed together, and work this over and among the roots so as to avoid any hollow spaces, but more especially to encourage the quick formation of fibrous roots in quantity. So arrange the plants that when planting is finished the crown or stock from which future stems will rise is three inches below the surface soil. Where the soil is heavy and cold the canes may be planted on instead of in the ground, lighter material being used to cover the roots, finishing off with the surface soil taken from between the rows. This method is adopted for the purpose of securing warmer and healthier conditions for the young roots. Curiously enough the same kind of planting may advantageously be adopted when the soil is poor and shallow, as in such cases the imported soil provides so much additional material from which the roots can draw food, and at the same time also holds more moisture than the staple alone.

It need only be further mentioned here that the trellises should be placed in position before planting-time, so that there is no subsequent root disturbance, and also because it admits of the canes that are shortened to two feet being tied to the lower wire, a point of some importance, as the motion that wind and rain would otherwise cause is prejudicial to the rapid formation of roots.

Propagation

Speaking generally, there is no difficulty in increasing stock of raspberries, as most varieties send out stoloni-

ferous roots, from which sucker growths appear at some little distance from the parent crown. Some of the varieties produce but few of these colonising suckers, expending their energy on the production of fruiting canes. These suckers are the natural method of increase, and ere they appear the stolon is pushed as far out from the parent as possible, so that the youngster may have all the advantages of light, air, and new soil to start life with. It is such suckers as these that make the best canes for planting, and, as a rule, they are so slightly connected with the parent that after leaf fall they may be pulled up by hand, with a good root system attached. A large hand-fork, or similar tool, should be used to assist in the removal of suckers, so that as many of the roots may be preserved as possible. As the roots are fibrous and delicate they must be kept moist until planted, by means of wet mats, damp moss, etc., and when packed for a journey, some damp material must of necessity be placed around the roots if the receiver is to secure the best results. If on receipt, after a long journey by rail, the roots appear at all dry, it is a good plan to plunge roots and canes into a tub or tank of water for a few hours ere planting is proceeded with.

Two methods are adopted for increasing scarce varieties or new seedlings, *i.e.*, cuttings of canes or of roots. Stem cuttings should be from six to twelve inches long, cut from well-ripened, unfruited canes. These are inserted a few inches apart, in light soil, burying three-fourths of their length, pressing the soil firmly, and subsequently providing shade and moisture as necessary. Root cuttings are preferable to stem cuttings, and are made by cutting up the long stoloniferous roots into three-inch lengths, placing these in a made-up bed of light soil, in a cold frame, or putting several together in a pan of light soil and affording

similar protection. In spring, as growths appear, transfer the young plants to a well-chosen spot where, in rich deep soil, they will make one good cane the same season.

Those who care to raise seedling raspberries must be prepared for considerable disappointment, even though the parents may have been suitably selected. The seedlings will show a large amount of variation, the great majority will be a long way inferior to the parents both in habit and fruitfulness, a few may possibly be as good, and perchance one or two may be distinct or superior. A good start is always desirable, and to secure this, not only should good parents be selected, but the seed bearing plant should be robust and fruitful, and the berries from which seed is saved ought to be of the finest. The seeds are easily separated from the pulp by washing with warm water, or by rubbing the berries in fine dry sand, sifting out the seeds. A sowing may be made in autumn on light rich soil in a sheltered spot, but a better method is to sow early in February in broad and deep pans, over a gentle hot-bed. When about three inches high prick out the seedlings in a rich made-up bed, in a frame or pit where gentle heat can be afforded, but where also air may be supplied abundantly. A generous treatment is essential, though coddling must be avoided. As the season advances commence a process of "hardening off" by giving more air and reducing the supply of artificial heat, so that by the middle or end of May the young plants may be transferred to thoroughly prepared ground, in rows, where they are to fruit. If many seedlings are raised the rows may be closer together than for permanent plantations. Under favourable conditions the seedlings will make good canes the same season as raised, and if these have their points removed in spring they should fruit fairly well the second summer. If the canes are poor, it is much the

best plan to cut them back to within six inches of the ground in autumn, as by this means a couple of good canes will be secured for fruiting the third year.

Make a rigid selection of the seedlings at fruiting time, retaining only those that are very promising for further trial. There is room for more first-class raspberries, and some attention might well be paid to the improvement of white or yellow varieties for dessert, but there is already too much mediocrity among both red and yellow forms.

Training

There are several modes of raspberry training practised, but gardeners now mostly adopt the wire trellis system, as by it the canes are kept from damage by storms, they can be left at such a length as to give the grower the maximum crop, and the fruit is kept clean, and it is readily gathered. Light and air also have full play on raspberries so trained.

Such a trellis is easily made of stout galvanised wire strained to stout wood (ash or larch) or iron posts firmly fixed at each end of the row, with lighter posts at intervals between these, if the row is a long one. The lowest wire should be strained two feet from the ground, and others added above according to the height of the variety under the conditions prevailing—for example, I have seen Superlative filling trellises over six feet high in a favoured Scottish garden.

An old-fashioned method is to plant the canes in threes, each cane forming the point of a triangle. Between them a stout ash or larch stake, painted or creosoted at the base, is thrust, and to it the canes are tied loosely, so as to make a kind of bundle. This triangular system of planting is freely adopted by market-growers, the large stools thus formed extending in long

rows; the only training—if it can be so-called—consisting in shortening the canes to render them self-supporting.

Another method of training is to take half the canes from two neighbouring stools or hills, and bend or arch them towards each other, allowing the points to cross sufficiently to admit of their being tied firmly together with tarred twine. An improvement upon this system is made by driving a stake in midway between each pair of hills or stools, arching the canes as before, and securing them to the stake at a height of about three feet from the ground.

Much success attends the practice of straining one row of stout wire on either side of a row of hills or stools, parallel with the row, two feet from it and three feet from the ground. To these wires the fruiting canes are tied, and the foliage will then be found to afford a slight shade to the fruit, and the latter will be finer than if more fully exposed. This system and the two previously noted, all allow the new young canes to grow straight up without any impediment. The system of parallel wires can also with advantage be adapted to raspberries growing close against a boundary fence, one wire being strained to supports placed two feet from the fence, and the canes tied to it.

Pruning

The business of pruning must receive the grower's attention not long after planting is done. When it is not at all necessary that the newly planted canes should bear fruit the following summer there is no difficulty in the matter, as pruning resolves itself into simply cutting the rods back to within six inches of the ground line some few weeks after planting, in any case not later than March. This method admits of the formation of a

good crown, and ensures one or more strong canes starting away in spring, and these will bear heavily in the succeeding summer. Not only does this cutting down ensure strong canes, but the root system of the raspberry is much improved, and is well able to stand the strain imposed upon it in the following summer by fruit production, and the provision of stout new canes.

It will be easily understood that if the canes, as planted, are allowed to remain and bear fruit, the small root system is fully occupied in supplying them with the necessary material. Consequently fruiting is at the expense of stout canes, and it will be several years ere the plantation is established, unless one fruit crop is sacrificed.

A compromise is frequently effected in gardens where there is a large demand and where space is limited. This is made by planting about three times as many canes as are necessary, cutting down those that are needed to make the plantation proper, fruiting the rest and pulling them out immediately the crop has been gathered.

There is yet another method, and that is to select extra strong sucker canes for planting, putting them into position by the end of October as a permanent plantation. The less delay and root exposure that occurs the better in all cases, but especially so with this. When the soil has well settled down, cut these strong canes back to about two feet from the ground, tie them to stakes or wires and allow them to fruit. In brief—extra strong canes, early and careful planting, and pruning back to two feet will ensure a small crop of fruit, and also the new canes necessary for the following year's crop.

Let us now consider the pruning of an established plantation. The work should begin in summer, the summer pruning consisting merely of the removal of all

sucker growths that rise from stoloniferous roots too far from stake or trellis to admit of their ready support. More than this, it should also consist of a reduction of the canes issuing from the crown, leaving only three to

THE STRAWBERRY-RASPBERRY [1]
(*Rubus Sorbifolius*)

five of the strongest, as may be needed to afford a full crop of high-class fruit, and fill up the trellis when the

[1] The so-called Strawberry-Raspberry is a recent import from Japan and the Himalayas. In appearance the fruits partake somewhat of the character both of the strawberry and of the raspberry, though the plant is a distinct species and not the hybrid which its name might seem to imply. It is quite hardy, very beautiful and very prolific. The fruits are sweet, lacking acidity, but they are pleasant in flavour and bright red in colour.

fruiting canes are subsequently cut out. A great deal has been written and said for and against the removal of fruiting canes directly the crop has been harvested, but this question would not assume much importance if the early thinning out of the canes and removal of all suckers that attempt colonisation were more generally practised. We remove the fruiting canes as soon as they cease to bear fruit.

All the further pruning that is necessary is to shorten back the canes in spring, to firm well ripened wood, to induce the formation of stout side branches that will yield sprays of fine fruit; or, if no artificial support is provided—as in the case of market gardens—to shorten the canes back so that they are of themselves able to support the fruit crop and keep the fruit from being damaged when a sharp storm splashes the dirt about. In this latter connection, it must be remembered that raspberry canes do not fruit from base to tip, side buds not being formed on the lower part. Injudicious pruning, or rather excessive shortening of the rods would curtail the crop. The shorter growing varieties are best adapted for cultivation where no artificial support is provided.

The autumn fruiting raspberries need quite different pruning to those that fruit in the summer, as their stems have to be treated as annual instead of as biennial. Cut down all the canes to the ground early in the new year, and in spring limit the number of new growths to three or four per crown, remembering that, as these have to ripen fruit at the end of September and during October, it is of the greatest importance that overcrowding be avoided, and that the canes retained receive ample light and air. As the fruit is mostly produced from the upper half of the cane, shortening is neither necessary nor desirable.

Cultivation

An ignorant garden labourer can soon do a vast amount of injury to the raspberry plantation by digging over the soil during winter. Such a practice would inevitably injure by far the larger proportion of the surface roots at a season when new root formation is practically at a standstill. Dutch hoeing, hand weeding, or the use of a Planet Junior machine, are the only methods of cultivation necessary or desirable in a closely planted plot. Where, however, abundant room is allowed, manure may be lightly forked in the centre of the space between the rows, using a three-tined fork.

As soon as the old fruiting canes have been removed, and those to be retained are properly secured, give the raspberry plot a heavy dressing of half-decayed farmyard or stable manure, laying it on two inches thick over the whole area occupied by the roots. Do not, however, use fresh cow manure, or any other wet and cold material for this dressing. I have found that the manure from spent hot-beds, so much of which becomes available at this season of the year in most establishments, is splendid material for a winter dressing; but this only applies to private gardens. A useful winter dressing of chemicals consists of kainit and superphosphate, mixed at the rate of two parts of the former to three parts of the latter, and applied at the rate of from 2 lbs. to 3 lbs. per rod, according to the condition of the soil. One or two light dressings of nitrate of soda in spring will improve growth and increase the size of the fruit. Where liquid manure can be spared, no mistake can be made in applying it fairly strong to raspberries during winter; and where this can be done, it reduces the necessity for heavy autumn manuring or the application of chemicals. Such a supply also admits

of an alternation of the winter treatment—*i.e.*, chemicals one season and animal manures the next.

In spring it is a matter of the greatest importance that raspberries be well mulched with short litter, so that soil moisture is conserved. If a light nitrate dressing is given directly growth commences, and the mulching is given a little later, but before the flowers commence to expand, then, if other details have been properly attended to, the cultivator will seldom need to do anything more than keep weeds down until the fruit is ready to pick. Watering, either with clear water or liquid manure, will serve to increase the size of the berries, and also to secure a longer season of fruitfulness; but it is only in very dry seasons, and on light soils, that summer waterings are really necessary to obtain fair results.

Gathering and Marketing

For exhibition or dessert purposes, it is found desirable somewhat to thin out the clusters in order to secure larger berries. Such fruits should be gathered with the foot-stalk or pedicel attached, as they then have a better appearance, and the stalk provides the necessary "handle" to such a soft fruit. It is very probable that it would pay to grow raspberries for dessert, provided local markets were supplied; but the juicy nature of the fruit operates against the presentation in quantity, to the general markets, of dessert raspberries.

For culinary purposes, the berries are pulled from off the central core, and are then quite ready for whatever purpose required. In market gardens they are not generally picked so carefully as in private gardens, consequently the purchaser has to pick out many a stalk and core in preparing the fruit for kitchen use. By far the largest quantity of the raspberries grown by the market

men find their way to the jam maker, to whom they are despatched in white-wood tubs, each tub filled to within about four inches of the top, and holding then about 56 lbs. of fruit. The space allowed permits of a little movement, and thus prevents loss of juice, which comes quickly to the surface of such a bulk of fruit. A double-thickness of brown paper is generally tied over the top of the tub, and on it is pasted a prominent label, signifying that the contents are "jam fruit," and reminding the railway officials which is the right side up. If the tubs have lids screwed, or otherwise fastened down tight, the contents would quickly ferment in hot weather, and would thus not arrive at their destination in good condition.

As regards cost of production and the selling price, many sets of figures have been given, but in all of them it is shown that though the produce realises good prices, and in some seasons very high rates, yet the cost of planting, manuring, and pruning is a very serious item. Planting canes of the more popular market-garden raspberries cost from £1 to £2, 10s. per 1000, and their purchase, together with the cost of planting, works out at about £14 per acre; to this must be subsequently added about £8 per acre per annum for manures and cultivation. The price paid for picking varies in different districts and also with the season, a lower rate being paid when the crop is heavy than when it is light. The variation is slight, however, though where large areas are under cultivation such variations may amount to a very considerable item, and may determine the amount of profit. One halfpenny per lb. is considered a good price for raspberry picking, but, given a good season and crop, 4d. per 12 lb. peck is a common rate.

The yield varies, but under the usual conditions of rows four feet apart and the plants two feet apart in the rows, there should be an annual crop of from two tons

to two and a half tons per acre. Taking the average price obtained as £25 per ton, this gives a return of £50 to £62, 10s. per acre. The price per ton is seldom lower than this, though I have known it reach £20 in a full season, while it not infrequently rises to £30, and even £50 has been obtained. The picking of choice dessert fruits costs more than the figures given, but then the price obtained increases proportionately.

Readers will, with these figures before them, be able to work out the profits to be made from raspberry culture, remembering that rent must be added to the cost of production; that during the first year the crop will be so small that even under favourable circumstances it is not likely to defray the initial cost of plants and planting, and that even in the second year there will not be a full crop. Then, too, railway rates and salesman's commission must be deducted from the market price realised. Raspberry culture is, however, not simply a matter of arithmetic; it is something more—a matter of brains, as is all profitable fruit culture.

Selection of Varieties

It is not at all a difficult matter to reduce the varieties of raspberries when a selection is necessary. No one will, I think, quarrel with the assertion that if but one variety can be grown that one should be Superlative. This is by far the best raspberry for general cultivation, as it grows as well in Scotland as in the south of England, crops abundantly over a long period, and produces large fruits that are by no means to be despised for dessert, while they are excellent for tarts, for preserving, and for the manufacture of raspberry vinegar.

Market-growers and others who do not wish to have the trouble of training the canes to stakes or trellises

should choose the dwarf, sturdy and splendid-cropping Carter's Prolific. This has rounder fruits than Superlative, deep red, firm, and fine for preserving. Gardeners wishing for a "second string" should certainly grow Carter's Prolific in addition to Superlative, while both in private and market-gardens these two with Northumberland Fillbasket form an excellent trio that do well on trellises or shortened back so as to be self-supporting.

Superlative we may consider the best garden raspberry and Carter's Prolific the best market-garden variety. We now want a variety for another special purpose, *i.e.*, preserving, and it is found in Semper Fidelis, one that is very largely grown in the home counties to meet the demands of the jam makers. It bears large, round, rich red fruits in abundance and over a long period, and these fruits are so firm that they retain their shape better than others—a point of considerable importance in these days of "whole-fruit jams." Then also the brisk flavour of Semper Fidelis is in its favour, because very sweet varieties make a somewhat sickly preserve. River's Hornet has such brilliant juice that it is valuable to syrup and sweet makers.

Where varieties must be selected from but one standpoint —that of flavour, there is no doubt that Baumforth's Seedling is the best, while Yellow Antwerp should have the preference if a yellow variety is needed for dessert. Red Antwerp is of excellent flavour, and is by some folk preferred to Baumforth's Seedling.

Among the half-dozen or so of late autumn fruiting varieties, three are ample, the best being October Red, Belle de Fontenay, and October Yellow.

A selection of half-a-dozen varieties that will meet the requirements of most establishments is: Superlative, Carter's Prolific, Baumforth's Seedling, Semper Fidelis,

Yellow Antwerp, and October Red. Other useful varieties are Hornet, Northumberland Fillbasket—an excellent variety for cold soils and northern districts—and Perpetuel de Billard, the latter an autumn fruit, bearing immense berries.

The Raspberry's Enemies

On the whole, raspberries cannot be considered as subject to general attack on the part of insects. In light soils, where moisture cannot be supplied regularly and in quantity, red spider will attack the foliage, but if generous treatment is afforded the plantation this pest need not be feared. There are, however, a few enemies that occasionally attack raspberries so viciously that some remarks upon their habits and suggestions for their extermination seem necessary here.

Raspberry Beetle. — This little beast (*Byturus tomentosus*) is a tiny buff-brown beetle when perfect, but in its larval state the yellow-brown grubs eat the fruit receptacle. The beetles eat the pollen and so damage the reproductive organs that fertilisation is either stopped or only partially effected. Hunt for the beetles in June when they visit the opening flowers, and trap them by means of freshly tarred boards held in a slanting position below the branches, while the latter are tapped or shaken. After an attack the early removal of fruited canes, fallen leaves, and loose mulching material is desirable, burning the whole at once.

Raspberry Bud Moth.—The perfect moth of this tiny pest (*Lampronia rubiella*) is so insignificant that though it flies by day it is seldom noticed. But the small red, brown-headed larvæ is capable of doing a vast amount of mischief to raspberries both in spring and autumn. The yellow-brown moth deposits her eggs in

the tips of growing shoots during May and June, or even as late as July, and from these the larvæ are hatched out in a few days. These commence at once to feed upon the leaves, but they soon enter the soil and hibernate until the following March. They then creep up the raspberry canes, entering and feeding upon the contents of each bud as they ascend, until, when full fed, they assume the chrysalis stage either in a hollowed bud or in a cocoon spun among the leaves. In about fifteen or seventeen days the moth emerges.

Handpicking, removal and burning of affected canes, and the removal of rubbish and loose surface soil from round the stools during winter are the principal remedies. Other names for this pest are Red Bud Moth, Red Bud Caterpillar, and Raspberry Stem Bud Moth.

Raspberry Leaf Miner.—I have seen a large plantation severely damaged by this pest (*Foenusa pumila*) which works on the same lines as the Celery Fly. In August the perfect, winged insects, which are of a dull black hue with lighter legs, appear. Some live through the winter, and these deposit eggs just under the leaf cuticle. When hatched, the larvæ eat the soft cellular tissue and leave in their track an excavated blistered area. Dusting the leaves with soot or spraying with weak paraffin emulsion early in spring will prevent the deposition of eggs but after the attack has been made the larvæ should be squeezed to death between thumb and finger, or the affected parts be removed and burned.

Raspberry Mite.—Fortunately the Raspberry Mite (*Phytoptus rubi*) is by no means so general a pest as its relative the Black Currant Mite. It works however on similar lines and though microscopic itself, its effects are seen in swollen buds. Removal of all such big buds, and, in the case of a wholesale infestation, completely cutting down the stems, and consigning the whole

to the flames are the only, but somewhat drastic measures to be taken. It is hoped that fumigation by hydrocyanic acid gas will prove fatal to these mites but its use is at present somewhat experimental and when proved will present many difficulties.

Raspberry Weevil.—Closely allied to the Vine Weevil is the clay-coloured or Raspberry Weevil (*Otiorhynchus picipes*). I sincerely pity any one whose raspberries are subject to its attack, for pity and sympathy are practically all that can be given. In a vinery the Vine Weevil is trapped by placing white cloths beneath the vines early in the evening, and then entering the house after dark and flashing a bright light upon the vines; this causes the weevils to drop and on the white material they are quickly seen and captured. For capturing the Raspberry Weevil a modification of this plan is the only advice I can give. If broad light boards are smeared with cart grease, or thickly and freshly tarred, they may take the place of the cloths; one should be carried on either side of a row of raspberries, slanting them inward toward the stools; this must be done at night, the light flashed from a bright lantern serving to bring down the pests, which are caught on the sticky surface.

BLACKBERRIES

THE common bramble (*Rubus fruticosus*) is such a common plant in country hedgerows, on commons, and in woods, and fruits so generously during September, that its merits as a cultivated plant have been very largely overlooked. It does so well in waste places without any assistance from man, and produces its richly flavoured deep black fruits so plentifully in long clusters that the country children find it profitable to harvest them, even though when the berries are sent to the London and other large markets the price realised is usually only about two shillings per peck.

These then are the arguments against cultivating blackberries. What are the arguments on behalf of cultivation ?

Firstly, there is the advantage of selection. Doubtless every reader has found that in a bramble hedgerow some plants have finer and better flavoured fruits than others, whilst others have finer clusters and a better habit of growth. An intending planter would reject poor forms and cultivate only the best.

Secondly, cultivation itself improves blackberries, increasing the crop, enlarging the berry, and improving the flavour.

Thirdly, it is not everyone, especially in suburban districts, that can command a blackberry hedge, or always depend upon a supply of uncultivated fruits. Even where they can be purchased cheaply at a market, blackberries so quickly lose their fine piquant flavour that there is no comparison between them when they

reach the consumer and those culled fresh and ripe from the garden.

Fourthly, blackberries make the most beautiful screens imaginable when trained to wood fences, or wood or wire trellises, and with a small amount of attention they will give a rich harvest of fruit as well as beauty. Other arguments could be put forward, but they are not necessary. Curiously enough, the extension of our large towns has largely increased blackberry cultivation, for as the wilding has been pushed further and further into the country, so the suburban dweller has provided for the taste created in childhood by growing the humble berry in his garden.

It has already been assumed that the blackberry is a desirable and useful fruit. It has a market value, and, so far, no substitute has been found for it. In tarts or puddings, either alone or with apples, blackberries are in every way most wholesome food, while the veriest epicure would not allow such a dish to pass untasted. The country housewife is well aware that the fruits of the bramble can be converted, with the addition of sugar, into a richly flavoured preserve, and she will probably not need to be told that good blackberry wine need never go begging.

Soil and Situation

So ubiquitous does the blackberry seem to be that at first thought it appears needless to raise the question of soil. And yet the question must be raised, for neither in a stagnant swamp or bog, nor in a dry hungry sand, will the bramble flourish, neither does it succeed in pure clay. In ordinarily fertile garden soil it will crop freely, but if the staple be fairly strong loam, deeply trenched, and moderately manured in the process, then, and only

WILD BLACKBERRIES

then, will the blackberry yield the enormous harvest of which it is capable.

With respect to situation it is not difficult to meet the brambles' requirements, for their hardihood is one of their great recommendations. If they receive plenty of air and sunshine, the situation is provided; but in districts where keen cutting winds prevail at various seasons of the year, and especially in spring and early autumn, endeavour should be made to secure a site where rising ground or woodland provides a little shelter. All the American varieties appreciate a southern or a south-western aspect, but British varieties do as well with an eastern exposure as with any other, provided the severity of the east wind is broken.

Propagation and Planting

In a delightful lecture, delivered before the Royal Horticultural Society in 1901, on "British and Irish Wild Plants worthy of Culture and Improvement," Mr F. W. Burbidge, M.A., V.M.H., observed that "Of all our native or wild fruits, the one worth earnest attention, culture, and improvement, is the common blackberry or bramble. Every stretch of blackberry country, every hedge, in fact, contains varieties of widely varying merit, and we must select the best flavoured, the largest fruited, and most prolific kinds." With this statement no one is likely to disagree, but it involves the question of raising seedlings, for, as gardeners are well aware, selected parents, followed by sowing seed of the finest berries and a rigid selection of the finest resultant seedlings—repeating the sowing and selection through several generations, it may be—is one of the best methods of obtaining new varieties of this or similar fruits. Seeds may be parted from the fruit by

the admixture of dry sand, rubbing the whole mass round in a fine sieve. Sowing may take place in autumn or spring, preferably the autumn, in the open, but protected from birds. Transplant as necessary, and by the third year the seedlings should show whether they are worth retaining or not.

Root cuttings, removal of suckers, and growth cuttings may all be utilised for the increase of blackberries, if necessary; but, undoubtedly, the quickest and easiest method of raising strong plants is by layering canes in the early autumn, pegging them firmly in the soil. So soon will roots be formed that, in a few weeks' time, a severance may be effected, and the youngsters planted in their fruiting quarters. It is a good plan to prepare the canes for layering, by pinching out the growing point at a yard high, and layering the side shoots subsequently made.

As with the majority of fruits, so with the bramble, autumn is by far the best time for planting, and there is no better month than October. The sites should be large enough to admit of the roots being carefully spread out; but, if the soil has been well prepared, there is no need to make deep stations. Plant firmly, so that when the ground settles the plants will not be deeper than before transplanting. During the operation avoid all unnecessary exposure of the roots, and, if the season be at all dry, give a thorough watering immediately after planting, following this with a mulching of half-decayed stable manure.

The distance to allow between each plant depends upon the variety and the method of training, but, as a general rule, four feet between the plants and six feet between the rows will suffice. More room must be given if large bushes are the end in view; but the general practice is to treat blackberries very much as raspberries, training them to low trellises.

Pruning and Training

These go hand in hand; but, to secure a good foundation, cut young plants to the ground-line when planting. By the following midsummer several good growths will have been made, and of these not more than two per plant must be retained, cutting out the rest. In autumn, shorten those left to four feet, except in the case of the cut-leaved or parsley-leaved bramble, which may be left at six feet, or much more, if strong. More growths may be left the next season, but four to each stool is generally ample to cover the trellis, and there is no advantage in overcrowding. Immediately after fruiting, cut out the canes that have borne fruit, shorten back the retained new ones to five feet or six feet, and prune the lateral growths back to plump buds. Tie the canes firmly to the trellis, so that late autumn gales may not damage them.

Quite a different method is followed to secure large blackberry bushes, for the plants are cut right down after the first year's growth as well as at planting. Three of the best canes formed the following season are selected, and the tips removed when about three feet high, allowing another foot extension for very strong varieties. Remove all surplus canes. Shorten in lateral growths to one foot, and then, in the third year from planting, a fine crop of fruit will result. In subsequent seasons more canes may be left, provided overcrowding is avoided and the ground well manured.

Manuring

Heavy autumn dressings of decomposed farmyard manure spread on the soil will generally suffice in the way of manurial assistance, and, failing this, much may

be done to secure fertility by annual additions of burned garden refuse, road scrapings, etc. Bone meal makes a fine autumn dressing, and may be followed in spring by light applications of nitrate of soda. Lime in some form should occasionally be given, as the blackberry appreciates this almost as much as do some stone fruits.

Pests

Fortunately the blackberry is seldom attacked by insect pests, but when grown against walls some varieties may become infested with red spider, in which case one or other of the well-known remedies must be applied by syringe or sprayer. Where birds are troublesome, netting or scaring must be resorted to.

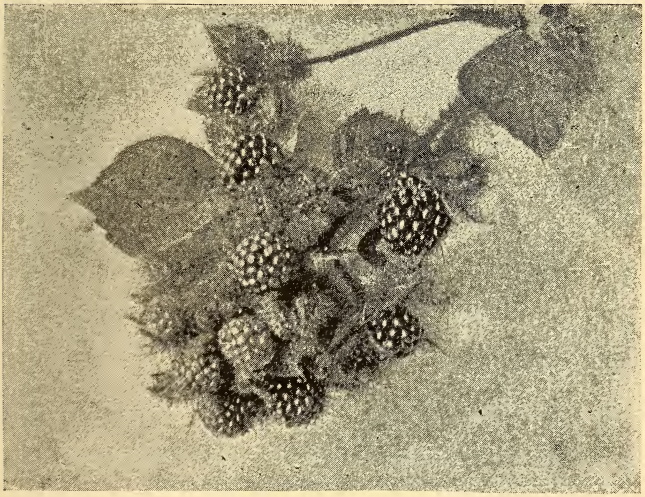
Varieties

The two best British blackberries are the strong, climbing Parsley-leaved — a splendid free-fruiting varietal form of *Rubus laciniatus*; and the Warwickshire, the latter a somewhat stiff grower.

Among American varieties that have been introduced during recent years, the most popular is Wilson Junior, which has very large fruits if grown in a favourable locality. Kittatiny is gaining a little favour; it requires similar care to the Wilson Junior. Early Harvest, Lawton, and Mammoth are other sorts, but they are not of special merit in this country.

THE JAPANESE WINEBERRY

Introduced from Japan about 1877, this handsome, strong growing bramble has become a popular garden subject, as much for its decorative value as for the use-



SHOOT OF THE JAPANESE WINEBERRY
(*Rubus Phoenicolasius*)

fulness of its fruits. Under suitable conditions the sub-scandent canes grow to a length of eight feet, and thus the plant is suitable for pillars, pergolas, or for trellises. The big terminal racemes bear pale pink

blossoms about midsummer, followed by vivid red—almost scarlet—berries about the size of those borne by our native blackberry. At fruiting time the early autumn winds agitate the trifoliate leaves so that the silvery under-sides contrast well with the upper green surface, and a large specimen is then a fine picture. Even in winter the bright red-purple stems are effective.

The berries have a very distinct flavour, sprightly sub-acid, and are much appreciated by many palates, though there are not a few that care little for it. The birds are all agreed as to its merits, so much so that netting is necessary to preserve the crop. The wineberry may be used for all purposes to which raspberries and blackberries are put.

Well worked garden soil, no matter what its texture, seems to suit the wineberry well. Grown in a broad border, supported by a stout pole rising eight feet out of the ground, or in the pleasure ground planted in threes, and trained to form a cone or pyramid it combines beauty and utility. In the matter of general culture it requires similar treatment to that accorded the blackberry, remembering that if well manured it will grow strong and bear heavy crops, when once established.

LOGAN BERRIES

THE LOGAN BERRY

In the Logan Berry we have a new and artificially raised fruit, produced by crossing the raspberry with the blackberry. The fruits are large, inclining mostly to the raspberry in shape, but they have not the white pithy centres common to that subject. The foliage resembles that of the bramble, while the habit is somewhat intermediate. Treated as a dwarf raspberry, each plant being supported by one stout stake, the Logan berry bears freely on heavy or well manured land, yielding abundance of reddish, fleshy, briskly flavoured fruits that are admirable for tarts and preserves, and also, when quite ripe, by no means to be despised for dessert.

Attention to tying, removal of old rods that have fruited, a good supply of water during hot weather and on light soils, mulching and weeding will produce good results.