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THE
GARDEN
UNDER
GLASS

WILLIAM F.
ROWLES

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ROWLES

1914

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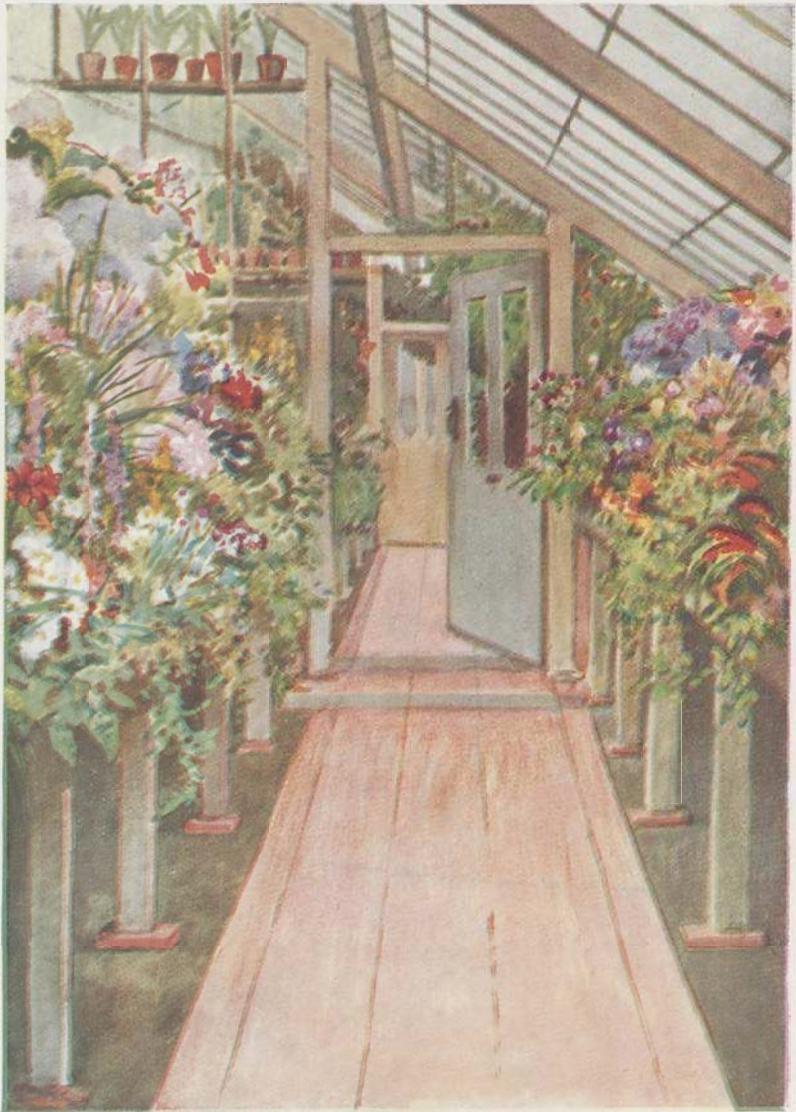
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THE GARDEN UNDER GLASS





A CHEERFUL GREENHOUSE

Rightly managed, a Greenhouse need never be duller than this.

THE GARDEN UNDER GLASS

BY

WILLIAM F. ROWLES

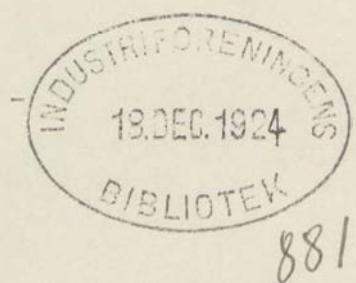
*WITH NUMEROUS PRACTICAL DIAGRAMS
FROM DRAWINGS BY*

G. D. ROWLES

*AND THIRTY-TWO ILLUSTRATIONS FROM
PHOTOGRAPHS*



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INTRODUCTION

I WOULD like to explain the scope of this work. I do not know of any other popular book which deals fully with the culture of fruit, flowers and vegetables under glass. We expect, of course, in the large and costly works of many volumes to find full details of all departments of gardening, but although there are several works devoted to greenhouse plants, I do not know of any work which includes the culture of fruit and vegetables under glass.

This book deals with all aspects of the subject—the management of frame or conservatory, the forcing of radishes as well as the flowering of orchids.

When an amateur has a greenhouse he does not confine himself solely to the culture of ornamental plants, although undoubtedly they would form the predominant partner. He uses his greenhouse also for the growing of tomatoes, melons, cucumbers and perhaps a grape vine, a peach, or a fig-tree ; for raising seedlings of flowering plants for the garden (such as stocks, asters, antirrhinums, etc.) ; for raising early vegetables ; for forwarding crops, such as onions, leeks, beans, peas, etc. ; and for wintering plants which are not hardy. Nor is the amateur alone in this, for in large establishments, where there are many glass-

houses, there is no clear dividing line between fruit and flowers. We often find them grown together in the same house, while seldom indeed is a house given over exclusively to forcing vegetables, that work being done in fruit and plant houses where space is available and the conditions correct.

As among my readers there will be some who can afford to have a house specially for the display of decorative plants, I have dealt with the conservatory, and also for the same reason with the viney় ; but throughout the book I have kept before me the needs of the man who has but one greenhouse and is afflicted by the possession of that ill-matched pair—limited space and unlimited ambition.

I have endeavoured to make my information clear and concise, and for the sake of those who are on the very threshold of garden knowledge I have avoided the use of technical terms, and have presumed no knowledge whatever on the part of the reader. I have endeavoured to show clearly not only what to do and when to do it, but what is more important, how to do the actual work in such a way as to ensure success. This much I may safely claim, that after a careful perusal of this book the reader will be in a fair way to having a greenhouse affording beautiful plants and flowers for his rooms, delicious fruit for his table and fresh early vegetables for the kitchen, besides giving earlier and better plants for his vegetable plot and flower garden : these constitute, to my mind, a

practical greenhouse. I hope the verdict of my readers will be that this is a practical book on the practical greenhouse.

A few words on the plan which I have adopted : For the purpose of clear treatment and to avoid repetition, I have found it best to deal separately with the different sections. Treating firstly of the constructive portion, I have passed on to cultural matters in the three main divisions of fruit, flowers and vegetables. It has been found convenient, however, to give details of how to do the work in a different section. Thus, by showing how to pot and to water a plant I have avoided the necessity of repeating this for every plant. So with greenhouse pests, a section devoted to them and the remedies and preventive measures provides greater clearness than if these facts were indiscriminately dotted about the book.

In order to make the book more practical I have in the cultural sections given fuller details for those plants which readers are most likely to grow. Thus such flowering plants as the pelargonium, gloxinia and primula receive far more attention than anthuriums, cattleyas, and gardenias, while in the fruit line nothing is mentioned of pines and bananas, which are seldom grown in England now. A copious calendar at the end will, I think, be appreciated. Some portions of the advice given have already appeared in *The East Anglian Daily Times*.

My readers must be the final judges of the value of this

work, and I trust they will show their appreciation by digesting the contents, converting them into practice, and acquainting their friends with the source of their inspiration. In this way they can greatly extend the successful growth of fruit, flowers and vegetables under glass, and make this part of their garden both useful and beautiful, so that in truth and reality they may have a "garden under glass."

WILLIAM F. ROWLES.

PART I

THE CONSTRUCTION OF GLASS HOUSES
AND FRAMES

CHAPTER I

THE AMATEUR'S GREENHOUSE

AN ALL-ROUND HOUSE

I WOULD like it to be distinctly understood that I do not intend to show how to make a greenhouse in the sense in which a joiner would understand the term. I can lay no claim to skill in carpentry, but I do pretend to a knowledge of the needs of plants, and of the means of arranging the greenhouse and its interior equipage so as to secure for them the best conditions. Sanitary conditions in the sense of affording plenty of light, air, drainage, etc., are as essential to health in plant as in human life. I do not advise readers generally to make their own greenhouse, for unless their trade lies in that direction the experiment is likely to be anything but successful; but by assimilating a knowledge of the essential conditions they may insist on the greenhouse being practical and useful.

At present I have in mind what we might call an all-round plant house which will serve for all the purposes hinted at in the Introduction. Such a house does not tend to perfection in culture, but often it is the most that can be done. If we cannot have a perfect greenhouse let us at least have a practical one. We have to consider as succinctly as possible aspect, site, size and probable cost.

SITE AND ASPECT

Most of my readers will be engaged in their usual avocations during the day, and will in many cases be able to attend personally to their greenhouse only in the morning and evening. Therefore I would advise a south-west aspect. In this way it will gain the full benefit of the afternoon sun, and a great deal during the evening, so that at the owner's return the temperature will not have fallen very low. Shelter from cold winds is recommended, as being a saving in the fuel bill, but this must not involve shade from neighbouring buildings or overhanging trees.

The site is mainly a local question, but we must bear in mind that it tends to economy to have water laid on, to have the greenhouse not too distant from the dwelling, and so situated that the necessary potting soil, fuel, etc., may be got quite close to it, and that the smoke from the chimney will not prove a nuisance in the dwelling.

SIZE AND COST

The size of the greenhouse must be in due proportion to the needs and means of the owner, and the spare time at his disposal. This may be considered a platitude, but the principle is so wantonly violated that it needs to be emphasised. To have a large greenhouse half empty, besides giving a bad impression, means a great waste in first cost and entails a heavier charge for maintenance and repair. On the other hand, to be cramped for room during greater part of the year means ruin to many of the plants, a struggling existence to the others, and disappointment bordering on disgust to the owner.

Where the wish is to have a display of flowering plants

in the greenhouse as well as in the rooms, and where the raising of early vegetables and forcing of fruit is to be done, then will the greenhouse need to be large. The size must bear due proportion to the extent of the garden, and in every case the person on the spot will be a better judge than I can possibly be. To make the best use of the greenhouse means that the best use must be made of the plants in the outside garden. In these days of hardy plants readers are advised not to rely so much on outdoor plants which need raising in the greenhouse. A bed or two in the front, a few borders, the window boxes and the vases may be filled with half-hardy plants, but if other parts are planted with hardy subjects it will mean that more beautiful plants of an exotic nature can be grown in the greenhouse. I shall often have occasion to emphasise the importance of frames, for I hold that whoever owns a greenhouse can afford a few cold frames, and these will very greatly increase the accommodation in the greenhouse.

I would suggest that for the ordinary villa garden a comparatively large house would be 30 feet long by 20 feet wide. Much could be grown in such a house, for it would admit of side and central stagings with a path round; and it would add greatly to its utility if frames were attached to the sides. This, however, would prove too large for many, so that I would suggest one 15 feet by 10 feet, with one central path through. Others smaller than this could be obtained, but I would like to put down 10 feet by 7 as the minimum.

The price, of course, depends mainly on the kind and quality of the material and also on such local circumstances as the run of the ground, the amount of excavation to be done, and the distance from the firm erecting it. Cheapness in its ordinary sense is seldom to be sought

and always to be suspected. Economy may sometimes involve a larger initial outlay, but it is certainly better to know at the beginning that a large expense is to be borne than to be deceived by a small initial outlay involving considerable subsequent expense. As with clothing, furniture, etc., so with a greenhouse the advice is to give as much as you can afford, insisting in every case on good quality material and sound workmanship.

Horticultural builders do not usually catalogue prices, because they are liable to considerable fluctuations, so that the advice I give is to consult two or more builders of repute, stating the wants, the local conditions, and if possible giving a ground and a sectional plan of the structure required.

THE IDEAL PLANT HOUSE

This is rather a favourite subject with me. So often have I written on it that I begin to know it by heart. I believe that in a perfect plant house the means of affording light, air, heat and moisture to the plants should be under perfect control. The figures relating to size need not be strictly adhered to, but commensurate with the size of the greenhouse I consider them ideal. I would have this plant house of a span-roofed pattern, with its gables facing north and south to give equal light on all sides. This, however, is not imperative. I would have the length 35 feet, the width 18 feet (inside measurements), the height to the eaves 5 feet and to the apex 12 feet. The ground floor would be about 6 inches above the surrounding ground, and there would be but one door. A side staging would run round the house 3 feet wide and the central staging would be 6 feet wide, leaving an ample width of 3 feet for the pathway. Such houses are sometimes built below the

level of the ground. This affords greater protection and often involves a less expenditure in fuel to maintain an even temperature, but, except in a bleak situation or where it is especially desired to keep the house low, I would not

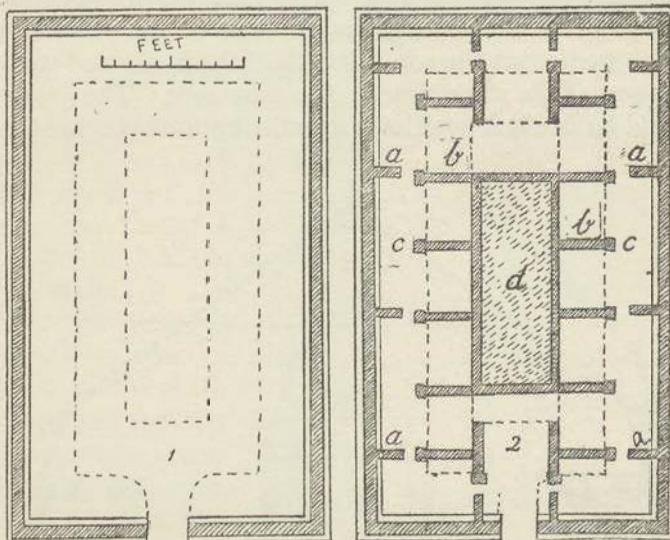


Diagram 1.—Ideal Plant House: 1. Showing position of stagings. 2. The foundation plan showing: a, rest for hot-water pipes; b, rest for trellis flooring; c, rest for support of staging; d, water tank.

favour it. There cannot be the same efficient ventilation, there cannot be that free circulation of air which is beloved of most plants as in a house well above ground. If the house is intended only for forcing, then I am willing to concede that it is an advantage.

HINTS ON THE STRUCTURE

For a house of this size the walls should be 9 inches thick with footing working down to 18 inches. The height

of the wall would be 3 feet and at intervals of 10 feet it would be provided with wooden shutters to admit air below the staging and over the hot-water pipes. The wall should be whitewashed on the inside. Standing on the outer edge of this wall should be 2 feet of wood and glass, the wood forming the framework for ventilators which would run the whole length of the house and would all open at the same time on the same side. The gearing would be worked by a lever permitting the light to stand

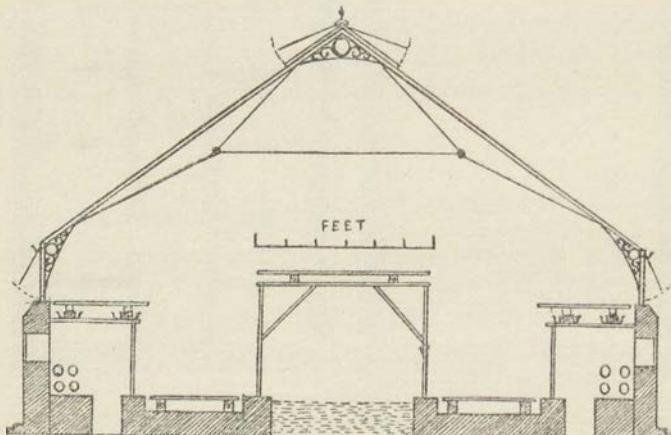


Diagram 2.—Sectional plan of same house.

fully open or to be regulated so as to give but the merest chink of air. From this glasswork would spring the roof, and on each span at the apex ventilators about eighteen inches deep would open the whole length of the house, being operated by levers in a similar manner to those at the side. The sashes and woodwork of both roof and sides should be as slender as is consistent with rigidity ; for the fullest possible amount of light will at times be needed, and whenever it is too strong it can be subdued by shading.

To assist in keeping the house rigid tie-rods would be put in as shown in the sectional illustration. The panes of glass (21 oz. to the foot square) should be well bedded in putty and the woodwork should have at least two coats of good white lead paint.

SHADING, HEATING AND WATER SUPPLY

I advise lath roller blinds as being the best. These may run on iron supports or directly on the roof. The former method is preferable. If the ropes are renewed annually and a point is made of setting the roller in place before drawing them up, these blinds will last for a long time, and will do well for dropping down on a frosty night, when they will make a difference of two or three degrees inside the house. Permanent shading known by such names as "summer cloud" may be used, but is not so desirable as a movable shading. If a permanent

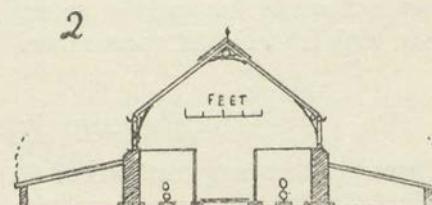
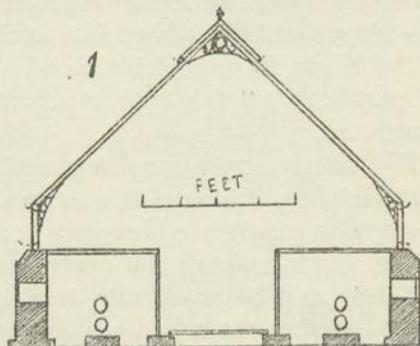


Diagram 3.—Sectional plans of span-roofed greenhouses, with frames attached to the sides of Fig. 2.

shading is decided on a cheap and efficient one can be made with lime and skim milk or sour milk. Where canvas shadings are used they must be entirely removed during the winter months.

As to heating, I would advise four rows of 4-inch piping to be taken round the house beneath the side staging. There the heat could be regulated by flow and return valves placed just outside the house. An open air pipe or air tap should be affixed to the pipes at their highest point and the pipes should be locked together by expansion joints. The pipes should be affixed to a small sectional boiler such as the White Rose or Robin Hood. The pipes should not be painted, but for appearance may be covered with lampblack.

The water supply for the greenhouse may largely be obtained from the roof if a large tank be provided. I know from experience how very economical it is to have a large tank beneath the central staging. If this be 4 feet deep and be practically as long and as wide as the central staging, water can be dipped up wherever watering is being done and there is no waste of time in running backward and forward. By this means also soft water only can be used and it is surprising what a large difference this makes in the welfare of the plants, for hard water does not make for healthy growth, nor (if syringing is done with it) for good appearance.

FLOORING AND STAGINGS

Among the many methods of flooring, such as cement, gravel, bricks, flagstones, asphalt, mosaic, boards, iron gratings or wooden trellising, I like none better than the last. A glance at the diagrams appended will show how they are made. Whether the wood run across the house,

along it or obliquely is mainly a matter of taste. In any case the bearers should rest solidly on bricks and be so affixed that while they do not "ride," they can easily be removed for cleaning beneath and for putting down an

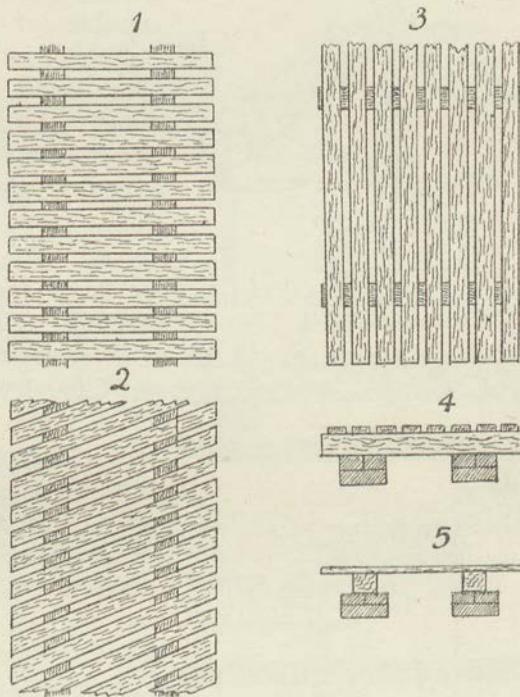


Diagram 4.—Types of Greenhouse Flooring: 1. Struts set laterally. 2. Struts set obliquely. 3. Struts set longitudinally. 4. Section of Fig. 3 standing on brick pier. 5. Section of Fig. 1 standing on brick pier.

annual coating of coal ashes. These walks are always dry and comfortable, are easily cleaned and yet do not interfere with the maintenance of moisture.

I like also trellis stagings, but as it would not be well

to have an open trellis standing immediately over the hot-water pipes I would advise the erection of a framework staging on which sheets of corrugated iron could be placed. This could be covered with clean shingle sifted from

gravel, washed, and capable of passing a quarter-inch sieve. The trellis staging could then stand about four inches over this staging and might rest on clean bricks. The idea is to keep the lower staging saturated with moisture without difficulty, and to allow a free circulation of air beneath and around the plants. It would be found a considerable advantage to divide the staging at the top into three parts, each being a foot wide. Then the plants could be arranged in tiers or on the flat, according to

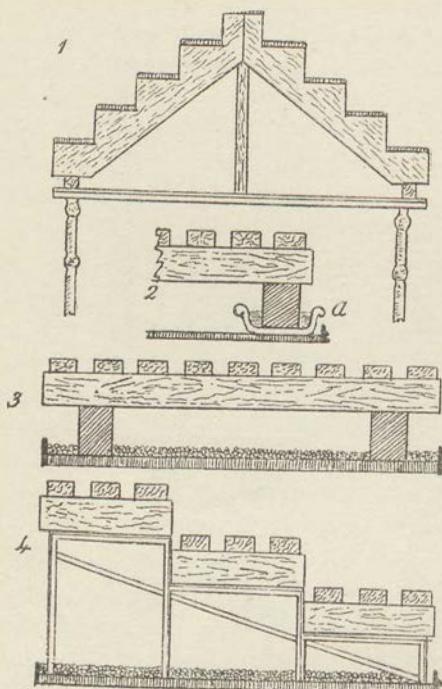


Diagram 5.—Types of Greenhouse Staging:
 1. Tiered staging for centre of house. 2. Scheme to prevent insects crawling on to staging; *a*, pan filled with water. 3. Double staging, trellis standing on bricks over solid staging covered with shingle. 4. Side staging formed in tiers.

the exigencies of the case. The middle staging could also be of the trellis pattern, but here a double staging would be unnecessary as there are no hot-water pipes beneath. I would advise a tiered staging of nine shelves, each shelf

being seven or eight inches wide and rising by steps of four inches. More plants can be got in a given space without overcrowding where tiered stagings are used, and whether in flower or not they are displayed to better advantage.

A method of preventing crawling insects from getting

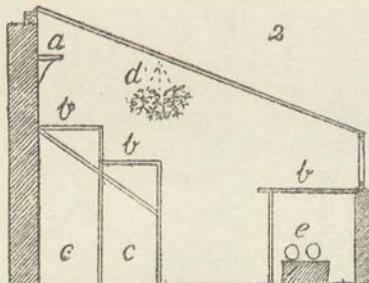
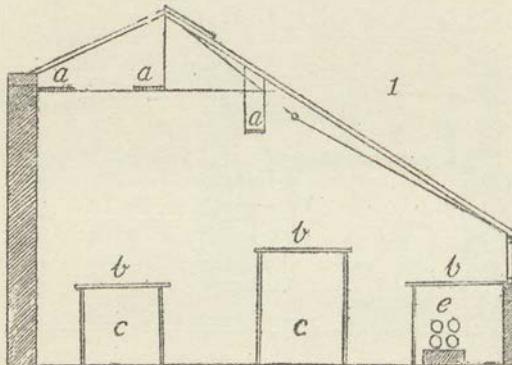


Diagram 6.—Making Most of Space: 1. Shelves and stagings in a viney. 2. Lean-to plant house with shelves and stagings: *a*, shelves; *b*, stagings; *c*, space beneath staging for rhubarb, seakale, and for drying off plants; *d*, hanging basket; *e*, hot-water pipes on which seed boxes may be set until germination.

on to the staging is to have the bricks or half-bricks or other stands supporting the stagings rest in iron or tin pans to be kept filled with water.

MAKING THE MOST OF SPACE

Especially in the "all-round house" should the most be made of space. This end is to a considerable extent

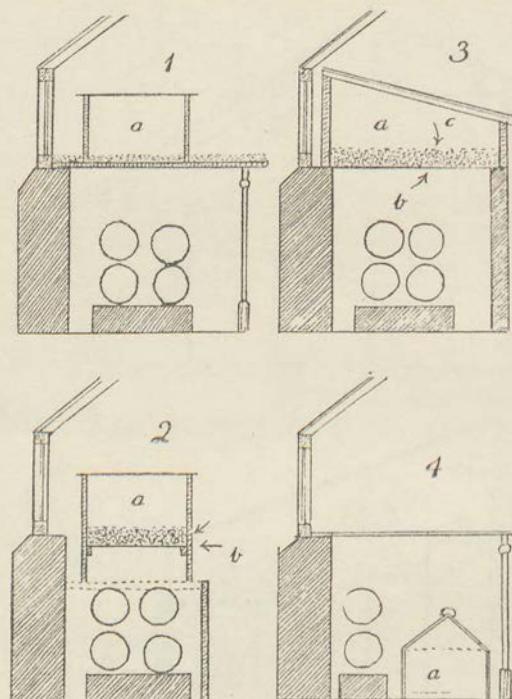


Diagram 7.—Propagators: 1. On staging of house. 2. Over hot-water pipes: a, space for cuttings, etc.; b, roofing slate; c, cocoa-nut fibre. 3. Permanent propagator over pipes. 4. Makeshift propagator: a, handlight beneath staging.

achieved by having tiered stagings, which are certainly a great saving of space; but a further use of the house may be effected by erecting shelves in suitable positions. These

positions are best shown in diagram. The space beneath the staging may be used for resting or drying off plants, for setting pots of bulbs just introduced for forcing, for

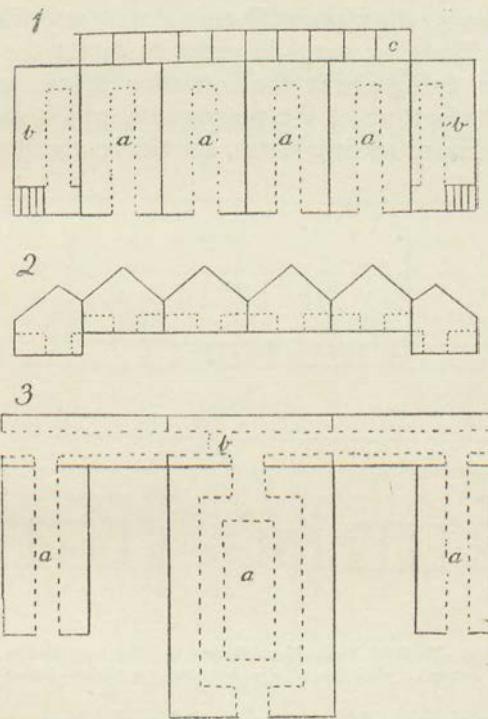


Diagram 8.—Compact Blocks of Houses: 1. Plan of four houses (a) on ground-level, and two houses (b) below ground-level, with frames (c) at back. 2. Sectional view of same block. 3. Three plant houses (a) and corridor (b) divided into three parts.

forcing seakale, rhubarb, asparagus, mustard and cress, for plants which are of hardy constitution and for which space cannot at the moment be found.

A PLANT PROPAGATOR

This is a necessity to the greenhouse owner. He may easily fix one over the hot-water pipes at their hottest part, enclosing the pipes with zinc, slates, or bricks (boards would be likely to warp) in order to direct the heat upwards and bring about the condition known as bottom heat. The bottom of the propagator, which should consist of ordinary roofing slates, should be about six inches

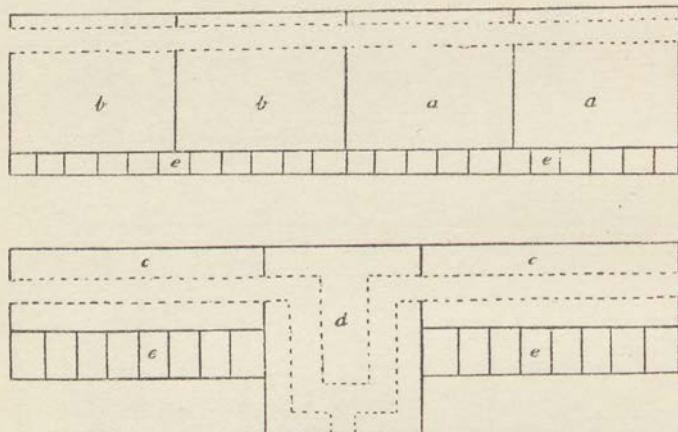


Diagram 9.—Block of Fruit, Plant Houses and Pits: *a*, vineries; *b*, peach houses; *c*, plant houses; *d*, conservatory; *e*, pits and frames.

above the pipes. If some material such as cocoa-nut fibre be placed over the slates to a depth of three or four inches the pots and pans containing cuttings or seeds may be plunged therein. The propagator itself may consist of a box about 1 foot deep and 18 inches to 2 feet wide covered by loose sheets of glass 18 inches or 2 feet by 1 foot. These can easily be reversed three times a day or as often as moisture adheres to the inner surface. A cool propagator

without bottom heat may be set on the greenhouse staging or even beneath the staging in case of severe restriction of space.

SMALL BLOCKS OR RANGES OF GLASS HOUSES

For the convenience of those who are so far favoured by

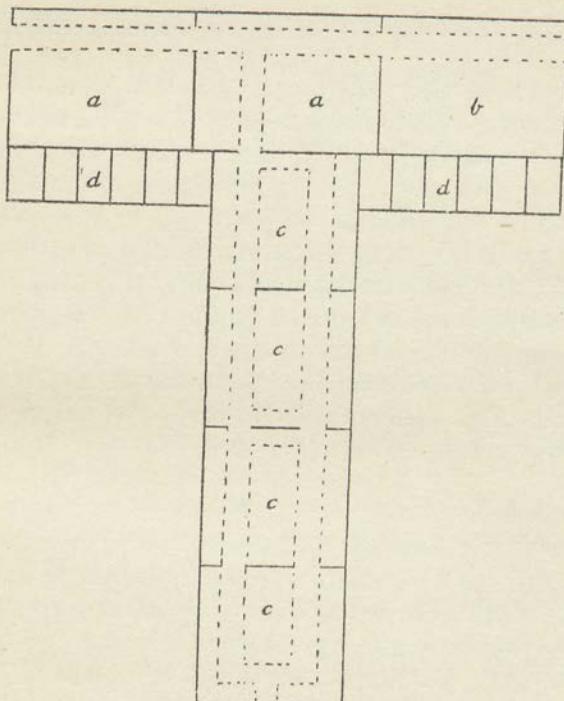


Diagram 10.—Block of Fruit and Plant Houses: *a*, vineries; *b*, peach house; *c*, plant houses; *d*, frames.

fortune as to contemplate the erection of several greenhouses I have given plans which with the references

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attached will afford sufficient explanation. In nearly every case they are designed from existing blocks, though drawn from memory. Having worked in them and found them convenient, I commend them to such of my readers as can afford them.

CHAPTER II

A MODEST CONSERVATORY

THE CONSERVATORY IN WINDOW AND ROOM

THE author's difficulty in compiling this book is no mean one. He is rightly expected to give such advice as may be useful to the amateur with his small greenhouse in town, as well as to the wealthy flower lover with his palatial conservatory in the country. I endeavour to meet these difficulties by telling how best to grow plants, not so much to give perfect flowers fit for exhibition, but rather beautiful flowering plants, forming an unbroken succession of floral beauty. Having had a wide experience of gardening in all four quarters of the English compass, I have met with most of the difficulties of plant culture and can offer the results of this experience to my readers with a considerable amount of confidence.

The window conservatory, as I have ventured to term it, could well be more generally a feature of the villa garden. I speak of the projection of a glass case from the window, which gives more space and more light for plants and would be a splendid place for showing to advantage plants which have been grown in the greenhouse. The condition of atmosphere will be somewhat difficult to adjust, but an endeavour should be made to have it as near as possible to that of the small conservatory I am about to treat of. The window conservatory is not intended for the growing of plants—indeed they could be grown there with but very

indifferent success—but rather for their display after they have been brought to their flowering stage. While so arranging the plants that they look well from the outside, an endeavour should be made to have a good frontage to the room. To secure this, and to give greater interest, it would be well to rearrange them frequently.

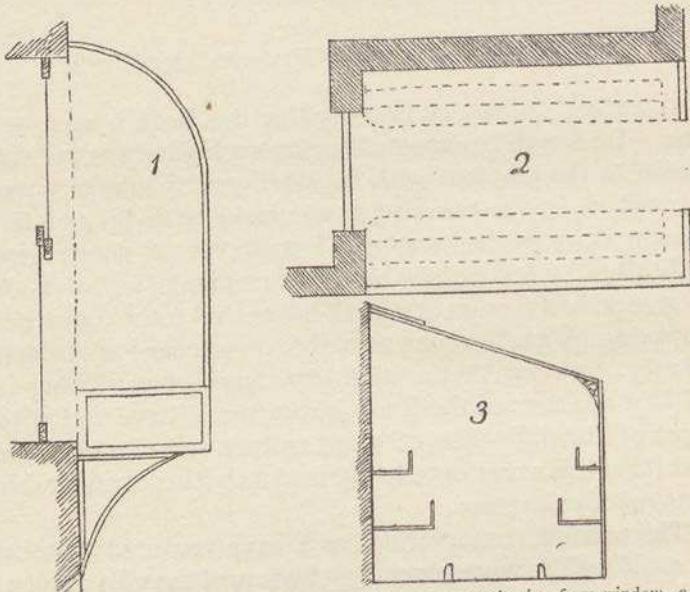


Diagram 11.—Small Conservatories: 1. Glass case projecting from window—a window conservatory. 2. Ground plan of small porch conservatory in angle of residence which, in conjunction with Fig. 3, shows position of pathway; space on floor for plants and on shelves above, provision being made for taking away the water so that it does not drip on to plants below.

I know several very keen amateurs who live in the town, and who have but one greenhouse wherein they grow a miscellaneous collection of plants, but who contrive always to have their windows and rooms gay with flowering plants. Where a window conservatory cannot be

erected a table could be set in front of the window and the plants be artistically arranged thereon.

The amateur with but one greenhouse has then his opportunity. He may show his friends the best of his plants in a place where they cannot fail to attract attention and where their beauty is not toned down by the presence of stern utility, as would be the case in the greenhouse.

THE SMALL CONSERVATORY

Too often this structure suffers in point of aspect and size. It is often added to the dwelling by way of an afterthought, and has, of course, to be fitted into the architectural scheme without much thought of aspect. I have seen conservatories on this account built on the east side of a house when we know that a south aspect is superior. It is an advantage to have it attached to the dwelling because there is then no excuse for crowding the rooms with plants ; for however beautiful the presence in a room of growing plants, it does not improve their health. If not attached to the house the conservatory should be in a part of the garden where it will not be too conspicuous yet not entirely hidden nor difficult to get at.

The conservatory, I have said, often suffers in size, for it is often too large for the amount of glass (greenhouse and frames) which have to supply it with plants. The result is that there never can be a really tasteful display because the plants have to be set so widely apart, or they have been crowded in their growing career in the other house, or again because in the endeavour to make the plants look well for as long a time as possible they are picked over daily until scarcely a bloom is left upon them. The size of the conservatory must accord with the means of

production in other directions and had better err on the side of being too small.

THE DIFFERENCE BETWEEN A CONSERVATORY AND A GREENHOUSE

These do not differ merely in name. The conservatory should be rather better in appearance, loftier, with a larger surface of glass at the sides and better flooring, ample means of ventilating and shading, and should have a heating arrangement capable of maintaining a minimum temperature of 50° by night. It is best that the whole of the ground floor be covered with tiles, concrete or some similar substance, and that the side staging be movable. If the conservatory be of fair size I would dispense with a middle staging and put the plants into picturesque groups which could be changed according to the character of the plants.

A conservatory need not be large to be beautiful. I know such a structure attached to the house which is barely ten feet in length and whose breadth could easily be spanned with outstretched arms, yet it is always gay with flowers supplied by a greenhouse and a few frames and gives great delight to its owner.

CHAPTER III

A SMALL FRUIT HOUSE

FOR GROWING GRAPES

IN the house which I am going to describe I can promise readers they will be able to grow grapes, figs, strawberries and tomatoes, besides using the house for forcing seakale, asparagus, rhubarb and French beans. In due course I will show how a vine, a fig, a few tomatoes and some pot strawberries can be grown in the ordinary greenhouse, but here we presume that the grower has a liking for fruit and has decided to build a small fruit house which will serve also for other purposes.

Probably—and preferably—the shape will be lean-to. The house need not be large, 12 feet being a suitable width. This would admit of an entirely inside border, and with the exception of a width of 2 feet at the back I would allow all the space to serve as vine border. This space might be retained for fig-trees, for they fruit the better if the roots are restricted. I have given plan and sectional drawings of fruit houses with scales appended.

Grape vines could be grown along the front, four feet apart, with tomatoes between them ; the back wall might be devoted to figs, with tomatoes at each end of the house and pot strawberries on the shelves. Then on the portable stagings there could be growing plants or boxes of seedlings, and beneath the staging, rhubarb, seakale, asparagus and chicory could be forced. Thus while grapes predom-.

ate and have first consideration, the house cannot be anything but eminently practical and useful. Gardeners

often look askance at such combinations, preaching always the doctrine that grapes must have the monopoly of a house—a counsel of perfection which undoubtedly makes for most successful grape culture but is decidedly uneconomical. I have seldom seen this practised and hope never to practise it myself.

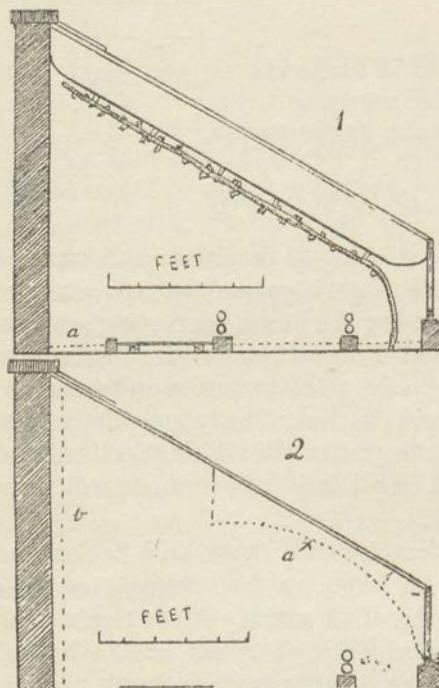


Diagram 12.—Vinery: 1. Showing position of rod, and (a) a small border for a fig-tree. 2. Peach house, showing (a) front trellis on which to train trees and (b) trellis on back wall.

ment would not be likely to prove successful and I shall not advise it. If a small house be given over to peaches and nectarines they may be grown along the front and also on the back wall, but the front trellis will need to be curved to admit as much light as possible to the trees at the back. Here again tomatoes and pot strawberries may be grown, and there might also be a movable staging for plants.

A PEACH HOUSE

Seldom indeed are peaches and vines grown in the same house, though figs will associate with either. The exper-

Early potatoes in pots, cauliflowers, lettuces, green peas, sweet-peas and all kinds of bedding plants could be grown along in such a house. If there is to be a permanent

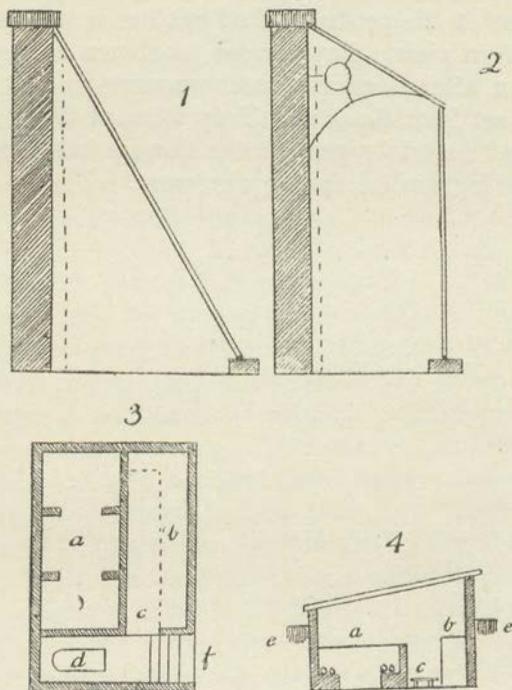


Diagram 13.—Peach Cases and Propagating House:
 1. Peach case with glass falling down at sharp angle.
 2. Peach case with projecting coping. 3. Propagating house, ground plan. 4. Sectional plan: *a*, staging over pipes; *b*, staging at back; *c*, pathway; *d*, small fireplace; *e*, ground-level outside; *f*, steps down to house.

staging it might be well to have an outside border for the peaches, the stems of the trees being put through a hole in the wall. This will answer well if the border be kept warm during winter by being covered with straw or bracken,

with sheets of corrugated iron on the top. In width, height and general size the peach house might accord with the viney, though a much less width and a sharper pitch will serve if economy in building is of prime importance, and if the production of peaches is practically the only end in view. Peach cases (as shown in the illustration) are often used for peach growing and stand only 4 to 6 feet from the wall. They forward the fruit somewhat and certainly protect the flowers but are scarcely as useful for small as for large growers.

CHAPTER IV

A FORCING HOUSE OR PIT

THERE is another type of house which the amateur might like to erect and a very useful house it would be for many purposes but especially for propagation and for growing cucumbers and melons. These houses are usually sunk in the ground for greater natural warmth ; for obviously they do not catch the wind so much and there is a smaller surface of glass for it to act upon. Moreover, in a forcing house, where a warm and fairly close atmosphere is maintained, there is not the same need for bottom ventilation as in a general plant house. Such a house as I mean has been illustrated, and for those who have a considerable amount of glass I would advise that they use it merely or mainly for propagation. A propagating frame could be built over the hot-water pipes so as to afford bottom heat, and a handlight or small box propagator could be put on the staging for the propagation of such plants as do not need bottom heat, while the open staging would do well for such cuttings as pelargoniums and coleuses, which do not relish a close atmosphere.

But the main purpose of the house under review is for forcing, and if it be so heated with hot-water pipes that heat can be commanded from a night minimum of 50° to 70° , much forcing, forwarding and propagation can be done.

During the summer-time, when forcing is not done, it can be utilised for melons and cucumbers, and, if it be kept

cooler and more airy, for tomatoes also. There is, of course, no objection to using such a house for cool-house plants if the heat be shut off, but it is not designed for this, the house I described and illustrated earlier being far and away more suitable.

Stove plants such as dracænas, crotons, eucharis, *pancratiums*, calanthes and gardenias do splendidly in such a house, and where space and means allow I would certainly advise the building of one.

A very small boiler is sufficient to maintain the heat, and the fuel need be nothing but cinders from the dwelling-house. In a house of this description it is usual to reduce the space for path, etc., to the narrowest dimensions while the staging is made fairly wide. It may be added that a house which is kept close and warm needs frequent painting if the wood is to be preserved; for the almost continuous presence of condensed moisture is apt to rot the wood. Moreover, more washing of the house and whitewashing of the walls become necessary owing to the growth of green and black slime.

CHAPTER V

PITS, FRAMES AND HANDLIGHTS

THOSE of my readers who cannot afford a conservatory, a plant house, a fruit house, or a forcing house will probably be able to indulge in the luxury of a pit, or at any rate of a frame. I know many cottagers who have a frame and who use it to such good purpose for their vegetable plot, their flower border and their allotment that they now deem it a necessity. And indeed to the good management of a garden some glass accommodation is necessary. Now a frame may be considered the least common denominator in glass accommodation, for few who own handlights or cloches would boast of the extent of their glass.

HEATED PITS

These have at least one row of pipes running through them. Usually this runs along the front and returns along the back, which is decidedly the best way. Four-inch piping is certainly better, as giving more heat, but three-inch piping is often used. Unless these pits are intended for growing figs, roses or tall pot plants, they should not be very deep. Three feet at the back should be deep enough for most plants, and if this be allowed it is always possible to raise dwarfer plants nearer to the glass. Nor should the width from back to front be more than seven feet, or there will be difficulty in watering the plants at the back, which will probably result in their being neglected. A founda-

tion of nine inches will be sufficient to support the pits, the walls of which need not be more than four and a half inches thick. If these pits stand in the open the lights will be made to slide up and down in the case of those of the lean-to shape, but where they are an adjunct to the greenhouse they will need to be hinged at the back and be supported with a prop while watering is being done.

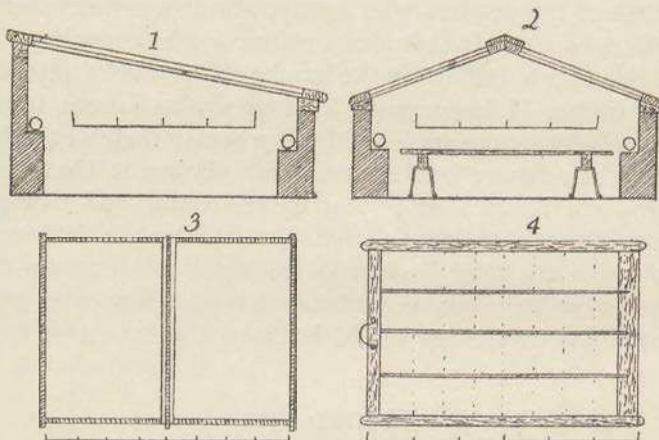


Diagram 14.—Pits and Frames: 1. Half-span frame with flow and return pipes. 2. Span-roofed frame with staging raised on pots. 3. Plan of a two-light wooden frame 8 feet by 6 feet. 4. One of the lights.

Span-roofed frames also have their lights kept open by this means. Wherever the frames stand independent of other buildings there should be sufficient room left to draw back the lights. It is not at all unusual to find this precept transgressed. Obviously it is a great nuisance if through the proximity of a wall the lights cannot be drawn off. If the amateur cares to go to the expense of a range of pits I would certainly advise that they be divided into pairs or threes, with brick or board partitions between, as by this

means plants can be kept closer and afforded different treatment.

COLD PITS

The only difference between these and others is that they are not provided with artificial heat, but, as it is often the plan to put in a lot of heating material to form a hotbed, they are usually made deeper than heated pits. Being formed of bricks, they keep out more frost than wooden frames and on that account are more valued. They can be used for a variety of purposes, such as forcing potatoes, asparagus, lettuces, carrots, radishes, cucumbers, marrows, for striking cuttings of pentstemons, calceolarias, antirrhinums, violas, marguerites, for plunging bulbs and strawberries, for wintering carnations and hardy plants in pots, for hardening off all kinds of bedding plants, for violets, and for such plants as geraniums, tree carnations, chrysanthemums, etc., in the late spring months. This list of purposes to which they may be put should surely be sufficient recommendation.

WOODEN FRAMES

These can be bought ready made and are probably better so; as there is nothing very intricate in their design, however, any handy man with some elementary tools could put one together. The cheap form of frames should be avoided; they are scarcely worth the rail carriage, for they warp and rot and quickly make one disgusted with gardening. A solidly built frame may incur a larger outlay in the beginning, but once made it will last for years.

As the illustrations are supplied with scale, it will not be necessary to write about dimensions. The ordinary two-light frame will be found the most useful, for it can easily

be moved about. Later in this book I devote a chapter to the "Amateur's Frame," and there I will briefly show its great value and the many purposes to which it may be put.

In most cases it will be best to stand the frame on a solid bottom, where it will not get flooded with water. It is an advantage to stand it on a course of brickwork and to fill up the space beyond the bottom of the woodwork with clinkers covered with coal ashes. The position of the frame depends to a great extent on the plants to be grown, but usually an open position (not bleak) and a southern aspect are recommended.

SKELETON FRAMES

These are formed of rough planks and left open, except in very severe frosts, when they are covered with mats, tarpaulins, or sheets of corrugated iron. They are very useful for plunging bulbs, for putting plants before or after they are forced and for striking cuttings of hardy plants which during the first year relish a little protection. They are also an excellent shelter for hardening off plants which are eventually to be used in the vegetable or flower garden. It is well to make them of such a size that a tarpaulin or sheets of corrugated iron or ordinary archangel mats will easily cover them.

HANDLIGHTS AND CLOCHEs

These glass covers are eminently useful for protecting and for forwarding plants. They are used mostly in connection with the vegetable garden, though for forwarding Christmas roses and for protecting cuttings they are invaluable. Much has been heard of the cloche during recent years,

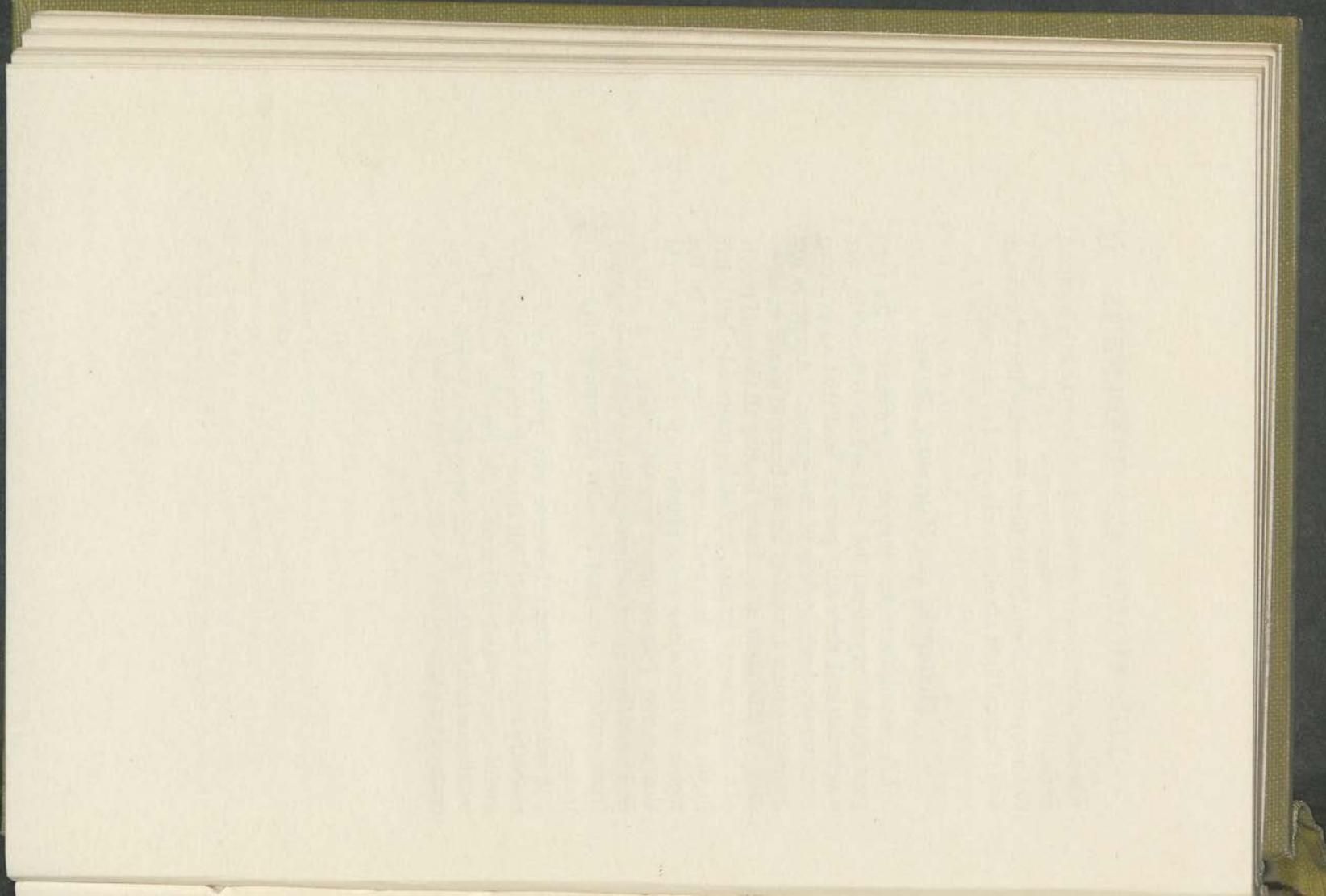
PITS, FRAMES AND HANDLIGHTS 33

when so-called French gardening has been greatly boomed, and although I do not wish readers to rely on the stories of huge profits I would like them to realise that the cloche and the handlight are supremely useful in any garden.

MINIATURE AND MAKESHIFT FRAMES

I do not advise them—they are only meant for the very poor and the very niggardly. Experience tells me they are a delusion and their only purpose (and that an evil one) is to supply broken glass to the garden. Amateurs are inclined to form a frame of an old box and an old window-sash. If it be made into a frame bearing all the good points of a frame except its size, it may be tolerated ; but if left in the elementary box and casement stage it will be the means of destroying more plants than it will save. On this account I know many amateurs have had failures and have then railed against gardeners who have advised frame culture. I cannot honestly recommend makeshift frames.

A miniature frame, however (say 3 feet by 2 feet), properly made so that it will throw off the rain, is a very useful concern and well repays the expense incurred in making or purchasing. It will repay also a couple of good coats of paint.



PART II

POPULAR GREENHOUSE PLANTS

A FOREWORD

IT is no easy matter for the author to decide how best to treat this portion of the work. Several courses are open to him, the easiest being to treat in alphabetical order all plants grown in the greenhouse. This method, however, I have dismissed as being too elementary and too tedious and lacking in interest alike for reader and author. I have preferred to pick out first of all the best flowering plants and then the best foliage plants and to treat them at some length, leaving a chapter giving brief and concise cultural information on such subjects as the minority may choose to grow. This will serve my purpose in another way, for readers are, I imagine, more likely to try their cultural skill on the plants to which prominence is given and which will most assuredly give good returns for good treatment. Having achieved success with these, they will be better equipped with knowledge, enthusiasm and experience to tackle other subjects to which their tastes may incline them. Notes are given on the plants most useful for a given purpose, while I have also decided to deal separately with bulbs for forcing, with plants for forcing, with outside plants which are flowered in the greenhouse, and with the raising of annuals and biennials for planting in the outside garden. It is difficult to draw clear lines of distinction in this matter, for a plant which one may consider all-important another despises. However, my aim is

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perspicuity and my endeavour to give an even balance to the book by not treating one part at undue length to the curtailment or omission of useful knowledge. Some day I hope to write a book on the Amateur's Greenhouse or Conservatory, when I shall devote myself solely to showing how to maintain a successional supply of beautiful plants.

CHAPTER VI

THE BEST FLOWERING PLANTS

AZALEAS

THOUGH often regarded as a forcing subject, the azalea is an excellent greenhouse plant, when treated in a natural manner. I allude here to the Indian azalea. Although botanists have now classed all under the name rhododendron, it will be many years before the mass of gardeners adopt the name for their old favourite.

The best varieties are, of course, expensive, and this rule applies practically throughout gardening, but some beautiful forms can be obtained very reasonably. I do not advise readers to attempt to raise or graft these themselves. Even the best gardeners find it preferable to buy short plants with good heads from a nurseryman who makes a speciality of the subject. Though forming a mass of flower when well grown, it cannot be said that they are of easy culture, for many are the failures with them, the chief cause of this being bad watering. Azaleas are peat-loving plants and like moisture, but to subject them to the extremes of being too wet or too dry will ruin the small roots and cause the plant to collapse or lose its foliage.

The soil found most suitable for azaleas is made up of two parts fibrous peat, from which most of the dust has been shaken, one part fibrous loam treated in a similar manner, one part good oak leaves dried and rubbed through a sieve, and some charcoal to preserve sweetness,

and sharp sand to further ensure porosity. This should be thoroughly mixed, and used when moist so that it will hang somewhat.

The plants should be potted up as soon as they are received from the nursery in clean, well-drained pots which will comfortably contain them, and the soil will need to be well firmed. Careful watering is essential, for if the centre of the ball of earth becomes dry nothing short of immersion for several hours in a pail of water will remedy the evil. Subsequent potting is best done about a month after the plants have flowered. At each potting the ball should be reduced in size to make room for fresh compost. Flower heads that are faded and seed pod should be removed, and until growth is completed detention in a warm house, with daily syringing, is advised. Later, after due hardening, they may be stood outside for a couple of months though not in full sunshine. If it is intended to force azaleas they should be brought into heat gradually. Hard forcing is not advised.

Good varieties are Deutsche Perle, Vervæneana, Empress of India, Reine des Fleurs, Baronne de Vriere and Sigismund Rucker. The great enemy is thrip (see Greenhouse Pests).

BEGONIAS, TUBEROUS AND FIBROUS-ROOTED

Without the begonia our greenhouse would not be so bright either in summer or winter. Some regard it as a difficult subject because they have not managed to get their seeds to germinate, or have found the bulbs rotten after drying off. These difficulties are easily surmounted. Let us deal firstly with the tuberous section. There are doubles and singles of all shades and they can be grown from seeds, from tubers, or from cuttings.



A FINE EXAMPLE OF A WELL-GROWN AZALEA INDICA

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The seeds are very minute, resembling powder, and should be sown as evenly as possible on the surface of a pan of sandy soil, well drained and previously watered. The seeds must not be covered with soil. A sheet of glass and a sheet of paper will give the necessary shade and closeness of atmosphere until germination takes place. Personally I prefer to sow the seeds as early in the year as



Diagram 15.—Tuberous Begonia: 1. Seeds sown in pan, covered with sheet of glass and sheet of paper. 2. Seedlings pricked off. 3. Plantlet for potting singly. 4. Dormant tuber. 5. Tuber just starting. 6. Tuber potted too deeply. 7. Not deep enough. 8. Correct depth.

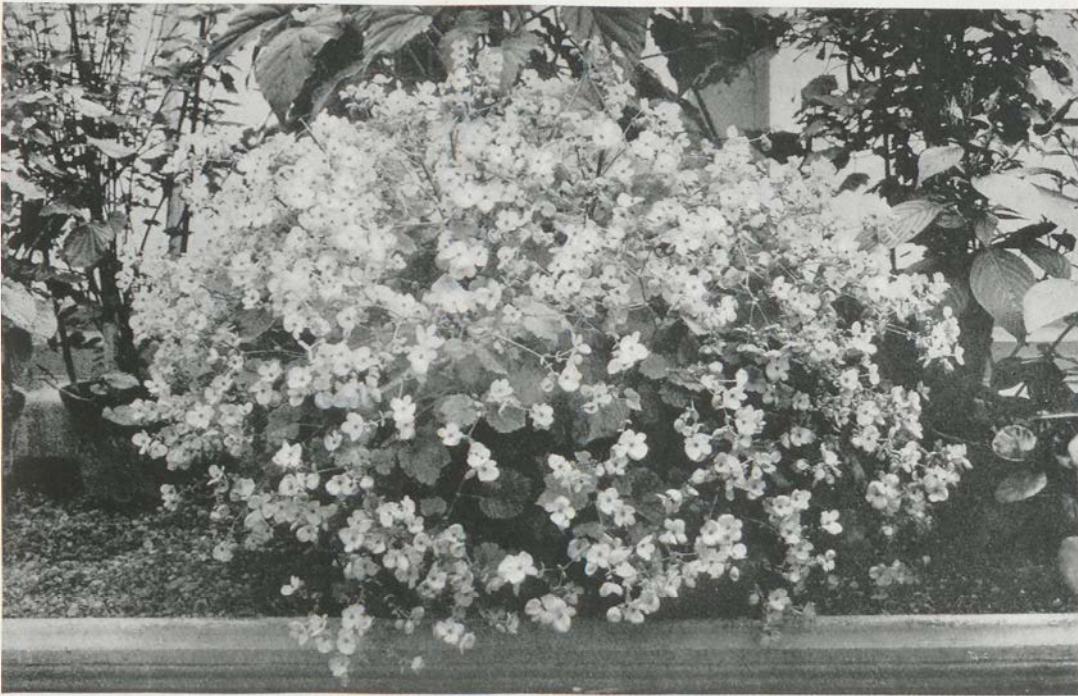
possible, putting the pan in a temperature of 60° to 65°. It is probable that the seeds will come up thickly. In any case they should be pricked off into other pans or boxes as soon as they can be handled. This is a delicate and tedious but necessary operation. The after-treatment of seedlings consists of potting them along as they fill their receptacles with roots and giving them a more open atmosphere and cooler temperature as the season advances.

BEGONIAS FROM TUBERS

The great advantage of buying tubers or growing along such as were flowered the previous year is that we are sure of the kind and colour of the flowers, and such assurances cannot be given by any seedsman, though there is always a strong presumption as to their eventual character. A fair price has to be paid for good tubers but they are really worth it. I have a great liking for the doubles for greenhouse work. They last longer and are more imposing than the singles, which, however, are by no means to be despised.

The starting of the tubers may take place in February, though if several are grown it would be an advantage to divide them into several batches so as to keep up a succession over several months. Personally I am of opinion that begonias do not relish root disturbance, and for this reason I make it a practice to break them up only once in three years. Another point worth noting is that they like a somewhat spongy soil made only moderately firm. It will be noticed that in a firm soil most of the roots will be found near the surface.

Where the policy of leaving the plants in their pots is pursued, they should, before starting, be put into a tank or pail of water for at least an hour to make sure that the whole ball of soil is saturated. After this, draining of surplus water must be arranged for and introduction to a temperature of about 60°. Shading from bright sunshine is essential while in a close, moist atmosphere, though rigid adherence to this precept when in cooler and airier quarters is not imperative. I do not advise overhead syringing. Not until the plants dry quickly should they be fed, and then it may be done with liquid cow manure,



THE GLORIOUS WINTER-FLOWERING BEGONIA GLOIRE DE LORRAINE

soot-water and a fortnightly sprinkling with Clay's fertiliser. For three days water with liquid manure and for the next four days with clear water.

As growth advances it will tend to greater sturdiness to remove the plants to cooler quarters, where they can stand clear of one another over a bed of moist shingle. Short stakes set so as not to injure the corm will prevent the growths from being broken off at their base. When flowering is over drier conditions should prevail, for the plants will be eventually dried off. When thoroughly dried they may be set on a shelf or beneath the staging.

A very good method of increasing these begonias is by cuttings taken in the summer. They will root in a cool propagator and will form a corm by the end of the year. A good policy to pursue is to buy seeds from a reliable source, grow along the seedlings quickly to their flowering stage and then take cuttings of the most desirable kinds ; besides growing these selected plant on for another year.

The Begonia *Lloydii* is a very fine type of plant which can be raised from seed but does not come true to colour. It admits, however, of selection by cuttings and tubers as mentioned above.

If varieties are to be bought, a good selection would be got from Messrs Blackmore & Langdon, who make a speciality of this subject and grow the finest in the country. A polite post card will bring along a list of the latest introductions.

WINTER-FLOWERING BEGONIAS

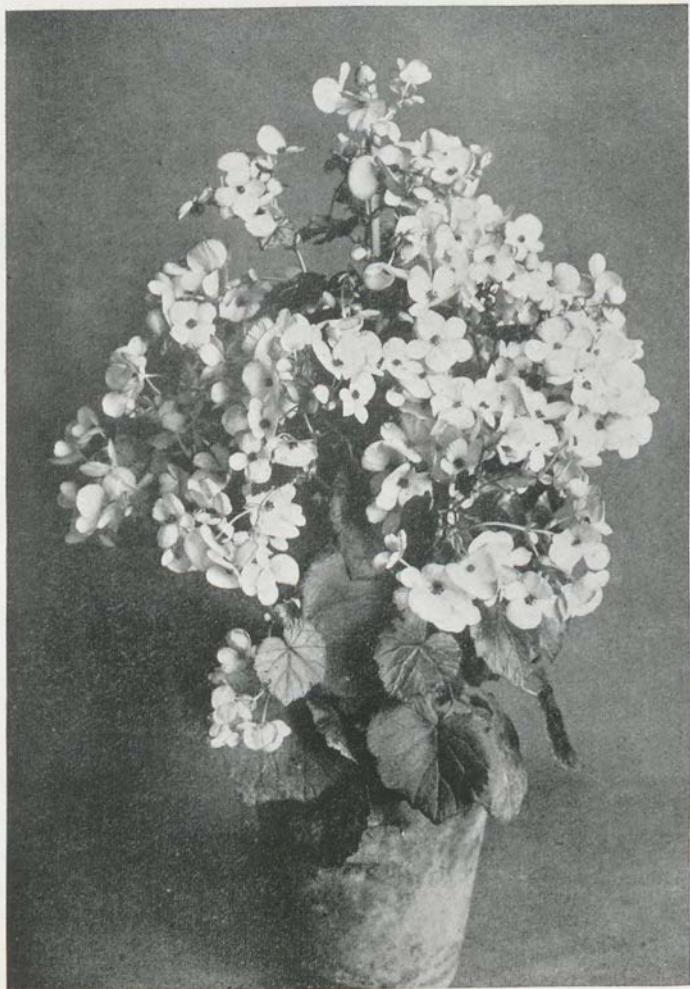
With this title is ever associated that beautiful variety, *Gloire de Lorraine*, which is one of the hybrids which have come to us by means of *Begonia socrotana*. Even this brilliant variety seems likely to be ousted from first place

as a winter flower, for others with larger leafage and flowers are now grown and shown in select circles.

The begonia in question is a fibrous-rooting one, and on that account should not be wholly dried off, although after flowering very little water will be needed. It is unfortunate that many growers find it very difficult to procure cuttings, which must be of a basal character as with chrysanthemums. Hence whenever a sucker or cutting is found it should be inserted. They root with considerable ease in a warm propagator, especially if put into cocoanut fibre, and should be grown along in a temperature of about 60°. Usually they will branch out freely ; if not, the plants will be worthless. A moist atmosphere, a fair amount of shade and overhead syringing will greatly help them along, but on no account should they be over-potted. The flower buds will be picked off until September or October. Once in flower they produce a blaze of bloom for several months. These plants may also be propagated from the leaf. Fully matured leaves only should be used and they root very quickly in cocoa-nut fibre, though one often has to wait some time for the young growth to throw up. I do not consider this a very reliable method of propagation. Old plants may, of course, be grown on a second or third year but young plants are more vigorous and satisfactory.

Some of the new winter-flowering begonias which I would advise my readers to purchase are best obtained from Messrs Clibran of Manchester, who have brought out most of these deserving novelties.

Begonias of the Rex type, grown for the beauty of their foliage, are not much in evidence now, though they repay culture. They propagate very readily from the leaf. *Gloire de Sceaux* is a variety which combines beauty of leaf and flower though some growers experience difficulty



BEGONIA GLOIRE DE LORRAINE, SUITABLE FOR FLOWERING IN THE
DRAWING-ROOM

with it. The old *fuchsioides* is by no means to be despised, nor are the climbing varieties of *begonia* which are often found on the greenhouse wall.

It remains to be said that a suitable soil for begonias would consist of two parts fibrous loam, of a kind which does not quickly rot, one part flaky leaf-soil, one part mushroom manure, some dried and broken cow manure, a liberal dusting of Clay's fertiliser and mortar rubble to keep the compost open.

THE CALCEOLARIA

A glorious plant when well grown, but the growing is difficult. It is one of those plants (and there are several) which need to be kept under strict observation—which will brook no relaxation of attention—no neglect.

Seeds may be sown from April till July, and from sowing to flowering there is usually the lapse of a year. Careful sowing, careful pricking off, careful watering, cool treatment and close attention—this epitomises the correct culture of calceolarias. The seeds, being very minute, require to be distributed as evenly as possible over the moist surface of a seed pan of finely sifted sandy soil half filled with crocks. No covering of soil or sand must be allowed. A sheet of glass, a sheet of paper, and such shelter as can be found in a cold frame are all that are required until germination takes place. Until the seedlings are pricked off, overhead watering should not be given, the pan, instead, being immersed to its rim in water until the water is absorbed by the soil and the surface becomes wet.

Pricking off requires to be done at an early stage, care being exercised to avoid breakage of the tiny rootlets. An open soil containing sand and leaf-soil in a slightly larger proportion than loam will aid in keeping on the right

side as regards moisture. The stages of potting should be from the pricking-off box to 2-inch pots, thence successively to 3-inch pots, 5-inch and 7-inch, in which size they should flower and make handsome specimens.

At the final potting the soil may be fibrous loam two parts, good leaf-soil one part, mushroom manure one part, a sufficient amount of sifted mortar rubble and sand to open the soil, a dusting of Clay's fertiliser, and, if possible, a small quantity of chopped sphagnum moss. A small quantity of dried and sifted cow manure would be appreciated.

Otherwise the main cultural points are cool treatment in a frame or greenhouse, a slight shade, moisture in the atmosphere but not on the leaves, frequent fumigation to keep down the fly to which they are greatly addicted, and feeding with liquid manure only when the pots are well filled with roots. Clean dry pots rather deeply crocked should always be insisted on, and the plants should never remain pot-bound. As they approach flowering a few neat stakes will be needed to keep the flowers and growths upright. A few dozen plants well on flower and set up in a bank relieved by ferns make a splendid floral picture and will repay the extra attention involved.

CARNATIONS FOR THE GREENHOUSE

It is difficult to tell in a chapter what would easily crowd a book, but as the garden outside would lose interest without carnations so would the garden under glass. Three types of carnations are recognised: the border carnation, the perpetual-flowering and the Malmaison. Were I growing plants for a conservatory only, I would dismiss the perpetuums, grow but a few borders, and concentrate strongly on the Malmaisons. They may be massed more

successfully, present a bolder display and the flowers individually are more imposing than those of the other types. It behoves us, however, to give directions for the culture of each section, for it cannot be denied that the perpetuals are more useful as cut flowers.

THE PERPETUAL-FLOWERING CARNATION

The best time for propagation is in early autumn, if cuttings are available, and the cuttings should be off the old plants which were flowered the previous year and have been stood outside for the purpose. Failing this, young cuttings may be procured early in the year. Inserted in the usual way, the pots being plunged in a warm propagator with bottom heat, the cuttings should root in about six weeks' time so as to be fit for transference to single pots. Many growers now make a practice of rooting the cuttings in pure clean sand. If this can be kept from getting dry it is no doubt a splendid plan, and is in most cases successful; but until amateurs have experimented and proved themselves successful at it, I would advise the usual mixture of sandy soil. A method of propagation now often practised, and one which I can unreservedly recommend, is to layer the plants in the summer or early autumn in the same way as border or Malmaison carnations.

During the winter, as a young plant the tree carnation should be kept rather warm, say in a temperature of 55° to 60°. A moist bottom and daily syringing with weak soot-water or clear soft water will prevent the soil from drying much, so that they will have formed a nice network of roots in a few weeks' time. Gradual shifts in potting will eventually lead to the 7-inch pot as the flowering size.

The soil at this final potting might consist of three parts

good yellow fibrous loam, one part leaf-soil, one part mortar rubble and sand or road grit, one part mushroom manure and a good sprinkling each of charcoal and Clay's fertiliser. In arriving at a fairly correct estimate it may be useful to know that a barrowful of soil will be sufficient to pot

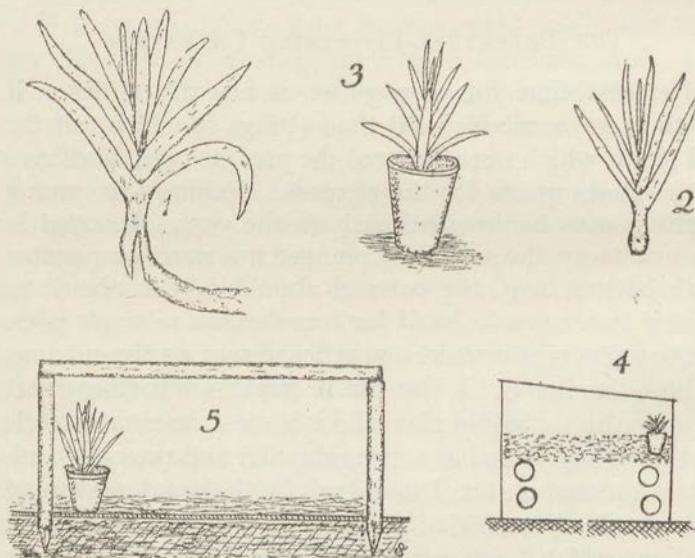


Diagram 16.—Carnations: 1. Layer of Malmaison. 2. Cutting of American tree carnation. 3. Rooted cutting potted up. 4. Same set in warm frame. 5. A framework set over in summer to ward off rain.

two hundred rooted cuttings into 3-inch pots and to transfer forty plants from 3-inch to 6-inch pots.

But between the first and the final pottings the plants will need much cultural attention. Pinching of the growths should happen when the plants are about four inches high, and later when the resulting growths are six inches high. Cooler treatment may be given in the spring, so that by the time the 5-inch pots are reached they will have been placed

THE BEST FLOWERING PLANTS 49

in frames where the lights can be removed whenever desirable.

Little in the way of staking and tying will be needed until they are set in the open, which will take place in June, after the bedding plants have been got rid of, and then one or three stakes may be set to each plant, according to the number of growths. Three stakes give a firmer and neater support.

As successful carnation culture consists of complete control over the plants it is advisable to have a framework set over the plants in such a way that at nights some lights, some sheets of corrugated iron or a tarpaulin may be set over the plants, and also during the day when heavy storms occur. Frequent syringings on fine days will keep the plants vigorous, free from red-spider and to a large extent also from green-fly. A fortnightly syringing with sulphide of potassium at the rate of one ounce to three gallons of water will also check the spread of the rust fungus.

As with other carnations so with perpetuals, feeding may be freely done when the pots are well filled with roots. Liquid cow manure, the drainings from the stable and soot-water are splendid stimulants, while in a dry form I would advise Clay's, Peruvian guano and Wood's carnation manure sprinkled over the soil once a fortnight, using, of course, only one at a time.

By the beginning of September the plants will need to be brought into the greenhouse, where they will thrive well in a temperature of 50° with the usual attention. A little air should be left on at all times, if it can be done without unduly lowering the temperature. I have left air on in a carnation house when there has been 18° of frost, and although this would not be advisable in every case I am convinced that there are few houses which could not

D



have a chink of air left on at the top when there are a few degrees of frost.

It is necessary to utter a word of warning that only healthy plants be propagated from, for that well-nigh ineradicable pest—rust—is very prevalent. It is a deplorable fact that it has largely been spread by the distribution of the newer varieties. That is not merely my own experience but many friends in various parts of the country make the same complaint. It is well to be progressive and secure the latest improvements, but if with the novelties we get a disease destined to destroy or disfigure, not the novelties only but likewise their neighbours, it is not difficult to see that we are buying trouble.

The present conception of an ideal carnation appears to be one whose flower stands on a long, vigorous stem which has a full expansive flower, with clarity of colour, a well-filled centre, unbroken calyx, neatly but not unduly serrated edges to the petals and a sweet fragrance. Added to this we like the flower to be long lasting, the flowering period to be of considerable duration, the number of flowers per plant well above the average, the foliage to be robust, plentiful, not too stiff, and the plant itself to possess an immunity from disease and freedom in producing cuttings.

Good varieties are : Enchantress in its blush, its rose and its white shades, Mrs T. W. Lawson, Mikado, Britannia, Robert Craig, R. F. Felton, May Day, Aurora, Jessica, Carola, White Perfection, Sunstar, Pink Delight, Regina and Lady Northcliffe. These are but a few which are certain to afford delight. A specialist's list would give dozens of names. Most leading firms would send sample boxes of flowers at a very small cost. I advise readers who are not yet converts to carnation culture to renounce this abstinence at once.

BORDER CARNATIONS IN THE GREENHOUSE

Though not commonly grown for the greenhouse, I can certainly well recommend this plant, especially when grown the second year. But to flower it the second year presupposes growing it the first. As a one-year-old plant it will only supply three decent blooms on the one spike, but a two-year-old plant will supply as many spikes as there are growths, and with three to each it is not uncommon to get thirty decent blooms on a plant all flowering at pretty much the same time.

This type of carnation is best propagated by layering, and the layering is best done in July so as to get young plants well forward by the winter. I will here deal only briefly with their culture, as many items given regarding perennials will apply also to these.

Concise hints on layering will be found in the section devoted to greenhouse work, so that beyond saying that either one or two year old plants will do for layering we will add that the young plants should, early in September, be potted into 3-inch pots. A soil containing very little manure and made up largely of loam, leaf-soil and sand is best at this time. With cold-frame treatment the plants should be sufficiently rooted by the end of October to be transferred into their flowering pots six inches in diameter. Here a stronger soil becomes imperative, and the plants will benefit by accommodation on the shelf of a cold greenhouse.

Not much growth will take place during the winter, the most difficult part of the attention needed being the watering, which should err rather on the spare side. In February the plants must be brought more under supervision. The open staging of a house with a night temperature of 45°

to 50° and a buoyant circulation of air are the conditions demanded. Now also a bamboo cane may be set to each plant to which to secure the spike, which as it heightens should be regularly tied, and to which also to sling the growths which are to be used for layering or for providing flowers if the plant is grown a second season.

Towards the end of March feeding will be needed, and this may be conducted as for perpetuals. Later, as the flowers evolve, more room between the plants and a slight shading from bright sunshine must be given, or the flowers will lose colour. No spike should be allowed to bear more than three flowers or they will be too small. As the flowers fade or are used for cut purposes the plants may be stood outside to be layered at the earliest opportunity or to be grown on for a second year.

The best plants—those most robust and free from disease and carrying the most growths—should at this time be selected for growing on and after being cleaned should be potted up at once, using a rich soil built up on the lines laid down for tree carnations. A 9-inch pot such as is used for chrysanthemums will afford a comfortable move from the 6-inch size. Eventually each growth should be given a separate bamboo cane, thin ones, 4 feet long, being bought for 1s. 9d. to 2s. per 100. But as this staking would limit them to being put only in places with plenty of head room it would be sufficient for a few months to sling the growths together with a strand of raffia grass.

Cool treatment, liberal feeding and plentiful supplies of water in the later stages will result in floriferous plants worthy of any greenhouse.

The following are the varieties I have found most useful for inside culture :—Lady Hermione, Daffodil, King Arthur, Goldilocks, Cecilia, Agnes Sorrel, Cordelia,



BORDER CARNATION—WELL WORTH GROWING IN THE GREENHOUSE
FOR DISPLAY OR FOR CUT BLOOM

Myrmidon and Venus. A glance at a specialist's catalogue will show how numerous are the varieties.

MALMAISON CARNATIONS

As I have previously said, these are the best of the three types for affording a bold display, and if they are somewhat ponderous in character, they compensate for this by the beautiful clove scent they possess. The growth may be built up on practically the same lines as the borders. They are propagated from layers, flowered in 6-inch pots the first year and made most of the second year, when they are expected to afford a handsome group in the conservatory or choice flowers for house and table decoration. Layering is best done from the middle to the end of June in a close frame duly shaded.

About six weeks must elapse before the layers are sufficiently rooted to be potted up. They may be subjected to the same treatment advocated for borders as regards soil, etc., but are better kept a little warmer through the winter. As there is a large flower to build up it is obvious that parsimony in the matter of liquid manure cannot be tolerated. One flower per spike is quite as much as can well be accommodated, and obviously this means disbudding or pulling out the side buds as the flower spike advances. The Malmaisons flowering from May to July nicely bridge the time between the tree carnations, which begin to lose colour about May, and the outdoor carnations, which come on in July and August.

Those who are greatly in love with carnations will not be content with growing a few only, but will keep increasing their stock until perforce they have to build a small house for them. I commend this plan to all who can afford it. Malmaisons have not many representative varieties, the

best being Princess of Wales, Maggie Hodgson, Montague, Lady Coventry, Mercia, Duchess of Westminster and Sir Evelyn Wood.

CELOSIAS AND COCKSCOMBS

These are not nearly so popular now as they were ten or twelve years ago. They are by no means unbeautiful, and as tastes differ greatly (and happily so) we might spare a few lines to show their general culture.

Early seed-sowing (January or February) is advised in order that the plants may be brought along steadily. As soon as they can be handled, remove them singly to small pots, and keep them somewhat warm. The young cockscombs should not be again potted up until the shape of the comb is visible. Some of these grow after the manner of celosias, and are, of course, useless for the purpose. If the young plants are kept close to the glass they will grow sturdily. While the state of being root-bound cannot but be injurious, the plants must not be potted on too quickly, as they are very susceptible to over-watering, and this can scarcely be avoided if they are over-potted. At no time should they be allowed to flag. This path of progressive potting will necessitate the use of several sizes of pots until they reach the 7-inch, in which tall specimens of the *Celosia pyramidalis* in its various colours may be flowered. Cockscombs will rarely need to go beyond a 6-inch pot. After the younger stages cool conditions should prevail, with the forcible use of the syringe if red-spider threatens, and the use of the liquid manure tank when the plants are found to dry quickly. Celosias make a pretty display in a miscellaneous group or dotted about along the staging, where their graceful plumes are bound to attract attention. They are valuable also for bedding

out, though less seldom used now than they were a decade or two ago.

THE CHARMING CYCLAMEN

This plant is indispensable to the amateur's greenhouse, especially as it flowers perhaps more copiously than any other plant of its size. It shows itself best as a flowering plant when grown on a second year. During the first year the flowers will be larger but by no means so numerous,

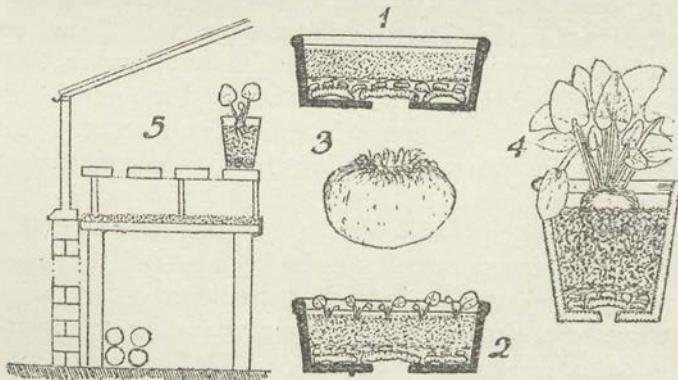


Diagram 17.—Cyclamen: 1. Seeds in pan an inch apart. 2. Seedlings pricked off. 3. Corm for growing along a second year. 4. Strong plant showing depth of potting. 5. Plants set on double staging.

while during the second year the plant, if well grown, will carry from fifty to one hundred blooms at the one time, and even this number has often been exceeded. Cyclamens are somewhat stiff and heavy when arranged alone, but put up in a bank interspersed with maidenhair ferns and similar foliage they make a lovely show.

It will be found that most books and writers advise sowing the seeds in October. I find, however, that the best results accrue from a sowing in June. The seeds, which are best set an inch apart, take a considerable time to

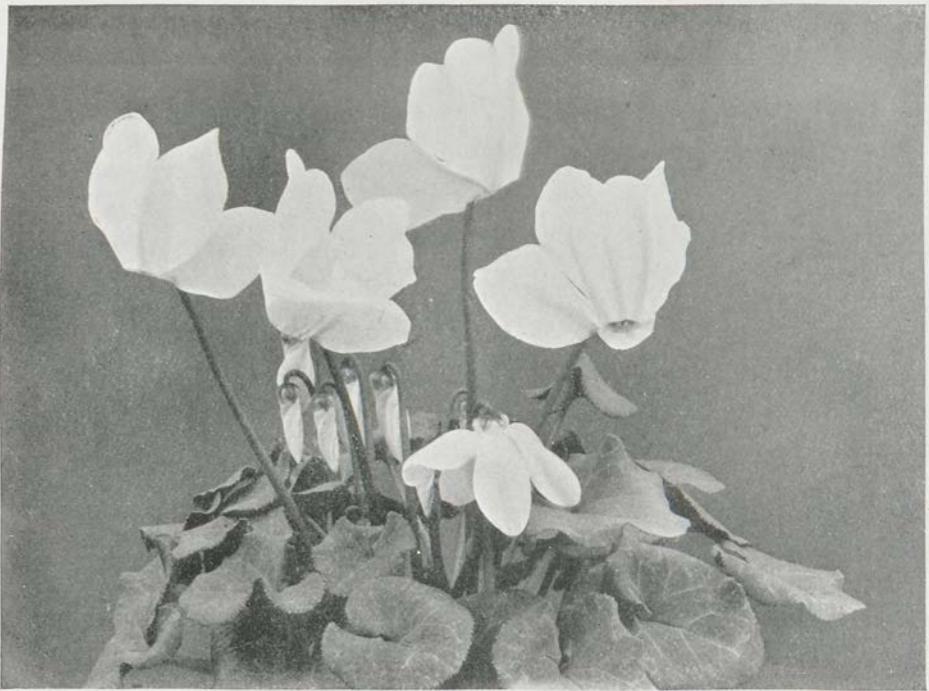
germinate, notwithstanding they are placed in a temperature of 65° to 70° by night, but there is likelihood of quicker germination in June than in October. The idea also is that the growth may be built up steadily, and as they will not be called upon to flower for nearly eighteen months they should by that time make large plants, well filling with roots their 7-inch pots.

When two or more leaves are formed the task of pricking out into other pans or boxes may be undertaken. Many gardeners at this time put them into tiny pots. I believe in the practice, but knowing the dangers and feeling sure that amateurs would scarcely be likely to water them correctly, I feel that the soundest advice I can give is that they be pricked into pans or boxes of nice open sandy soil and not be put into pots until they have a nice mat of roots and several leaves.

For opening the soil I like to use brick dust as well as sand. Soft pieces of brick may be pounded up and passed through a fine wire sieve. It may be used for all the pottings of cyclamen as well as for many other greenhouse plants.

Through the first winter young cyclamens need a warm house of about 60° , but when they have become established in their 3-inch pots they may very well be removed to cooler quarters.

The cyclamen when growing well relishes a cool, moist, airy atmosphere, and while over-watering is as great a danger with them as with other plants, yet moisture on the leaves and about the plant is essential to good growth. The form of staging mentioned previously, by which the bottom staging, covered with shingle, can be kept moist, is best for cyclamen, and spraying of the foliage (especially the underside) should be done three or four times a day, or as often as the leaves become dry.



CYCLAMEN JUST COMMENCING TO FLOWER. THE FOLIAGE AS WELL AS THE FLOWER
IS DISTINCTLY ORNAMENTAL

The various pottings will include moving them into 3-inch, 5-inch and eventually 7-inch pots, though none but plants well furnished with healthy growth will merit their size. If they are not worthy of this they may be flowered in the 6-inch. A somewhat close sandy soil is relished, and firm potting. Fibrous loam, flaky leaf-soil, broken cow manure, mushroom manure, brick dust, sand and Clay's fertiliser will form a very good compost, which can be supplemented, when filled with roots, by frequent waterings with liquid cow manure and soot-water.

Shading is another need of cyclamen which cannot be neglected. Heavy shading such as that afforded by archangel mats is not needed, but such as is given by tiffany or canvas. A cold frame admitting plenty of air will suit them well during the summer, giving them warmer conditions early in September. The flower buds may be pulled off until then but left to develop afterwards. While flowering, of course the plants will not be syringed, though for some time yet they will be benefited by damping between the pots.

Cyclamen can be used as pot plants in rooms ; and as cut flowers they will last nearly a fortnight. But they must be pulled, not cut, from the plant, and after cutting off about half-an-inch of stem it should be split up for half-an-inch so that water can be freely drawn up towards the flower. On account of its value in this respect, and for its beautiful symmetry of foliage—often being richly marked with silver—the cyclamen ranks high as a useful greenhouse plant.

When the corms are to be grown along a second time, the plants having borne their full complement of flowers may be kept on the dry side in a cold frame. All withered flowers should be pulled out, and also all leaves as they get of bad appearance. When young leaves are seen to be

springing up from the corm the plants may be turned out of their pots, a portion of the soil taken away—such as will come away easily—and they may then be potted up into the same size pots and be grown along under precisely the same treatment as for young plants.

CHRYSANTHEMUMS FOR THE GREENHOUSE

As with carnations so with chrysanthemums, I would advise those who wish to go in strongly for them to

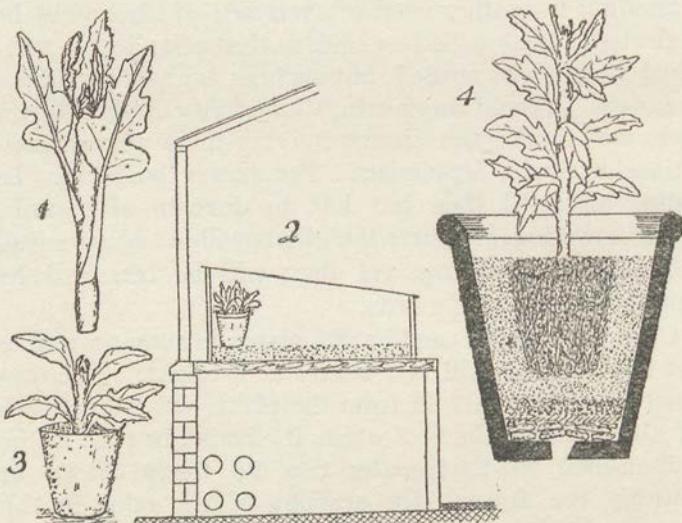


Diagram 18.—Chrysanthemums: 1. Suitable cutting. 2. Pot of cuttings set in a cool frame on staging. 3. First potting in 3-inch pot. 4. Potted finally in 9-inch pot.

purchase a special book on the subject, where greater detail can be given than is possible here. Here we can but get the outline of their culture. For the sake of clearness I will treat of "'mums,'" as gardeners familiarly call them, in two ways—as large flowering plants or as decorative

or "bush" plants. In the latter section are included the singles.

As large plants are out of place in a small greenhouse, and presumably few of my readers possess a large conservatory, I will here give priority of place to the decorative and single section. In order to get well-grown plants with abundance of bloom, propagation should be commenced early. For the speedy and successful rooting of cuttings a small portable frame will be put up in a cool greenhouse early in December. A moist bed of well-weathered coal ashes sifted through a quarter-inch sieve will form the best bottom, and loose sheets of glass, which may be reversed several times a day to disperse the moisture accumulating on the inner surface, the best covering. I strongly advise a good soil in which to strike the cuttings as making success more certain. Many failures may be traced to the use of old potting bench soil which probably has rank manure, chemical manure, or too much humus in it. Loam sifted through a quarter-inch sieve, mixed with an equal quantity of leaf-soil similarly treated and half the amount of clean silver sand, will form a splendid compost.

As far as possible a careful selection of cuttings should be made, avoiding all which come from the stem of the plant, all which have buds on them, all which are malformed and such as are thin and drawn or far too fat and sappy. Such as spring from the base of the plant beneath the soil—suckers, in fact—these are the kind of cuttings to choose.

The two chief reasons for failure to root them are that many do not get the base of the cutting to rest firmly on the bottom of the hole made by the dibber, or do not make the soil firm about the cutting. When inserted firmly at the rate of five or six in a 3-inch pot they will need a good watering, and after the surplus water has been

drained off can be put closely together in the propagator.

It can scarcely be hoped that the cuttings will root until four to eight weeks have elapsed, but when this delightful event takes place the close conditions of the propagator may be relaxed by setting these pots either in another propagator or at the far end, where they will receive more air and may in a few days be inured to more open conditions so as to be able to be put on the greenhouse shelf.

THE FIRST POTTING OF CHRYSANTHEMUMS

The soil advised for cuttings will do well for the first potting if to it be added some sifted horse manure which has been used for mushroom growing, and just the slightest sprinkling of Clay's. I like to put the rooted cuttings into $2\frac{1}{2}$ -inch pots known as thumbs. They will quickly fill these with roots and are not so liable to suffer from over-watering as when they are moved to 3-inch pots. At this stage their needs may best be catered for by keeping them close to the glass but not subjected to chilling winds, by syringing them frequently and by shading only when the leaves cannot be kept erect by syringing. Whatever shading is used should be discarded as soon as possible.

By assiduous attention to these matters they will soon be found to root through this compost so as to qualify themselves for a 4-inch pot, and eventually on to a 6-inch or a 7-inch, and lastly to a 9-inch pot, which should be large enough for any chrysanthemum. In each of these successive pottings the soil should be made stronger, meaning that loam should predominate over any other material and that the amount of animal and chemical manures should be increased. The following formula is what I generally use



A VERY EFFECTIVE ARRANGEMENT OF CHRYSANTHEMUMS,
SHOWING VARIOUS TYPES.

myself for the final potting :—Loam, twenty parts ; leaf-soil (through a three-quarter inch sieve) seven ; well-rotten manure chopped up, six ; lime rubble or sharp road grit, four parts, and to each barrowful of this mixture a 5-inch potful of bone meal and of Clay's. Over the whole heap soot may be freely scattered and the mass then well turned over five or six times. A barrowful of soil will usually be sufficient to pot twelve to sixteen plants from 6-inch to 9-inch pots. I do not believe in putting a lot of chemicals into the soil, for it is so easy to add them afterwards and to feed with liquid manure.

OTHER ITEMS OF CULTURE

Though chrysanthemums are perfectly hardy in a natural state, the raising of them in glass structures renders them susceptible to extreme cold, so that it is far better not to subject them to frost, but when they are somewhat settled in the 4-inch pots they will bear cold-frame treatment, the lights being withdrawn on all fine sunny days. It will not be safe to set them outside until the end of May, at which time they should be ready for their final pots. I would advise syringing the plants right through their career until they are brought inside in October. Weak soot-water for this purpose will help to keep down rust and greenfly.

PINCHING THE GROWTHS

Some notable growers work their decorative plants along without stopping them at all, and as they obtain excellent results by this means my readers may feel no hesitation in following their example if they feel that they do not quite understand the pinching process. I will try, however, to make it quite clear. When the plants are six inches high

nip out the point—say about an inch. Three or more growths will push up, and when these are about six inches long they also may be pinched. It is possible by early propagation to pinch the plants three times in the season, but in no case should pinching be done after the end of June for the main batch and the beginning for late plants. If they are pinched later it will depend greatly on the season whether they flower at all, and the general experience is that they will not.

FEEDING THE PLANTS

If a good open compost has been provided there need be no hesitation in using liquid cow manure rather freely. The plan I advise is to water for two or three days with liquid manure and for an equal time with clear water. If these be used on alternate days it will probably happen that a plant will not be sufficiently dry to receive manure-water, and being watered with clear water the next day will, on the following day, for the same reason, lose the advantage of the stimulant. Alternate watering does not at all equalise the benefits of feeding. A dusting of Clay's or of Peruvian guano once a fortnight or three weeks may be given in addition to the liquid manure. A top-dressing of loam, spent horse manure, and chemical manure may be applied if space for it has been left at the time of potting. Besides feeding the plants it will keep the roots on the surface free from the burning influence of the sun. Feeding of any kind should not be commenced until by drying out quickly the plants show that their roots have taken a good hold of the compost.

Early after potting the work of staking will engage attention. One good stake will usually be found sufficient for each plant, and further protection from wind may be



DECORATIVE CHRYSANTHEMUMS GROUPED *EN MASSE* IN THE GREENHOUSE

given by driving strong stakes in the ground at distances of twelve feet apart, connecting them with wire, and attaching the stake of each plant to this.

In October the housing of decorative "mums" must be attended to, allowing as much space as can be spared between the plants, or mildew and loss of leaves will result. It is usually, however, impossible to guard against a certain amount of overcrowding at this time of the year. The grower will now have to decide whether he prefers the bloom to come singly on a stem or in sprays. In the former case pinching out all but the central bud will have the desired effect, or they may be reduced to three. Another good plan is to pinch out only the central bud and to allow the other flowers on the spray to develop.

The following will be found very useful varieties. Decoratives : Moneymaker, Source d'Or, A. J. Balfour, Madame R. Oberthur, Kathleen Thompson, Mrs J. Thompson, H. W. Thorpe, W. H. Lincoln, Victoria, Market Red, Lizzie Adcock. Singles : Metta, Roupel Beauty, Mensa Sylvia Slade, Mary Richardson, F. W. Smith, Edith Pagram.

Varieties soon wear out, but these are as good as any at the present time and seem likely to hold a high place for a few years.

LARGE FLOWERING CHRYSANTHEMUMS

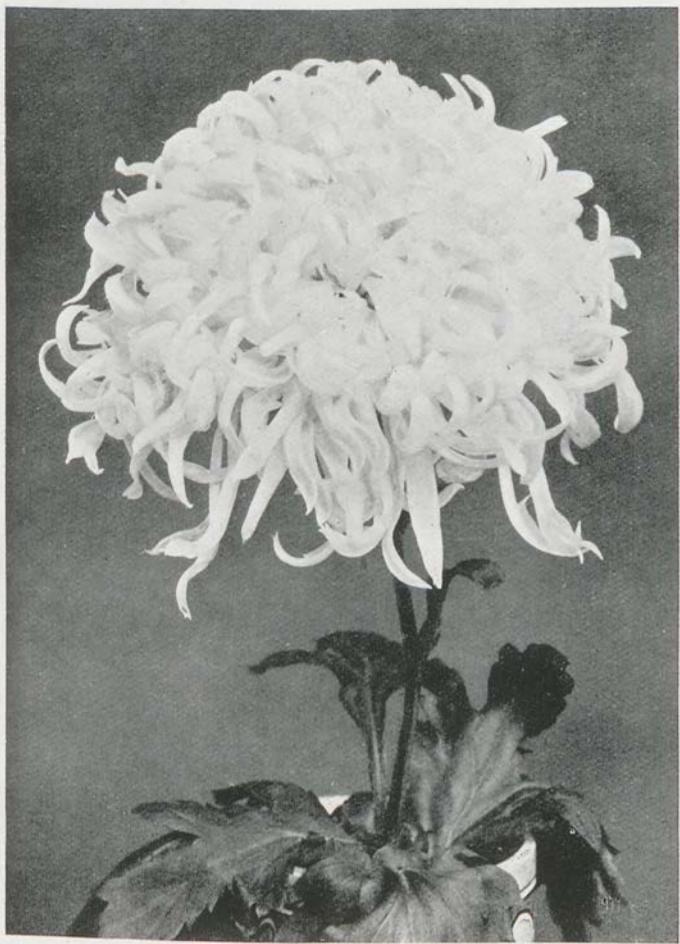
Having dealt at some length on the culture of decorative chrysanthemums, I need now only point out wherein their culture differs from those we now intend discussing. Briefly, the points of difference are in the number of growths allowed, the time of propagation and the pinching and disbudding. Moreover, it is usual to pay greater attention to these varieties and to give them first-class high culture. Early in December is the best time for propagation, though

if good cuttings are available after the middle of November they should by all means be used.

Amateurs who do not see clearly through the problem of pinching and timing, and who do not wish to exhibit may follow the plan of letting all the plants break naturally. Those which have not shown signs of breaking by the end of May can be pinched. Then the first crown bud may be secured, or, if this appears before the end of July, it may be taken out and the growth run on to the next bud. Timing is only really needed for exhibitors.

MANIPULATING THE BUDS

I cannot do better in elucidating this matter than quote a few lines which I wrote on another occasion. "Presuming that a normal cutting has been put in and has rooted it will in due course, if not pinched produce a bud, which is known as the 'break bud.' This will not develop into a flower but a cluster of growths will surround it. Three or four of these are usually left and after they have grown for a time each forms at its tip another bud known as the first crown bud. This may be retained or pinched out. For the purpose of illustration we may suppose it has been pinched out. Several young growths will then push out and on each stem the best is retained and the others rubbed off. After a little while another bud will appear which is known as the second crown bud. This is the bud generally selected for the flower, but if this were rubbed out the next formed bud would be surrounded by the buds instead of growths and would be called the terminal, denoting that the plant has finished its growth. The terminal bud is seldom selected for large flowering plants the second crown being the favourite, as it usually gives a better colour and opens more freely. In many cases the first



A CREDITABLE BLOOM OF THE LARGE-FLOWERING TYPE OF CHRYSANTHEMUM, WHICH IS STILL LARGELY GROWN DESPITE THE PROPHECY THAT IT WILL LOSE ITS POPULARITY

THE BEST FLOWERING PLANTS 65

crown must be grown on as the second would be too late."

Varieties differ greatly in respect to bud formation and each one must be regulated according to the experience gained of it by oneself or by others. These differences account for the confused ideas of buds, and envelop the whole process in a cloud of mystery.

THE VALUE OF DATA

It may happen that a certain variety does well on the second crown bud, but if allowed to break naturally the flower from that bud would be insufficiently developed for the time of the show at which it is intended to exhibit. This brings about the necessity of stopping the young plant earlier and thus bringing about the appearance of the bud and its full development at approximate dates. For future guidance it is well to keep an accurate account of when the cuttings were inserted, when they received their various pottings, when they were stopped, when the various buds appeared, the date on which the chosen one was taken and the time of its full development. Added to these, it would be alike instructive and interesting to note the formulæ for the various composts, the times of feeding the plants, and the kinds of liquid and dry fertilisers used, together with the time of housing and the heights of the plants at specified times. If all these notes are taken they will not only compel an interest in the work and stimulate observation, but also would provide data for the next year which could be put to practical account.

NUMBER OF BLOOMS PER PLANT

If extra large blooms are to be grown no more than three should be allowed on each plant. Some of the leading

exhibitors allow but two blooms to each plant. If more than three blooms are allowed they cannot reasonably be expected to be so fine. When, however, exhibition is not the object in view some good plants may be grown bearing six or eight blooms by pinching them twice during the season. Quite large blooms may be obtained by this system. Another method of growing some useful plants is to strike cuttings during March and April and grow the plant along so as to get one bloom in a 6-inch or 7-inch pot. Exhibition-sized blooms may be obtained by this method, which also gives us useful dwarf plants for a small conservatory.

As the large flowering plants form their buds earlier than the others, so should they be housed earlier or the rain will spoil the buds. Towards the end of September is in most cases the correct time.

Sound varieties are : Lady Talbot, F. S. Vallis, Reginald Vallis, Mrs Gilbert Drabble, Francis Jolliffe, Master James, Bob Pulling, Walter Jinks, Master David, Mrs R. C. Pulling, Queen Mary, Mrs A. T. Miller.

THE STATELY CINERARIA

I believe the cineraria is generally to be found in the amateur's greenhouse, even though it has sometimes not so good a name as it deserves. It is spoken of as a dirty plant because it is often troubled with attacks of green and white fly. But this is one of the easiest of pests in the greenhouse to deal with, as it succumbs alike to fumigation or to spraying with practically any of the advertised insecticides. Certainly when well grown it is a handsome plant, especially the *stellata* type, which often stands quite three feet high, and is alike useful for vases, bouquets, sprays, or as ornamental room plants. A packet of



CINERARIA STELLATA, SHOWING ITS STATELY HABIT AND PRETTY FLOWERS

mixed seeds from a good source will give many forms and shades of colour.

If two sowings are made, say about the middle of April and again a month later, we have thus two strings to our bow and a succession of plants can be obtained. Both the *stellata* and the large flowering type may be treated in a similar manner. As the *cineraria* is essentially a cool house plant it should never be subjected to a high tempera-

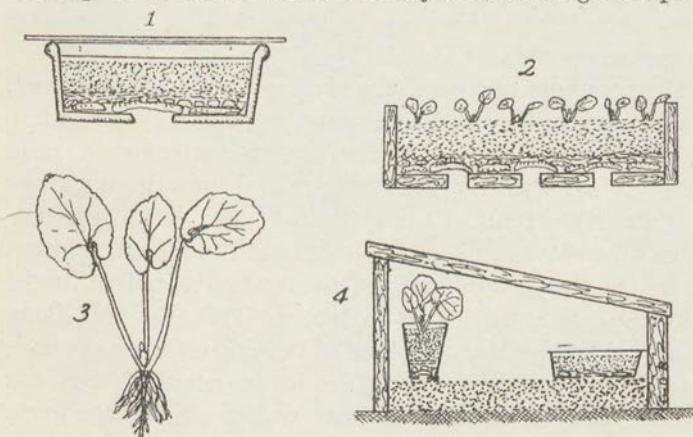


Diagram 19.—*Cineraria*: 1. Seeds sown in pan. 2. Pricked off. 3. Young plant for first potting. 4. Frame for pan and later for potted plants.

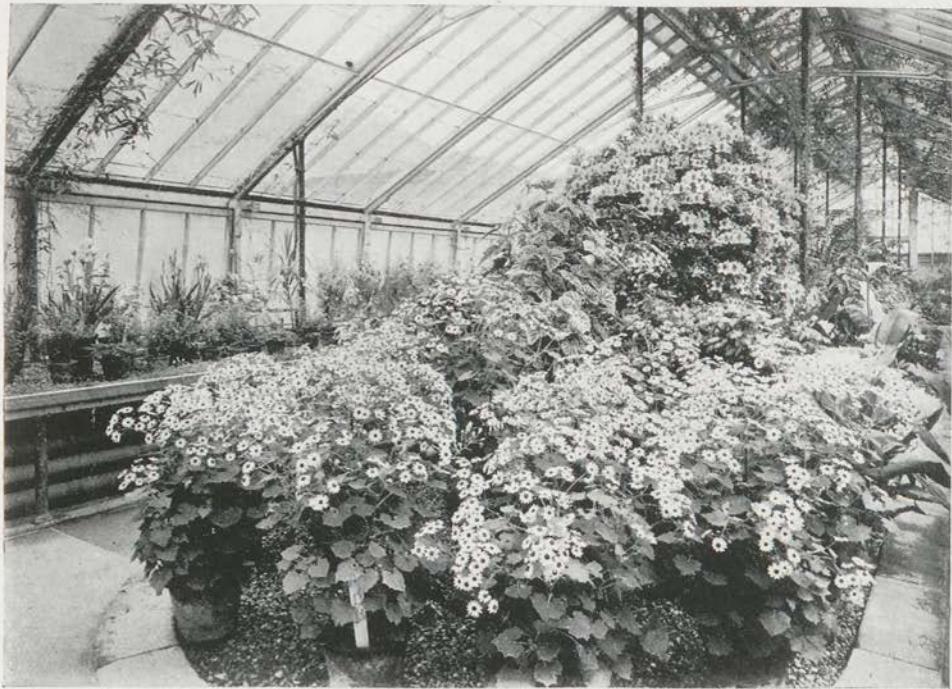
ture. Even the seeds are best germinated in a cool house. They usually come up quickly and well, and should be pricked off into pans or boxes and a few days later be put into a cold frame where they can be shaded. A cool, shady spot with a moist atmosphere are the conditions relished. From the pan the seedlings will be transferred, when they show a tendency to crowd, to small pots, 3-inch, thence to 5-inch, and eventually to their flowering size, 7-inch pots. Those who have had some experience in growing these plants will know that there is a tendency

for them to damp off when in the small pots. The chief causes of this are that a sweet soil has not been used, that over-watering has been done or that the atmosphere has been overcharged with moisture by failure to admit plenty of air. Not much water is needed in the young stage, it being less productive of evil to allow the plants to wilt than to become too wet. A rich soil is not needed. Loam, leaf-soil, mushroom manure, sand and Clay's will grow good cinerarias if they are sufficiently fed in the later stages of growth.

The prominent needs of the cineraria are cool treatment, partial shade, frequent syringing, occasional fumigation, abundant ventilation, great care in watering, a mild stimulant by way of liquid manure and sometimes a stake to stiffen the stems of the *stellata* type. As autumn advances the plants will need to be brought to the greenhouse, where shading should only be given when a spell of bright sunshine causes the leaves to droop. This they will likely do also in the spring. Instead of putting on a heavy shading it will sometimes bring the leaves erect if they are lightly sprayed over with clear water. No greenhouse can afford to be without the cineraria.

CYTISUS AND CORONILLA

Being so closely allied and having so much in common from a cultural standpoint, these two plants may well be treated together. Both are highly ornamental, but popular opinion favours the *cytisus*, and with this public expression of good taste I am in entire accord. Nicely grown plants can very easily be bought from the London shops. For the refinement of its foliage, the profusion of its flowers, and, above all, for the deliciousness of its fragrance, the *cytisus* deserves extended culture. This



A BOLD GROUP OF THE STAR CINERARIA

plant has, until recent years, been known as a genista, but botanical authorities assure us that cytisus is more correct.

Except for there being sometimes a difficulty in propagation by cuttings, the cytisus cannot be said to be a fastidious subject, and is nearly hardy. Cuttings may be inserted in the usual way in spring and should be carefully attended to in the matter of water until roots are emitted, when the young plantlets may be potted singly into 2-inch pots, to be eventually transferred into larger ones. The cytisus may be grown as a standard, a pyramid or a bush. The bush is the general and most convenient form, while the pyramid is now rarely found.

A light position in a cool house will suit the young plants well, for they resent heat. A few pinchings will make them shapely bushes and feeding well with liquid manure will make them floriferous plants. After flowering, the growth should be cut back into shape and the plants stood outside till the autumn. Frequent potting for established plants is not needed ; an overhauling every second or third year will suffice. Each year work on a few young plants and destroy a few old ones. In this policy lies progress.

The coronilla is more easily struck from cuttings, and, moreover, is of a hard constitution. It is a negligent man's plant, for I have known it give quite reasonable results when left unpotted and unsupplied with stimulants for over five years.

Neither cytisus nor coronilla are fastidious as to soil, and might well be given any general soil which happens to be on the bench. *Cytisus racemosus* and *Coronilla glauca* are the species grown in the greenhouse.

COLEUS THYRSOIDEUS

Though it has not the ornamental leaves of the well-known coleus, this plant is well worth growing for the

beauty of its blue flowers, which may be had in autumn or in spring. At one time I harboured misgivings as to whether the plant was worth cultivation, but having grown it along in large pots it gave such a fine display for quite a long time in the conservatory that I make it now a point of honour to mention it with commendation.

There is sometimes found a difficulty in rooting the cuttings in a propagator. Now the ornamental-leaved coleus resents confinement in a propagator, and it is reasonable to suppose that *C. thyrsoideus* would also. My method of striking is to put three cuttings in a 3-inch pot during May and to let them root on the open staging in a house having a night temperature of 60° to 65°. They will not take long to root. I advise growing all three along together without separation, and with only once pinching the growths. After they are rooted cooler treatment may be meted out to them, and this may be continued throughout their career. In the winter cold air should not be allowed to blow directly on to them, but they only require a cool temperature, such as about 45°. From a 3-inch to a 6-inch and from thence to an 8-inch pot will be the progress of potting. This coleus will bear liberal feeding in the same way as the ornamental one. The spikes are useful for cutting, though the sticky character of the leaves is not a commendation.

THE FRAGRANT FREESIA

Although most professional gardeners grow freesias in quantity I do not think amateurs regard it with the favour they should. This can only be through want of knowledge, and this defect in their gardening knowledge they should hasten to repair.

If the bulbs are carefully dried off and if the foliage is

not cut as well as the flowers, the bulbs may be used year after year, besides having the stock increased by means of the little offsets.

The great attribute of the freesia is its delicious fragrance, but it lasts well as a cut flower, is useful for making sprays and buttonholes, as well as for church and table decoration.

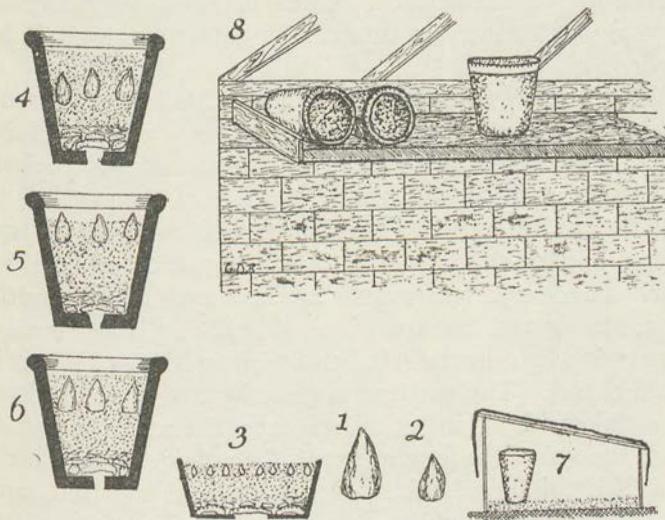


Diagram 20.—Freesia: 1. Corm which will flower. 2. Small corm to be boxed up thickly as at Fig. 3. 4 and 5. Wrong methods of potting. 6. Correct method. 7. Frame for pots covered with mat until blades appear. 8. Shelf for drying off.

The usual number of bells per spike is eight under good culture, but excellent culture will make ten on a stem frequent, while I have had twelve on one stem, not counting the side growths, and as many as thirty-three from one bulb.

If flowers are wanted for Christmas, the bulbs must be started not later than the beginning of July. Eight bulbs will be quite sufficient for a 6-inch pot, and they must

72 THE GARDEN UNDER GLASS

only have the tips just covered. Three parts loam, two parts leaf-soil, one part mushroom manure, sharp sand and Peruvian guano make up the compost which I have found will grow excellent freesias. I do not believe in plunging the pots, but instead of this I would put them in a cold frame and cover this with a thick mat until the blades appear above the surface. Until this time no watering beyond what was given immediately after potting will be needed.

When the growths are four to six inches high they may be supported with stakes, four or five being put round the pot. A method which I have found successful is to place five sticks equidistantly round the side of the pot and to lace the matting around and between them so as to form a starlike appearance, each stick being at a point of the star. It is very simply done in this way. A sufficiently long, strong and twisted piece of matting is got ready. One end is held in the left hand while with the right it is laced round. The matting is passed round the outside of two stakes, the third is missed, and the matting passed from the second to fourth, round the outside of the fourth and fifth, missing the first, over the second and third, and so on, each time going round the outside of two and missing one until the point of commencement is reached, when a neat reef-knot completes the operation. The tying material should be sufficiently tight to have a slight pull on the sticks. When this is done it is a simple matter to adjust the growths in the separate compartments formed. As the plants grow the arrangement of matting can be moved up higher. Growths from a privet hedge, stripped and dried, make useful stakes for the purpose. If they must be used green it will be advisable to peel off the bark from that portion which enters the soil.

When the spikes seem likely to show, a few of the plants



THE FREESIA—AN INDISPENSABLE PLANT TO THOSE WHO VALUE
FRAGRANCE

may be hastened into flower by putting them in a warm house. A succession may be kept up from December till April by potting up a few pots each fortnight from the beginning of July onwards. Unfortunately it is rather difficult to keep freesia flowers in the spring, when the bees get about, as the flowers soon wither after being visited by these busy creatures. After the flowers are cut the plants require to be gradually dried off, not by giving mere driblets at a time but by watering less frequently. For drying off and for keeping them until they are potted up in the summer, a hot, dry shelf in a cool house is the most suitable place.

Freesias may also be raised from seeds and can often, though not invariably, be got to flower in about six months, but a truer stock and a more certain success is assured by growing from bulbs.

THE FREE-FLOWERING FUCHSIA

This plant is known and loved by all, being commonly found in cottage windows and cottage gardens. There are some splendid forms and varieties, and when well cared for the fuchsia will flower for a great length of time, besides being practically hardy. They have the merit also of being easily trained in any shape, and of being grown on from year to year.

Cuttings may be rooted in autumn or spring, but unless standard plants are desired I would advise spring propagation. Nice plants may be obtained in the one year from these. The cuttings are easily rooted in a warm propagator in the spring or in a cold frame in the autumn. If only bush plants are required the plants may be pinched when they are about six inches high and again when the resulting growths are the same length. Except for large plants, a

6-inch pot will be quite large enough for flowering; in fact, nice first-year plants may be flowered in 5-inch pots.

A point in their culture worth noting is that when the plants are pinched the point of every growth should be nipped out at the same time. Inattention to this rule will result in unshapely and unevenly flowering plants.

Standard plants are particularly pleasing, and if the cuttings of young growths are rooted in the early autumn

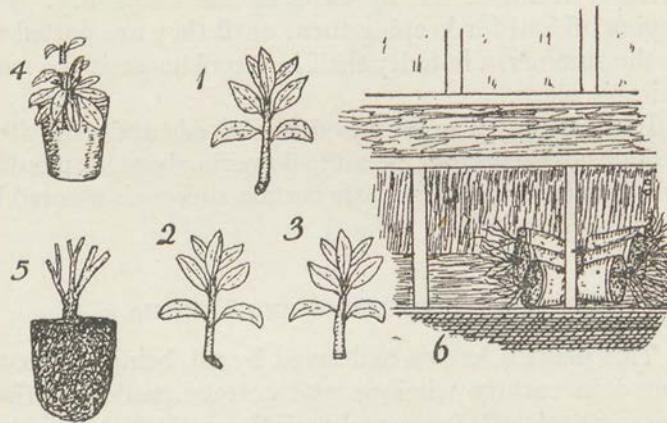
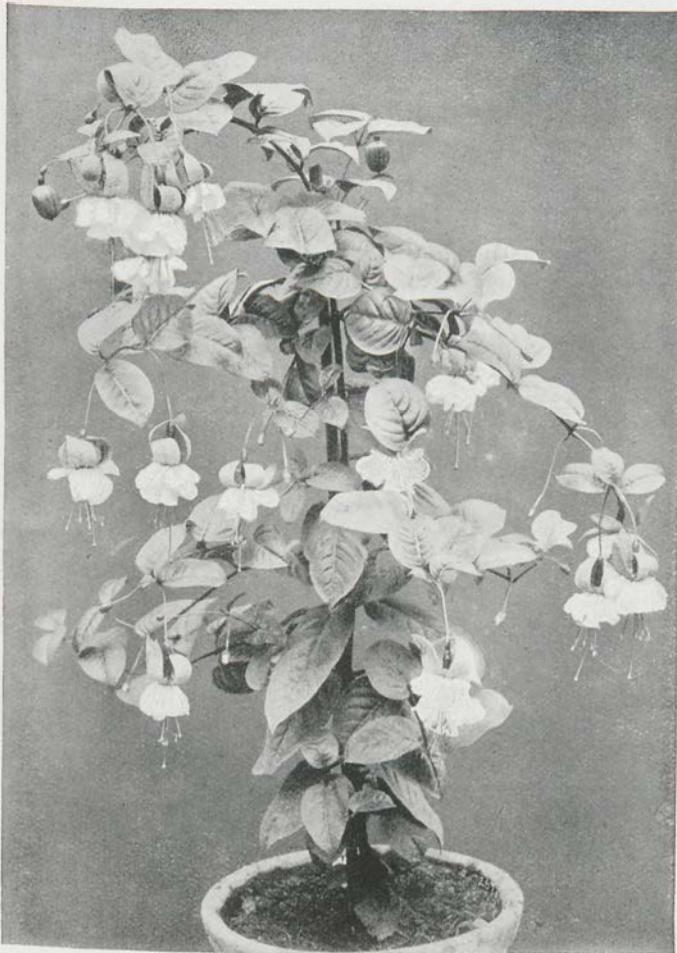


Diagram 21.—*Fuchsia*: 1 and 2. Cuttings with old wood attached (a method seldom needed). 3. Cutting of young wood only. 4. Plant rooted, potted and pinched. 5. Last year's plant pruned back for starting afresh. 6. *Fuchsias* dry-ing off beneath staging.

and grown along in a warm house during the winter and early spring the standard with a clear three-feet stem can be produced within the year. The leading growth should be encouraged to extend until it is three and a half to four feet high, when it may be topped to induce it to form a head. Meanwhile all side growth must be pinched out, the main stem duly supported, and the plant steadily potted along until it reaches a 6-inch or, in exceptionally favoured cases, a 7-inch pot. Pyramid plants are seldom



FUCHSIA PHENOMENAL—A FINE VARIETY WHICH HAS STOOD THE
TEST OF TIME

produced now, and I doubt if any of my readers could find space for them.

During the winter-time fuchsias may be stored away on a shelf, beneath the greenhouse staging, or in any shed or room from which frost can be kept, though really a few degrees will not seriously harm them. This, of course, means that the plants should be dried off in the autumn and stored away, either with or without their pots. In February these pots may be brought out of store and started in a warm house. As soon as the young growths appear the shoots may be cut back to within a few inches of their base, and may then be shaken out from the old soil and put into other pots. Any good potting soil will do, as fuchsias are not fastidious subjects. I would recommend the following varieties :—*Fulgens*, *Phenomenal*, *Mrs Hill*, *Ballet Girl*, *Rose of Castile*, *Charming*, *Countess of Aberdeen* and a very pretty little plant of the *fulgens* type known as *Little Mary*.

THE GLORIOUS GLOXINIA

This is one of the finest plants that could be grown in a warm house for flowering during the summer months. It is a special favourite of mine and will, I hope, occupy the same position in the affections of my readers. It is remarkably free flowering, has great brilliancy and a wide range of colour, responds readily to good treatment, is remarkably effective as a pot plant and the flowers will last for a considerable time in water. It is easily grown from seeds, from leaves, or from old corms, all of which courses are advised.

My conception of an ideal gloxinia flower may not accord with the rigid rules of the old florists, but will, I venture to think, merit repetition. The flower should

be large, with a clear, open throat and preferably with six segments in the flower, which I will perhaps unscientifically call petals. These petals should curve over, but not so much as to suggest wilting, and they should certainly not stand up almost erect from the flower as in some

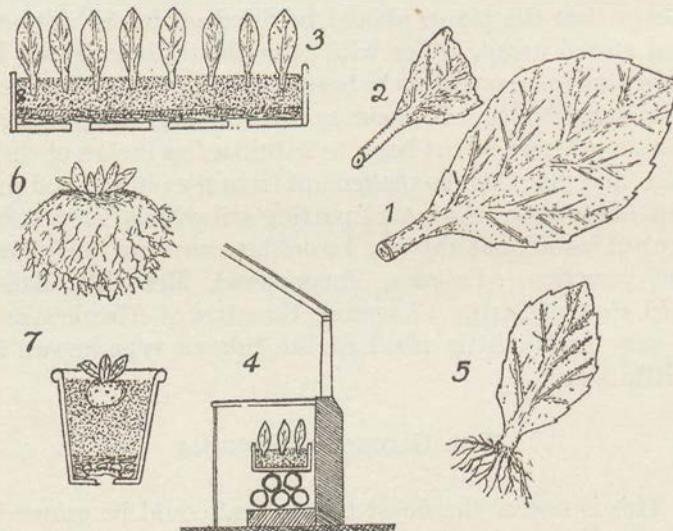


Diagram 22.—Gloxinia: 1. Leaf cutting of gloxinia. 2. The leaf cut slanting (some think it roots more quickly this way). 3. Leaves inserted in upright position in box. 4. Box placed over hot-water pipes. 5. Leaf cutting rooted. 6. Old corm restarted. 7. Same potted up.

varieties. Where the number of petals exceeds seven the flower is usually badly formed. Personally, I like to see the petals fringed, though this probably would be a defect from the florist's standpoint. The distribution of colour should be even on all the petals and far down into the bell. The flower itself should stand erect on a strong stem and the number of flowers should not be so great as to cause many to be badly shaped through lack of space to develop

in. Strong dark succulent foliage, with a tendency to in-curve rather than recurve, seems to set off the flowers best and renders moving of the plants easier. Wide, flat flabby leaves do not add to the refinement of the plant.

METHODS OF PROPAGATION

As mentioned, they are three in number, and I advise them all as part of a progressive policy. Seeds should be procured from a nurseryman who is known to have a good strain. When the seedlings flower let the best be marked so that the corms may, after drying off, be grown for a second and again for a third year. From any of these selected, take leaf cuttings and so perpetuate the best kinds. By sowing a few seeds each year the vigour of the stock is kept up and oft-times more beautiful forms are introduced.

The earlier the seeds are sown in the new year the better, and I think the method of sowing begonia seeds might well be imitated here. As soon as it is possible to handle them a pan should be prepared for pricking them off about an inch apart. Later they may be removed to a box with the space between them increased to three inches, and from there to 3-inch and then to 5-inch pots, which will be a sufficient size for the first year's flowering.

The leaves used for propagation may be from the young or the old plants, but it is preferable that they be large, fully matured leaves. If they are cut clean with about half-an-inch of foot-stalk and inserted upright in a box of sandy soil placed in a warm house, they will root within a few weeks, but it will be some little time before the young growths spring up. These might safely be left in the box during the first year and under careful treatment will make corms as large around as a half-crown. After being dried off they will rest for a time, and when starting in the

spring may be potted into small pots and thence transferred to 6-inch pots, where they will make a splendid show.

The first batch of old corms will be started in December by shaking them free from the old soil and starting them in boxes of leaf-soil. With a nice network of roots in active growth they will justify transference to just the size of pot that will comfortably contain them without crushing the roots. When well rooted into these, and before the leaves become so expansive as to render potting difficult, they may be moved to the flowering pots, usually six but sometimes seven inches in diameter. For the final potting I have found good results accrue from a compost made up of fibrous yellow loam, peat, sand, leaf-soil and cow manure. The loam should be broken up, the peat be freed from dust, the leaf-soil sifted through a half-inch sieve and the cow manure broken up after being dried.

Small sticks may be needed to keep some of the flowers erect. *Gloxinia*s relish a moist atmosphere such as can best be given when grown on a double staging similar to that which I have previously described. They are best kept in a temperature of 65° until they flower, when a few degrees lower will not harm them. After the flowers are faded the bulbs will be gradually dried off in the usual manner. Heavy shading is not necessary, but exposure to full sunshine will certainly harm them whether in flower or in growth. A succession of flowers of these beautiful plants can be kept up for many weeks.

HIPPEASTRUMS (AMARYLLIS)

In correct circles this delightful bulbous plant is always referred to as *hippeastrum*. But by being correct there is often a danger of being obscure, so in seeking safety it is



A WELL-GROWN BATCH OF GLOXINIAS. THE FLOWERS LAST WELL IN WATER, AND THE PLANTS FLOWER OVER A LONG PERIOD

well to give both popular and precise names. With us at any rate it is not so much the name as the needs of the plant which really matters.

It is too much to say that the amaryllis is a necessity for the small greenhouse, but certainly it is a plant which when well grown gives a remarkably brilliant display. Though the method of culture is from seeds or from offsets I would strongly recommend the purchase of bulbs from a firm which specialises in them, such as Messrs Ker of Liverpool. If, however, the pleasures of propagation are proposed, I would advise sowing the seeds in pans in heat and pricking them off in other pans or boxes. In due course they may be potted into small pots, using for the first year soil containing no manure. No drying off should take place during the first season. Offsets or small bulbs formed beside the old bulb should not be detached and treated as separate plants until they have a few roots of their own to support them in their separate existence. Except that several may be grown together in the same pot and that not so strong a soil should be used, they may follow on the lines of treatment advised for matured bulbs.

A POLICY WITH AMARYLLISES

Personally, I do not believe in shaking out all the plants each year. Once in two years is sufficiently often. If the collection be divided into two parts one may be shaken out and repotted and the other top-dressed or moved into larger pots. Plants in small pots could be moved into larger ones, while those already in large pots could be top-dressed with good soil.

STARTING THE BULBS

For the class of reader for which this book is mainly intended the beginning of the year will be sufficiently early to start the plants. The plants should have their old ball of soil well soaked by immersion for an hour in water. After draining for a day or two the soil will be in a fit state to handle and may then be shaken from the roots of such as are to be broken up. It is essential that in moving into pots which are large enough just to accommodate comfortably the roots the latter are not huddled together. This may be prevented by shaking plenty of small soil between them. Firmness of soil is essential and the soil should be brought up just to cover the bulb at a point immediately above its largest circumference.

At first no watering beyond the first one immediately after potting will be needed, but the syringe must be frequently used. A temperature of 50° to 55° is a good starting heat. The preservation of perfect hardness in the bulb is a certain sign of correct treatment in the matter of water. When it may be safely supposed that the soil is well furnished with roots (and this may be known by the rapidity with which it dries) manure water may be given to build up a good flower and good growths for the following season.

About August the growth will be completed, and from then may the process of drying off be undertaken. When this is completed a shelf in the greenhouse will serve for storing. In many cases a stake will be needed to stiffen the spike, which in good culture should bear four large flowers. In fact, extra good culture will induce two spikes to form, each bearing four flowers.



HIPPEASTRUMS—WHICH MAKE QUITE A GORGEOUS DISPLAY, AND ARE NOT FASTIDIOUS IN THE MATTER OF CULTURE

THE SOIL—AN IMPORTANT FACTOR

Its composition may consist of good fibrous loam, leaf-soil, mushroom manure, charcoal, and sharp sand or mortar rubble, with a sprinkling of Peruvian guano. The other important factors in the successful culture of this brilliant bulb are firm potting, frequent syringing, careful watering and correct drying off. Altogether it may be advanced as an easy subject to grow.

HYDRANGEA HORTENSIS

This is largely grown as a tub plant to be set outside during the summer, but it may also be used to advantage as a pot plant, especially during the first year, when it is grown to produce one large head of bloom in a 6-inch pot. After the flower is off, the plant may, of course, be grown along to produce several heads per plant and may eventually merit the dignity of a tub.

Cuttings are best taken in August or early September, choosing well-ripened growths which have not flowered, and putting them singly into small pots in a cool greenhouse. During the winter the leaves will probably fall off, but there need be no apprehension of failure on this score, provided the wood and the bud at the top are sound. In the spring growth will commence and the young plants may be shifted along until they reach a 5-inch or 6-inch pot, in which they may flower in May or June. After flowering the plants may be stood outside until the advent of frost. These plants will bear a considerable amount of neglect without greatly showing it, but respond readily to a good rich soil and high feeding. To render the flowers of a blue colour, "Cyanol" is advised. It can be obtained

from Messrs Wood & Sons of Wood Green, and should be used according to directions.

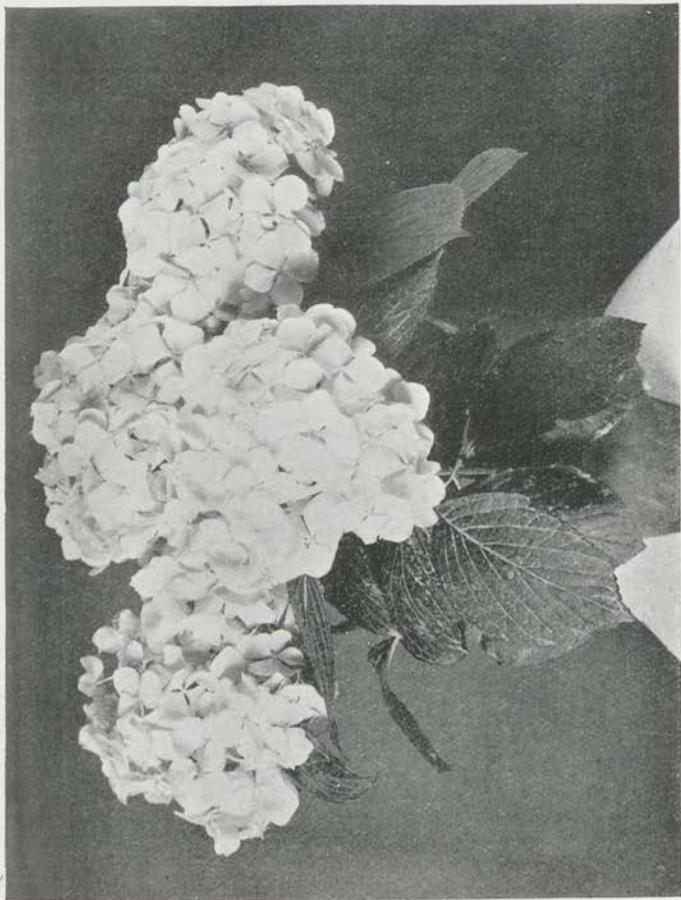
POPULAR ORCHIDS

Here again we are confronted with the problem of pressing a volume into a chapter. Few greenhouse owners who read this book will make a speciality of orchids, and if they do it is pretty certain that their desire for detailed knowledge will take them far beyond the limits of this book. I propose to surmount the difficulty by dealing with the six most popular orchids, and if readers master the cultural directions in regard to them I do not fear that they will cause the early demise of any more valuable species which comes into their possession. The six most popular orchids are : *Calanthe Veitchii*, *Cattleya labiata*, *Cœlogyna cristata*, *Dendrobium Nobile*, *Cypripedium insigne*, and *Odontoglossum crispum*. These can be grown to a fair stage of perfection by any amateur who can command the necessary heat.

CALANTHE VEITCHII

This orchid is a great favourite of mine, and although I have never yet had the opportunity of growing it in a separate house so as to give it exclusive treatment, I have been able to get graceful spikes over three feet long, two feet of which were furnished with flowers, and some of them bearing over forty flowers. I am well aware that this has been exceeded, but if my readers can manage to secure equal results by following these directions I feel sure they will be grateful to me for introducing them to this beautiful orchid.

Nor is the culture at all difficult, as will be seen from the



HYDRANGEA HORTENSIS. NATURALLY OF A PINK COLOUR THE FLOWERS MAY BE MADE QUITE BLUE BY FEEDING WITH A CHEMICAL COMPOUND

following remarks. It is usual to start the bulbs into growth in March. They will be in the pots of last season and will in many cases be seen to throw out young growths from the base. These are the growths of which we must take care, for they will furnish us with the flower. The soil may be removed and all the roots cut off to within an inch of the base of the bulb. These ends will be left to give anchorage to the bulbs when they are potted. If infested with scale during the previous year it would now be a splendid opportunity for washing them well, and I know of no more effective wash than that made with X.L. All insecticide. Until the growths are about an inch in length it is best to lay the bulbs on the staging and syringe them frequently. This will cause the emission of new roots as well as of growth.

We now arrive at what I think the greatest factor in the culture of calanthes—the soil. The following is the formula I always use:—1 bushel of fibrous peat, 2 bushels of fibrous yellow loam, hand picked, 1 bushel of oak-leaf soil, one 10-inch pot of charcoal, and the same quantity of brick chips, of sand, of cow manure and of sphagnum moss. The leaves are prepared in the following manner:—Good oak leaves are procured in the autumn, put into a bag and put on the boiler or over the hot-water pipes. In course of time they become dry and brittle and it is then possible to rub them through a quarter-inch sieve. It will be well to damp this leaf-soil before using it. The brick chips are prepared by breaking soft bricks so as to pass through a quarter-inch sieve, and then discarding the dusty portion by the use of a very fine sieve. Cow manure should be dried, preferably by the sun, and broken so as to pass the quarter-inch sieve. The sphagnum moss should also be chopped up. When all these have been prepared they should be thoroughly mixed and put in a warm house

for a few days to become warm. This amount of soil will be sufficient to pot about one hundred and twenty bulbs separately into 5-inch pots.

Only clean pots and clean crocks can be tolerated, and the latter should fill the former by about one-third. It will then be necessary to grade the bulbs. Very large ones may merit a 6-inch pot, the next size a 5-inch, while the smaller ones may be set in a 6-inch pot, three or four in each, according to size.

In potting, the soil should not be mounded up over the rim as is done with such orchids as cattleyas, dendrobiums, etc. The bulbs should be so placed that the base is only just covered and the soil may be firmed with a stick. In doing this it is quite possible to injure seriously the roots and thereby cause the young growths to become black. This, of course, must be guarded against. Orchids cannot be potted quickly, but they can and should be potted well. When all the bulbs are potted, set them pot thick on the double staging which I recommend for so many other subjects. I do not advise watering for quite a week, but syringing should be done for some time until the leaves begin to break away from the growths. It is best to give water only when it is quite sure that it is needed. This question of correct watering is difficult to explain, but if the bulb is kept quite firm and the young growths fairly stiff there need be no fear of starvation.

From now onwards the culture is all plain sailing. Whether, when two growths show from a bulb, both are to be left or the weaker one pulled out, is a matter for the grower to decide. Personally I prefer one monster growth to two smaller ones, but if it is desired to increase the stock then two must remain.

Three times every day the lower staging should be damped; the temperature must not fall below 60°; the

plants must be shaded from bright sunshine ; and as they grow they must be spread out so as to be free from overcrowding. Not until the growths show a sign of bulbing should manure-water be given, and then it may be applied with frequency. By this time also the roots will be seen all over the surface and this suggests the need for top-dressing, which may be done with soil similar to that in which they were potted.

By the middle of August the plants will have made their growths and the flower spikes will begin to appear. At about the same time the leaves will commence to yellow preparatory to dying off. This is a sign for less water, so that by the time the colour is seen in the flower all watering will have been stopped. The plants may then be put more closely together, or even, if necessity demand it, be put on a shelf. After the flowers are cut the pots and bulbs may be set on their side beneath the staging until the time arrives for restarting them.

CYPRIPEDIUM INSIGNE

This is known as a terrestrial orchid, growing in its native habitat on the ground, as distinct from epiphytal orchids, which grow on trees.

Any good orchid establishment will supply the reader with some of these cypripediums, insigne being the most common and least expensive. There is a wide range of choice in colour and form, and although they are not so showy as cattleyas, they flower freely and are very attractive. If they are kept in good growth they can be increased by division so that a good stock can soon be obtained.

The soil should for the most part be fibrous peat and loam, with chopped sphagnum moss, some charcoal and some cow manure. With this mixture it is scarcely

possible to pot too firmly. *Cypripediums* do not need repotting every year. Once in two years will be quite sufficient, or better still, do half each year. It is very easy to jumble the roots up together, which should, of course, be avoided, the soil being shaken and worked in between the roots and made firm with a blunt stick.

When well established, feeding with liquid manure is advised but not to such an extent as in the case of calanthes. If large plants are required they may be potted on until they reach the 10-inch size, in which they should provide a multitude of blooms. These will need to be staked out with the tips of bamboo canes or with lengths of stiff wire.

A temperature of 55° to 60° will suit them throughout the year, and they will bear syringing except when in flower.

After flowering, which will last a long while, the plants will benefit from a rest. This may be given by cutting off all withered blooms, giving less water and putting the plants in a slightly cooler temperature. They are plants which when well established will withstand a considerable amount of hardship. Other kinds which might figure in a modest collection are: *Barbatum*, *Charlesworthii*, *Callosum*, *Spicerianum*, all of which are easy to grow.

CATTLEYA LABIATA

This is a very showy orchid when in flower, but by no means beautiful in growth. Like most other orchids, they are propagated by division, any piece bearing buds and roots growing if given proper attention.

With this class of orchid no loam is needed in the potting soil, the bulk of the compost being fibrous peat freed from dust, and sphagnum moss. Peat suitable for orchids can

be bought from most nurserymen, but certainly from Messrs Wood & Sons of Wood Green. Sphagnum moss may also be obtained in this way, though it may also be often found growing in swampy woods in the neighbourhood. This is the only kind of moss which will live and grow under these conditions, and it furnishes a valuable guide to watering, for whenever it appears of a whitish colour water may be given to the plants (provided, of course, they are in active growth). Fibrous peat, two parts, sphagnum moss, one part, and a fair admixture of charcoal will prove a suitable compost for cattleyas. It needs to be added that all fern roots must be removed from the peat. The live ones must be thrown aside, but the dry, dead ones may well be used for putting at the bottom of the compost when potting instead of so many crocks.

It is usual to mound the compost above the rim of the pot, as cattleyas do not need a lot of water. Rarely will the same plant need watering more than twice a week. Syringing between the plants—not overhead—should be done twice a day. Shading is advised from hot sunshine. When the leaves begin to feel warm let the blinds be dropped. They do not need shading to so great an extent as odontoglossums. The temperature at night should be about 60° and ventilation be given to prevent too rapid a rise by day.

A point which I would like to emphasise with regard to cattleyas is that they be kept clean by frequent sponging, for the leaves very quickly get dirty.

Plants which are freshly imported should have all dead roots trimmed off, the plants be well washed, stood on a layer of moist stones, crocks, ashes or coke, and be frequently syringed until roots are thrown out. Not until the roots are an inch or more in length should they be potted up.

Besides *C. labiata*, I would advise also *C. trianae*, *C. mossiae*, *C. aurea*, *C. Eldorado*, *C. Skinneri* and *C. Gas-kelliana*.

ODONTOGLOSSUM CRISPUM

This is perhaps more of an amateur's orchid than the others I have mentioned, for it will do well in a temperature kept as closely as possible to 50°. It relishes cool conditions, combined with a moist atmosphere. On this account it is imperative that the flooring and staging and the spaces between the plants be damped three times a day. I do not recommend overhead syringing, as with inexperienced growers it can easily be overdone.

Imported plants should be treated as advised for cattleyas, but when potting is being done I would advocate the use of *osmunda* fibre in preference to peat, and to this and sphagnum moss should be added some good oak-leaf soil prepared in the same manner as advised for calanthes.

With closeness of atmosphere (for the temperature can be kept down by shading without a great amount of ventilation) and moisture, the pots will become coated with a green slime. This should be washed off. Shading may be given, except during the winter months, whenever the sun strikes the house.

Beyond the differences noted in shading, temperature, moisture and compost, the culture of odontoglossums may follow on similar lines to the other orchids. Repotting will only be needed when the roots are seen to roam outside the pot. Then may the plants be put into larger pots or be divided.

Other good odontoglossums are *Pescatorei*, *Rossi majus*, *coronarium*, *citrosum*, *grande*, *cirrhosum*, *gloriosum* and *triumphans*.

DENDROBIUM NOBILE

Here we have another of those orchids which give living and floral testimony to the rankness of the heresy that orchids are for the rich and extravagant ; for this plant can be grown and flowered easily in a warm greenhouse. Indeed in small establishments we often find a few neglected orchids, and *dendrobium nobile* being among them can be depended on to flower well and during that time bring the owner credit for cultural skill which should make any honest man blush.

Imported pieces, which are cheapest to buy but not always the most satisfactory, may be treated on arrival in the usual manner by washing and cleaning them and laying them on a bed of moist material in a warm house to be subjected to several syringings a day, until sufficient roots are emitted to give some anchorage and support when potted. This support may be augmented by a stake set in before the crocks are put in the pot, for obviously it would have little stability if driven into the compost only.

The compost may follow on the lines recommended for *cattleyas*. Indeed, with this class of orchid compost does not play a large part in successful culture. Provided it be clean, sweet and capable of holding moisture, the essentials are present. Here let me warn readers never to give these orchids—viz. *cattleyas*, *dendrobiums* and *odontoglossums*—any manure-water or chemical stimulant. I do not contend that they never benefit from it, but in the hands of inexperienced persons it is likely to cause grave injury. Few good cultivators, in fact, do use stimulants, and then only in a very careful manner. The soundest advice I can offer readers is to leave all kinds of stimulants alone.

During its growing career the *dendrobium* relishes a

warm, moist atmosphere such as is found in what gardeners call a "stove." It may be syringed freely and forcibly to keep the plant growing and to ward off red-spider, or dislodge it if already there.

The growth that is made one year flowers the next after the leaves have fallen. When growth is completed (and this may be known by the growth terminating in a leaf and showing no more signs of extension) a temperature of 55° to 60° will suit the plants well.

Good varieties are *D. wardianum*, *densiflorum*, *Devonianum* and *philanopsis Shroderæ*, the last being specially useful for cutting.

CŒLOGYNE CRISTATA

This class of orchid is probably less popular than any I have yet named. It is very showy when grown in large pans or wooden baskets, but on account of the short duration of the flowers it is practically useless as a cut flower. But this should not deter us from growing a very accommodating plant. A temperature of about 55° will suit it well throughout its growth. It dislikes much disturbance, and if doing well should only be divided when it has overgrown the pans or baskets. At other times it may be invigorated by having some fresh compost (peat fibre and sphagnum moss) pushed in between the bulbs. Usually cœlogynes flower early in the year and will, of course, at that time, have to be watered carefully. Sponging of the leaves is advised for this as for all the other orchids to free them from dust.

POPULAR PELARGONIUMS

I write "popular" advisedly, knowing well that while many affect to despise few are bold enough to discard the

pelargonium. There are several classes of these which seem to me essential to greenhouse beauty. There is the old-fashioned but free-flowering "geranium," the ivy-leaved pelargonium, the show pelargonium, and for convenience we might here include also the scented-leaved pelargonium, which is grown for the delightful association it makes with cut flowers.

THE ZONAL PELARGONIUM

First in order of place (as it is undoubtedly first in popularity) let us put the common geranium. This is a

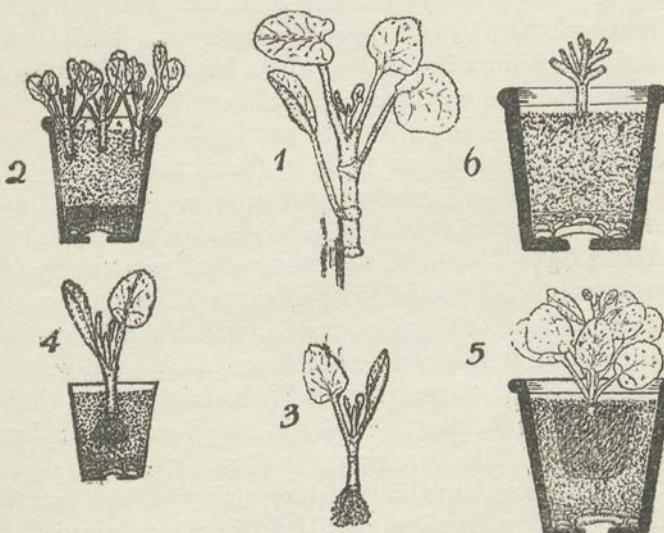


Diagram 23.—Zonal Pelargonium: 1. Suitable cutting. 2. A potful of cuttings. 3. A rooted cutting. 4. Same potted in 3-inch pot. 5. Potted into 6-inch pot. 6. Cut back after flowering.

very adaptable plant which can be had in flower at any season of the year, but I will treat it chiefly as a winter-

flowering plant, when it is decidedly more useful than in the summer. It is a good plant for house and for table decoration, looks well in a conservatory, and is good as a cut flower. It is also eminently useful as a wall plant or a window plant. The singles do not travel as cut flowers as well as the doubles, unless into the eye of each pip is dropped some floral cement, but they do well for home decoration.

I would advise that cuttings be inserted either in autumn or spring. If in spring—and this will usually be found the most convenient time—then the end of January may be chosen. By that time, in the course of culture which I am going to outline the plants will be almost past flowering. It is usual then to cut the old plants hard back—each growth to within a bud or two of its base—and to choose cuttings from the prunings. The old cut-back plants may be kept dry for a time, then be put into a moderate heat and be allowed to flower again in the summer.

The cuttings are usually put five in a 3-inch pot and rooted on the open staging of a house with a temperature of about 60°. Not until they are rooted, potted up and somewhat established in their single pots should a cooler place be chosen for them. Once they reach this stage they will go ahead well in cool conditions. Any good potting compost will suit them, provided it be fairly open. With two or three pinchings the plants may be made to form a nice bush. The flowering size of pot recommended is six inches, stimulants in the way of liquid cow manure and fortnightly dressings of Clay's fertiliser being given when the plants fill their pots with roots.

During the late spring months a cold frame with abundance of air is the best place for them, but after danger from frost has passed an open situation outside on a bed of cinder ashes will be preferable, until the beginning of September,



ZONAL PELARGONIUM—KING OF DENMARK. PROBABLY THE MOST POPULAR DOUBLE VARIETY. IT IS USEFUL ALIKE FOR GREENHOUSE DECORATION OR FOR BEDDING

when they should be brought inside. Until this time no flower buds may be allowed to develop. It will be well into October before a full display of bloom is obtained, but this should last until the end of January.

With the old cut-back plants flowering in the summer and the young plants in the autumn and winter we get quite a surfeit of geraniums. Varieties are very numerous, and most of them good. If I must mention a few I would give Ville de Poitiers, Raspail, Hermione and Denmark as doubles, with Dryden, The Ghost, St Louis, Carmania, Gertrude Pearson, The Sirdar and Dr Rothera as singles.

Ivy-Leaved Pelargoniums

These are more extensively used for outside, but when well grown they form a good feature in the greenhouse. It is essential that they be kept sturdy or they will not flower well. For the amateur's greenhouse the best form for growing them is undoubtedly in baskets. This is best done by planting two or three well-established plants in each basket and tying them along the outside until it becomes completely furnished. Cuttings rooted early in the year will form useful flowering plants for the autumn. They look well when grown as standards or columns, especially if arranged in a mass with dwarfer plants beneath. I do not recommend ivy-leaved geraniums for the greenhouse wall, as they do not flower during the winter.

In the matter of soil, pinching and housing the culture may follow on the lines recommended for zonals.

Scented-Leaved Geraniums

These are not largely grown but a few may usually be seen in the amateur's greenhouse. I have found that the

cuttings root more readily in the autumn and make finer plants than spring cuttings. A few toppings of the growths will induce a more bushy appearance. Cold frame and outside treatment will serve as with zonals. They are grown on precisely the same lines.

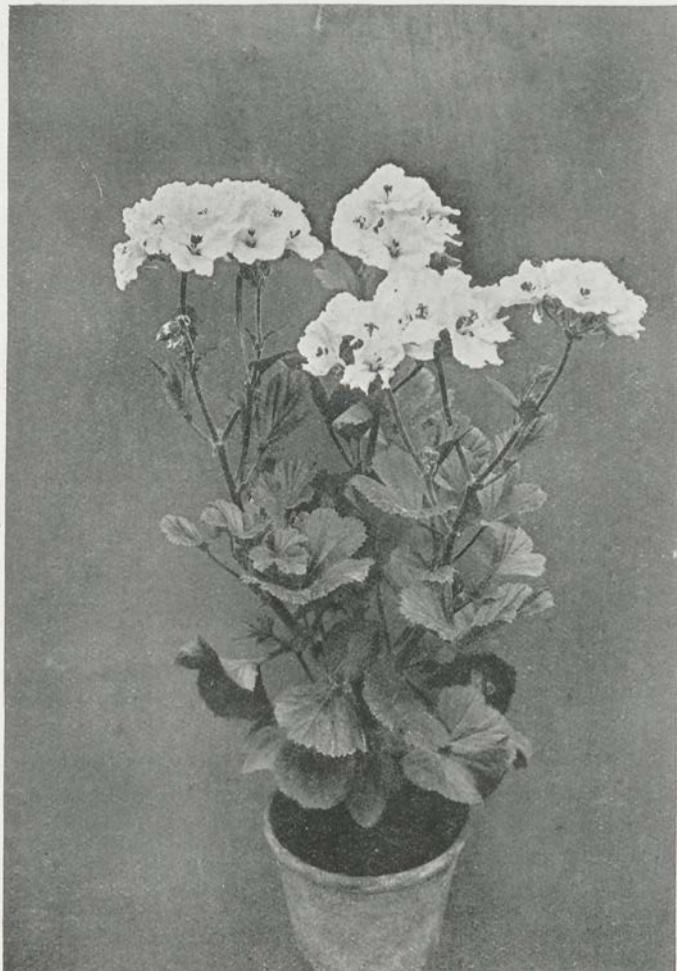
SHOW PELARGONIUMS

These are now becoming once more popular, though why they should for a time have been otherwise I cannot imagine. I strongly advocate the growing of young plants each year, so that some of the older ones may be discarded. Besides giving a more dignified appearance in the foliage, they flower boldly, though for making large masses of bloom the young must undoubtedly give place to the older and consequently larger plants.

Strong, healthy cuttings may be got at the beginning of July when the plants have finished flowering and are cut back. I prefer to put them into a box (where they are more likely to be kept in a right condition of moisture), in a frame or cool greenhouse. It will be some time before they are rooted, but when they are it is best to transfer them to small pots two and a half inches in diameter and set them in a cool greenhouse. Here they will have a chance to get well rooted, ready for moving into 4-inch pots, in which they may remain until the beginning of the year.

By this time they will be getting pot-bound and may be removed into their flowering size—6-inch pots. I have got them along to flower in 7-inch pots within the year, but it requires good treatment throughout.

Throughout their career pelargoniums need cool conditions and plenty of light. To shade them will induce thin, weak growth and encourage green and white fly, to



SHOW PELARGONIUM. PLANTS OF THIS SIZE MAY BE RAISED FROM CUTTINGS AND FLOWERED IN LESS THAN A YEAR

which they are only too much addicted. Plants which do not seem to be breaking well may have the points pinched out to induce them to become bushy plants.

The correct treatment for old plants is to cut the growth hard back after they have flowered and to keep them well on the dry side until new growth pushes out. Then in September bring them in, shake nearly all the old soil from them, put them into such pots as will just accommodate them and keep them in a cool house until January, when they may be moved into their flowering pots.

Good turfy loam should form the base of the compost. Add to this plenty of leaf-soil, some broken cow manure, some mushroom manure, mortar rubble and a dusting of Peruvian guano.

I like varieties whose petals overlap well, as they do not fall so quickly and give a better appearance to the plants. Well-grown plants should be smothered with flowers.

POINSETTIA PULCHERRIMA

To be precise, we should call this plant *Euphorbia pulcherrima*, but the one used is more generally known and understood. It is not largely grown by amateurs, nor is it one which can be whole-heartedly recommended to them as being likely to succeed well.

The great difficulty with regard to it is rooting the cuttings. It is necessary that the pots be prepared beforehand, so that there may be no waste of time. Usually I have cut off the young growths with a slice of the old wood, dipped the exposed cut in water and then plunged it into a pan of sharp sand. When three or four cuttings are made I insert them singly in 2-inch pots, water them immediately and when the water has drained away put them into a close, warm propagator, where they can be

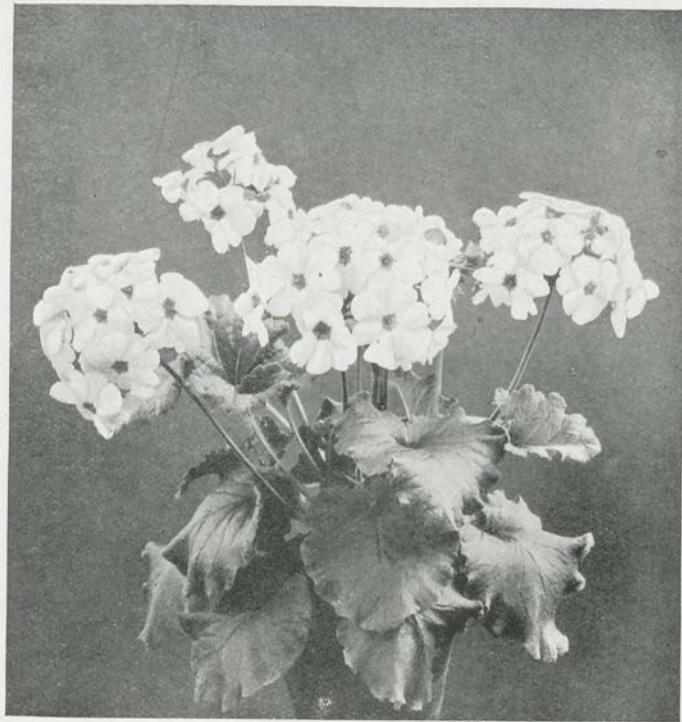
shaded. These precautions are necessary to prevent the sap from flowing away, and as far as possible to prevent flagging. After they have rooted there is no great trouble with poinsettias beyond keeping them dwarf. They have a tendency to become drawn, and this must be guarded against by keeping them up close to the glass and working them into cooler quarters as soon as they seem somewhat established. Never should they be allowed to suffer from want of water, or they will surely lose their leaves.

Six-inch pots should be large enough for good plants bearing bracts twelve to fifteen inches across. For be it noted, it is not the flower itself but the beautifully coloured leaves surrounding it which forms the beauty of the plant. A soil made open with mortar rubble and rich with cow manure will give sufficient nutriment until the plants are root-bound, when cow manure will form the finest liquid stimulant.

Propagation may take place any time from May to July, the earlier month being preferable. If intended to be grown for a second year the plants should be pruned about the end of April to within a couple of eyes of the base after being kept dry from the time of the fading of the flowers. Poinsettias can be used as cut flowers if the end when cut is immediately seared with a hot iron to prevent the escape of sap.

PRIMULA OBCONICA

Although this plant flowers almost perpetually, it is banned by many on account of the poisonous attribute of its leaves. The mere touch of them will set up an irritation in many skins, though personally I have always been able to handle them with impunity. Apart from this I consider *P. obconica* a splendid plant for the amateur. It can be grown from division as well as from seeds.



PRIMULA OBCONICA, WHICH MIGHT ALMOST BE DESCRIBED AS PERPETUAL FLOWERING. THE NEW HYBRID FORMS ARE A VAST IMPROVEMENT ON THE OLD TYPE

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Where seeds are sown, the early weeks of March should be chosen, as they are sometimes troublesome to germinate. If sown after the manner recommended for calceolarias success is more certain, though a higher temperature— 55° —is desirable. I prefer to use no leaf-soil in the seed pans. Early pricking off in boxes should

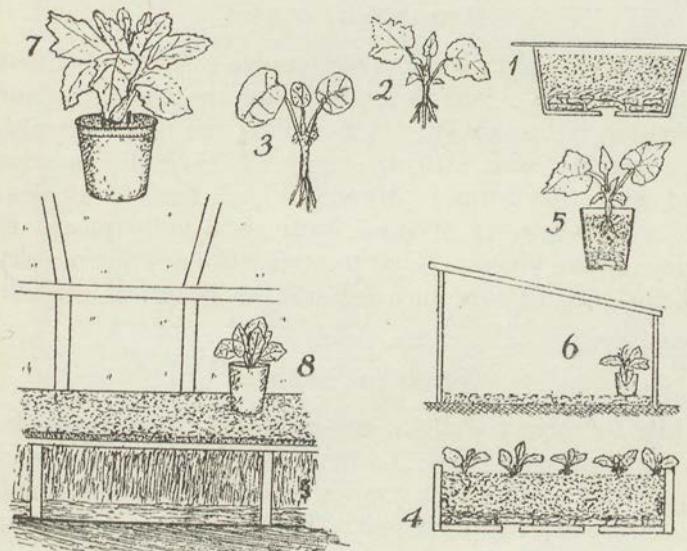


Diagram 24.—*Primula*: 1. Pan for seed-sowing. 2. Seedling *Primula sinensis*. 3. Seedling *Primula obconica*. 4. Seedling pricked off. 5. Potted in 3-inch pot. 6. Placed in cold frame. 7. Removed to 6-inch pot and supported with small pegs. 8. Placed on moist staging.

be followed in due course by pottings into 2-inch, 3-inch and 5-inch pots, in which nice plants can be grown for the first year. Except in the young stages, the plant relishes cool treatment and moisture at the roots, with shading from hot sunshine. Liberal feeding will be appreciated when the plants are well established. Old plants may be broken apart in the spring, and with the additional aid of

seeds a large batch can quickly be got together. I have known plants to form handsome floral specimens from October to June without intermission. The colours have been wonderfully improved of late years, and now the flowers are in many cases as large as those of the *sinensis* type.

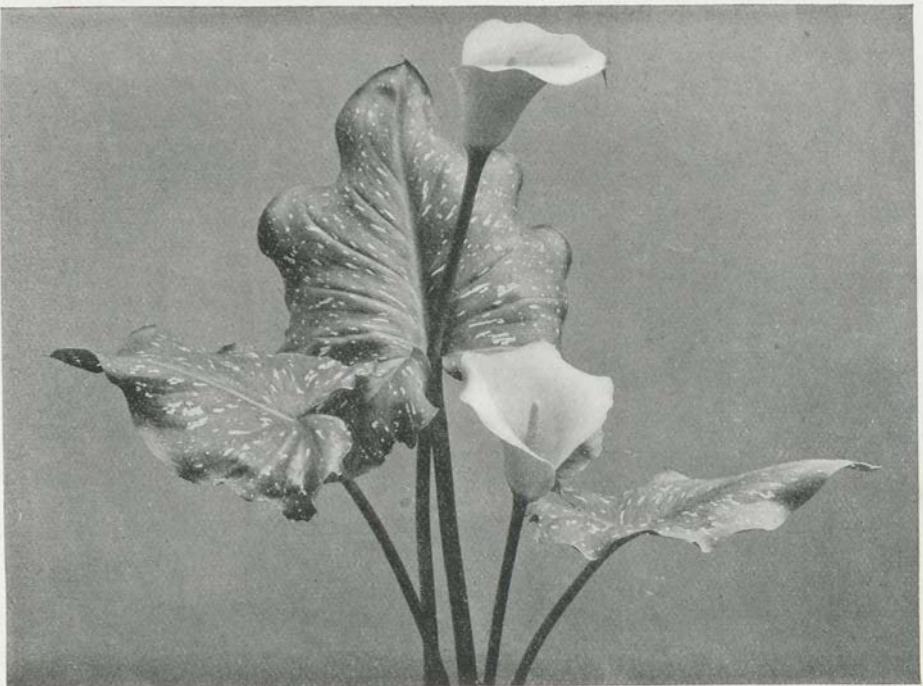
PRIMULA KEWENSIS

Another primula which every reader must try, because it possesses a colour hitherto unknown among indoor primulas, is the above. It is yellow and flowers freely, tier over tier, with untiring energy. Like the *P. obconica* and most other forms of primula, it lends itself to division. To trust wholly to division, however, usually means in time a loss of vigour. Cool treatment following precisely on the lines of *P. obconica* will suit this beautiful primula.

PRIMULA SINENSIS

Like its variety, *stellata*, known best as the star primula, this is a gorgeous plant, but more fastidious and requiring more heat than the foregoing; not, be it remembered, that they require much heat. That is not so; for during the summer months they can well be accommodated in a cold frame and during winter a temperature of 50° will suffice.

From February to June the seeds may be sown in a warm temperature. About the germination there is seldom any difficulty. I prefer to see the young plants pricked off into boxes, and only potted singly when they begin to crowd each other. Any good open soil will suit them, provided it be not old potting soil, for they certainly deserve good loam, fresh leaf-soil, and something in the way of manure. A fault with these primulas is that they



THE BEAUTIFUL YELLOW CALLA LILY—*RICHARDIA ELLIOTIANA*, SHOWING ITS
SILVER-SPANGLED FOLIAGE

are inclined to topple over if not correctly potted, while burying the crown will cause the leaves to damp at their base. I would advise that the soil be brought fairly well up to the crown, and as a further security that three short pegs be put around the plant rising only about an inch or two above the soil.

Primula sinensis requires shading, but will succeed well in a cold frame in the summer if transferred to a warmer structure early in September. Careful watering, no syringing, plenty of space, a moist bottom, liquid manure after good root-hold, pinching out all flower buds till the end of August—these are the items of culture which need most attention. The stellata type flowers more continuously than the older form. A stock of greenhouse plants can scarcely be deemed complete without primulas.

RICHARDIA ETHIOPICA

This harsh name, so science has decreed, obscures the well-known arum or calla lily. This plant, indeed, is one which amateurs might well rejoice over, for, being fond of swampy surroundings, it cannot be injured by over-watering. It is a very adaptable plant, and may be grown in different ways. In some districts it is the practice to set the plants out in the open ground during summer and to divide and pot them up in the early autumn. Others divide them at the time of planting out. Another method much favoured and found equally successful is gradually to dry off the plants after flowering and then to stand them in their pots in some odd corner till the autumn. This is the safer way and the method I recommend on that account, though growers of an experimental turn of mind may well try a few on the planting-out system. Let it, however, be said, by way of caution, that many good

gardeners have failed to grow them in this way, so that it would seem that district and soil very largely affect the result.

Any good potting soil will suit Richardias, and feeding may be adopted to increase wealth of bloom and rich foliage. I prefer to see several plants in one large pot rather than one specimen in a 6-inch or 7-inch pot.

Cool treatment is relished, though flowering may be

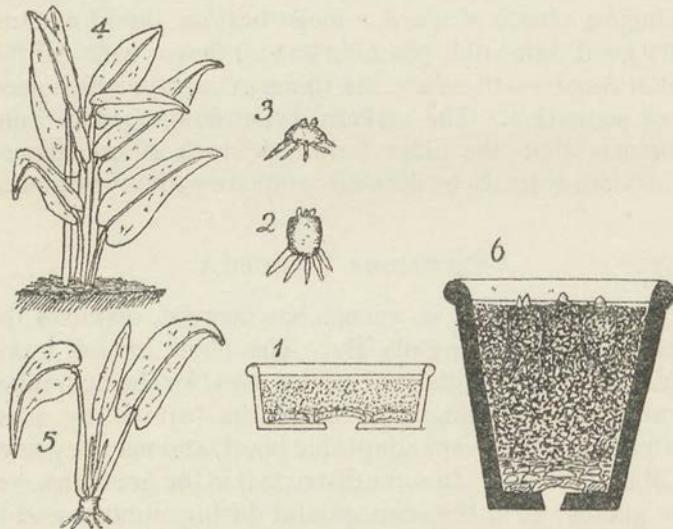


Diagram 25.—Richardia (Arum or Calla): 1. Seed pan for *R. Elliotiana*. 2 and 3. Root-stocks starting into growth. 4. Plants set out in open ground. 5. A division from old plant. 6. Several roots potted into large pot.

forwarded by gentle heat, so that with a sufficient supply of plants a succession may cover both Christmas and Easter.

The yellow form, *R. Elliotiana*, deserves more extensive culture, not only on account of its rich colour but also because of the beauty of its silver-spangled leaves. It

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can readily be produced from seeds but requires rather stronger heat than its white relative.

These lilies when well flowered make a brave show.

SALVIA SPLENDENS AND PATENS

The scarlet salvia is undoubtedly a very brilliant plant in the autumn, and with good treatment I have known it last well in the conservatory for quite three months. It also looks pleasing, though vivid, in a drawing-room vase. We certainly must have salvias in our greenhouse to cheer the dull time of autumn. The cuttings root very easily in a warm house any time during the spring. Afterwards the plants are easily managed, for once they are established in 3-inch pots they may join company with chrysanthemums and be grown along with them, being treated similarly in every respect.

Throughout their career the plants show a disposition to flower. This must be repressed by pinching out the points till the end of August. Free and forcible syringing will keep down that dreaded pest—red-spider. A point of culture meriting special emphasis is that the plants must never be allowed to become so dry as to flag. To obviate this I would advise plunging in ashes during the hottest part of the summer. After flowering, the plants may be cut back and put in a cold house or frame until cuttings are needed.

It is not generally known that this plant can be grown successfully from seeds sown early in January. Last year I had a nice batch raised in this manner, the variety being Sutton's Scarlet Queen.

Salvia patens is a pretty sky-blue, which is much grown outside but not so often inside. It forms tuberous roots

and can be practically dried off after flowering. It can also be raised from seeds or from cuttings.

SCHIZANTHUS

At last we arrive at a plant which all might grow. Rapid strides have been made of late years in the improvement of these plants since the time when *S. pinnatus* was sometimes seen in the greenhouse. Carter's and Sutton's may be relied on to give good strains, though the seeds would cost a few pence more than from some other firms.

I do not advise the growing of schizanthuses to flower in the summer-time. They run too quickly to flower and do not form such handsome specimens as when grown in the autumn and winter, when the future is built up on a soild groundwork of slow growth.

I advise that seeds be sown at intervals between the latter part of August and of October. It may happen that some will run prematurely to flower, but with several batches having a break of but a fortnight between them this difficulty is easily overcome.

The earlier batches may be sown in a pan stood in a cold frame and only be protected during rain. It is important that they be kept cool. They greatly resent forcing, and as a guide it may be said that their ideal temperature would be between 40° and 45°. Plants from these sowings should give a succession of flowers from January till June, a sufficiently lengthy period to prevent us tiring of them.

A method of culture which I have found eminently successful is to prick off the young seedlings into boxes as soon as the first sign of a rough leaf is seen. When the growths touch, the plantlets may be potted singly into 3-inch pots, be thence, in due course, transferred to

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5-inch, and finally, if doing well, into 7-inch pots, in which huge plants can be grown.

A good open soil and firm potting will suit schizanthuses with no attempt at shading. Never should they want for water, while to allow them to remain root-bound is a deadly sin, the punishment for which is premature flowering and puny plants. It was at one time delivered to me as a doctrine that these plants would not bear feeding. This I have proved to be a heresy, for besides adding chemical stimulants liberally to the soil I have fed them with liquid cow manure and frequently top-dressed them with Peruvian guano.

One or sometimes two pinchings are required to make bushy specimens. Beyond this a neat central stake, frequent tying, and a clear space for development are essential items in successful culture.

S. retusus, though beautiful as a cut flower, cannot compare *en masse* with its more floriferous relative, *S. Wisetonensis*, and especially with the large-flowering hybrid forms which are now so popular.

STREPTOCARPUS

If the gloxinia is popular, so also should be the streptocarpus, for in many respects they partake of the same character and culturally may be grown and flowered together. The plants do not present so striking an appearance, nor are the flowers arrayed with such gorgeous colours, but considering the improvements made in them during the last decade, I would certainly advise their inclusion among the best flowering plants.

Seeds must be sown in the early part of the year and be diligently attended to. Prick off into other pans or a box when large enough, but do not pot them until they have

made a sufficient mass of roots to merit a $2\frac{1}{2}$ -inch pot. From this, by way of progressive potting they may reach a 5-inch or 6-inch pot, and will, if massed together or grouped with maidenhair ferns, form quite a charming feature. Soil such as that advised for gloxinias will suit them splendidly, with liberal feeding with liquid manure when the pots are so filled with roots that the soil dries out quickly.

The plants relish what gardeners term an intermediate temperature, say about 55° ; they must not have great fluctuations of temperature or they will not make steady growth, and an eye must be kept on their leaves to get rid of thrip as soon as it makes an appearance. This pest is dealt with in the chapter especially devoted to greenhouse pests.

CHAPTER VII

THE BEST FOLIAGE PLANTS

ARALIA

WITH the aspidistra and *Ficus elastica* this forms a veritable triumvirate which cannot be matched among greenhouse plants for hardness of constitution as plants for rooms. None of them is distinctly ornamental in a greenhouse, where they might easily escape notice, but, as they last for a long while, with apparent indifference to adverse climatic conditions, they deserve special culture for house purposes.

I knew an aralia which served as a room plant for over five years—the only interlude of greenhouse occupation being when the family were away. After this the family moved and the plant came into the possession of a cottager, who probably has it now.

Aralias can easily be grown from seed, and this is the method advised for amateurs. Ringing or notching of old plants is often resorted to, and those who feel equal to the task could try this method. By working young seedlings along in a warm temperature they can quickly be made into useful specimens; but to my idea they never look so well in their young stage as when they get a head on them, and all the leaves seem to spring from the same centre, some drooping, some erect, and others standing out horizontally from the stem.

When they have reached a 6-inch pot they may be given a cooler temperature.

It is advised to grow a few plants from seeds each year, and to discard tall, ungainly specimens, though they can, of course, be rejuvenated by ringing or notching. The latter method is preferable. A cut is made half-way through the stem at a point a few inches below the lowest leaves. From below the cut a piece is sliced out so as to leave the surface of the first cut bare. Thus the top is supported by only half the stem. Some damp moss mixed with sharp sand is tied over the cut, and this is kept moist by syringing until sufficient roots are thrown out to enable the top to be cut away entirely and be treated as a separate plant.

ASPIDISTRA

This is a plant that is found in so many homes and so many greenhouses that it needs no eulogy from me. There is a variegated form which is not very beautiful and not very popular. I wonder if readers have ever seen this plant flower. Its flowers are quite close to the soil and might easily pass unnoticed, as they frequently do. The usual method of propagation is by division, but this need not be frequently practised. Plants which are root-bound—provided they are plentifully supplied with water—are much better left undisturbed for several years. If extra large plants are desired they may be secured by giving a gentle heat and keeping the plants potted along. As the plants are intended to remain a long time undisturbed a good soil should be provided at potting-time and charcoal should be incorporated to keep the compost sweet. Good fibrous, turfey loam should form the major portion, with an admixture of oak leaf-soil. Stimulants may be given afterwards by way of liquid manure. Aspidistras are

generally priced at a penny a leaf. Frequent sponging of the leaves is the only way to keep them in good appearance, especially when in a dwelling-house. A mixture of milk and water for sponging will give the leaves a glossy appearance.

GREENHOUSE ASPARAGUS

The two kinds usually grown are *A. sprengeri* and *A. plumosus*. The latter is specially adapted for making buttonholes, sprays and bouquets and for decorative work generally. There are climbing and dwarf forms, the latter being preferable for the small greenhouse. *A. sprengeri* is also useful for decoration, and makes a splendid basket plant. In fact, when growing vigorously no pot can contain it, for its tuberous roots exert such pressure that they will in time split the stoutest pot, even when bound with wire. In a wire basket the roots can easily push through. Both forms may be raised from seed and both may be increased by division. It is best to keep them rather closely potted. Usually I make it a practice to pot them up at the same time as the chrysanthemums are put into their final pots, using the same soil and making it quite firm. They flourish best when kept somewhat warm.

CALADIUM

Those who can command sufficient heat should certainly grow some caladiums, which do remarkably well for display in the house or the conservatory, even if they confine themselves to the dwarf form such as *C. argyrites*, which makes a charming effect when dotted along the fringe of a group or bank of plants.

The roots should be potted up in the spring as soon as

they show signs of renewed growth, and may be put into quite small pots when the soil has been shaken off. A further potting will be needed when the roots have made progress. Free exposure to all but the fiercest sunshine will improve the colour of the leaves. Large forms may be obtained, with broad, expansive leaves which under high cultivation suggest coarseness. They would do well enough for large grouping but are altogether out of place in a small greenhouse.

A soil made up of peat, turf, leaf-soil and mortar rubble or road grit will do well for caladiums, and when once established they will stand liberal feeding. Flowers should be pulled off as they appear, and after gradually drying off in the autumn the plants may be set beneath a staging of a warm house till spring.

COLEUS

This is a highly ornamental plant, which is very easily grown and may be had in many lovely shades of colour. It serves a good purpose in giving colour to the greenhouse in summer, when a multitude of flowers is not looked for. By striking cuttings in the autumn huge plants may be got by June and July, and these will keep fresh for four or five months.

I find that the cuttings root best if not put into a propagator but simply set in 3-inch pots, five cuttings in each, and put on the open staging. It may be necessary to shade them if they have a tendency to flag. This can be easily done with a sheet of newspaper.

When the cuttings show they have rooted by commencing to grow, they may be potted singly into 3-inch pots, and rather more than a week later the points may be pinched out. From this size they may, when they have well

filled the pot with roots and made several side growths, be moved into a 6-inch. This will probably not be needed until the turn of the year, it being usually better to avoid doing much potting during November and December, when growth seems so difficult. The 6-inch pots should last until May, when a further and final shift into 9-inch pots will enable huge plants four feet high and three feet through to be formed. Several pinchings of the growths will bring about a nice bushy shape, and in summer, if three of these plants are banked up together they fill a very large space.

Some forms of coleuses damp off in the leaf a good deal. These should be eliminated from the stock as early as possible. Flower buds should be pinched off as they appear, for they are by no means ornamental. Any good soil will suit, provided it be made open. When cuttings are taken the old plants may be thrown away.

CROTON

This is a highly ornamental foliage plant which relishes a close atmosphere and a brisk heat and cannot be grown to any good standard of success in the cold greenhouse. Few amateurs grow it on account of its requiring too much heat but it is well worth all the care bestowed on it. For a table plant, for grouping, or for the use of its beautifully marked and oft-times curly leaves in flower glasses and bowls, it serves very useful purposes. The usual method of propagation is by notching the stem in the same manner as described for the aralia. They root quite easily from cuttings, but the notching and mossing is done to ensure the leaves being quite close to the pot. It is a fault of great magnitude to have crotons with bare stems. Cuttings may be taken whenever available, but the notching is

usually done in spring. Crotons like a rich soil, with peat to keep it open. They are best grown in 5-inch pots.

DRACÆNAS

Embracing so many forms and varieties, these plants are not difficult to grow, for many of them—mostly the

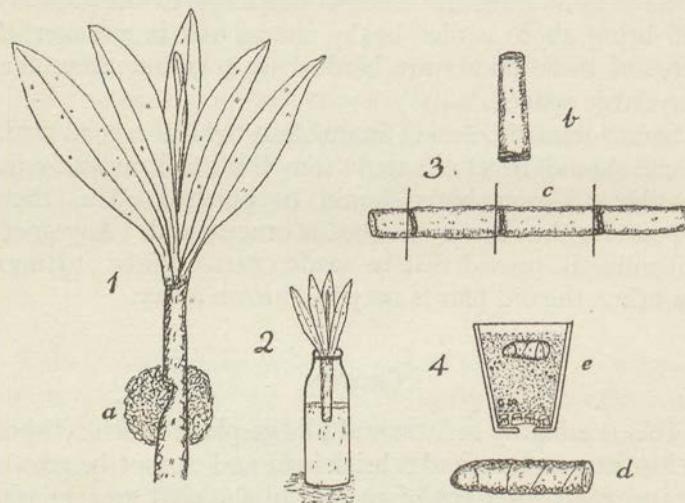


Diagram 26.—1. Dracæna notched at (a) and covered with moss and sand. 2. Cutting inserted in bottle of water. 3. Stem cut up as at (c) into lengths (b) and put in as cuttings. 4. Toes or thick fleshy roots cut off (d), and put in a pot (e).

green-leaved varieties—will stand cold treatment and are therefore more especially recommended for readers of this book. Quite tall specimens may be had if desired, but those which are a few feet in height will be found the most useful.

There are several methods of propagation, such as by seeds, by offsets or side cuttings, by eyes and by cuttings of the tap-root. When the ball of soil is seen to be lifted

out of the pot an inspection will disclose the fact that there is a thick, fleshy tap-root at the bottom. If this "toe," as it is sometimes called, is cut off an inch or more long and put into a propagator it will quickly produce another plant. The stem of the dracæna may also be cut into lengths of a couple of inches, and if put into soil will, most of them, grow. Tall plants may also be dwarfed by notching and mossing and seeds may be sown, though this course is rarely practised. Cuttings of side growths will root if put into a bottle of water or in soil.

When rooted the young plants may be potted along in a fairly warm house and it will be found best to keep them in small pots instead of rushing them into a large size, where they lose their value as room plants.

Varieties to be recommended are: *Australis*, *Lindenii*, *Indivisa* and *Sanderiana*, which are but a few among several scores of different sorts and types. A few dracænas are almost essential for setting off other plants in the greenhouse.

FICUS ELASTICA

More frequently grown for the room than for the greenhouse, this is nevertheless a splendid plant. It has a very hard constitution and will bear much ill-treatment, which it certainly does not deserve. There is a variegated form which deserves more extended culture. To grow these plants requires no skill, the main item being good watering. Plants may be obtained from cuttings, but the usual method is notching and ringing, which rarely fails to produce a good result. To keep the plants healthy and of good appearance the leaves should be frequently sponged. Any good potting soil will suit the *ficus*.

Ficus repens is a pretty clinging plant well adapted for clothing the wall of a warm house.

GESNERAS

Although not so largely grown as they were some years ago, they richly deserve a place in the greenhouse, for they have the merit of being beautiful alike in foliage and flower. They are grown from corms and are dried off after the manner of gloxinias, to which they are related. They may be easily propagated also by the leaf. The corms are very brittle and need careful handling when they are shaken free of the old soil and potted up in the spring. Several plants are grown in a pot, and fine specimens can be obtained in a 7-inch size. A peaty soil built up on the lines laid down for gloxinias will suit them admirably. The temperature best suiting gesneras will be found to be 50° to 55°. Some support will be needed for the growths—such as thin bamboo tips—and during bright sunshine a screen from its fierce rays must be provided, while, like gloxinia, they prefer a humid atmosphere.

GREVILLEA ROBUSTA

This is a very graceful plant with palm-like leaves, and, being very quickly and easily grown, is in many cases more useful than palms. As a table or room plant it is invaluable as well as for mixing with other plants in the conservatory, while it is also employed as a dot plant in sub-tropical bedding. It can easily be grown from seeds, which is the usual method of propagation. These will need to be sown in a warm house early in the year, and when they have broken into the rough leaf they can be accommodated in quite small pots and be potted along in good soil as occasion demands. It is not desirable to grow them in large pots.

Cuttings may be taken if desired, but better and surer results are obtained from seeds. When the plant becomes leggy it may be cut back and will break out from below, but young plants worked along from a small yearly sowing will give the best results. Except during the early part of its career, the Grevillea does not require a high temperature, a cold-house temperature of 45° to 50° being more suitable.

FERNS

Judged by the number of species and varieties, this is indeed a formidable subject. But unless any reader intends to specialise in ferns I can in a few words outline a treatment which will be sufficiently satisfactory. If he intends to specialise, then I can only recommend him to buy some of the eminently practical books on ferns by such well-known specialists as the Rev. D. Druery. This work is not intended for the specialist but for the general grower.

However, ferns are a vital necessity to a beautiful conservatory, so we must afford a few practical paragraphs.

In the first place I would advise the reader to purchase young plants in pots from a good fern-grower. To increase his stock he has then two courses open to him. Either he may grow them from spores, which is interesting, or he may increase them by division, which is certain. I would advise both methods.

Fronds of ferns should be gathered when the spores at the back of the little leaflets are ripe—quite brown. These fronds should be carefully put in clean white paper. After several days it will be found on examination that there has accumulated a quantity of very fine brown dust. This will be sown. Fill a shallow pan, after duly crocking it, with clean, fine sandy soil pressed down moderately firm. Then put a small piece of brown paper or cardboard on

the surface and gently pour boiling water over until the whole of the sandy soil is saturated. This is done in order to kill any spores of worthless varieties and to ensure good forms similar to those from which the fronds were gathered. A sheet of glass should then be placed over the pan and when the water has well drained away—say by the next day—sowing may be done as evenly as possible. The glass should again be put on and the pan taken to the greenhouse, where it can be shaded and be stood in a saucer or pan kept continually filled with water. Hence there will be no need to remove the glass until the ferns appear. This will occur in two or three months' time, after a green coating has appeared over the surface. When the small fronds appear the little ferns may be pricked off into pans and be eventually potted up.

Division is usually undertaken about February, when the plants have completed their resting period and young growths are appearing. The pieces should be potted into the smallest pots that will contain them and whether or not they make good plants will largely depend on the skill exercised in watering. I do not advocate the splitting up of ferns every year. A few should be done each year, but the others should be kept growing steadily along; for despite the great value of ferns in small pots it cannot be gainsaid that a nice specimen in a 10-inch pot is a plant to be proud of and it will provide plenty of fronds for cutting.

A good soil for ferns will consist of fibrous loam broken into pieces, fibrous peat, good oak leaf-soil, charcoal, brick dust and sharp silver sand. If this be thoroughly mixed, well moistened, and made fairly firm there are very few ferns which it will not grow.

Ferns need careful watering, yet when in full growth they dry out quickly, and if perchance they flag it is the best plan



POLYPODIUM KNIGHTIAE—A BEAUTIFUL FERN FOR A BASKET



to set them bodily in a pail or tub of water for a few hours. Most ferns resent overhead syringing, yet like a moist atmosphere and shade from bright sunshine.

Ferns may be grown in pots, in baskets, and on walls, and often spring up spontaneously in the most unlooked-for places.

A few of those most suitable for the general grower would be : *Adiantum capillis veneris*, *A. cuneatum*, *A. gracillimum*, *A. farleyense* ; *Pteris cristata*, *tremula*, *serrulata*, *cretica* ; *Nephrolepsis exaltata*, *Duffi*, *davallivides*. These are very easy to grow, and are those most often found in miscellaneous collections of plants.

PALMS

Most greenhouse owners will have a few palms, if they only be kept for taking into the drawing-room or the hall on special occasions. Certainly they beautify a greenhouse at all times, and come to the rescue when there is a shortage of flowering plants—an occurrence which cannot always be avoided.

There is not much to write about the culture of palms, for they have the happy knack of looking after themselves to a large extent. Neglect, however, especially in the matter of watering, will very soon produce brown tips to the leaves, while failure to give adequate shading will develop brown patches. Unless a palm is free from blemishes of this description it is scarcely fitting to use it to set off the beauty of other plants.

Many forms can be grown from seeds, but the most satisfactory method is to buy young plants established in small pots. With correct treatment they will grow and last for a great number of years.

There is nothing to surpass good fibrous, turf-like loam for

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palms, though to ensure porosity and sweetness I would add mortar rubble and charcoal. If the turf be of a nature which quickly decays it would be well to add good fibrous peat. Being naturally of a slow-growing nature, palms do not need to be stimulated, hence manure or manurial stimulants are best avoided. Good drainage and firm potting are advised in view of the fact that it will be some time before the larger plants have a shift.

Syringing of the foliage should be frequent and sponging of the foliage should be done periodically—at any rate three or four times a year. It is not wise to stand palms directly on an earth floor, as they thereby become troubled with worms in the soil which soon produce sourness.

Useful palms are: *Kentia Balmoriana*, *K. Fosteriana*, *K. Sanderiana*; *Cocos Weddelliana*; *Phœnix Rœbelini* and *P. dactylifera*.

CHAPTER VIII

BEAUTIFUL BULBS FOR FORCING

A GREENHOUSE without bulbous flowering plants in the winter and spring would never achieve a very wide reputation. Whoever sets himself the task of making the spring greenhouse beautiful without them sets himself a task which does no credit to his ideas of floral beauty.

Readers will know that I refer to tulips, hyacinths, narcissi, jonquils, gladioli, snowdrops, irises, and perhaps a few crocuses.

There need be no distinction made in the matter of culture, and this renders my task comparatively easy. It is well first of all to procure good sound bulbs early in the season, and pay a fair price for them. The man who aims hard at being economical will find that economy in coin has borne the unlooked-for offspring of economy in beauty. This is but a just punishment for those who wait till the end of the season, when everyone has had the best pick, in order to be able to get bulbs in the saleroom a few shillings cheaper.

It is well to have the bulbs potted up in September or October for the main supply. Roman hyacinths and Paper-white Narcissi need to be potted early in August to secure blooms during November and December. But if I were an amateur gardener with a small greenhouse I would not try to get any of these bulbs in flower before the New Year. About that time the chrysanthemums are getting over and we want something to fill up the gap.

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Nor would I endeavour to get tulips or daffodils before the New Year, as they rarely produce their best when quickly forced, and although we get the tulips to flower, the stems are too short to render them of any value as cut flowers.

Bulbs may be forced in pans, bowls, pots or boxes. In a small way pots will be found most serviceable, as then a few pots may be brought on at a time. Five-inch or six-inch pots are most serviceable, and I would advise that as many

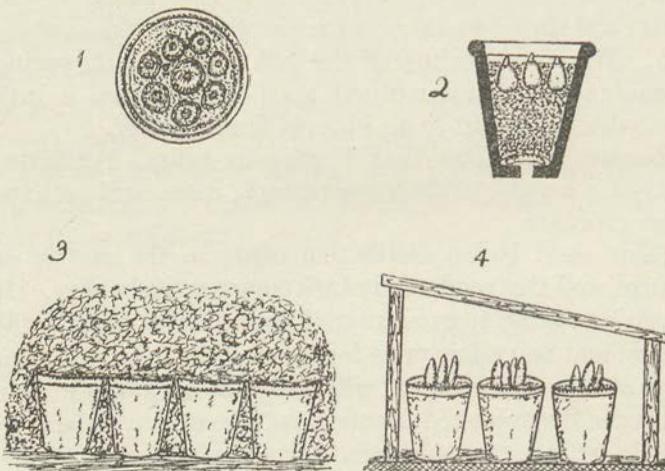


Diagram 27.—1. Bulbs potted closely together. 2. Showing position of bulbs. 3. Pots covered with ashes or sand. 4. Removed from ashes and put in a cold frame when growth is an inch or two high.

bulbs as can be accommodated be put in each pot. Usually four to six tulips may be put in a 5-inch pot without their touching. The pots being duly crocked and the drainage covered with moss or leaves, some soil is put in and made firm but not unduly so. The bulbs are then set in place so that when the potting is finished the points will just appear above the surface. Some press the bulbs into the soil, but this, I am sure, is a mistaken policy, and is the

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reason why the bulbs lift out of the soil when they start to throw out roots. Having set the bulbs in place, put some more soil in and press it down with the fingers, but leave a space between the surface and the rim of the pot for watering.

To ensure success we must now plunge the pots in sand or ashes. Sifted coal ashes will usually be available. It is necessary to cover them with about six inches. This is done in order to induce them to throw out a plentiful supply of roots before much growth is made at the top. If they are allowed to grow at the top before roots are made, the result will be very poor flowers. All the bulbs mentioned may be subjected to this treatment, and they may remain in the ashes for two months or more. Frequent examination after this time will show whether they need removal, as they will do when the growths are rather more than an inch long.

Bulbs of this kind relish a soil made up of loam, leaf-soil, mushroom manure and sand. The chief point of culture is the watering. It is very easy to spoil them by allowing them to become very dry. A few small sticks may be necessary, for some of the hyacinths and certainly the narcissi of all kinds will need support.

To keep up a successional supply a few plants may be brought into the warm house each week. Where the convenience exists, the best plan in this respect is to have some bulbs in a cold frame, some in a cool house and others in a warm house. Each week a few are brought into the warm from the cool house; these are replaced by others from the frame. In this way a regular succession is kept up without any difficulty.

Small deep boxes are useful for the purpose, but for successional batches the large boxes would mean that too many flowers were brought on at the same time.

Good varieties of tulips for growing in the greenhouse are: *Mon Tresor*, *Proserpine*, *Couleur de Cardinal*, *Rose Gris de Lin*, *Thomas Moore*, *Tournesol*, *Keizerskroon*; and the early varieties, *Duc von Thol*. A few *Darwin* or *May*-flowering tulips might well be tried in pots if space be available, but it would not do to force them very early.

Among narcissi we should include the old English double, as also the various forms of *Phœnix*, *Golden Spur*, *Emperor*, *Sir Watkin*, *Princeps* and *Autocrat*. A few also of the *polyanthus* forms might be included, such as *Grand Monarque*. The sweet-scented *jonquil* will be most appreciated.

Good hyacinths may be bought more cheaply in their colours than in named varieties, and considering the great price asked for hyacinths I would certainly advise this course.

Irises, crocuses and snowdrops are not often grown in pots, but when they are the same kind of treatment may be afforded them.

It must not be forgotten that after forcing most of these bulbs become available for the outside garden, and on that account they should be carefully dried off and be planted out during the summer or autumn, so that if they are somewhat expensive at first they serve a purpose, with few exceptions, for more than one year.

CHAPTER IX

BEAUTIFUL PLANTS FOR FORCING

THERE are many shrubby plants which naturally flower outside in the spring that can by forcing be persuaded to flower much earlier in the greenhouse.

Among those most generally used with success are: lilacs, deutzias, staphyleas, spireas, dielytras, roses, azaleas, lilies of the valley, lilliums, hydrangeas, violets, Solomon's seal.

Plants which are intended for forcing are best got into their flowering pots early in the autumn, if indeed they have not been left in them through the summer. If they are left exposed to frost it is usually found that they force much better, but to expose the pots to severe frost will mean that many of them will probably become cracked, or at any rate damaged. This can be guarded against by plunging the plants above the rims of the pots in ashes or leaves, or even in ordinary soil. If leaves are available I would prefer them. Then the plants will be safe throughout the autumn and winter, and a few may be brought along at a time as they are wanted.

But to take a plant from a frosty atmosphere to a warm house is not a good practice, for no plant relishes such sharp fluctuations of temperature and many will show unmistakable signs of this resentment. They should be removed from the outside to a cold house for a week, and from this they may be moved into a warm house. As with bulbs, the easiest manner is to move a few plants round each week or each fortnight. Gentle forcing can be done at

50°, and rarely for the plants in question will it be necessary to go beyond 65°. If the thermometer stand fairly steady at 60°, that should meet most requirements.

For successful forcing a policy must be formed and adhered to. That may be to force the same plants only once in three years, planting them out early in the summer and allowing them to recuperate and build up strength under natural conditions for two years. Where this cannot be done the batch could at any rate be divided into two parts, one part being forced and the other grown naturally alternate seasons. It is further advised that only robust, healthy plants be chosen for forcing. As may be supposed, this unnatural process is rather exhaustive and weaklings would surely produce poor results.

When potting these subjects up for forcing it must be remembered that not many roots will be made during the time, therefore the smallest pots which will contain them should be used. During their stay in the forcing house the plants must be syringed twice daily, and it is an advantage though not a necessity to have the pots plunged in a bed of leaves. Watering should only be done when there are clear signs of its being needed, for over-watering will surely do harm. As the plants come into flower syringing will cease and when the blooms are expanded they may be taken to the conservatory or the dwelling-house. Such plants as are forced should not be set outside after forcing until danger from frost may reasonably be supposed to have departed. Even though they are hardy plants their growth after being forced is sure to be soft and tender.

Besides those named there are other plants which may be forced, such as *ribes*, *viburnum*, *wistaria*, *pyrus*, *magnolia*, *jasmines*, *choysia*, *daphne*, *taburnum* and *rhododendron*, but even in large establishments these are very seldom used.



SPIREA QUEEN ALEXANDRA. A BEAUTIFUL BLUSH-COLOURED SPIREA,
SPLENDID FOR FLOWERING WITH GENTLE FORCING IN MAY

CHAPTER X

OUTDOOR PLANTS IN THE GREENHOUSE

WE can form quite a list of plants which, though usually grown in the garden, are well worth a place in the greenhouse. Stocks, asters, heliotrope, antirrhinums, pentstemons, kochias, sweet-peas, Canterbury bells, auriculas, violets, Clarkias, godetias, wallflowers, lobelias, violas, campanulas, mignonette, *nicotiana*, *petunia*, *verbena*—these form quite a good list, and may be successfully grown by any amateur.

ANTIRRHINUMS.—These are grown from seeds or from cuttings, and I would recommend clear shades or self-colours. Seeds should be sown early in the spring and cuttings inserted in a cold frame in the autumn. They will be pricked off into boxes and worked along as if intended for outside, except that when large enough for 3-inch pots, they will be put into them, and eventually into 6-inch pots, or possibly 7-inch, in which good plants should be obtained.

AURICULAS.—These plants are not the favourites they used to be in the greenhouse. If it is decided to grow them—and they are well worth it—quite good kinds may be grown from seeds sown in the spring and treated in a manner similar to primulas. *Polyanthus* might also be grown in the greenhouse with good results if good clumps are potted up in the autumn.

ASTERS.—These form delightful subjects for pots, and

they do exceedingly well for cut flowers. Tall kinds, such as Sutton's Mammoth, make grand specimens in large pots. They have to be watered carefully. It is sometimes found a good plan to pot up asters in order that they may be kept back until some other plants, whose place they are to take, have finished flowering.

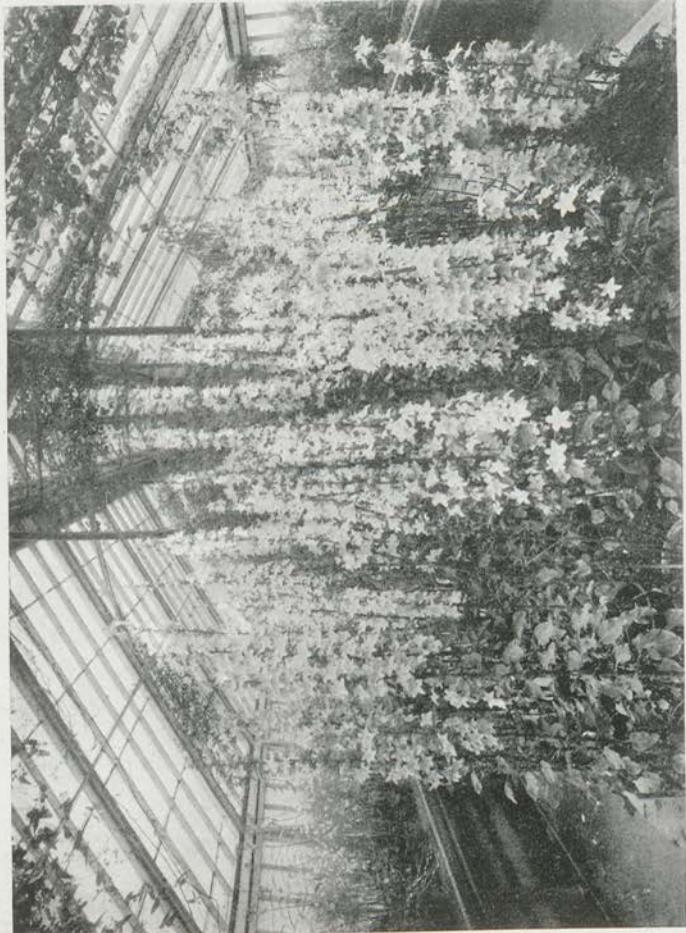
CANTERBURY BELLS.—Delightful as pot plants. They may be potted up just before they throw up their flower spikes; or, when quite seedlings, they may be potted into 3-inch pots, and eventually moved along so that three plants will flower in a 9-inch pot. Only clear, soft colours of the single varieties are advised.

CAMPANULAS.—I here refer to the tall chimney campanulas. As with Canterbury bells, I prefer to get them in their pots quite early in their career. Sow in spring, prick off into boxes, pot into 3-inch pots, and through 6-inch to their final 9-inch pots. They will not flower the same season they are sown, but if given hardy treatment and liberal feeding they should eventually form good specimens and may afterwards be planted out in the borders. Blue and white forms are available.

CLARKIAS.—These grow taller as pot plants than they would outside. They may very well be treated in the same manner as advised for schizanthuses. They are rather impatient of root disturbance and should be carefully looked after, following the pricking out and potting. Sutton's Firefly should certainly be grown.

GODETIAS.—Godetias are strong rivals to Clarkias for the purpose of furnishing the greenhouse and providing cut flowers, especially as they are more compact in habit and some forms are much more dwarf-like. Sow in autumn and grow along in cold quarters to flower in the spring.

HELIOTROPS.—Heliotrope is quite popular on account



CAMPANULA PYRAMIDALIS—THE CHIMNEY CAMPANULA. A STRIKING PLANT WHEN ALONE, BUT WHEN A GROUP IS MADE THE EFFECT IS CONSIDERABLY ENHANCED.

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of its fragrance. Large plants may be obtained by propagating from cuttings in the autumn and growing them along under warm conditions. I have obtained standard plants four feet high, with bushy heads, by adopting this method, but quite respectable plants may be got from spring propagation. Six-inch pots will be quite large enough in which to flower them. Good varieties to grow in pots are Lord Roberts and Madame de Bussey.

KOCHIA TRICOPHYLLA.—Often called the mock cypress, this is a very pretty foliage plant which towards autumn changes to a beautiful reddish tint. It can easily be grown from seeds sown early in the year. If good branching plants are to be obtained the young plants must be pricked off early and on no account be crowded or starved.

LOBELIAS.—Both double and single, they make very pretty edging plants in the greenhouse if grown in 3-inch pots. They may be rooted in spring and potted up in April or May. I prefer the double form for this purpose. In the following spring these plants are useful for providing cuttings for the beds and borders. Some very promising plants I have even moved on to 6-inch pots and they have amply repaid the trouble.

MIGNONETTE.—Success with mignonette cannot be guaranteed. A system which has brought me more success than any other is to make up some good soil containing plenty of mortar rubble and fill some 5-inch pots to within an inch of the rim. The space thus left is filled with fine sandy soil such as is used for seeds and cuttings. In this the seeds are sown and put into a cold frame and shaded until germination. The seedlings are thinned early, and in due course, when the plants have grown a few inches and are going away strongly, a move is made into 7-inch pots in which fine stuff for the con-

servatory or for cutting are obtained. For winter and spring flowering sow in August and October.

NICOTIANA.—Some like to grow the hybrid forms of these plants in pots. They are not difficult to grow, being sown early in February, pricked off early and potted up from boxes to 3-inch pots, being moved later to flower in the 7-inch size. Cool conditions are required for these as for practically all the outdoor plants named.

PENTSTEMONS.—These are not often grown in pots, except by nurserymen for exhibition, but given a good bold variety they make a striking display. Strike cuttings in a cold frame in the autumn, pot up in 3-inch pots in the spring and move on to 6-inch. This method of culture also provides good plants for the beds.

PETUNIAS.—These were at one time recognised as greenhouse plants, but of late they have lost favour both in greenhouse and garden. There is no reason why they should not again grow into favour, as I think they will when some of their newer rivals have become stale. They can be propagated from seeds or cuttings in the spring and grown along in the same manner as plants for bedding.

STOCKS.—Stocks of the intermediate section are now so largely used for the greenhouse that they may almost be classed as greenhouse plants. Seeds should be sown from June to August and be pricked off three in a pot to be eventually worked on to 6-inch or 7-inch pots. When about three inches high pinch the points out and take up about three growths per plant. June sowings will usually give stocks at Christmas, with a succession from those sown in August, but during a mild autumn, such as that of 1913, they cannot be prevented from flowering much earlier. Ten weeks' stocks may be grown for the purpose, but most firms now catalogue a selection of winter-flowering

stocks, good varieties among them being Crimson King, Beauty of Nice, Riviera Market and Queen Alexandra.

SWEET-PEAS.—By gentle forcing, sweet-peas may be had in flower in April and May. Sow seeds in September in boxes or pots and put five or six in large pots about Christmas. By keeping them in a cold, light, airy house and staking them when they need it, they will produce quite a good supply of flowers before they can be had outside.

VERBENAS.—When grown for the greenhouse these are best propagated by means of cuttings rooted under cold conditions in the autumn, or over a hotbed in the spring. The great enemy is mildew, which may be kept in check to some extent by dusting flowers of sulphur over the foliage. Verbenas come fairly true from seed—even that beautiful variety, Miss Willmott, can be had almost true to colour from seeds. These should be sown quite early in the year.

VIOLAS.—Though not often grown in the greenhouse, violas would be a pleasing picture there for a change. For this purpose cuttings should be rooted in July or August and grown along three in a pot to flower in a 5-inch or 6-inch pot. Keep them as cool as possible without actually being in a cold frame.

VIOLETS.—Violets are usually grown in frames, though they do remarkably well in pots. Split up the old plants when they have finished flowering in the spring and plant them in good, rich, deeply trenched soil, where they will get partial shade. Here they may remain until August, when the frame should be prepared for them. Put a load of heating material in the bottom, and after treading it firmly, cover with good rich soil, setting the plants about nine inches apart at such a height that the leaves nearly touch the glass. Keep the lights off on all warm days

and allow plenty of air at all times, only excluding frost (by covering with mats or litter), so that the flowers are not spoiled nor the plants checked. Decayed leaves must be regularly picked off and the soil may be loosened. If growing healthily, give a dusting over the surface with Clay's fertiliser. The violets must be watered when they need it, choosing a bright sunny day for the work.

WALLFLOWERS.—If potted along during the autumn, wallflowers will give quite a nice lot of sweet-scented flowers during the early spring months before they would be available outside. I do not advise that all these subjects be grown in preference to what we might call real greenhouse plants, but they are, I think, well worth growing, as a change from the general run of plants. Each season it would be a good plan to grow a batch of two or three of the subjects named. It will surprise many to know how well these plants will grow under really good cultivation.

CHAPTER XI

OTHER WORTHY PLANTS FOR THE GREENHOUSE

I HERE intend to give very brief notes on other greenhouse plants not already mentioned. The list I do not claim will be anything like complete, for I wish this to be a practical and popular rather than a botanical book, and I think my space can be better utilised by giving prominence to the plants that are likely to be grown and omitting those which are not essential to a beautiful greenhouse and which not one amateur in a thousand will be likely to grow.

Before discussing these plants it may be well to say that, unless stated otherwise, ordinary potting soil made up of loam, leaf-soil and sand will suit these plants. As regards the temperature needed, "warm" will mean 60° to 70°; "cool," 50° to 60°, and "cold," 40° to 50°.

ABUTILON.—Beautiful foliage plant, sometimes used in beds. Can be propagated by cuttings or seeds in the spring. Cool.

ACACIA.—Very pretty flowering plants, mostly yellow. Grow from cuttings taken off in summer or early autumn and struck under cold conditions. Cold house. Varieties, *armata* and *pulchella*.

ACALYPHA MUSAICA. A pretty foliage plant useful for house or table. *A. Sanderiana* has green leaves but beautiful drooping tassel-like flowers, rendering it distinctly ornamental. Increased by cuttings in warm propagator. Warm house plants.

ACHIMENES.—Pretty flowering plants, doing well in

baskets. Start in spring, dry off after flowering. Eight or nine corms to 6-inch pot. Cool house. Well worth growing.

AGAPANTHUS.—Usually grown in tubs for standing outside during summer. May be grown in large pots. Keep free from frost, feed well, and divide the plant every fourth year by chopping or sawing them apart.

ALOYSIA CITRIODORA.—Sometimes called lemon-scented verbena. Practically hardy, but sometimes grown in a cold house for mixing with cut flowers. Propagated by cuttings put in in spring or practically at any time.

ALLAMANDA.—A stove house climber with pretty yellow flowers. Sometimes grown as a bush plant. Propagated by spring cuttings. Being grown under warm conditions, is subject to attacks of mealy bug.

ANTHURIUM.—Stove plants belonging to same order as Calla lilies and having coloured flowers resembling them, but with ornamental and richly veined leaves. Relish a peaty soil and plenty of drainage. Propagated by division. The bright small-flowered and green-leaved *A. scherzerianum* is most commonly grown.

ARAUCARIA EXCELSA.—A pretty pot plant for a vase in the house. Amateurs are advised to buy their plants, though cuttings may be taken from the top growth. Grow under cool conditions and be careful not to overpot it.

BALSAMS.—Known to gardeners as impatiens. Sow seeds in warm house in spring and grow along under cool conditions. There are many pretty colours among them.

BORONIA.—Propagated—often with difficulty—from short growth in summer or autumn, and grown along in a somewhat peaty soil.



ARAUCARIA EXCELSA. ONE OF THE BEST ROOM PLANTS. IT IS
VERY EASILY GROWN

WORTHY PLANTS FOR GREENHOUSE 131

BOUGAINVILLEA.—A beautiful climber. Will do well in greenhouse or conservatory, though usually grown in a stove. Propagated by cuttings in heat. Prune hard back in autumn. Feed established plants with liquid cow manure and top-dress each year with good loam. Useful for cutting.

BOUVARDIAS.—These are not now such general favourites as they used to be. They are propagated from cuttings which can usually be had in plenty during the spring from cut-back plants. A warm propagator will be needed, and the plants are best grown under cool conditions. Dry off for a time after flowering.

BROWALLIA.—Showy annuals raised from seed which claim attention when well grown. Not often seen, however, but could well be grown for a year by amateurs looking for something a little out of the common.

BRUGMANSIA.—See *Datura*.

CACTUS.—These can scarcely be recommended as plants easily grown and making a good display. Many may be propagated from cuttings, but some are grafted. Good loam made open with sand or road grit and sweet with charcoal will suit most kinds.

CAMELLIAS.—Generally grown on a wall or as tub plants, and need little attention beyond sponging. Be careful about water, shift the plants as little as possible, but when making up soil let it be good turfy loam and fibrous peat with a liberal supply of charcoal. Syringe freely and thin out growths which crowd.

CAMPANULA.—Besides the chimney campanula already noted, I must recommend *C. isophylla*, which make a pretty plant in a basket or as an edging plant hanging over the side of the staging. Propagate by cuttings or division, and grow in cold house.

CANNA.—Besides being useful in beds, cannas make a

fine display in the greenhouse, mainly for the sake of their beautiful flowers. Propagated by division or by seeds which, being extremely hard, should have an opening filed in them before sowing. Dry off after flowering and winter in a cold house. During growth they need cool treatment.

CAREX.—A very pretty grass used among flowers in the greenhouse. Propagated by division.

CHORIZEMA.—Will be liked by some, though not a very showy plant. Propagated by seeds and cuttings, and may be grown as dwarf plants or over wire shapes. Relishes a cold temperature.

CLERODENDRON FALLAX.—A beautiful plant requiring cool to warm treatment. It may be grown from seeds or from cuttings, and if kept free from mealy bug will develop into a showy plant of rich scarlet. C. Balfouri makes a beautiful display as a pillar plant in a warm house. A fair amount of peat should be used in the soil.

CLIVIA.—Known also as *Imantophyllum*. A beautiful and easily grown plant for the cool greenhouse. It requires frequent sponging and plenty of liquid manure, but seldom requires potting. Quite large plants can be grown, and when well established they are very reliable and look well even when not in flower. Propagate by division.

CRASSULA.—Known also as *Kalosanthe*. Rather a heavy plant which is not favoured in these days. Cuttings taken off in spring and summer root very freely, and large plants may be grown by putting three or four in a pot and working them on to 8-inch pots. Cold house.

CRINUM.—A plant of a bulbous character, not very elegant in itself, but with a beautiful flower. It resents root disturbance but will benefit from an annual top-



DATURA KNIGHTII. DOES WELL AS A GREENHOUSE CLIMBER IF TREATED GENEROUSLY

dressing. Propagate by division and grow mostly in a cold house.

DATURA SUAVEOLENS.—Does well in a cold greenhouse if fed liberally, and will produce an abundance of beautiful fragrant flowers which I have heard described as gramophone horns. The plant is grown pretty easily from cuttings.

DIOSMA ERICOIDES.—A pretty and fragrant plant resembling a boronia, but it can be rooted much more easily from cuttings. Useful for dotting along the edging of a cold house.

DIEFFENBACHIA.—A warm-house plant grown from cuttings for the beauty of its foliage. Cutting up the stem in the same manner as for dracænas will produce young plants in a warm propagator.

DIPLADENIA.—A stove climber with beautiful flowers ; suitable for growing up the roof of the house. Cuttings of young growth root very early. Plants should be potted or boxed with soil containing peat, charcoal and strong turf loam.

DIPLACUS GLUTINOSUS.—Also useful for growing up the roof or the pillars of a cold house. Strike cuttings in the usual way, and if planted out give good lasting soil.

ERICAS.—Would become great favourites if they were better known and more easily grown. They require a peaty soil and great care in watering on account of their fine roots. Propagated from cuttings and grown in a cold house.

EUCHARIS.—Splendid subjects if they can be kept free from the dreaded eucharis mite. They relish a warm, moist atmosphere with plenty of shade, a strong soil and, when freely growing, plenty of liquid manure. They are also frequently troubled with mealy bug and scale.

When they become too large split up and repot; or a far better plan is to split up one-third of the collection each year.

EULALIA.—A very pretty grass, useful for mixing with flowering plants, especially *E. japonica variegata*. *Eulalia zebrina* is worth growing. Splitting up the plants is most satisfactory. Cool house.

EUPATORIUM.—Several of these are well worth growing in the greenhouse to flower in the spring. *Ageratoides*, *riparium* and *petiolaris* are recommended. Cuttings are easily procured when the plants are cut back after flowering. Cold-house treatment will suit them, and they do not mind being pot-bound if kept well watered.

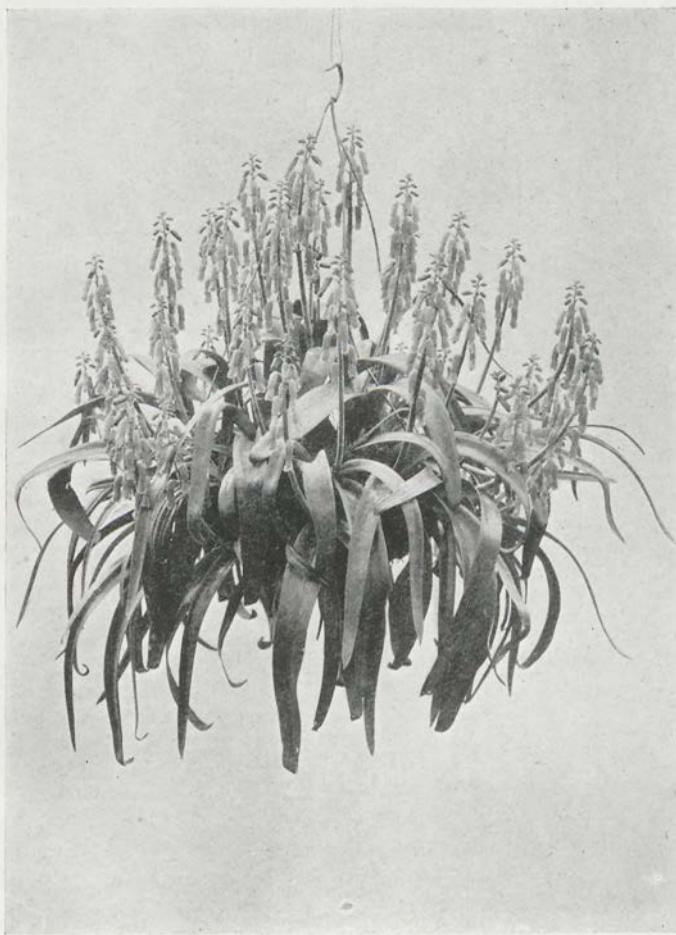
EUPHORBIA PULCHERRIMA.—Known better as Poinsettia. This has already been dealt with. *Jacquiniaeflora* can be grown from cuttings with a heel, struck in a brisk heat, and grown along three in a pot in a warm temperature.

FITTONIA.—A small ornamental-leaved warm-house plant propagated by division. Useful for the front of a miscellaneous group.

FRANCOA RAMOSA OR “**BRIDAL WREATH.**”—A neglected plant which, though bearing rough treatment, merits much better. Cold-house treatment and propagation from cuttings. Keep on the dry side.

GARDENIA.—A flowering plant well worth growing on account of its beautiful fragrance and its use for the buttonhole. It has the reputation of being a dirty plant on account of its being so subject to mealy bug. To keep the stock young, cutting should be put in during autumn or spring. Warm house.

GLADIOLUS COLVILLEI VARS.—Bride, Blushing Bride and Peach Bloom are more often found in greenhouse than garden. Buy fresh bulbs, pot up in autumn, introduce



LACHENALIA TRICOLOR—A VERY PRETTY PLANT FOR BASKETS
OR POTS

WORTHY PLANTS FOR GREENHOUSE 135

to cool greenhouse in December and flower in May and June.

GLORIOSA.—Pretty climber for the warm house. Propagated from offsets. Prefers a peaty soil.

HABROTHAMNUS.—A cool-house climber propagated from cuttings.

HEDYCHIUM.—Grown in same way as cannas by division of roots. Dry off after flowering.

HUMEA ELEGANS.—Often used as a dot plant outside. It has a graceful grassy flower. Sow in summer and prick off, keeping young plants on dry side during winter and free from aphides. They are sometimes difficult plants to do well.

IPOMEA.—A beautiful climber of the convolvulus family which does well on a greenhouse pillar. Sow seeds, prick off, pot on and train up the pillar.

ISOLEPSIS GRACILLIS.—A pretty grass, used often as an edging to a staging. It may be used in a warm or a cold house. Propagate by division of old clumps. It likes plenty of water.

IXIAS.—Pretty bulbs giving a variety of colours. Grow from offsets and keep in a frame as long as possible. Like other bulbs, they require drying off.

IXORA.—A warm-house plant valued alike for its flowers and foliage. Propagated by cuttings put in a brisk bottom heat.

LACHENALIA.—A very pretty subject for a basket as well as for pots. Pot up bulbs in autumn and grow along under cool conditions. Leaves are distinctly pretty. Offsets form in abundance and may be grown on to form flowering bulbs.

LANTANA.—Grown much in the same way as heliotrope by cuttings rooted in autumn and spring and from plants cut back. Grows well in a cold house.

LAPAGERIA.—A beautiful greenhouse climber giving pretty bell-shaped flowers in red or white. They are best grown in a small made-up border. Plants may be bought, or propagated by layering. Cold conditions are most suitable.

LILIUMS.—In some respects these are forcing subjects, but as I did not deal with them specifically then I may spare a few words here. Most of the kinds used for pot work are potted up in autumn. The bulbs (three or four in a pot) are just covered in a soil made up of loam, peat, leaf-soil and sand. Top-dressing will be needed, so at first the bulbs should be set half-way down the pots (8-inch and 9-inch size). Grow coldly those intended for autumn and force in a humid atmosphere those for spring flowering. Plant in the garden after flowering. *Auratum*, *longiflorum*, *speciosum* and *Harrisii* are the more generally grown.

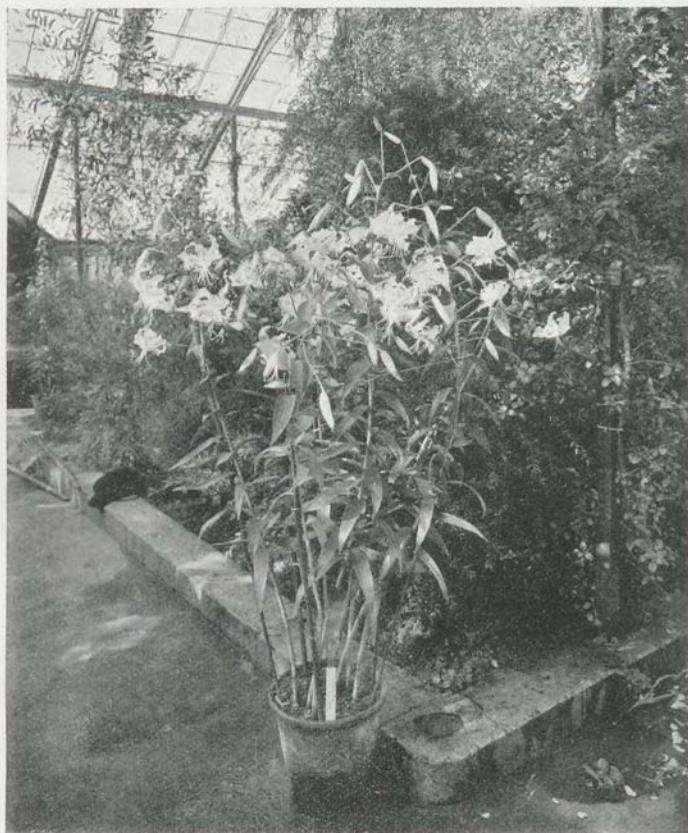
MIMOSA PUDICA.—This, known as the “sensitive plant,” is grown on account of its curiosity, the leaves drooping whenever they are touched. Sow seeds in heat but later cooler quarters will do.

MOSCHOSMA RIPARIUM.—With flower somewhat resembling a spiraea; is grown from cuttings inserted in spring and needs cool treatment. Though recently introduced, it is not destined to become a great favourite.

MUSK.—An old-fashioned plant which deserves to be grown other than in the cottage windows. Grown from seed and in cold house.

NERINE.—A beautiful bulbous plant, increased from division but resenting interference. Hence should be divided only once in four years. Rest after growth is completed and water freely with liquid manure. Cool temperature.

NÆGELIA.—Grown in the same way as gesnera.



A FINE EXAMPLE OF *LILIUM SPECIOSUM ROSEUM*

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NERIUM (OLEANDER).—A plant often met with but seldom grown well. Grown from cuttings. Cool temperature.

OLEANDER.—See above.

ONCIDIUM.—A fairly popular orchid, most of them needing a cool to warm temperature. See notes on Orchids. Varieties: *Forbesi*, *papilio*, *sarcodes* and *varicosum*.

ORANGE TREES.—These are seldom grown by small owners. Once established they require nothing beyond protecting from frost, watering carefully and frequently sponging.

PANCRATIUM.—A beautiful, fragrant warm-house plant grown on similar lines to the *eucharis*, which it resembles. Propagated from offsets. When well established requires plenty of water.

PANDANUS.—A graceful variegated foliage plant of the pine family. Increased from offsets, which should not be detached until they have a few roots. Useful as a table or room plant. Warm house.

PANICUM.—A pretty little foliage plant often used as an edging to the staging. Very easily propagated from cuttings, which should be done frequently. Warm house.

PEPEROMIA.—A pretty little variegated dot plant for the warm house. Propagated from cuttings.

PLUMBAGO ROSEA.—Usually grown under warm conditions to produce flowers for table and room decoration. Root cuttings in a brisk bottom heat. *P. capensis* may be grown as a greenhouse climber or as a tub plant and be cut back before breaking into growth. It is very pretty and is often employed in the garden.

PTERIS.—See *Ferns*.

SAINTPAULIA.—A pretty little plant with violet-like flowers, often used as a dot plant in the warm house.

Can be propagated by leaves cut off and put in any moist, open material in a warm propagator.

SIBTHORPIA EUROPEA.—A pretty little evergreen creeper, useful for edging the staging or covering the floor in either warm or cold house. Easily propagated by division. Requires renewing occasionally. Does well also in a window as a hanging plant or for covering the soil of plants in tubs, boxes or large pots.

SMILAX.—Best grown from seeds and trained up straight pieces of cotton or thread, one piece of smilax to each thread. Most useful for table decoration. It may be had with small or large leaves.

SOLANUM CAPSICASTRUM.—An ornamental plant grown for the beauty of its berries. May be propagated from seeds and grown along three in a pot. Must not be allowed to flag.

SPARMANNIA AFRICANA.—A cool-house plant propagated from cuttings. Very easily grown but only ornamental when grown well.

STEPHANOTIS.—A very fragrant climber for the warm greenhouse. Is often a prey to mealy bug. Propagate in brisk heat from cuttings in spring.

SWAINSONIA.—Can be very effectively used for clothing the rafters of a greenhouse. Grow in a cool house and propagate from cuttings. Sometimes used for flowering outside.

TORENIA.—A pretty plant for the cool house, grown from seeds or cuttings.

TRACHELIUM CÆRULEUM.—Well worth growing under cold conditions. It can easily be grown from seeds sown early in the year. Flowers are very graceful.

TRADESCANTIA.—Often used as an edging plant, a basket plant, or for growing on a mossed wall or beneath

WORTHY PLANTS FOR GREENHOUSE 139

the staging. Grows easily from cuttings, put in at any time.

TUBEROSE.—A very sweet-smelling flower grown from bulbs potted up in the autumn and worked through the greenhouse in batches. Often badly affected with red spider. Bulbs are usually thrown away after flowering.

VALLOTA (SCARBOROUGH LILY).—A bulbous plant well worth growing but dislikes much soil disturbance. Break up only every second or third year. Soil such as advised for *hippeastrum* will suit these well.

CHAPTER XII

PLANTS FOR VARIOUS PURPOSES

CLIMBING PLANTS

A LIST of these suitable for the greenhouse would be very extensive if I were to name all, but I think the purpose of this book is best served by giving only those which the amateur is most likely to be successful with. It must be remarked that climbers on a wall or on pillars are distinctly ornamental if not overdone. Certainly they can be overdone on the roof, especially if the house be used for growing plants as well as for showing them, as they naturally give a large amount of shade. Wherever they are grown some good soil should be made up for them, as it is usual to leave them undisturbed for several years. Whether the plants be grown in a border on the floor-level, or in a brick enclosure brought level with the staging, or in pots, the same class of soil will suit them. Good fibrous turf loam should form the base, and to this may be added leaf-soil, preferably from oak leaves, mortar rubble, wood ashes and charcoal. This will tend to keep the soil sweet. At the time of making up, some well-rotted manure should be put in, and as this becomes exhausted the plant will have to be fed by means of liquid manure and top-dressing. If climbers in the greenhouse are to be successful it is important that they be kept clean by frequent syringing and, where they need it, by sponging of the leaves.

The plants which I recommend as being good doers are :

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acacia, allamanda, Asparagus plumosus, begonia (climbing sorts, of course), bougainvillea, brugmansia (or datura), camellia, clerodendron, diplacus, dipladenia, Ficus repens, fuchsia, geraniums, habrothamnus, heliotrope, hoyia, ipomea, lapageria, passion flower, plumbago (capensis and rosea), rose, smilax, stephanotis, streptosolen, swainsonia and tradescantia.

A very pretty wall feature may be made by clothing a wall with ferns. This is by no means a difficult matter. Some half or three-quarter inch wire netting is tacked up about three inches from the wall, and in the space thus made peat loam and charcoal are put in firmly, and in this the little ferns and other plants are set. It will be necessary to give it a thorough watering after planting, and frequent syrings at other times. The easiest method of making this feature is to fill in the space as the wire netting is being put on, putting soil at the bottom first and working upwards. Such plants as the commoner of the small ferns, selaginella, Rex begonias, fittonias, peperomeas, tradescantia, panicum, are admirably suited for this method of covering a wall.

SOME PLANTS FOR EDGING

Practically any dwarf plant will do for edging a group of plants in the greenhouse. If there be a staging it will look better to have a hanging plant, such as Isolepsis gracilis, Nepeta gleckoma, panicum or selaginella. Little plants such as Saintpaulia ionantha, Caladium argyrites, Nertera depressa, pilea, musk and small ferns also look decidedly well at the edge of the staging or the foot of a group. I think it, in fact, preferable to a formal edging that these dwarf plants be dotted along the front.

BENEATH THE STAGING

Most greenhouse owners will at some time glance beneath the stagings and bewail the waste of space there.

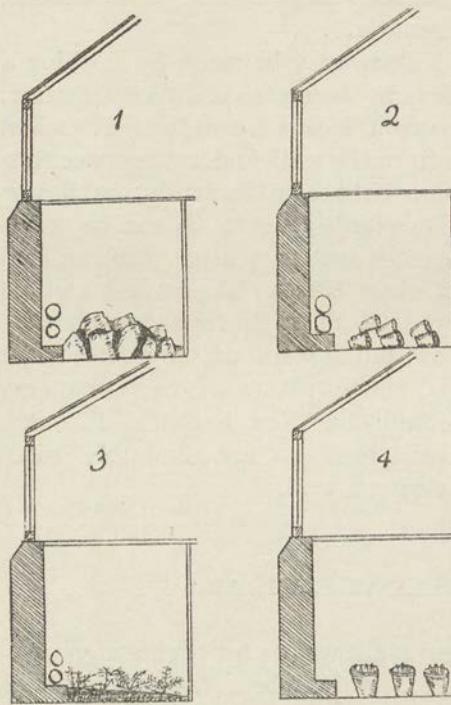


Diagram 28.—Using space beneath staging: 1. Ornamental rockwork. 2. For drying off pot plants. 3. For ferns. 4. For starting bulbs.

But it need not be wasted, for it can be beautified with suitable plants or put to a useful purpose for drying off plants, etc. Unless the owner is a skilful plant grower, I would not advise him to try to use it at any time for flowering plants. Those who know their plants well, and know to a nicety how much rough treatment a plant will stand, may make use of the space with advantage at times of pressure, but it is not a practice

which can be commended. Besides there being much shade in such a position there is the constant drip from the staging above. When plants are dried off in that position the pots should be laid on their sides. Trade-

scantia, helxina, selaginella, the commoner maidenhair ferns, and some small coleuses will do fairly well in this position. If a few stones are set in the form of a rocky mound in this position and the spaces between the stones planted it will give a very pleasing effect.

HANGING BASKETS

It is scarcely possible to have a greenhouse properly bedecked with flowers without hanging baskets. There are, perhaps, climbers on the roof, and these hanging baskets form a connecting link between the canopy of flowers above and the forest of flowers below. There are many plants naturally endowed with that pendulous habit which is well-nigh essential to suitability as a basket plant. Among them we may name ivy-leaved pelargonium, heliotrope, lachenalia, ferns in great variety, Asparagus sprengeri, achimenes, begonias, fuchsias, cœlogynes, Campanula isophylla, schizanthuses, streptosolen and tradescantia. Several plants should be clumped together for the purpose of forming a full basket. The baskets, preferably of wire, should be well lined with sphagnum moss and fibrous peat before the plants or bulbs are put in. By tying the trailing shoots in place and turning the baskets occasionally it will be possible to cover the wire quickly. A too formal appearance should be avoided. In other respects the culture does not differ from that of pot plants.

Too often the difficulty of watering is made an excuse for neglecting the plants. The baskets, which in most cases will be set over the pathway, must, of course, be set sufficiently high to render walking beneath them comfortable, and unless some special arrangement be adopted steps will have to be used to reach them. But usually with a slight

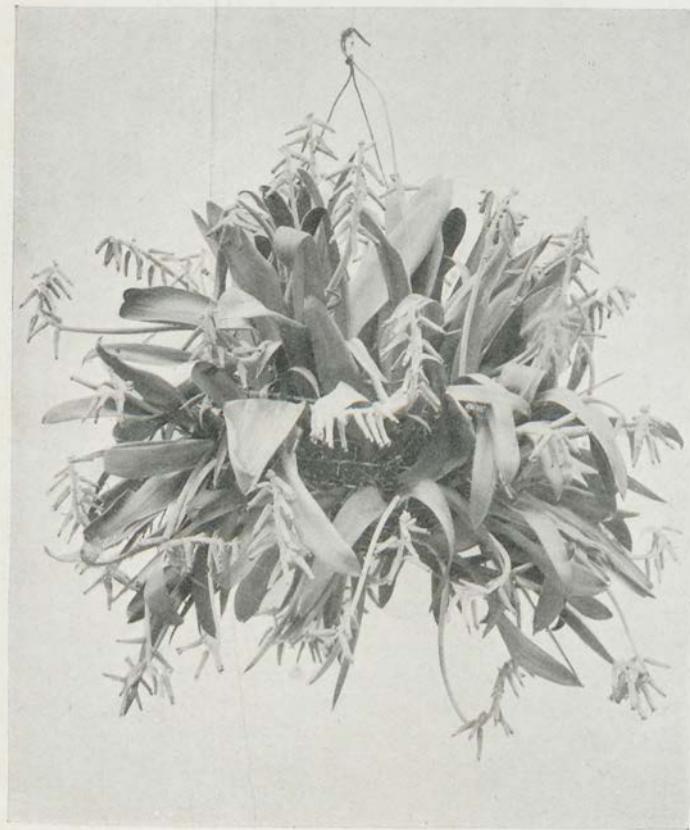
exercise of ingenuity it will be possible to hang them by strong sash cord running over a pulley so that they may be let down to a convenient height for watering and secured there until watering is done, when they may be again pulled up.

THE GREENHOUSE IN WINTER

In the dull days when the outside garden is cheerless we want the greenhouse to look gay. At such a time bright, warm colours have a decided charm. We find these well illustrated in the deservedly popular begonia, *Gloire de Lorraine*, in *Poinsettia pulcherrima* and its modest relative, *Euphorbia jacquiniæflora*, in the grace of that most useful orchid, *Calanthe Veitchii*, and in the dignified clivia, as we must now call our old friend the *imantophyllum*. The colours lending warmth and brightness are also found in cyclamen, primulas (*stellata* and *obconica*), in the zonal pelargonium, the winter-flowering stocks, and in forced batches of hyacinths and tulips. Chrysanthemums will brighten the house till well-nigh the end of January, when their place will be taken by forced plants, and this brings us to the

GREENHOUSE IN SPRING

Azaleas, lilacs, spiræas, deutzias, dielytras and the many varieties of hyacinths, tulips, narcissi and jonquils. Lilies of the valley may now be had at any time of the year from retarded crowns, but by forcing natural crowns under cooler conditions we get better results at this time. To these we may add arums, *Coleus thyrsoideus*, schizan-thuses, eupatoriums, cinerarias, Clarkias, *cytisus*, stocks, spiræas, deutzias and lachenalias.



LACHENALIA PENAULA. A SPLENDID PLANT FOR MAKING UP A
WELL-FLOWERED BASKET

PLANTS FOR VARIOUS PURPOSES 145

IN SUMMER

At this season we do not want so rich a display, as there are now so many flowering plants outside. The most suitable subjects for use in the summer greenhouse are begonias, gloxinias, pelargoniums, geraniums, *Trachelium coeruleum*, cannas, lobelia, Canterbury bells, celosias, browallias, heliotrope, fuchsias, *Clerodendron fallax*, campanulas, hydrangeas, border carnations and Malmaisons. Surely with such a list as this the summer greenhouse may be gay.

IN AUTUMN

The difficulty of securing a display is not great, for we still have a nice lot of coleuses, and there will be also ivy-leaved geraniums, early chrysanthemums, salvias (blue and scarlet), streptosolen, and many of the plants just mentioned as being useful during the summer months.

CHAPTER XIII

FORWARDING BEDDING PLANTS IN THE GREENHOUSE

THOSE who possess a greenhouse and frames have a great advantage over others in beautifying their front beds and borders in the summer months. There are so many plants which can be most successfully raised under glass and be afterwards planted out that to deal separately with each would take up an unwarrantable amount of space. Happily they undergo very much the same treatment, and may thus be conveniently grouped together. Thus we have those which are raised from cuttings or from seeds in the autumn; those which are much tenderer and are raised from cuttings in autumn and spring, and those which are raised from seeds sown under glass in the spring.

Among the first section we might mention sweet-peas, pentstemons, antirrhinums, violas, calceolarias and marguerites. These may be grown entirely in a cold frame. Sweet-peas will be best sown in boxes or pots. I prefer boxes myself, but probably pots will be found most useful for small growers. The seeds are sown in these in the usual way and put into a cold frame. Except for a week or so after being put there they are kept uncovered as much as possible, the only time the lights are put on being when it is raining or when frosty; for although sweet-peas will withstand frost, yet it is not a good plan to allow them to be subjected to it. Scarcely any water will be needed during the winter months. The other plants men-

BEDDING PLANTS IN GREENHOUSE 147

tioned in this category are rooted from cuttings put in during the autumn. A frame should be prepared by putting a layer of leaves in the bottom and covering with three or four inches of finely sifted sandy soil pressed quite firmly. The soil should then be covered with sand and the frame will be ready for putting the cuttings in. These may be prepared in the usual way and inserted in lines at a distance of two or three inches apart. It will be necessary to provide other covering than the light during severe weather, and if it should be found that the soil has frozen the young plants may often be saved by keeping them covered until they have thawed. In the spring the soil should be loosened about these young

plants, and by free ventilation and careful watering they should be encouraged to grow. They may be planted out in April and early May, or may follow after the spring plants have been got off. By growing plants in this way

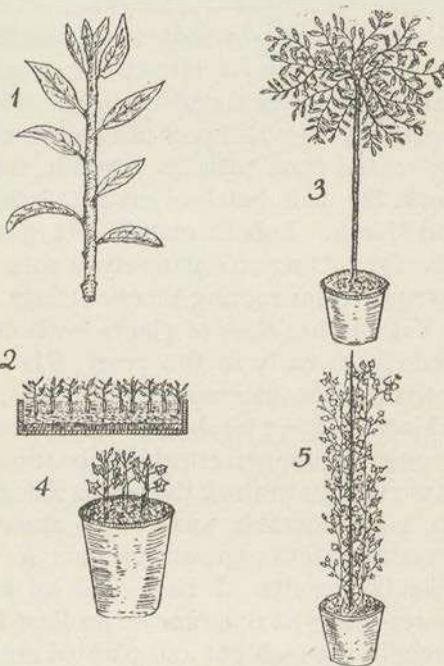


Diagram 29.—Growing Heliotropes and Ivy-leaved Geraniums into tall plants: 1. Cutting of heliotrope. 2. Box of cuttings. 3. A standard heliotrope. 4. Cuttings of "ivies"—three in a pot. 5. Tall columnar plant of ivy-leaved geranium.

we do away with a lot of congestion in the greenhouse during the spring months.

The other class of plants alluded to are tender subjects such as geraniums both zonal and ivy-leaved, heliotrope, lobelia, ageratum, fuchsias, and such as need to have cuttings taken of them either in autumn or spring. Geraniums are best rooted early in the autumn in a cold frame and brought into a warmer structure when the frames have been found too cold. They should be potted separately in 3-inch pots in February. The other subjects are rooted from cuttings taken in the autumn to supply stock, the main batch of cuttings being taken in February and March. Lobelia may be left in boxes, but heliotrope pays for potting up separately in pots. A warm propagator is required for rooting these cuttings in the spring.

Yet another class of plants for bedding are raised from seeds sown early in the year. These are stocks, asters, antirrhinums, *nicotiana*, *salpiglossis*, alyssum and such subjects which, while being easily raised from seeds to flower during the summer, are able to be transplanted from boxes. Often it pays to work the plants along in pots, but it takes up a considerable amount of space and also of time. Certainly stocks grown in pots for planting out give splendid results. I have had as many as sixty-three flower-spikes at one time on an East Lothian stock grown along in a 5-inch pot and planted out. Seeds of all these plants should be sown thinly in a warm house, and the young plants should be pricked off before they become crowded. The notes on this subject, as well as on hardening off, to be found in the section devoted to Greenhouse Work, will bear perusal in connection with this subject.

Annuals are also raised in lines in a frame over a very mild hotbed, and are thus kept out of the greenhouse. It may here be said that the making up of a hotbed frame

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will afford a good opportunity for raising seeds and cuttings and thus the greenhouse space will not be so severely burdened. Even in these days, when hardy plants have gained the ascendancy, the grower who has a greenhouse has a considerable advantage in stocking his flower garden.

Hollyhocks, border carnations, border chrysanthemums, dahlias, salvias, begonias and many similar subjects are brought along in the greenhouse to be hardened off and planted outside. Up to that time they are grown on practically the same lines as advised for their inside culture. Dahlias are not usually started inside unless it is desired to take cuttings of them.

PART III

FRUIT UNDER GLASS

CHAPTER XIV

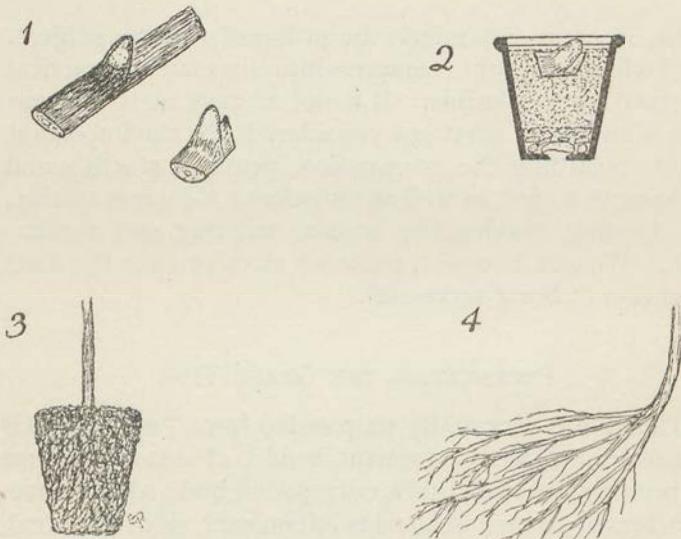
AN EPITOME OF VINE CULTURE

I CAN, of course, give merely the outline of so large a subject, but I will endeavour to compress into this as much practical information as possible. It is not an easy matter to put into a few pages what one considers to be the important points regarding the propagation, pruning, starting and training of a vine, as well as remarks on thinning, storing, top-dressing, making the border, watering and ventilation. We can, however, make an attempt with the fixed intention of being successful.

PROPAGATING THE GRAPE VINE

The vine is very easily propagated from "eyes." This means that a piece of dormant wood is chosen at the time of pruning and from this is cut a sound bud; about three-quarters of an inch of wood is left on each side of the bud, and this is put into some sandy soil in a close propagator having a brisk bottom heat. In the ordinary way it will not be long before roots are thrown out and the growth also starts. The young vine may then be removed from the propagator but still be kept under close observation, until it has filled the pot with roots. It is usual then to work it along under similar atmospheric conditions to that advised for vines in full growth. In due course it will grow and require potting on in good strong compost in several pots until a 9-inch or 10-inch is reached. Let it be distinctly

understood that it is very unwise to put a young plant into a border before it has made a good mass of roots. Even in the best made border under the best possible conditions this would be too uncertain a method for good growers to adopt. It is scarcely likely that the young plant will get further than a 7-inch pot the first year, but it can be potted into a larger size the next year. When the plant becomes



*Diagram 30.—1. Vine eye or bud prepared for putting in pot as at Fig. 2.
3. Pot vine to be planted. 4. Roots washed and spread out.*

of sufficient size for planting it should be shaken from the pot and be held in a tub of water to moisten thoroughly the old ball and get away the soil. Every particle of soil should be carefully washed away, so that when planted the roots may be spread out to their utmost limit. Thus far the beginning of the vine, but I would strongly urge every amateur to pay a few shillings for a pot vine grown by a specialist. He will by this means have a fair start, which

he probably would not if he had never propagated a vine before.

THE VINE BORDER

Considering that under skilful treatment a vine should flourish for a great many years, it is all-important that it should have a good border made up for it. Now without arguing the perennial question as to the value of inside and outside borders I will only say that I will advise only an inside border. If the subsoil be of a retentive clay I would certainly advocate a concrete bottom, with a slight fall to a line of drain-pipes. The making of a concrete bottom is a task which any intelligent man may undertake. Excavate the soil to the requisite depth, say two and a half to three feet, and slope the ground sufficiently to take away the water to the drains. Then a layer of brick rubble may be put on and covered with ashes. Over this the concrete may be put. A barrowful will do several yards. Good concrete can be made by mixing four barrowloads of clean gravel with one bag of cement, turning it over well while dry and again when wet. Only a few days will be needed for it to set sufficiently. Some drainage material may then be put on and be covered with clean straw. Fresh turves are laid over this and the compost for the border is then put in.

This compost may consist of freshly cut fibrous turf or loam, mortar rubble and half-inch bones. If the best possible border is to be made I would advise the use of loam procured from Kettering, Walton Heath, Banstead, or Cranleigh, but usually some of a sufficiently good fibre can be obtained locally. This should be chopped up into fairly large pieces, for it is really the fibre we need. If a viney় is to be planted I would advise that only a part of it be done at a time, say four feet the first year and two

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feet each year afterwards until the make-up of the border is completed. A border made up on these lines should, with the usual top-dressing each year, last for a considerable number of years. Watering with liquid manure may be done after the berries have stoned.

STARTING A VINYERY OR VINE

Usually the beginning of February will be quite time enough to start a vinery, unless very early grapes are desired. Started in February, grapes should be nicely ripe from such vines by the end of July.

The main points in starting a vine into growth are to make sure that it is well watered, that the house is washed, the vines cleaned and the border top-dressed. To ensure cleanliness the whole structure will need to be well washed with hot soapy water. When this has been done the walls will need whitewashing, and the border may be top-dressed with loam, mortar rubble and a fair sprinkling of a good chemical manure such as "Le Fruitier." It will generally be found necessary to take off an inch or two of the old soil and wheel it into the kitchen garden. When the roots are reached the top-dressing may be put on—the object being to entice the roots to the surface. The vine itself had better be washed with "Gishurst Compound," but this, like all other insecticides, should be kept clear of the buds. Scraping the bark of the vine is a practice which can only be encouraged when there has been an attack of mealy bug.

Before putting heat into the house it is best to keep it fairly close for a week or two. After this a temperature of 45° to 50° should be maintained at night, with a corresponding increase from sun-heat during the day. Syringing of the vines is advised each day at about nine A.M. and

two P.M., at which latter time the structure should be closed to keep in as much sun-heat as possible. For young vines, or those started into growth quite early, it is usual to tie the rods down horizontally along the house in order that the lower buds will start into growth at the same time as those at the top, which is found not to be the case unless this precaution is taken.

TRAINING A VINE

To beginners there always seems to be some great mystery in the training of a vine. When I was in my teens I had just that feeling, but with a little knowledge it is very soon dispersed. Perhaps I had better begin with the autumn work of pruning, which is really the first beginning to put the vine in the way of starting in the spring. This is really a very simple matter. Every side growth or lateral is cut hard back to within two buds of its base. Only one growth will be required in most cases, but it is well to leave two buds, so that if one fails we can rely on the other. It is far better to use a knife than secateurs for pruning, as the latter has a tendency to split the growth.

Now in the spring both these buds will probably produce a growth, but as only one will be required the less desirable one should be rubbed out when about two inches long, giving the growth nearest the rod the preference of remaining if there is not much difference between them. When the growths are about three inches long the vine rods should be tied permanently in place, and we are at once confronted with the work of

TYING AND DISBUDDING

It must not be overlooked that the young growths are very brittle, and if not carefully handled when tying them

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down they will snap off either half-way along the growth or at the junction with the rod. To do the work well they should be eased down gradually until the growth can be securely attached to the wire. This may necessitate tying two or three times. One or at most two shoots should be

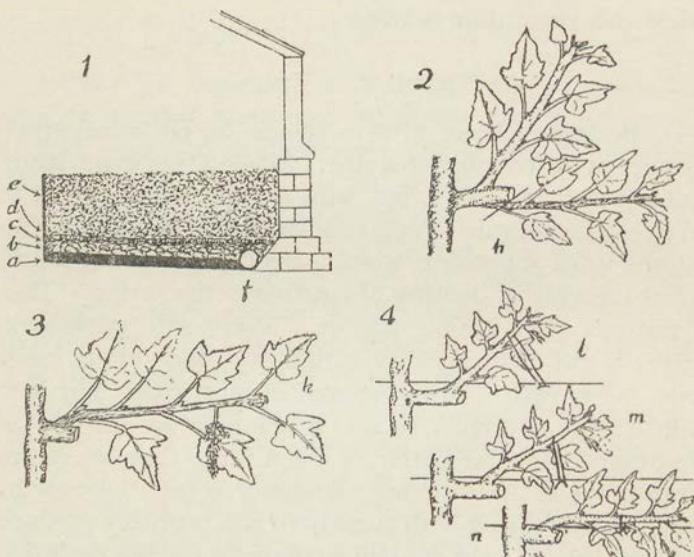


Diagram 31.—1. Vine border: *a*, concrete; *b*, rubble for drainage; *c*, layer of clean straw; *d*, layer of inverted turves; *e*, compost; *f*, drain pipe. 2. Vine growths—cutting out the weaker (*h*). 3. Stopping growth two leaves beyond the bunch (*k*). 4. Tying vine, first time *l*, second time *m*, finally *n*.

selected from each spur, and in the selection the growth which shows the best bunch, the healthiest appearance and the best position, should have the preference. Growths which are badly placed, are devoid of a bunch, weak in growth or flat in the stem should by no means be retained. After tying it is advisable to syringe for some time with less force, for if the growths are brought down rather tightly

there is always a danger of their snapping with forcible syringing.

SYRINGING AND DAMPING

From the time of starting the vine until flowering, syringing and damping of the border and walk with a rosed can should take place twice daily and the vines should be syringed from both sides and along their whole length. The ventilators should be closed shortly after two in the afternoon. A temperature of 45° to 50° at night, with a slight rise in the daytime, will be sufficient heat for some time. Sudden fluctuations of temperature must be sedulously avoided.

STOPPING THE GROWTHS

When the young shoots of the vine have been tied down the question of stopping will arise. Each growth should be stopped at the second leaf beyond the bunch, and the laterals and sub-laterals which afterwards arise will need to be pinched back to their first leaf. The leading growth on the vine might with advantage be left to grow undisturbed. This will tend to stimulate root action. Until the vines flower the damping and syringing should be done twice daily except on dull, cold days, when a light damping only will be needed. From the time the vines start to flower all syringing should be stopped, and except in the case of a severe attack of red-spider, no further syringing will be necessary throughout the season. To ensure free setting of the flowers a drier atmosphere must be aimed at by damping only once a day, and that at noon, by leaving a chink of air on the top ventilator all night, and by the use of a little more fire-heat during dull days. As a further means of ensuring success it is well to go over the

rods at noon each day and to give each a sharp rap to disperse the pollen or to go over each bunch with a rabbit's tail tied to a stick, gently brushing each one. This latter course will only be necessary in the case of shy-setting varieties, notable among which is the Muscat of Alexandria.

THINNING THE BUNCHES AND BERRIES

Once the flowering period has passed the damping two or three times a day should be resumed, and in a compara-

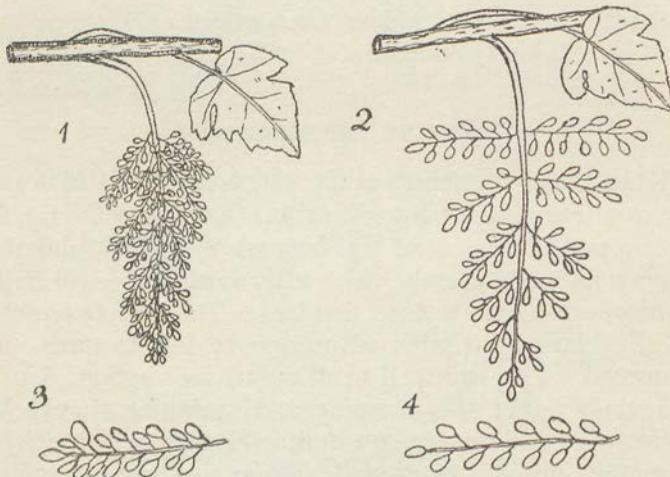


Diagram 32.—Grape Thinning: 1. Bunch unthinned. 2. Thinned bunch.
3. Unthinned shoulder. 4. Thinned shoulder.

tively short time the bunches and berries will have so far developed as to necessitate thinning. As to the number of bunches to allow to a rod, that will depend a great deal on the age, strength and length of the rod, and the size of bunch required. A fully established vine with a rod twelve to fourteen feet long could well carry twenty very

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decent bunches, and this may be taken as a guide. Having decided on the number of bunches to be left, the others may be cut out, but in the selection due regard should be paid to the position, the size, the shape and the fullness of the bunch as well as respect for the balance of the vine by having the bunches evenly distributed.

Unless the bunches are thinned the berries become small and packed closely together, with the result that they hold more moisture and are very liable to damp. Besides which the bunches are not so fine and the proportion of stone to fruit pulp is much larger. Grapes inside must certainly be thinned, though it is tedious work. Early morning and evening are the best times, because, being cooler, more work can be done in greater comfort. Considerable practice is needed to be able to thin grapes expeditiously and well. Primarily the leaving of the best bunches as described above has much to do with the after-appearance of the crop. Having made the selection, the shoulders of the bunch should be tied out with raffia grass and the thinning may then be undertaken. All small seedless berries should be cut out as well as those which grow inwards. Beyond that the best-placed berries should be retained, and in the case of the shoulders as well as the main bunch it is better to retain the point berries. If the berries stand out clear, so that no two are nigher than half-an-inch to one another, the bunch may be considered well thinned. All the little berries or flower stalks which have not set must be cut out, and in doing so care must be taken not to injure the berries which are to be left, with the points of the scissors. Special scissors are used for the purpose, and it is essential that they cut well at the points. A little monkey soap will be found useful for cleaning them occasionally.

STONING AND COLOURING

After the bunches have been thinned they will swell rapidly for a few weeks and will then remain at a standstill for some time, during which the stoning takes place. At the time of flowering, of stoning and of colouring it is inadvisable to defoliate the vines greatly, or it will cause an undue flow of sap to the bunches. As the summer advances more air will be needed from both top and bottom ventilators and closing the house may be delayed until four o'clock.

Once the first tinge of colour is seen a little air may be left on at nights, and as the colour deepens so may the amount of air be increased. At this period also the amount of moisture in the atmosphere will need to be diminished by damping less frequently until it becomes totally unnecessary. On no account must the vines suffer from lack of water at the roots, but it is unwise to flood them with water during flowering, stoning and colouring.

VENTILATING A VINEY

For the purpose of greater clearness I may perhaps spare a few special words on ventilation, which requires a certain amount of experience, and in April a considerable amount of patience.

A start must be made at the time when the house is closed for the purpose of causing the vines to break into growth. For beginners it is better that the thermometer be taken as a guide. With experience the smell of a house will suggest to the grower the need of air. The starting temperature of a viney has been shown to be 45° to 50°. In the daytime a spell of sunshine may raise the temperature,

and as this advances towards 60° the top ventilators may be slightly opened, so as to keep the heat between 55° and 60°. Whenever the weather clouds over the ventilators must be closed, and be reopened at the outbreak of sun-shine. This may occasion a good deal of running about, but if good grapes are to be grown it is the only way. The reason, of course, is that fluctuations of temperature must be avoided as causing checks, and thus being inimical to good growth. In the early stages of growth no front air must be admitted until the leaves have well expanded, nor should the house be left open during the night. As the sun begins to wane during the afternoon the house must be syringed and shut up in order to bottle up the sun-heat, which is always to be preferred to that caused by a fire. It may happen, of course, that on dull days no ventilation will be needed.

As the season advances and the vines grow more ventilation will be needed, the time of opening the lights will be earlier, and of closing them later. In the height of the season air may have to be admitted at six A.M., but it will always be safe to close by five P.M. Front air is usually regarded as supplementary to top ventilation, and besides being put on later is also taken off earlier. When ripening is completed a full supply of air is essential. When the fruit has been cut off all possible air may be admitted, and unless there are other plants in the house there is no need to keep out the frost, although a slight circulation of heat must at such times be run through the hot-water pipes to keep them from freezing and bursting.

STORING GRAPES IN BOTTLES

Few amateurs probably grow so many grapes that they have to store them. But it may happen that they want

to get them cut from the rod. This may be made convenient by storing them in bottles. Ordinary wine bottles will serve the purpose, though they are certainly not the best. A flat, square bottle turned up at the mouth and provided with a place for refilling has been largely in use of late years. It was patented by Mr Bullock, head gardener at Copped Hall, Essex. By its use there is not the same likelihood of the grapes getting wet during the operation of bottling and refilling. The grapes should be cut with quite six inches of the old wood attached. The end of the wood should be inserted in the bottle of water, and so arranged that the bunches themselves hang clear of everything. If ordinary wine bottles are used they should be so arranged that they are steadily fixed in a slanting manner to enable the bunches to stand clear. It will be necessary to look to the bottles occasionally to see that they are well supplied with water. In this way in a cool, dry, frost-proof place grapes will last for many months.

THE AMATEUR'S VINE

No variety of the grape vine has so richly deserved this title as Black Hamburgh. It is the easiest grape to grow and has a very pleasant flavour. Other varieties which amateurs might grow are Black Alicanti for late use, or Lady Down, Madresfield Court and Muscat of Alexandria. This latter is one which needs skilled attention but its flavour is so unique that I certainly advise everyone to try it.

Where the amateur has but one vine in a greenhouse he should give it the best treatment that circumstances will allow. He should enclose a part of the floor to form a border and build up a good one when he starts. Unless he has the border under complete control he labours in

vain who tries to secure good grapes. In a case of this kind no attempt should be made to force the vine. It may be allowed to start naturally and will then grow along under natural conditions, but it is preferable to give it some consideration above the ordinary stock of plants in the greenhouse, and to regard its needs in such matters as ventilation before that of other plants which are not so valuable.

It remains to be said that when planting a vine from a pot all the soil—every particle—should be washed away from the roots in a tub of water, and then, when planting, they should be carefully spread out in all directions, each at the proper level. To plant straight from a pot as one might a geranium is a very careless method which cannot be countenanced.

CHAPTER XV

PEACHES AND NECTARINES

IN cold districts it is very difficult to grow good peaches outside, especially now when the condition or disease, whichever it may be, known as "silver leaf" is so prevalent. In any case the trees, being under perfect control, can be got to yield very satisfactory crops inside, year after year. It is but natural to expect that those who go to the expense of building a glass structure for these trees will not consider it waste of time and money to make up a good border and from the outset buy good young trees true to name from some good fruit grower.

To ensure success I would advise that a border be made for peaches on similar lines to that advised for vines. It goes without saying that if drainage of the subsoil be needed this should be undertaken. It would be the height of folly to plant a peach-tree in soil where for any part of the year the water remained stagnant. If the soil be of a heavy plastic clay I would certainly advise concreting the bottom. If the whole site of the border be not concreted at least an area of three feet radius all round the tree could be done. This would effectively check any tap-roots, while the others on the outer part of the concrete could be cut off when found to be too strong or enticed to the surface before they become gross and fibreless.

There is nothing to equal good turfy loam for fruit-trees generally, and on top of the drainage flags of this should be set grass side downwards. Then the compost should

be put in. If the barrows be filled with a fork it will naturally happen that the larger lumps will get to the bottom, and towards the finish it will be worked so fine that spades or shovels will be needed. I would advise intending purchasers to go to the fruit ground and see their trees before purchasing. That is the only satisfactory method. Choose fan-shaped trees—the real type of fan-shaped, with all the shoots springing from the middle, not the so-called fan-shaped which has a central branch with others springing obliquely from it all the way up. The former are sometimes called Scotsmen's trees, and this reflects credit on the discernment of our brothers over the border. Another point to be noticed is that the wood is well ripened. Do not buy a tree which has very thick, long green growths. That means rank growth, which must be cured before there will be much fruit.

PLANTING PEACHES AND NECTARINES

As soon as the trees are received from the nursery they should be planted. A suitable hole is made in the border and the tree put in, so that the stem is buried to the same depth as previously. It must be remembered in planting that every encouragement should be given to the roots to run straight away, and for this purpose they should be spread out in all directions and set at their respective levels. Fine soil should be sprinkled directly over them, as the work proceeds, and the soil should be well firmed. All torn roots should be trimmed off neatly with a sharp knife, and thick, fleshy ones devoid of fibre must be cut hard back. Peach-trees usually need lifting two or three times until they have worn down their exuberance and settled into bearing. The very fact of lifting them will often give them a sufficient check, but when strong, fibreless roots

(which are the real cause of the mischief) are found, they should certainly be cut off. This system of root-pruning must be practised if good crops of fruit are to be forthcoming. The best time to do it is as soon as the leaves have fallen.

PRUNING AND TRAINING PEACH-TREES

It is, I think, generally admitted that the training of trees is to a large extent a dying art in gardening. Especially is this the case with peaches and nectarines, which do not admit of such rigid training as apples and pears, owing to the fact that their pruning varies considerably from these and necessitates a taking down and rearrangement of the branches.

Now the practice of some growers is to be wholly indifferent to the position of the branches. They maintain, and rightly, that fruit is the essential consideration and that the position of the branches is a matter of no consequence. With the simple reservation that I know there are cases where a gardener cannot find time to do the work in as efficient a manner as he would wish, I must differ from that opinion. I contend that the difference in the manner of training does not involve so much more time as is imagined. But the result of straight training is that it gives the tree a better appearance and the gardener a better name.

In the beginning of my gardening career I came under the tuition of a gardener of the old school who was very particular about the training of fruit-trees in general and peach-trees in particular. He would have every shoot trained out perfectly straight, both in the glass houses and on the outside walls, so straight that no two branches ever crossed or could conceivably have crossed had the shoots

been extended indefinitely. Often we lads had to take down and retie whole branches because they did not reach his rigid standard. His advice was to give alternate ties up and down and to be quite sure that the last tie was an upward one so as to bear the weight if a fruit were left near the extremity of the shoot. Nor is this straight training

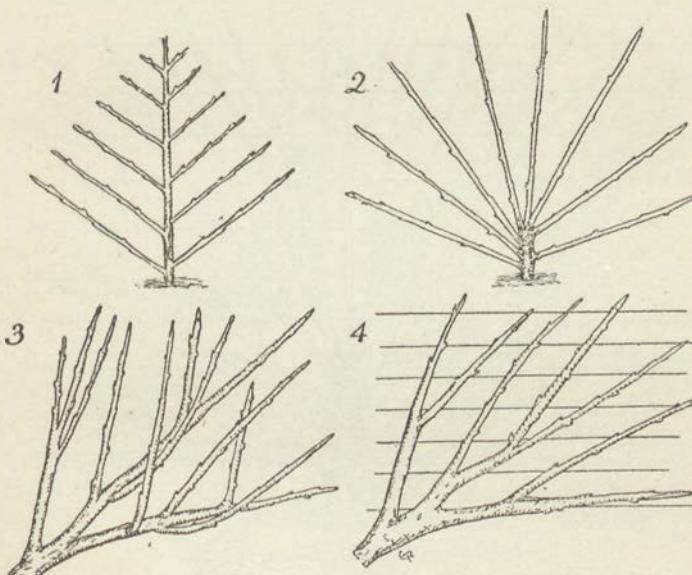


Diagram 33.—Peach Training: 1. Undesirable shape of tree. 2. Best type for peach-tree. 3. Branch of peach-tree before pruning and tying. 4. Same branch after pruning and tying.

at all difficult if it be started early in the tree's career. To take over a tree of some ten years' indiscriminate training and to endeavour to make it into a well-trained tree is a difficulty bordering on the impossible.

The main idea in the pruning and training of a peach-tree is to have the tree well clothed from bottom to top with fruiting wood. To allow the tree to extend unduly

and to have large gaps in the centre and bottom of the tree is a decidedly bad policy. It will be generally noticed that the best fruits are found near the base of the fruiting branches, which would lead us to infer that the nearer the fruiting wood is to the base of the tree itself the better crop we shall get. Were there no difference in the crop

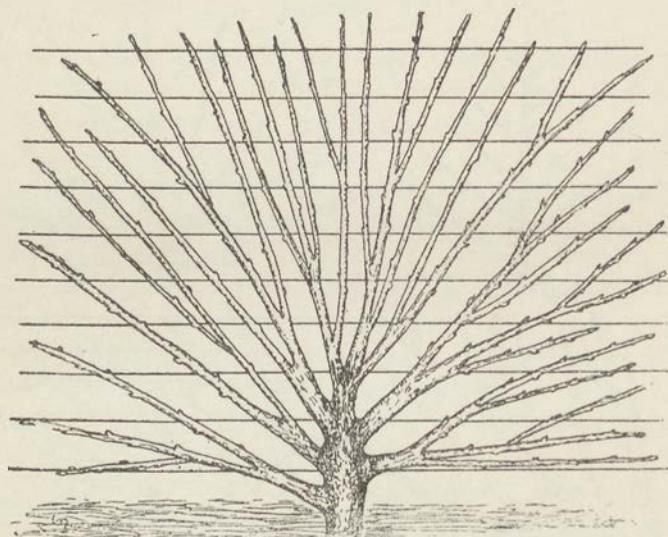


Diagram 34.—A well-furnished peach-tree.

it would certainly be a breach of economy to waste the wall or trellis space.

Where a peach-tree has been well managed during the growing season by disbudding the growths so as to leave only basal shoots and a leader to each branch, it will be an easy matter to cut out the fruiting wood at the point from which the new growths spring and then to thin the branches. In the thinning the lower shoots should have the preference in retention, unless they are decidedly weak, ill-ripened or obviously inferior to the others. During

the growing season the careful grower will have taken care to have tied in these shoots close to the fruiting wood, and in that case there will be little difficulty in training them straight. Whether inside or out, on wires or on walls, I certainly advise tying the small branches with raffia grass and the large ones with tar-cord.

Where there has been scale and red-spider, or where it



Diagram 35.—1. Branch of peach-tree not disbudded. 2. Same branch disbudded. 3. Same branch with the resulting growths temporarily tied in.

is feared there will be, a winter dressing should be applied to all the old wood first and then carefully, with a small brush, to the young growths, omitting only the buds, and exercising care not to rub these out. The dressing sold by Timothy & Sandwith is very effectual, and where it is used in the winter I find there is less difficulty in warding off red-spider in the summer.

THE ROUTINE WORK

Among peach-trees this cannot be considered at all difficult. From the time they are started into growth, which in the usual course will be about February, they must be syringed freely and forcibly twice a day, except when the weather is dull and when they are in flower. Otherwise the syringing must go on without intermission until the fruits begin to colour. When by the combined force of syringing and of increased warmth the buds burst and growth appears, we are confronted with the work of disbudding. It has often been said that peach-pruning should be done with the thumb and finger, which means that early in the year all growths which are not likely to be required are nipped out, the growths nearest the base of the previous year's growth being retained where it is possible and suitable. Other growths which make towards the back or the front of the tree are pinched out. For safety's sake and to leave a choice for winter pruning some leave rather more growths, but owing to the danger of overcrowding, and thus preventing the sun from colouring the fruit and ripening the wood, it is not a commendable plan. The branches left must be tied in as they become long enough.

FLOWERING AND THINNING

As previously stated, syringing must cease during flowering, and to ensure a good set of fruit it is wise to touch all the flowers at noon with a rabbit's tail tied to a stick. This must be done until the form of the embryo peach is clearly seen. Then again may syringing be resumed. In ordinary cases it will be found that more fruits have set than will be required, for it is bad policy to over-crop a tree. Not only

will the future of the tree be jeopardised, but only medium fruits will be obtained. The number of fruit a healthy tree can carry depends on its size, but in most peach houses sixty on a tree would be a good crop. When quite small the fruit may be thinned the first time, but a final thinning should not be undertaken until after the stones have been formed, for during this critical period many are liable to drop off. The fruit should be spaced out all over the tree, not for appearance only but to preserve the balance of the tree.

The trees should never want for water during the whole of their career. The best periods for watering are immediately on starting the trees, when the fruit begins to swell after stoning, just before colouring begins and immediately after all the fruit has been gathered.

It remains to be added that the best varieties of nectarines are Cardinal, Lord Napier, Stanwick Elrige, Spencer and Violette Hative. Among peaches may be recommended Bellegarde, Sea Eagle, Royal George, Grosse Mignonne, Hale's Early and Dymond.

CHAPTER XVI

FORCING STRAWBERRIES IN POTS

IF the details of culture which I am going to outline be well followed I feel sure that a good reward of fruit will be the result. Strawberry culture in pots is by no means difficult, so I hope all readers who have the opportunity will endeavour to grow a few dozens.

CHOOSING STRAWBERRY RUNNERS

There can be no question about the fact that if good strawberry plants are wanted a good start must be made, and this can best be done by selecting good runners for layering. The policy of severe selection is one which needs to be emphasised. It is not, I know, always convenient or even possible to follow good counsel, but as there is no inconvenience or impossibility in giving it, and as it is always well to aim high, I would advise this policy in strawberry culture—and it applies to outside or inside culture: allow no fruit on plants intended for runners, and no runners on plants intended for fruit. Unless the space at disposal is so restricted as to render good gardening impossible, a few plants should be set aside especially for the production of runners. Allow only five runners on each plant, cut off all others, as well as secondary runners, and allow neither flower nor fruit on these plants. With the ground kept clean, the runners fully exposed, the

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absence of straw or of overcrowding of runners, there should be every prospect of getting a good start.

The general method—which I do not advise—is to secure such runners as are available from fruiting plants. This may serve the purpose, and with skilful management afterwards it is quite possible to secure good fruit. But it is certainly not the best way. Let us consider. As soon as the fruit has set straw is placed beneath them along each side of the row in order, of course, to keep the fruit from dragging in the soil. This means that the runners go a considerable distance beneath the straw and thus become weak and unripened, and the thin leaves stand on long, slender stalks. Not until the fruit has passed and the litter cleared away can layering be successfully accomplished.

PLANTING OUT FORCED PLANTS

In pursuance of the policy of growing, especially for runners, it is an excellent plan to save the best of the plants which have been forced, and after duly hardening them off to plant them on a piece of trenched ground. Some good runners can be procured in this way, and if they have not been forced very hard they should make splendid plants for fruiting the following year.

LAYERING STRAWBERRIES

When the runners are large enough layering may be commenced. For whatever purpose the plants are intended it is better to layer them in pots, but especially so if good pot plants are desired. I would advise amateurs to layer into 3-inch pots. These should be clean, but a small bunch of leaves put in the bottom will serve the purpose of drainage quite as well as crocks. Fill the pots with

sandy soil and place them between the rows in an upright manner so that they can be properly watered. Where runners are taken from several rows it is customary to place the pots between two rows and to layer the runners from those two rows, leaving vacant the space between the next two rows for a pathway when watering. A little

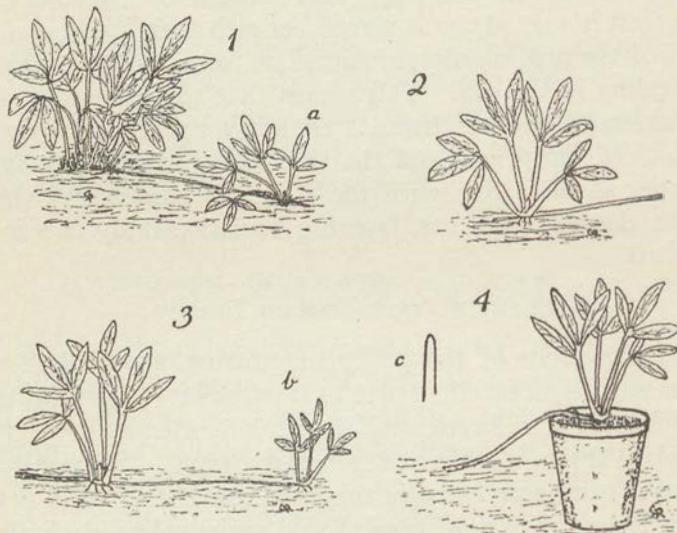


Diagram 36.—Layering Strawberries: 1. Weak layer (a) through being buried in straw put beneath fruit. 2. A strong layer. 3. Secondary layer as at (b) should be avoided. 4. Layer set in fruiting pot and pegged (c).

soil may be scraped out with the finger to give place to the roots at the base of the runner. Firm the soil somewhat around the base and put in a wooden or wire peg or a stone to keep the runner in place until sufficient roots have been formed. Beyond watering, it will also be necessary to keep all other runners cut off the old plant and all the secondary ones off the runners. When there is sufficient evidence that the runners have rooted they may be severed

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from the old plants, and it would then be most convenient to get the pots off the beds and put them on a piece of ground with a cool ashed bottom.

Yet another method, and one which I always adopt myself, is to layer the plants directly into their fruiting pots, which may be six inches in diameter. The great danger which accompanies this process is that the plants may be over-watered before the roots are able to well take hold of the soil. Although this method of layering into fruiting pots is known to produce good crops, it has also been fruitful in failures, and I cannot recommend it to amateurs generally, until they have themselves tried its merits with a few plants. The old way is the safer, the newer one far better, but the latter is only for experienced growers.

POTTING THE PLANTS

When the plants are layered in 3-inch pots they will by the end of August need to be transferred to 6-inch pots. Let clean, dry pots be used, and for a compost use good turfy loam, leaf-soil, mushroom manure, mortar rubble and a slight admixture of Peruvian guano or Le Fruitier, also a scattering of soot. Stand the plants either on an ashed bottom, or preferably on boards, after they have been potted quite firmly. The pots will quickly be filled with roots and will then bear with liquid manure. This should not be very strong, but frequent, for as the winter approaches very little water will be needed. A sprinkling of some good chemical manure may be given before the autumn is very far advanced.

TREATMENT DURING FORCING

Before forcing the plants are plunged in ashes or leaves to preserve the pots from frost, and if lights can be put over

to ward off heavy rains it will be a decided advantage. From their plunging quarters they may be taken early in the year and be put on a shelf close to the glass in a warm house. The pots should be washed and dead leaves pulled off the plants. It is probable that for some time the soil will be very wet. When this dries somewhat a slight dressing of Clay's fertiliser may be sprinkled over the surface soil of each pot and the surface be loosened with a label. With careful watering and forcible syringing they will soon make headway. The syringing should be stopped during the flowering, but be resumed afterwards until the fruit shows colour. To ensure pollination and the formation of shapely fruits the blooms should be lightly touched at midday with a rabbit's tail. When the fruit has set, thinning may take place. The usual and commendable plan is to reduce the number of fruit to six on each plant. The opportunity will then occur to give the fruit some support by the use of twiggy pieces of birch. From this time onward they will require much water, must never be allowed to flag, and in addition to fortnightly top-dressing of dry fertiliser, they will receive much benefit from frequent watering with manure and soot water. But these stimulants and the syringing must cease as the fruit colours and the plants will benefit by removal to cooler, drier and more airy quarters.

By introducing a few plants into heat each fortnight a succession of fruit may be kept up.

CHAPTER XVII

TOMATOES IN THE GREENHOUSE

THOSE who wish may have a splendid crop of tomatoes in a house in which there is scarcely any heat, though they will not be so early. In the germination and in the early stages they will, of course, need fire-heat, but scarcely any after they are planted out. Early in February is a good time to sow the seeds. Instead of scattering them indiscriminately over the surface of the pan or box, let them be placed about an inch apart, then covered with soil, then with a sheet of glass and finally with a sheet of paper. If put into a temperature of 50° to 60° they will germinate in about a week. By the end of the month, with the pan put close to the glass, the seedlings should be sufficiently advanced to be pricked off into boxes at a distance of about two and a half inches apart. Sandy soil and leaf-soil will form a suitable medium, and no manure must be used.

THE POTTING OF TOMATOES

In the boxes and in the same temperature they may remain for about three weeks, when they will be fit for transference singly to 3-inch pots. Here again an open soil free from manure will be needed. But a few days before potting move them to a cooler quarter, where the temperature is somewhat less and the atmosphere not so close. To prevent their becoming leggy pot them right up to the base of the seed leaves and give them a light

position quite close to the glass. Water them immediately after potting, and while keeping them somewhat on the dry side do not allow them ever to flag. At this stage, with the rapidly lengthening days they grow quickly, and it will be found that in little more than a fortnight they will

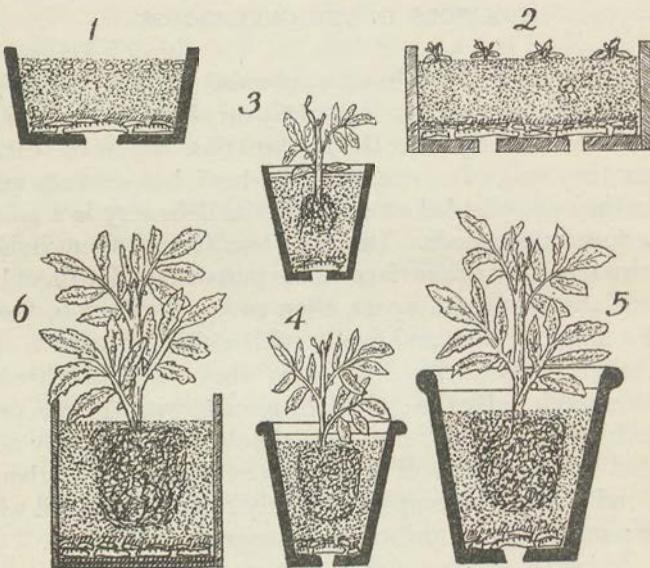


Diagram 37.—Tomatoes: 1. Seeds sown in pan. 2. Pricked off into box. 3. Potted into 3-inch pot. 4. Shifted into 5-inch pot. 5. Planted permanently in 9-inch pot or (Fig. 6) in a box.

qualify for another shift, this time into 5-inch or 6-inch pots. When the plants are eventually to be planted out on the staging the 5-inch size will be found most suitable, but if intended for fruiting in large pots let them now be accommodated with 6-inch pots.

PLANTING TOMATOES

As soon as they have nicely filled these pots with roots and before they become root-bound, the plants will be fit for setting out. This will occur under favourable conditions about three weeks after potting, so that we come to the early part of April or not later than the middle. From the time of planting onwards they will grow without fire-heat, though they benefit by the pipes being slightly warm.

We will presume that the plants are to be set out on the greenhouse staging. Having cleared off the shingle or ashes, let two boards be set on end at a distance of eight or nine inches apart and make the requisite arrangements for keeping these in place. Cover the bottom with leaves, and over this put some soil, making it fairly firm. A depth of two inches will be quite sufficient. It now remains to knock the plants out of the pots, extract the crocks and set them at a distance of eighteen inches apart. Fill in with soil and make this firm about the ball and sufficient to cover the balls of soil by about an inch. It is essential that the soil be made quite firm to induce sturdy and short-jointed growth and the earlier formation of fruit. No stimulant of any kind should be used in the soil. Such soil as is obtained from old chrysanthemum stools or which has been used for violets in frames will serve well for tomatoes.

THE TRAINING OF TOMATOES

There is no great problem in the training of a tomato. The method found most generally satisfactory is to train it to a single stem and to pinch out every side growth as it appears. These side growths form at the base of the

leaves and are easily distinguished from the flower clusters which form on the stem some distance from the leaves. The pinching should be continued throughout the life of the tomato. It is usual also to pinch out the point of the plant when it has attained a height of about five feet. By this time it will have set many clusters of fruit, and the aim will be to divert the energies of the plant to the swelling and ripening of these fruits. One stake to each plant will be sufficient, and to this the growing point must be frequently tied. There is a disagreement among growers as to the advantage of shortening the leaves of tomatoes during growth. Personally I do not believe in the practice except as a means of exposing the fruit to the ripening influence of the sun. As the season advances the period of sunshine becomes less, and then it is an advantage to cut off any leaves which prevent this being fully utilised.

Although it is not absolutely necessary to fertilise tomatoes artificially it is an advantage to run over them at noon, touching each flower with a rabbit's tail. This takes but a moment of time, and the resulting fruits are likely to be of better shape.

TOP-DRESSING TOMATOES

If the plants have been treated as advised they will by the end of May have filled the soil with roots. They will also have set several clusters of fruit. It will now be safe and necessary to top-dress them with soil richer than that in which they were planted. This may consist of two parts soil similar to that in which they were planted, one part leaf-soil, and one part mushroom manure. Shift the boards back three inches each way, fix them firmly in place and put in the soil at the rate of a pailful to each plant. This should be rammed quite firm. The old soil

must not be dry at the time of top-dressing, but a good watering afterwards will settle down the new soil. A further top-dressing will be needed about six weeks afterwards.

Feeding with liquid manure should not be undertaken immediately after top-dressing, but as the roots show a disposition to run joyously into the soil liquid stimulants may be resorted to.

OTHER ITEMS IN TOMATO CULTURE

Tying and disbudding must be attended to regularly, and any fruit clusters which seem to be too heavy, or which are too near the soil, should be duly supported. Plenty of air should be given on all possible occasions, but not such as to produce a strong draught playing directly on to the foliage. Disfigured fruits and any which seem to be diseased must be cut off. Grown under these conditions, ripe fruit will be available towards the end of June, and although the plants may be cut out in October it should be possible to keep the fruit in a storeroom so as to maintain a supply until the end of November. Good varieties for amateurs would be Carter's Sunrise and Holmes' Supreme. These do not form extra large fruits, but the clusters often produce as many as thirty fruits of medium and useful size.

As a rule amateurs who have a greenhouse cannot maintain much heat, so that the method shown above should prove eminently economical and satisfactory.

TOMATOES IN A FRAME

Tomatoes may be grown in a frame with every prospect of success. At the lower end or front of the frame, box-work could be made for them by running a plank along

the inside at a foot from the front and fixing it firmly in position. Some rough turf may then be put over the hard bottom, and over this could with advantage be spread some spent horse droppings such as have been used for mushroom beds. With a little of the compost put over this and made firm the place is ready for the reception of the plants. If the depth of the box be about fifteen inches there will be ample room for setting out the plants and afterwards treating them to periodical top-dressings. The plants may be bought cheaply if they have not been raised on the place and could be set out at not less than twelve nor more than eighteen inches apart. Afterwards the work of training, top-dressing, etc., will follow on the same lines as that given above for tomatoes in a greenhouse.

CHAPTER XVIII

CUCUMBERS AND MELONS

CUCUMBERS IN A FRAME

IN the course of my writing for the press on horticultural subjects I have frequently been asked to give details of how to grow cucumbers.

Few indeed are the amateurs or small growers who could not grow a cucumber in a frame. If he has a frame and can obtain some stable manure and tree leaves he can certainly grow cucumbers.

The actual work of making a hotbed will be given in the part of this work devoted to forcing vegetables. Suffice it here to say that the great danger with the amateur grower is that he will allow the bed to heat too violently, and the result will be death or grave injury to the plants, if they be already planted, or considerable subsequent loss of heat, and as a consequence less satisfactory results. The best way to obviate this danger is by mixing the materials well and also by treading the bed firmly. It is scarcely possible to tread a hotbed too firmly, for no matter how much it is trodden it will always sink somewhat later on. When the bed has been made and the frame set on, a stick might be plunged far into the centre. This, when pulled out and handled, will be a guide as to the amount of heat in the bed.

When the stick feels nicely warm to the hand without being hot it will be safe to get ready for planting. To make

sure of keeping down rank heat and obnoxious gases it is a good plan to cover the heating material with a few inches of soil or cinder ashes. The soil intended for planting may then be put in a mound in the middle of each light and be left for a day to become warm. The soil may consist of fresh loam and horse manure in equal parts, with some leaf-soil added. Preference should be given to horse droppings which have been used for mushroom beds, as the rankness will then have departed. About a bushel and a half of soil should be sufficient for the planting of two cucumbers. It is not advisable to make the soil firm. Such firmness as is imparted by patting the soil with the palm of the hand will be ample. Nor after planting should any greater firmness be aimed at. Two plants may be planted to each light, the one to be trained towards the top and the other towards the bottom of the frame.

Where there is no greenhouse for rearing the young plants they must be bought, but for the benefit of those who have facilities for raising their own plants the method of doing so will be outlined. It is safer always to put in more pips than will be wanted, else failure will cause inconvenience or delay. The best plan is to insert the pips singly in small pots. The pot, after being duly crocked, is nearly filled with sandy soil. A hole is then made with a dibber, or with the finger, a pinch of sand is put in, the pip is inserted, and is covered with sand, and afterwards with soil. In this way the process of throwing out root and top is facilitated and there is little danger of loss from rotting. If put into a propagator growth will quickly protrude, and in a short time it will be possible to accommodate each plant with a 3-inch pot, and eventually with a 5-inch pot, from which size or a 6-inch they may be planted.

After planting, the main items of culture are syringing and manipulation of the growth. The syringing should be

done twice daily in fine weather, at nine A.M. when opening the lights and between two and three P.M. when closing them. The manipulation of the shoots is not so difficult as may be imagined. When the main growth gets near to reaching the top or bottom of the frame it may be stopped. Each other growth should be stopped just beyond the first leaf after the fruit. As there becomes a network of growth this stopping becomes mainly a matter of thinning by cutting out the older growths and encouraging young ones.

Cucumbers may also, of course, be grown in a house, trained to wires. A forcing or propagating house would suit them best. Here they require heat and moisture and regulation of the growths so as to cover the trellis with fruiting wood.

HOW TO GROW MELONS

Those of my readers who have only a small amount of glass will want to use it to the best advantage, and I feel that they can best do this by growing melons in a frame. It is not a difficult matter to choose a variety which is known to do satisfactorily under frame treatment. Hero of Lockinge and Ringleader can be safely recommended for this purpose. If a heated pit is available it is, of course, preferable that it be used, but even then it is a good plan to make up a hotbed to give bottom heat. In the early stages melons may be grown precisely like cucumbers until they have got nicely settled in a 3-inch pot. The preparation of the hotbed will also be similar, the soil being made up in a mound in the centre. But the soil for melons will differ. They relish a heavy medium made porous with lime rubble and wood ashes. In this they may be planted after they have got over the pinching. For when they are a few inches high the point of each plant will be pinched

out and two growths will be retained. By planting two plants beneath each light we thus get four growths, which may be trained towards the four corners of the frame. In the usual course the leading growth should not be stopped until the point is within a foot of the corner of the frame. The laterals that push out will probably show female flowers ; if not they must be pinched, when females are pretty sure to be found on the resulting growths. When the fruit has set the growth should be nipped off about two leaves beyond the fruit. Melons require artificial setting about the middle of the day by putting the pollen of a male flower on a female flower. This should be done each day, for the aim is to get three, four or possibly more melons to run along together. When it is seen that several fruits are growing together the others should be cut off. Syringe twice a day as for cucumber until the fruit shows signs of netting, when a drier atmosphere must be maintained. Red spider is a great enemy with melons, but usually a humid atmosphere and forcible syringing will keep this in check.

Like cucumbers, a top-dressing will be needed for melons when they have taken well hold of the original soil, and they like also to have a firm soil. The fruit must be freely exposed to sun when ripening. This is the method of culture which I would certainly advise for all those who have only a small amount of glass.

FIGS UNDER GLASS

Although I do not feel that it is within the province of this work to treat of the culture of pineapples and bananas, as so very few people grow them now, yet a few words must be spared for the fig, for where there is a viney or a peach house there is usually space for a fig. The fig is a gross

grower and should, on that account, have restricted root space. A border two feet wide and three feet deep, drained and formed similarly to a vine border, will be amply roomy for a fig. The endeavour is to get young growth covering all the space of the trellis, so the young growths should be tied in about six inches apart. Heat, syringing, etc., will be the same as for the vines or peaches. The border should never become dry and when once the trees are established they will bear plenty of feeding with liquid manure, farmyard manure and a good fruit fertiliser, such as *Le Fruitier*.

PART IV

VEGETABLES UNDER GLASS

CHAPTER XIX

FORCING VEGETABLES

THERE are two phases in the culture of vegetables under glass. Some are forced and brought to maturity under glass, while others are raised and forwarded under glass to be eventually planted out. Thus the subject naturally divides itself into two parts. As for both purposes a hotbed will be found most useful, I will show how to make one. The question arises whether those with very limited glass accommodation should go in for forcing early vegetables—whether they should not rather utilise their room for growing greenhouse plants and flowers and forwarding plants for the flower garden. Personally, I think that is the wiser course, but I know that everyone is anxious to score against his fellows and to show that he can get early vegetables. That I cannot well condemn, for I am myself strongly impelled by the same desire.

MAKING A HOTBED

A hotbed may be made of leaves, of stable litter, or of a combination of the two. The latter is the better plan, the proportions being equal. The material should be spread in layers and be allowed to stand in a heap for several days. Then it may be turned over once, and after another few days made into a hotbed. The size of the hotbed will depend on the frame which is to be put on it. A clear space of at least eighteen inches should be left all around

the frame. Then if the frame be 6 feet by 4 feet the dimensions of the hotbed will need to be 9 feet by 7 feet. It is essential that the material be well trodden, or the heat will be violent at first, but will not last long. After every layer is put on, treading should be done. It is useless to make up the bed first and try to tread it afterwards.

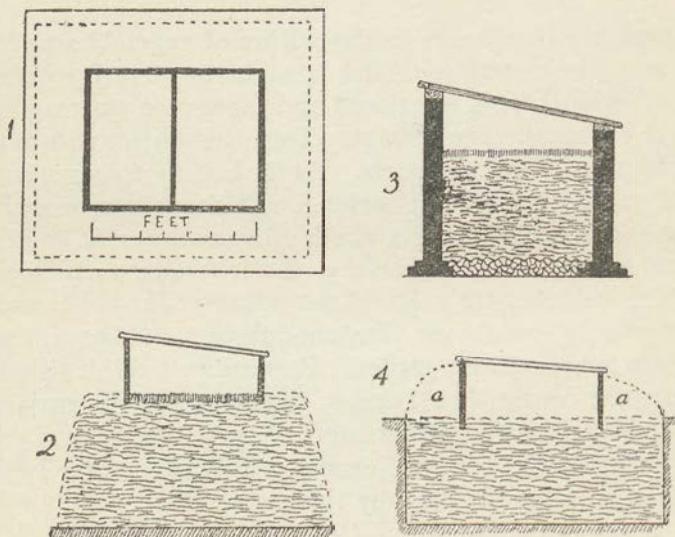


Diagram 38.—Hotbed: 1. Plan of hotbed showing position of frame. Outside line shows dimensions at bottom, and dotted lines dimension at top. 2. Section of frame set on hotbed. 3. Heating material put into a brick pit. 4. Heating material put in a hole with frame over. Further litter may be added at (a).

When nearing the top of the bed, set the frame in place, and then put some of the material inside it and tread well down. This precaution is necessary because the material will sink, and it may not sink equally, thus leaving a space at the bottom of the frame.

An easy method of knowing how the heat runs in a hot-

bed is to thrust a stick deeply in the centre of the bed. After a few days the heat may be known by drawing the stick out. When comfortably warm, the hotbed may be used.

Soil should be spread over the top of the bed, the amount required being regulated by the use to which the bed is to be put. If intended for carrots, lettuces, radishes and such like, six inches should be the depth.

It may be remarked that after the hotbed has been exhausted the material will still be useful for working into the land, especially if the land be heavy. In fact, it is the best way of making use of stable manure. The manure is brought from the stables, the droppings are shaken out, to be formed into a mushroom bed ; the long straw is mixed with leaves to form a hotbed, which will eventually be returned to the land ; and after the mushroom bed is exhausted the manure is still very useful. Thus a double use is made of the manure, with very little of its virtue gone.

Where plenty of leaves are available it is a wise plan to form them into a large heap and cover them with a frame or to set them in a hole and put a frame over. In this way a heat will be given to the frame, the leaves will decay, and in the following year they will be drier than those stacked in the open.

ASPARAGUS.—This agreeable vegetable may very easily be forced on a hotbed made as described above. Good roots from an established bed should be dug up and placed over a few inches of soil on the hotbed. A slight covering of soil should be given, and a good watering. The frame will need to be covered at nights when there is likely to be frost. In well-appointed gardens it is customary to force plants from the oldest bed and to make a new bed each year.

BEANS.—Dwarf French beans are the kind usually forced in a warm house, though where space abounds the climbing form of French bean may be grown. Amateurs generally will find less trouble with the dwarf forms. I would recommend a selected form of *Ne Plus Ultra*. Four or five beans may be put into a 4-inch pot in any sandy soil and be covered lightly with half-an-inch of soil. The pots should then be placed on a board and the board put directly over the hot-water pipes. They will shoot out in a few days, when they may be put on the staging. When well rooted, let two pots of plants be put together in an 8-inch pot. If kept in a light position, duly staked, well syringed to keep down red spider, and fed after they have flowered, they will fruit plentifully.

CARROTS.—(I would recommend Sutton's *Inimitable Forcing*.) May be sown in drills six inches apart, with radishes between them on a mild hotbed. Beyond watering and ventilating, they need very little attention. They may be thinned as they become fit for use.

CAULIFLOWERS.—These vegetables are seldom brought to maturity under glass. If, however, such a course is decided on, they should be sown outside in September, and afterwards potted into small pots, and eventually into the 8-inch size. Until the beginning of the year they will do with cold-frame treatment, but after this date a gentle heat will bring them along to maturity several weeks before they could be got, under ordinary conditions, outside.

LETTUCES.—A supply of these can usually be kept up through the greater part of the year outside, but to supplement this it is often the practice to sow in autumn and prick out the plants in frames. A soil composed largely of leaf-soil will suit them well, and plenty of ventilation will be needed to keep them from damping. They may

also be planted between potatoes when these are grown in frames. Earliest of All, Commodore Nutt and Golden Ball are good varieties.

MUSTARD AND CRESS.—Known in the trade as “hot and cold.” It is very easily grown. It needs to be sown quite thickly over the surface of a box of soil previously watered. Put the box in a warm house and cover it

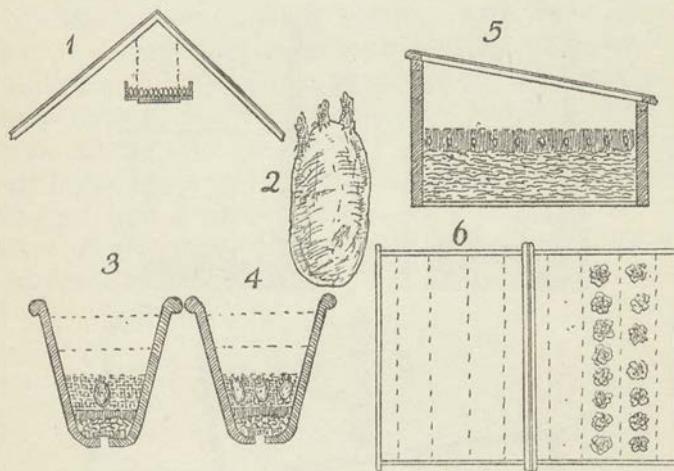


Diagram 39.—Potatoes: 1. Sprouting potatoes in a box on greenhouse shelf. 2. A well-sprouted potato. 3 and 4. Potatoes put singly or in threes in 9-inch pot. 5. Potatoes planted in pit over heating material. 6. Top view of frame showing lines of potatoes with lettuces between.

until germination commences. Then take off the covering and cut before it has broken into rough leaf. To keep up a supply, sow a little of both each week.

POTATOES.—May be forced in a frame or in pots. If grown in frames, it is preferable that a modicum of bottom heat be given by means of a foot or more of heating material. Plant in rows about fifteen inches apart and six inches between the sets. As stated previously, carrots

or lettuces may be put between the rows, also radishes. If grown in pots, one or two sets may be put in each 9-inch pot and the tuber should be just covered, allowing room for future top-dressing. If the growths are kept upright by stakes, and the soil never allowed to become quite

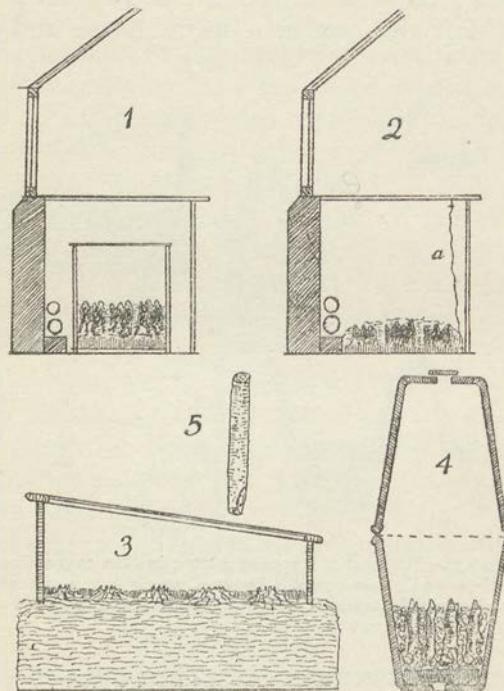


Diagram 40.—Forcing Rhubarb, Asparagus and Seakale:
 1. Rhubarb in box beneath staging. 2. Rhubarb set on floor and covered with leaves with mat put up (a). 3. Asparagus in frame. 4. Seakale in pots. 5. Root-cutting of seakale.

dry, some useful tubers may be produced. The pots used for chrysanthemums will do well for these. Sharp's Victor, Sharp's Express and May Queen are good varieties for forcing.

RADISHES.—May be obtained for use in a very short time by sowing broadcast in a frame used for carrots, potatoes or lettuces. Cover the seeds lightly. French Breakfast is a good variety.

RHUBARB.—This is really better forced in the open ground by setting boxes over it. It may be treated precisely like seakale for indoor culture. Roots should be taken up from the open ground (and, if possible, be exposed to frost) and be put in a deep frame, box or pot, or beneath the greenhouse staging, with some soil worked round the roots. Some means must be taken to keep them dark. The seakale roots will be of little use after forcing, but the rhubarb may be planted out but not forced again for two years. If several seakale crowns are put into a 9-inch pot another pot may be inverted over them. A succession may be kept up until it is available outside.

CHAPTER XX

FORWARDING PLANTS FOR VEGETABLE PLOT

ONE good method of getting early vegetables is by forwarding them in heat during the early months of the year, and planting them out later, usually in April. In this way we may get much earlier vegetables in the way of onions, leeks, cauliflowers, cabbages, lettuces, sprouts, celery, beet, marrows, peas, broad beans, runner beans, dwarf beans, potatoes, mint, parsley and tomatoes. The latter, though in reality a fruit, may for convenience be dealt with here, as it is the only thing in the fruit line which is forwarded under glass and afterwards planted out.

For convenience also, and to avoid repetition, I will give directions how to get along those plants which are sown in boxes and transplanted from them. The remarks will apply to onions, leeks, cauliflowers, cabbages, lettuces, sprouts, broad beans and parsley. All these may be sown early in the year, during January and February, and put into a temperature of about 50° to 55°. The boxes should be covered with a sheet of glass, if possible, or a sheet of cardboard or paper until germination takes place. Before they become crowded prick the young plants off into other boxes at a distance of about three inches apart, using some sandy soil. The boxes should have the bottom covered with dry leaves and the soil should be passed through a half-inch sieve and made quite firm, allowing about half-an-inch of space at the top for watering. A small setting peg may be used for pricking off, but

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generally gardeners do it with the index finger. When the young plants are growing along nicely they should be gradually accustomed to a colder atmosphere so that they may later be transferred to cold frames and later still to a sheltered position outside to prepare them for planting out in the open. It is essential that these plants be not drawn and that they be not at any time subjected to a very high temperature.

Beet may be sown in boxes in April and be planted out. The Globe type is the best for this purpose, as it comes to maturity earlier. *Peas* may be sown in pots or in boxes. Personally I have been more successful by using boxes. A box 2 feet by 15 inches will easily accommodate a hundred seeds, and when hardened off these may be planted in double rows. *Broad Beans* may be treated in a precisely similar manner. For *Runner Beans* I would sow one bean in a 3-inch pot and plant out a foot apart. *Dwarf Beans* I would sow three in a pot and plant one foot apart in rows two feet apart, and a row of radishes between. They may by this means be got much forwarder than by sowing outside, and they occupy space in the greenhouse for a short time only.

Tomatoes should be sown early in February and be worked steadily along to a 5-inch or 6-inch pot, planting them against a sunny wall or fence during May, but protecting them from late frost, should any occur. *Potatoes* are merely forwarded by bringing them in boxes into a greenhouse to get the growths about an inch long before planting. It has been found to increase the yield of all kinds if they are treated in this way. *Marrows* should be sown during the last week of March, singly, in small pots, which may later be replaced by larger ones, so that the plants may early in May be set out under handlights from 6-inch pots. *Mint* may be forced for use with early potatoes, by digging up

some roots, putting them in a box over a layer of leaves and covering them with soil. Cuttings of the growths may be taken to form a new plantation. *Celery* should be sown in boxes in February, pricked off closely into other boxes, and afterwards set out at a greater distance apart in a frame or on a piece of suitable ground, where they can be protected as occasion demands. To ward off celery fly, syringe frequently with weak soot-water and quassia-water.

PART V

GREENHOUSE WORK

CHAPTER XXI

PROPAGATION UNDER GLASS

SEEDS AND SEED SOWING

UNDER natural conditions, all the energy of a plant is devoted to the formation and ripening of its seed for the purpose of perpetuating its kind. Hence in a seed we get the concentrated energy of the parent plant, and it is not extraordinary that plants grown from seeds display more vigour and are better able to withstand the vicissitudes of culture than those grown from cuttings. Vigour and strong constitution, though not always accompanied by delicacy and refinement, either in plants or in human beings, nor necessarily opposed to them, must not be despised. When hybridisers wish to impart vigour to cultivated plants, which by repeated propagation have deteriorated, they invariably cross them with the wild plants whose vigour has remained unimpaired. This has been successfully accomplished with the apple and the potato. Though we get vigour with plants from seeds it is not always possible to use this method of increase ; for there are many plants which do not come true—that is, do not display those useful or beautiful characteristics of the parent that we wish to perpetuate. In such cases recourse must be had to propagation from bud in its many forms of cuttings, layers, roots, runners, offsets, budding and grafting. Colour and fragrance of flowers, form and variegation of leaf and habit of growth are characteristics of a plant which constitute

for us probably its only charm, yet in many cases propagation from seeds would rob us of these.

SOWING IN PANS AND BOXES

Pans should be clean and dry and have a crock (a piece of broken pot) placed over the hole at the bottom; other crocks should be placed over this, and then a few leaves or some moss to prevent the soil choking the drainage.

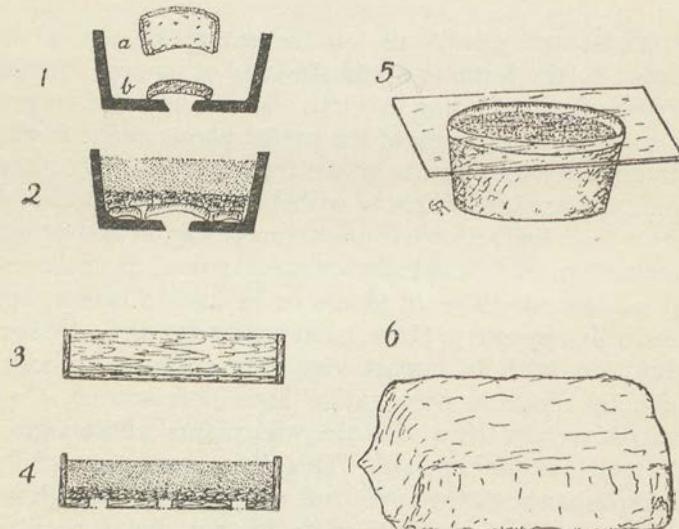


Diagram 41.—Seed Sowing: 1. Concave crock (a) set in position (b). 2. Pan duly prepared with soil and drainage. 3. Wooden tray 12 inches x 15 inches x 2 inches. 4. Same prepared for seeds. 5. Pan covered with sheet of glass after sowing. 6. Pan and glass covered with sheet of paper.

Fill to within half-an-inch with sandy soil passed through a quarter-inch sieve. Press firmly and evenly and dust the surface with soil sifted through a very fine sand sieve. Press evenly with some flat surface and sow the seeds in as even a manner as possible, avoiding very thick sowing.

Cover lightly with more fine soil, press lightly, water with a fine rosed can, cover with a sheet of glass, shade with a sheet of paper and put in a suitable temperature about 5° or 10° higher than that in which the plants usually grow. Boxes, of course, may be similarly treated, though no crocks, but only leaves, will be needed at the bottom. For sowing seeds which will soon be pricked off, shallow trays, bought very cheaply from a horticultural sundriesman, will be found most useful.

Seeds germinate best in a soil fine, firm and porous—a suitable mixture being two parts loam, one part leaf-soil and one part sand, through a quarter-inch sieve. Frequent mistakes in seed sowing are filling the pans or boxes too full, not providing drainage and using soil containing animal or chemical manure.

PROPAGATION BY CUTTINGS

The conditions essential to success in rooting cuttings are that the wood be in a sufficient state of ripeness, that the cutting be inserted in light, sandy soil at a suitable time and a suitable depth, that it be cut off straight just below a joint, that it be put in firmly, and afterwards receive the necessary attention in the matter of warmth, water and shading. In degree these conditions differ with various plants ; the more difficult the subject the more diligent should we be to ascertain the suitable conditions and the more scrupulous to ensure them.

HOW TO MAKE AND INSERT CUTTINGS

A cutting should usually be the point of the shoot and contain from four to six buds or joints, though with hard-wooded stuff the preservation of the growing point is not

essential. Long experience has taught us that the cut should be straight and not slanting, that it should be clean and not jagged, that it should be made immediately below a joint yet not so close that the leaf would drop off. The

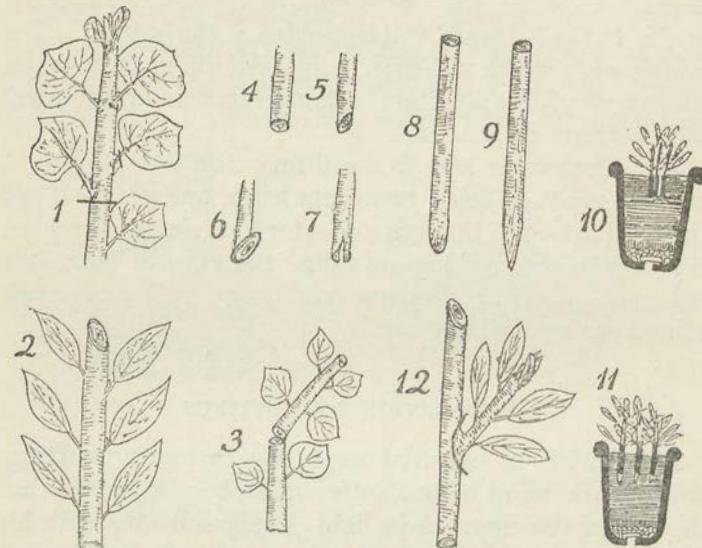


Diagram 42.—Propagation by Cuttings: 1. Shows where to cut the growths and the leaves to trim off. 2. Cutting of hard-wooded plant where the point is often cut off. 3. A difficult subject cut half-way through and allowed to remain thus. 4. Ordinary way of making the cut. 5. A slanting cut—not advised. 6. A heel of the old wood left on. 7. Base of carnation cutting split to ensure easier rooting. 8. A good setting stick with blunt end. 9. A bad setting stick, the end being too pointed. 10. Several cuttings put into the same hole to form a bushy plant. 11. A space left at the base of the cuttings, the result of a pointed dibber—bad practice. 12. How to take a cutting with a heel.

leaf, however, must be pinched off, as well as any others which would be underground when the cutting is duly inserted. If left they would probably rot and perhaps cause the cutting to damp. About one-third of the length of a cutting is the right depth to bury it. The surface of the soil should previously be sprinkled with sharp, dry sand,

a hole should be made with a dibber whose end is quite as blunt as, and larger than, the base of the cutting and the surrounding soil should be made so firm that a gentle pull by the leaf will not uplift the cutting. The base of the cutting should touch the bottom of the hole. After insertion some means should be taken to prevent the cutting from flagging, such as shading it from sunshine or covering with a handlight to shield from draughts.

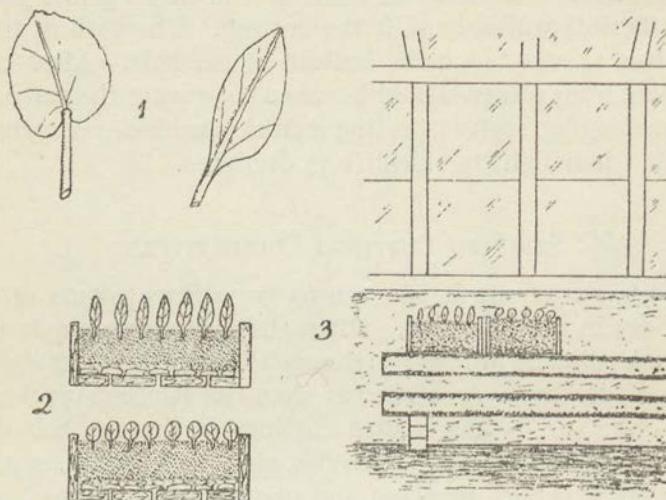
STRIKING CUTTINGS COLLECTIVELY

It is sometimes a practice to grow three plants of a variety in the same pot. Often they are grown singly in 3-inch pots and afterwards clumped together and repotted in a larger size. A better way than this (since it involves no check) is to insert three cuttings in the one hole at the time of propagation. *Salvias*, *chrysanthemums*, *eupatoriums*, *coleuses*, *panicum* and many similar free-rooting subjects are amenable to this treatment. Big plants are thus formed which to the average observer would appear to emanate from but one plant.

LEAF CUTTINGS

Some plants admit of ready propagation by the leaf, and where their habit of growth precludes the taking of cuttings, or the desire of having these plants true to form and colour does away with the idea of raising them from seeds, this method is taken advantage of. The *gloxinia* is easily grown from this humble beginning, as well as the popular *begonia*, *Gloire de Lorraine*. The leaf is detached with a portion of the leaf stalk, and a clean cut is made. If this be cut obliquely it is thought that roots are thrown out more quickly. Inserted in leaf-soil and sand in a warm

propagator, roots will in due course be thrown out, and after a further elapse of time growth will appear. The box



*Diagram 43.—Propagation by Leaf: 1. Leaf cuttings of begonia and gloxinia.
2. The leaves inserted in boxes. 3. The boxes set on hot-water pipes.*

containing these leaf cuttings may be stood over the hot-water pipes.

EXPRESS PROPAGATION

Where it is desired to work up a stock of plants from a few, the grower is called upon to do his utmost. For the purpose of illustration let us suppose the subject is the geranium and only a few plants are in hand. Every available cutting is inserted and the larger of the leaves which have been cut away in the process of trimming the cuttings are also put in to form plants. The old plants are potted up in a slightly larger pot if root-bound, and put into a close, warm house to induce them to break into

growth. As soon as the young growths are able to be handled they are inserted as cuttings and the leaves treated as before. In due course the young rooted plants are potted up and as soon as large enough the tops are taken as cuttings. In this way, by promptitude and perseverance, a large stock may be worked up from humble beginnings. Potatoes have frequently been subjected to this express propagation by cutting up the tubers into as many pieces as there are eyes, putting them into a brisk heat and nipping off the points as cuttings as fast as they appear. It must be admitted that it is an exhausting process, and it is only reasonable to believe that there is a sacrifice of constitution in the offspring, but it is well to know the method, even if it never be used.

SOIL FOR CUTTINGS

This should be of a sandy nature to admit of the free passage of air which plays such an important part in the process of rooting. Although not necessarily so fine as for seeds, it should be approximately of the same character. On no account should manure be present in cutting soil. Failure in rooting may often be traced to this cause. Brick dust, silver sand, leaf-soil and cocoa-nut fibre may each be added to soil for cuttings, though a mixture of loam, leaf-soil and sand in nearly equal parts will serve the purpose.

ADVICE NEEDING EMPHASIS

It must be made perfectly certain that the base of the cutting rests on the bottom of the hole and that the cutting be firm. Lobelias and some other subjects will root quite readily in the spring if torn apart. Whether cuttings are put singly or severally in a pot, or whether

boxes or pots are used are minor considerations which admit of no general rule. Most cuttings prefer a close, moist atmosphere until they have rooted. In many cases basal cuttings or suckers are preferred to stem cuttings, notably with chrysanthemums.

TREATMENT OF DIFFICULT SUBJECTS

Cuttings which display a difficulty in being rooted in the ordinary way may have a heel of the old wood left on. With carnations it is often a custom to split the base of the cutting. It is also a good plan with stubborn subjects to cut the stem half-way through at a joint and leave it thus on the plant until "callusing" (or swelling of the cut surface) has taken place, and then to sever it completely and insert in the usual way. Cuttings of poinsettias should be inserted almost immediately they are severed from the plant, as they have a tendency to lose their sap. To obviate this it is usual to dip the ends in dry sand immediately on cutting them off. This will to a great extent avert loss of sap.

PROPAGATION BY LAYERS

I think my purpose will best be served by showing how carnations are layered, for it is chiefly with them that this method of increase is used. It is usual to layer the plants immediately after they have matured their flowers. The earlier layering is done the larger will be the root system established before winter sets in.

We will layer them in a frame, for that is the better and quicker method, although success well attends the layering of plants in the soil surrounding them. Soil suitable for cuttings will do likewise for layering. We will have a hard

bottom to our frame and over it we will put a couple of inches of half-decayed leaf-soil. The soil will now be got at hand, pegs prepared and a mat put in readiness to shade the layers from sunshine. Meanwhile we will prepare the plants by cutting out the flower stem, removing weak

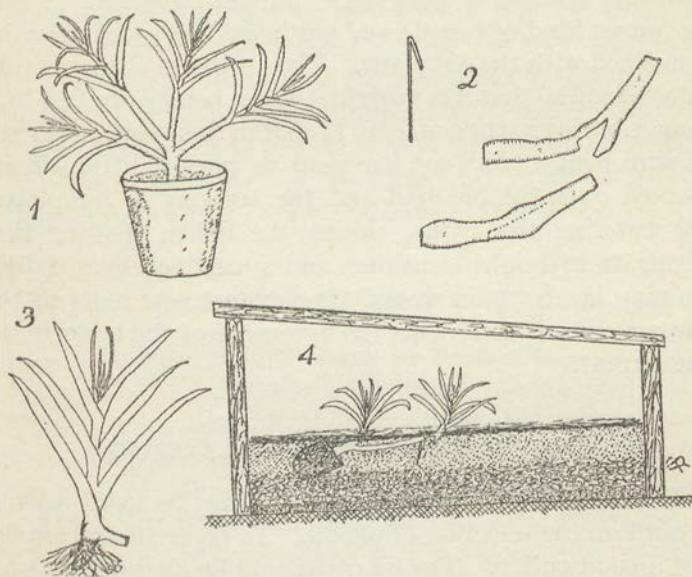


Diagram 44.—Propagation by Layering: 1. Plant prepared for layering. 2. How to make the cut and a peg for keeping the layer in place. 3. A rooted layer severed from the old plant. 4. How the plants and layers are set in a frame.

grass and stripping from the rest of the plant all the leaves to within four or five inches of the point of each growth. The growths being loosely looped together to prevent them from slivering off at the base, we knock the plant from the pot, remove the crocks and lay the ball sideways in the frame.

The next move is to put some soil beneath the growths and press it firmly with the hand. We then arrange

the growths so that they will be equidistant from each other. Now begins the layering proper. With a sharp knife a cut is made about an inch below the base of the lowest leaves. When the growth is cut half-way through immediately below a joint the knife is given an upward turn and is made to pass right through the joint. Thus we form a kind of tongue and yet leave the young growth connected with the old plant. The growth is then pressed into the soil so that it is upright, the cut being open and the tongue buried in the soil. To keep it in this position pieces of wire bent at one end are used as pegs, a little soil is worked over the old ball and the layering is complete. By watering the layers, closing the lights, shading the plants from bright sunshine and syringing them daily, we may in about six weeks' time expect new roots to be thrown out, thus allowing the severance of the layer from the parent.

SELECTION OF PLANTS FOR LAYERING

For the general cause of progress it may be well to spare a word on the selection of plants. To layer all and any is not a good policy. The plants should be chosen for their vigour, their general good habit, their freedom from disease, their profusion of flowering and the quality of having all the flowers blooming at the same time. Added to this we have to consider the value of the individual flowers, their colour, their form, their substance, their fragrance, their size, their lasting properties, the non-bursting of the calyx, and the strength and length of the flower stem. Those which have most merits should be propagated largely and the others in their order of merit.

WHAT TO AVOID IN LAYERING

It is wrong to use the soil too wet, or too dry ; to layer the plants while the ball of the soil is dry ; to use soil containing manure ; to allow the shoots to split or sliver at their base ; to neglect to bury the old ball ; to break the stem in pressing in the layer ; to set the layer obliquely ; to strip off too much of the foliage ; to neglect to label the plants ; to make so deep a notch that the layer is almost entirely severed ; to give too much ventilation for a start ; to neglect syringing and watering, and to fail to pull out those layers which are seen to have withered.

MINOR METHODS OF PROPAGATION

The notching and mossing of such plants as aralias, *Ficus elastica*, *dracæna* and *croton* has already been alluded to, as also the method of propagation by a bud or eye. This has been shown to be the best method of propagating the vine. *Offsets* are small bulbs or shoots springing from the base of an older plant. The term is usually applied in reference to tulips, hyacinths, narcissi, freesias, vallotas, etc. These will, if detached with a few roots of their own, soon grow into separate subjects. Though not absolutely necessary, it is a decided advantage that the offsets possess roots before being detached. *Division* is a very convenient method of increasing stock. It is used in the case of ferns, asparagus, grasses and all plants which have a root-stock furnished with numerous buds. The best time for splitting up is when the plants are not in active growth.

CHAPTER XXII

POTTING AND POTTING SOILS

THE usual type of flower pot is too well known to need any description. These pots are usually sold in casts, a certain number going to a cast, according to their size. Among gardeners it is customary to speak of pots in numbers rather than in inches, and as I know this often confuses amateurs I now give the numbers and the size in inches. The inches represent the diameter of the pot at its top. Thimbles are 2 inches ; thumbs, $2\frac{1}{2}$ inches ; small sixties, 3 inches ; large sixties, $3\frac{1}{2}$ inches ; fifty-fours, 4 inches ; forty-eights, 5 inches ; forties (or small thirty-twos), $5\frac{1}{2}$ inches ; large thirty-twos, 6 inches ; twenty-fours, 7 inches ; sixteens, $8\frac{1}{2}$ inches ; twelves, 9 to 10 inches. These figures vary slightly, according to the different makes, but they may be regarded as being approximately correct.

CLEAN *v.* DIRTY POTS

This is a subject of annual, if not, indeed, perennial discussion, among gardeners. Some insist on every pot being scrupulously clean before it is used. Others prefer to wipe them out, and only to wash them when they become unsightly in the greenhouse. Others again adopt a compromising attitude by insisting on every pot being clean before being used for certain subjects, while for others of little importance they consider this attention needless. I am personally very much inclined to this

latter view. It seems to combine in a practical manner the ideals of cleanliness and of economy. For carnations, cyclamens, chrysanthemums and for everything on which the grower is very keen, I should certainly advise clean pots and clean crocks, but for such subjects as bedding geraniums, forced beans, etc., the difference in the result is not worth the extra expenditure of labour. When pots are to be washed it is better to soak them previously, so that the dirt may be brushed off more easily. In all cases pots should be dried by the stokehold fire or on hot-water pipes and be rubbed out with a dry rag before being used. New pots should be well soaked prior to use, and then be allowed to dry. If used without soaking they will absorb much of the moisture from the soil, and there will not be that same binding union between pot and soil which is really essential to good watering and ultimate success with the plant.

THE DRAINAGE OF POTS

It is essential that pots be well drained, and this is brought about by the use of pieces of broken pots set over the holes. A large piece nearly as big as the bottom of the pot should be put in first, with its concave side downwards. Other smaller pieces should be arranged over this, and finally there should be a handful of still smaller pieces. This constitutes the drainage. To prevent the soil, which will be put in, from filtering into, and so obstructing, the drainage, some rough material, leaves, moss, peat, or stable droppings should be put over the crocks. Some plants require deeper drainage than others. It may be regarded as a safe maxim to give sound and deep drainage to those plants which will have to remain in the pots for a considerable time, and shallow drainage to those which will

have but a few weeks' stay. Thus for eucharis, palms, clivias, and such subjects as do not need annual potting, good drainage is essential, while for spiræas and other forcing stuff which will be over in a few weeks, a large crock at the bottom will be sufficient. Indeed, in potting up geraniums in the spring for planting out in the summer only a few leaves are thrown in to keep the soil from falling out of the hole. For orchids the pots are filled one-third of the way up with crocks, or some growers prefer to use the dead roots of ferns got when picking over the peat.

HOW TO POT A PLANT

We will now presume that a plant has to be shifted from a 3-inch to a 6-inch pot. The compost has been prepared, the pots are crocked and everything is ready. The plant may be knocked out of its small pot by holding it in the right hand and tapping the rim of the pot on the edge of the bench, when the pot may be lifted clear of the ball of soil. Having extracted the crocks with as little disturbance of the roots as possible, the loose soil at the top should be rubbed off. Some soil should then be put into the large pot and made firm with the rammer. Place the plant in an upright position in the centre of the pot, and work more soil around it. This also should be rammed firmly, and more put in, until the surface reaches to within half-an-inch of the top of the pot. This space will be necessary for watering. The surface of the old ball of soil will, in perfect potting, be covered by about half-an-inch. It is wrong to ram the soil above the old ball, or the roots will in all probability be destroyed. A good shift for a well-rooted plant is given when there is a space of one inch between the old ball of soil and the side of the pot. Bulbs such as narcissi, tulips and hyacinths are covered so that only

the tips are seen. The amaryllis should only have half its bulb buried ; the cyclamen should be covered rather

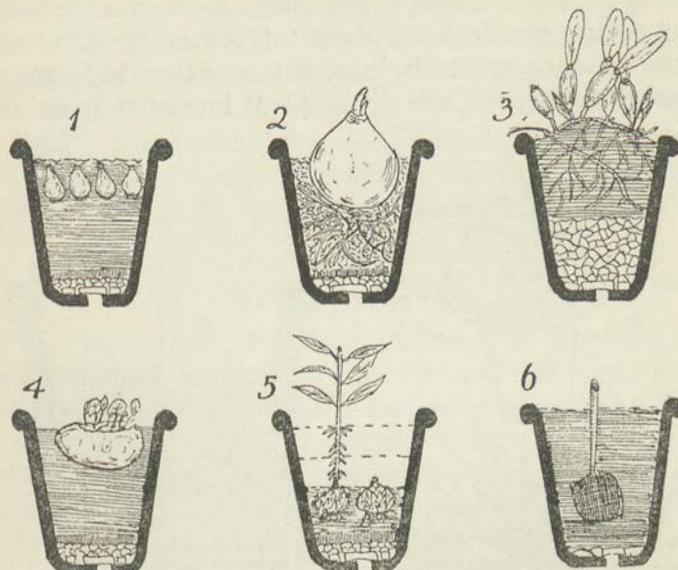


Diagram 45.—Potting Plants : 1. Depth to pot narcissi and tulips. 2. Depth to pot amaryllis. 3. Potting a cattleya (orchid). 4. Depth to pot cyclamen. 5. Depth to pot lilliums, allowing space for top-dressings. 6. Bad potting. Not sufficient drainage ; ball of soil too deep ; no space left for watering.

more than three parts ; the lily should be potted deeply in a large pot and be scarcely covered, room being allowed for top-dressing.

MISTAKES IN POTTING PLANTS

There are so many wrong ways of doing a thing that it is hardly likely that the right way will be found at the first attempt. Even in such an apparently simple affair as potting a plant there are numerous errors into which the novice may fall. The following are the most common

mistakes: Using wet, dirty or cracked pots; using new pots which have not been soaked; omitting to provide ample drainage; failing to put a large crock over the hole; not putting smaller ones above; throwing the loose soil immediately over the drainage before putting in leaves or moss; placing the ball of the plant immediately on the

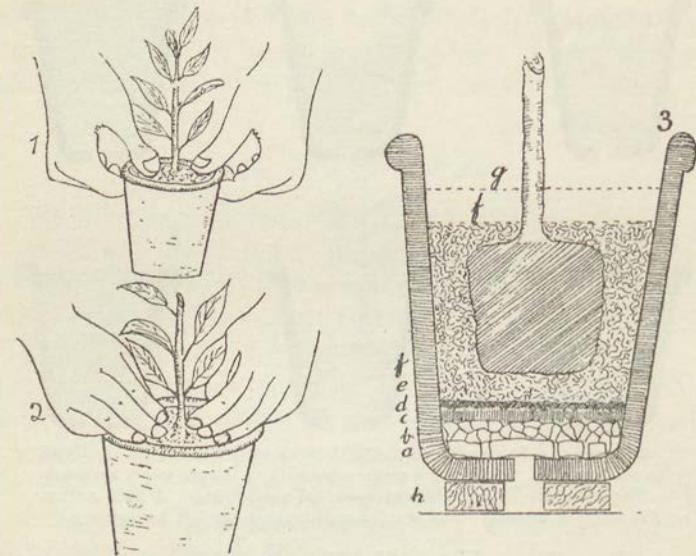


Diagram 46.—Potting: 1. Thumb used for pressing soil—bad practice. Three fingers of each hand should be used as at Fig. 2. 3. A well-potted plant. Chrysanthemum in final pot: *a*, large crocks at bottom; *b*, smaller crocks; *c*, leaves to prevent soil blocking the drainage; *d*, a dusting of soot; *e*, compost; *f*, space left for top-dressing; *g*, space eventually left for watering; *h*, two strips of wood on which to stand the plants.

drainage; breaking the ball on removing it from the other pot; not extracting the drainage; putting the ball too deep or not sufficiently deep; setting it too much to one side; crushing it when ramming; not keeping the plant upright; not sufficiently firming the soil; not leaving sufficient space for water; leaving the surface lumpy or

uneven ; destroying the lower leaves of the plant ; giving the plant too large or too small a shift ; using the soil when too wet, or too dry, or too lumpy, or too much endowed with grass ; putting too much manure in the soil ; not properly mixing it ; omitting to pull from the old ball soil not taken up by roots ; roughly raking or combing the old ball ; potting when the old ball is very dry ; pressing the soil with the two thumbs when six fingers may be used. These are the more common mistakes in general potting.

A STACK OF TURF

For the purpose of potting, fibrous loam is greatly in demand. This is usually procured from old pastures where the land has not been broken for generations, and where the roots of the grass form a complete network for several inches down. To obtain loam with plenty of fibre for a depth of about four inches is the aim of the grower. The best time to cut it is in the early autumn, though where wire-worm abounds it would be well to leave it until later to afford a chance for this pest to hide itself lower in the soil. The turf should then be made into a stack by setting it with the grass downwards and a layer of well-rotted cow manure between the layers of turf. In the course of a few months the loam will be thoroughly impregnated with the virtue of the manure, and will be more suitable for the growth of the majority of pot plants than if no manure had been used.

The method of adding manure at the time of stacking is far preferable to mixing it with the soil when forming the compost. The stack may be made of a square or an oblong shape, and the layers at the top should be so arranged as to form a roof for throwing off the water. The bottom on which the stack is to stand should be both level and dry.

I have seen a stack put on unlevel ground which has toppled over in a few weeks.

Some growers prepare special composts for chrysanthemums, carnations, etc., by putting layers of wood ashes, lime, soot, bones and artificial fertilisers between the turf

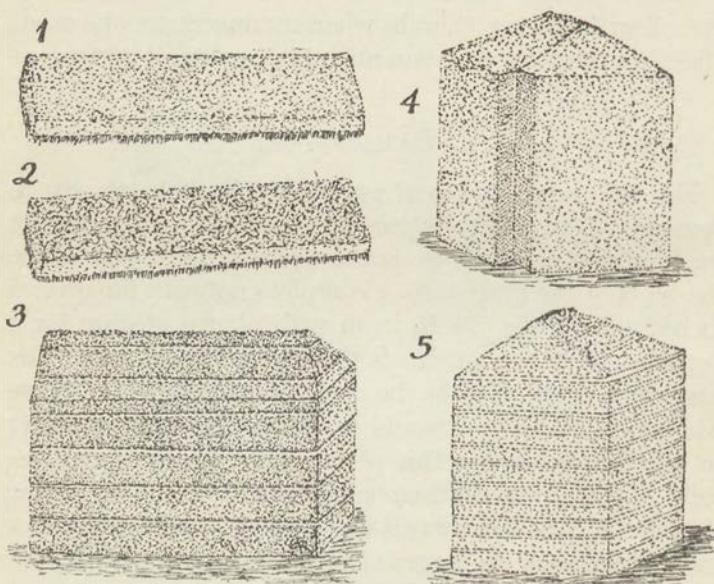


Diagram 47.—Turf for Potting Soil: 1. Poor turf deficient in fibre. 2. Good fibrous turf. 3. Turf stack, two layers of turf to one of manure. 4. Turf to be cut straight down. 5. Stack with alternate layers of turf and manure.

at the time of stacking, so that the soil will be well blended at the time of cutting. For use the loam should always be cut straight down with a sharp spade. It is all the better for being left some time before use. By that time the grass will have become stifled, and the result will be less likelihood of weeds abounding in the pots.

INGREDIENTS FOR POTTING SOILS

There are many substances used for making up a compost, according to the class of plant to be dealt with. Among these we may mention leaf-soil, animal manures, peat, sand, charcoal, mortar rubble, wood ashes, brick dust, sphagnum moss, oyster shell, bones and bone meal, and the many patent plant fertilisers. Of course, all these are not put into one compost, or it would, indeed, be a peculiar mixture, but if many different sorts of plants are grown, and it is desired to grow them well, it will be difficult to do without a little of each of them at some time or other.

LEAF-SOIL AND MANURES

Leaf-soil enters largely into well-nigh every mixture. Besides giving nourishment of a nitrogenous nature it possesses in a remarkable degree the property of retaining moisture, and for this reason it is especially suitable for forming a compost for seeds, cuttings and young plants. The best leaf-soil is that made from oak leaves. These should be gathered in the autumn and put into a heap to rot. If time be spared it is a good plan to turn them over occasionally, but this is not imperative. For use they should be passed through a half-inch sieve. Where possible, it is better to leave them for two years, so that they may pass the sieve more easily. When leaf-soil is used for orchids I prefer to prepare them in the following manner: Dry oak leaves are put into a bag, and this is placed over the greenhouse boiler, or on the hot-water pipes, where the leaves will be so completely dried as to be quite crisp. In due course they may be taken out and

rubbled through a half or quarter inch sieve. In this way they are introduced to the compost in a comparatively fresh condition, and will last much longer than if they had been allowed to rot.

With regard to animal manure, horse, cow and sheep are more commonly used. Any of these should be passed through a half-inch sieve. Horse manure, as is well known, is often used for making mushroom beds. After having produced a good crop of mushrooms the manure will be in an ideal state for mixing in potting soil, for it will have lost most of the virulence incidental to freshness. Cow manure should be dried, and afterwards broken to pass the sieve. Sheep manure may be used in like manner.

Artificial manures are dangerous to meddle with, and in using them in potting composts the directions should be fully read. Usually it is safe to use a 5-inch potful to a barrowload of soil, though more may be used when it is known that the strength is not great. The best advice I can give is to use the preparations cautiously at first, noting at each time the amount used, so that, should success attend it, the quantity on the next occasion may be similar, or reduced if it has proved to be too much. Bones, bone meal and steamed bone dust are often classed with artificials. They are slower in action, and may be used more freely than specially prepared manures. The younger the plant the less stimulant should be given in the way of artificial or chemical fertilisers. Indeed, some growers will not on any account use them for young plants, though I am convinced from positive practice that far from injuring the young plants, the admixture of a little artificial fertiliser is of considerable benefit to them.

PEAT, MOSS AND FIBRE

These I have grouped together chiefly because they answer in many respects the same purpose—that of retaining moisture. None of them are of any great fertilising value, but for their mechanical action they are in great demand. The great drawback to the use of peat is that it has a tendency to go quickly sour. This is especially the case if the dusty portion is not eliminated. For use I should advise that it be broken up, so as to exclude most of the dust. The dust may be used for putting on the outside garden, especially near rhododendrons; but on no account should it be used for any purpose under glass. Where peat is largely used in a compost the soil will be more difficult to mix, on account of its so hanging together. It is used chiefly for orchids, azaleas, ericas and rhododendrons.

Sphagnum moss, which is found in boggy woods, is the only kind which can be induced to keep alive in a compost. For this reason it forms a large part of an orchid soil; for, besides thus retaining more moisture, which the orchid will appropriate, it serves as an indication of the need of water. When on the top of the compost the moss heads show themselves freshly green there is sufficient moisture; but if the green be of a pale colour, approaching whiteness, then water will be needed. Cut off the bottom ends of the moss, using only the top two inches, or chop the moss into fine pieces. In either case weeds should be taken out.

The fibre mentioned is the refuse from cocoa-nut fibre. It is not greatly used for potting, though often for plunging plants, and for striking cuttings. I have, however, found it useful for mixing with leaf-soil and loam for forming a seed compost. For starting bulbous plants it is also

very useful, for the young roots run easily into it, and are not torn when taken out, the fibre shaking readily from them.

MORTAR RUBBLE, WOOD ASHES, CHARCOAL

Mortar rubble is, of course, endowed with a considerable quantity of lime, from which most of the virtue will probably have departed. Judging, however, by the way it is relished by fruit-trees, there must be a certain amount of nourishment to add to its mechanical value. I would advise its use for all pot fruits of any kind, and also for chrysanthemums. It may be passed through a half-inch sieve, though for chrysanthemums and for large fruit-trees it would be better to eliminate the dust afterwards by using a still finer sieve.

When wood ashes are obtained from the burning of wood only they form a valuable fertiliser, but usually they are obtained from the garden smother fire, or the burning of all kinds of garden refuse, such as tree prunings, hedge trimmings, etc. Though they lose in value by this means, they are still rich in plant food, and should, after being sifted to get out all rubbish, be stored in a dry place.

Charcoal is chiefly used for the purpose of keeping a compost sweet, and might well form a part of every compost. It mixes better if broken so as to pass through a quarter-inch sieve. For all those plants which have to be content with the same compost for several years it is essential.

BRICK DUST AND SAND

These have none other than a mechanical value for opening and aerating the soil ; though brick dust certainly holds

the moisture fairly well, and seems to be relished by the young roots, which take to it quite readily. Soft bricks should be chosen to be crushed, and the dust passed through a fine sieve. Silver sand is usually advised for potting soils, and although there is no other objection to it, it has no such advantage over other kinds as to justify much additional expense. The sand obtained from gravel is usually coarse enough, and quite as useful. If the sand be of a very close texture, so as to be as fine as moist sugar, it is better to avoid it.

HOW TO PREPARE A COMPOST

When preparing a compost the first thing is to get the loam chopped up or broken to the required size, and put on the bench so as to be only about six to eight inches deep. Then sift on to this the necessary amount of leaf-soil. Other matters, such as horse manure and mortar rubble, may then follow. The artificial manure should be sprinkled evenly over the top, and last of all will be the sand. It will now need to be turned at least four times, though I usually prefer six, especially where artificials are used. Turn it well over to one side with the spade, and then back again, until it is seen to be properly mixed. If too dry at the time of potting it cannot be made sufficiently firm, if too wet the result of potting with it will be still more disastrous. When in an ideal state it should so hang together when pressed in the hand that but a slight touch will be needed to separate it.

COMPOSTS FOR VARIOUS PURPOSES

1. For seeds and cuttings: equal parts of loam, leaf-soil, cocoa-nut fibre and sand, passed through a quarter-

inch sieve. 2. For general purposes: six parts loam, three parts leaf-soil, one part sand. 3. For special plants: five parts loam, two parts horse manure, two parts leaf-soil, one part mortar rubble, one part sand. 4. For terrestrial orchids (those growing on the ground): three parts loam, three parts peat, one part cow-dung, one part charcoal, one part leaf-soil. 5. For epiphytal orchids (growing on trees): three parts peat, two parts sphagnum moss, one part leaf-soil, half-part charcoal. These are given merely as a general idea of what to use. The mixing of a compost is governed to a very great extent by the character of the loam which forms the base of the compost. If this be of a heavy nature more opening matter will be needed; if very sandy, cow manure may be used in preference to any other form. As a general idea I like a compost to be fairly open, with not much manure in it. Then, when the plant is well established, liquid manure may be freely given.

CHAPTER XXIII

WATER FOR GREENHOUSE PLANTS

WHEN A PLANT NEEDS WATER

IT would be easy to answer that a plant needs water when it is dry, but it would be equally easy to find instances of a plant being very dry and yet not needing water. Bulbous plants, such as amaryllises, nerines, crinums, begonias, gesneras, calanthes (using the term bulbous in its widest meaning), are allowed to become quite dry, almost to the point of shrivelling, during their period of inactivity. A plant may be said to need water when in active growth, but to need the artificial application of water only at a time when the resources of moisture in the soil have been exhausted, and the plant, lacking the necessary moisture, is unable to perform its proper functions. Of course, the canons of good culture forbid us to allow a plant to reach this extreme state, just as the canons of good sense and the demands of good appetite will not allow us to be faint with hunger before replenishing our internal larder. In the outside garden there is little difficulty in knowing when the plants should be watered, and little danger of giving them too much, but greater care and more exact knowledge is needed in dealing with plants in pots, pans, tubs and boxes. There are, however, several well-proved means of ascertaining the need of a plant. It is a very unsafe plan to judge of the requirements of a plant by the appearance of the surface soil of the pot. This may appear quite dry

owing to a few hours' sunshine, while beneath, the soil may be amply endowed with moisture. On the other hand, the soil may appear moist and yet in reality be in urgent need of a renewed supply. When the leaves of a plant droop down it should be examined, and dryness will often be found to be the cause, though bright sunshine following a period of dullness, or the presence at the roots of eel-worms, wire-worms or weevils may be responsible for it. When the leaves feel flabby, when on being sharply rapped the pot gives forth a hollow sound, or when on being lifted the plant is below its normal weight, it may safely be watered.

MISTAKES IN WATERING

It is a very common mistake to suppose that a plant needs water at specified times, such as once a day or three times a week. This is altogether wrong. So much in this respect depends on the vigour of the plant, the texture of the soil, the amount of root-run, the heat of the house, the state of the weather and the time of year. There is not, nor can there be, any fixed time for watering, and whoever endeavours to disregard this rule by watering at specified times will be lucky if he can keep the plants alive, and he will certainly never attain to that success which should be aimed at by every healthy gardener. To deal out the water in dribblets is another all too common error. Sufficient water should be given at each time to saturate the whole of the soil occupied by the roots. Knowing as we do that it is the tiny root hairs at the extremity of the roots which assimilate the moisture, it must be our aim to reach every one of these. Other mistakes are watering plants in a cold frame when there is danger of a frost, watering hothouse plants with cold water, watering with hard water, watering newly potted or top-dressed plants without a rose or

sprinkler, allowing the water to fall over the leaves, flopping the water on so that it runs away from the plant, giving the same amount of water to a cut-back as to a full-grown plant, watering in the middle of the day when the evening or morning would serve, and allowing a plant to become very dry before affording water. In the majority of these cases the mistake need but be mentioned for the orthodox method to be perceived.

PRACTICAL PRECEPTS IN WATERING

It is obvious that in winter less water will be needed, and a plant practically devoid of active growth will need but little in comparison with a plant plenteously furnished with large, expansive leaves. In winter it would be safer to regard water as a necessary evil to be avoided as much as possible, for when the soil is constantly saturated with water it is impossible for the roots to perform their proper functions ; the soil becomes sour and the growth sappy and useless. In winter it is advisable to water early in the day, so that, the surplus water having drained away, the soil is warmer during the night, which is usually so much colder than the day. At all seasons the best times for watering are in the early morning and the evening. The reason for not watering during the bright, sunny part of the day is that the roots, aided by the warmth and water, are made unduly active, and this activity cannot be maintained. This does not, of course, mean that when a plant is found to be flagging in the middle of the day it should receive no water until the evening ; but it is here meant to emphasise the advantages of watering in the cool part of the day, and especially in the evening, when the moisture does not quickly evaporate, but surrounds the plant, and enables it to drink freely at the roots and inhale with its

leaves. When a pot plant has become very dry it is well to soak it in a pail of water and leave it until bubbles cease to rise. In the case also of small seeds and tender seedlings it may be advisable to water by immersing the pan in water well-nigh up to the brim, and hold it thus until the whole mass of soil becomes damp, instead of watering it overhead with a can.

POT RAPPERS

It is usual to use a pot rapper to ascertain whether a plant needs water. The old way was to employ the

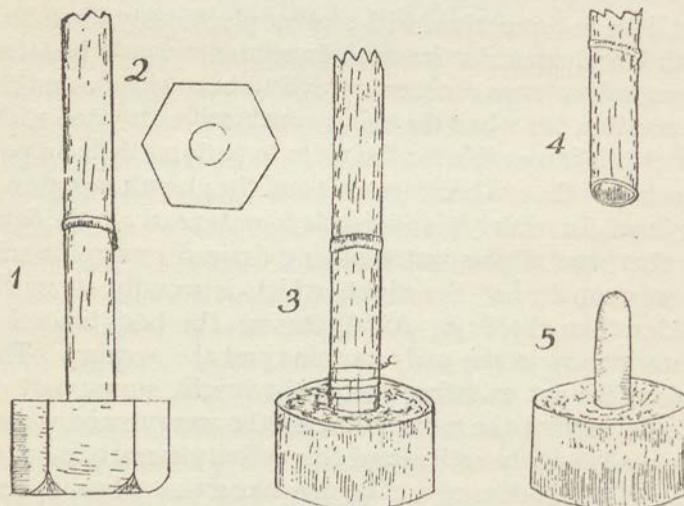


Diagram 48.—Pot Rappers: 1. Formed of nut put on bamboo cane. 2. Shows the shape of the nut. 3. A piece of wood fitted on to bamboo cane as shown at Figs. 4 and 5.

knuckles. Besides being often a painful process, it is impossible to reach the plants on a wide staging, and here the rapper becomes necessary. The best form of rapper is

made by screwing a hexagonal nut on a bamboo cane and driving a peg through the hollow part left by the pith. If the rapper be kept in the shade, or in water, it will not quickly become loosened. There are other methods of making rappers, such as cutting a stick with a knob at the end or fitting a piece of wood in a bamboo cane and wiring it on, but I have always found the nut form most suitable.

THE DRYING OFF OF BULBS, ETC.

THE PRINCIPLE EXPLAINED

The drying off process is governed by this law of growth—that the supply of moisture should only be sufficient to meet the demand. Now, when a plant has completed its yearly growth, and probably also its flowering, it is evident that it has little further need of moisture and nutriment. But so long as the growth remains on the plant it will be draining supplies from the bulb, as not only science but practical experience teaches us ; for it will be noticed that if water be altogether withheld while the leaves still remain on the plant the bulb becomes soft and flabby. As long, then, as this growth continues, water must be administered, and in most cases feeding will also be necessary to enable the bulb to store up sufficient virtue to infuse vigour and quality into the next season's flower, which in many cases precedes the expansion of foliage. If the practice were made of keeping the plants watered when there was no top growth and no root action, the soil would become sour and the roots and probably the whole plant would decay. Thus, besides the waste of time and water, there would be also the loss of the plant. Whether the time when growth is not apparent be a period of rest or of

recuperation, or whether there is any distinction between the two terms, is a fitting argument for those of a controversial turn of mind but is of little practical interest.

THE PRACTICE EXPLAINED

On the face of it, it certainly does seem absurd to teach people how to dry off plants, especially as this may be read on a broiling hot day, when the real difficulty is to keep the plants moist enough. But the fact is that there is a very wide misconception of the meaning of the process. A popular error is to understand the drying off to mean that only a small quantity of water is to be given at each watering, whereas it means that the soil should become well dried before water is given. The period between the waterings should be lengthened, but the quantity at one time must not be decreased. Throughout the resting period, have an eye to the bulb, and see that it retains its plumpness and firmness. If allowed to become flabby and spongy the ill effects will be seen in the flowers of the ensuing season. This, then, is the correct criterion—the plumpness of the bulb. Only sufficient moisture should be given to preserve that plumpness. If this rule be followed in the case of those bulbous plants that submit to the treatment, no disaster will arise.

A CONTROVERSY AND A COMPROMISE

The controversy is as to whether it is advisable to dry some plants off or to keep them slightly moist throughout. This controversy centres round such plants as the cyclamen and the amaryllis, and there is much to be said on either side, especially as good results attend either method. Now, rather than keep such plants dust-dry on the one

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hand, or quite moist on the other, I prefer to effect a compromise after the following manner:—After the foliage has died down and the plants so completely dried off that it is unlikely that more water will be needed, let them be plunged in moist ashes beneath the staging of a suitable house, and in such a way that worms do not get through the bottom, nor water from the plants overhead fall on to the crowns. A slight sprinkling of the ashes might also be strewn over the tops. By this method the extent of dryness is not only arrested, but through the porosity of the pots a certain amount of moisture is absorbed by the ball of soil. This plan I have followed with success on many occasions. In the case of arum lilies the question is whether they should be dried off completely or planted out. Here also either practice obtains the sanction of good growers, but the general and, as I think, the better plan, is to plant them out as soon as possible after they have flowered.

OTHER ITEMS CONCERNING DRYING OFF

The most convenient places for putting pot plants during their resting period are beneath the stagings, on shelves, on the hot-water pipes or in a cool shed. As growth is not needed we must give them conditions opposite to those advised for germination. Thus, instead of affording heat, moisture and closeness of atmosphere, we must arrange for a cool, dry, airy place. When it is advised to keep plants on the dry side it is but a loose method of saying that they resent over-watering, and that the opposite state would be preferable. If watered only when they really need it, and always when they need it, and then copiously, no error will occur.

SYRINGING

What the soft, growing showers of April do for outside plants syringing does for the inside. Moisture forced on to a plant in this way frees it from dust, helps to keep down insect pests and enables the plant to revel in a moist, buoyant atmosphere. In the spring, and when the young growth is breaking out, is the time when syringing is really needed. The water softens the bark and enables young growth to expand rapidly into full leaf. It will be recognised also that young leaves, which have but just begun their life's labour, have not the power to withstand sudden outbursts of sunshine, unless there is plenty of moisture at hand. This is because the sun naturally absorbs moisture, and if none be present on the surface of the leaf, that which is in the leaves will be sucked out, and probably at a greater rate than the few active roots can supply. Clear rain-water only should be used. Spring water, being charged with minerals, leaves a deposit on the foliage, which detracts from their beauty and is difficult to get off. Plants in flower, those which are ripening their fruits, those which are not in active growth and most of those whose leaves are clothed with minute hairs—should not be syringed.

Avoid buying cheap syringes. They easily become dinged and useless. Syringe forcibly with the open jet and make a spray by putting the forefinger of the left hand in front of the jet. By this method the spray can be regulated to any degree of fineness and can be directed beneath the leaves, where most insect pests make their abode. Early morning and afternoon are the best times for syringing. When, after some wear, it is found that water is drawn back in the syringe it is a clear sign that it needs repacking with grease and tow.

DAMPING DOWN

The term is used chiefly in reference to the management of a viney়. Here it is usual during the early stages of growth to sprinkle water on every available surface in order that there may be plenty of moisture in the house. This is usually done in the morning, at midday and at the time of closing the house in the afternoon. A can supplied with a sprinkler should be used, and all the floor, the pathways, the stagings, and practically every exposed surface should be damped over. Then the moisture will be more evenly spread over the whole house. Damping down should not be done on dull days, when the pathways are already seen to be sufficiently moist or when there is known to be plenty of moisture in the atmosphere. Nor should this damping be done more than once a day while the vines are in flower or when they are ripening.

CHAPTER XXIV

FEEDING AND TOP-DRESSING

THE ADVANTAGES OF LIQUID MANURES

WHEN a person advocates the use of liquid instead of dry manure he is entering on controversial ground, though not dangerously so, for the large body of gardeners favour the method. There are, indeed, few who would wish altogether to pin their faith to the use of solid or of liquid manure only, but many deprecate the too frequent use of manure in a liquid form as having a tendency to cause the soil to become sour. Liquid manure is more or less confined to the watering of pot plants, though there is no valid reason for not using it for outdoor crops. The chief advantage is that after a soil has been mixed for potting, and the plant potted, there is a difficulty in affording much manure after the roots have absorbed all that is in the soil. To put on dry fertilisers is certainly a help, but in the hurried waterings to which pot-bound plants are too often subjected during hot weather there is a danger of their being washed over the pot, and thus expense is incurred without profitable result. To add a top-dressing of soil is not always possible, for perhaps sufficient space has not been left at potting time. In such a case the only way of giving the plant a stimulant is to give it water in which manure of some kind has been steeped.

Let it not be thought that I am averse to the use of solid manures. On the contrary, I hold that when mixing soil

for potting, manure of a chemical and an animal origin should be used ; and, furthermore, I strongly advocate putting a layer of manure between each layer of turf at the time of stacking, for few indeed are the plants to which manure in the soil comes amiss. Yet even in such a case the virtue of this has departed long before the plant has completed its growth, and poor indeed would be the policy which would condemn it to a clear-water diet when naturally thirsting for stronger liquor.

MANURES USED IN LIQUID FORM

There are few manures which cannot be used in liquid state. Cow, sheep, pig, horse, deer and fowl manure are frequently used in this way, and the treatment of them is identical. But beyond these soot, guano and all kinds of chemical manures may be so employed. Soot is a fairly safe manure, and can be easily procured. This being so, it can be more extensively used. In the case of chemicals there are two methods of using them in a liquid form. A certain amount, according to the strength, may be put loosely into a pail of hot water and left to stand over night. This is a very good method, as there is little fear of any of the soluble matter being left unused, for most of it would lose its solid form under the influence of the combined warmth and wet. The other method is to put a quantity in a bag, put in also half a brick, tie the bag, and immerse it in a tub. This is a slower method, but it is often more convenient. It would be wearisome, even if it were useful, to give the quantities to be used of each of the proprietary manures, for the directions are usually sent with the manure, and may be relied on. Nor should the quantity be exceeded unless proof has been given by experiment that such quantity is not only harmless but beneficial.

METHODS OF MAKING LIQUID MANURE

The commonest and usually the most convenient method of making liquid manure is to procure a bag of coarse texture—a cement bag, for instance, is useless, as the liquid cannot pass through. See that it is innocent of holes, put

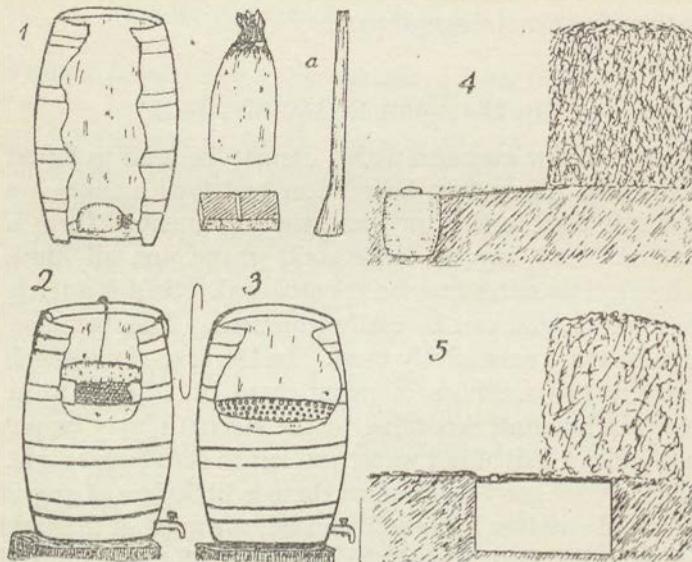


Diagram 49.—Obtaining Liquid Manure: 1. Bag of manure and brick to put into barrel of water; a, stick for poking the bag. 2. Sieve with manure suspended in barrel. 3. Zinc framework fitted in barrel, manure to be put over and water drawn from bottom. 4. A drain conveying liquid waste from manure heap to a barrel sunk in ground. 5. A tank fitted up for the same purpose.

in some cow, sheep, deer or fowl manure, as the case may be, also a brick to keep it at the bottom; tie it up, put it in a tub, and fill the tub with water. A blunt-ended stick, like the butt end of a gun, should be kept at hand, so that the bag may on occasion be poked about to ensure the

emission of the liquid. Were the stick pointed it would, of course, make holes in the bag.

Another method sometimes used is to get a large cask, and after having duly cleaned it—if used for paraffin—make arrangements on the inside for a sheet of perforated zinc to fit closely against the sides, about one-half of the way down. The manure, of whatever kind it be, may then be put in and the tub filled with water. In passing, the water will, of course, take with it a fair amount of the goodness of the manure, and it may in due course be drawn from the cask by means of a tap fitted to the bottom. Once the arrangement is fitted up this is, perhaps, the simplest method of making manure-water.

It will be noticed that where there is a large heap of manure the water in the vicinity during rainy weather is highly coloured, oft-times bordering on black. Does not this clearly show that a great deal of nutrition is being wasted? And does not it occur that means are available for making use of it? The simplest method, of course, is to dig a hole and run the water into this; it can then be bailed out in a bucket. But the best way is to make a proper cemented square opening in such a position that water will freely flow towards it. In this way much good manure-water may be saved. It would, of course, be necessary to provide it with an overflow to take away the surplus, but in a well-managed garden there would be very little to flow away.

TOP-DRESSING POT PLANTS

It is often advised to top-dress pot plants when well established, but there is another method of adding to the amount of available nutriment which I term “bottom dressing.” The method is not often adopted, probably

because it is little known, but for plants in large pots which have exhausted the stock of plant food in their compost it is a fine aid. We will take as an example a climbing plant in a greenhouse. It is already in a large pot standing on the greenhouse staging, and has its growths trained to

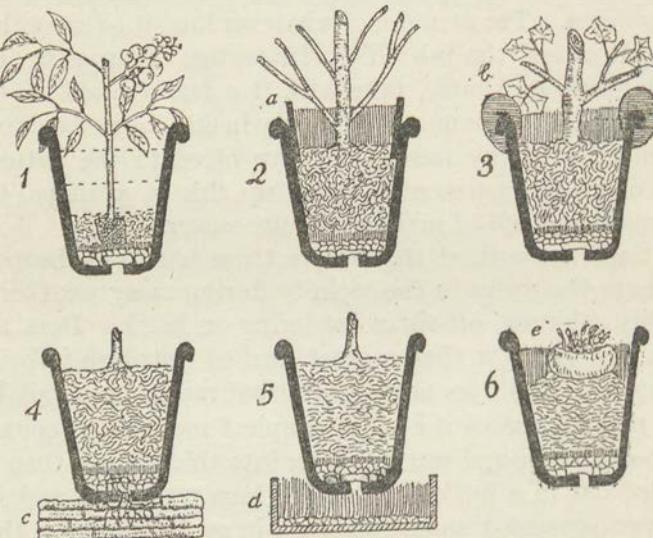


Diagram 50.—Top-dressing: 1. Space left for top-dressing tomato twice. 2. A zinc collar (*a*) put round top of pot to admit of top-dressing. 3. The same idea carried out by making a mound of clay (*b*) over the rim. 4. Bottom dressing. Turves (*c*) set beneath a pot plant for the escaping roots to feed upon. 5. A box of soil (*d*) set beneath for the same purpose. 6. Some soil taken away from old cyclamen and fresh put in its place (*e*).

wires on the roof or the end of the house. It is desired to afford it more nourishment of a substantial character without taking it from the wires. It has, we will presume, been top-dressed to the fullest extent, and has the roots pushing through the several holes found in the bottom and sides of large pots. The pot may be temporarily raised up, and a few squares of good fibrous turf laid beneath it

to a thickness of about four to six inches. If this turf has been stacked with cow manure between the layers for several months its nutritive value will be considerably enhanced. When the turf has been formed into a neat square the pot may be placed on it. The roots escaping through the hole at the bottom of the pot will revel in such luxury, and the result in growth and flower will soon be seen. It will be necessary to damp this soil when watering.

A SPACE FOR TOP-DRESSING

When potting a plant it is usual to leave a space between the soil and the top of the pot for the convenience of watering. If the plant is likely to remain so long in the pot that it will need a considerable amount of nutriment over and above that contained in the compost it would be wise to allow further space so that soil and manure may be added later. There are also other means of providing space for top-dressing. The commonest method is to put a collar of zinc or tin around the inside of the pot so that its upper edge is about an inch or an inch and a half above the rim of the pot. Top-dressing material may then be added, and there will still be sufficient room left for holding water. Another method is to mix clay and cow manure in the same manner as is done for grafting, and to form a mound over the rim of the pot and rising more than an inch above it. This is often done in the case of fruit-trees in pots, notably figs.

A good mixture for general top-dressing would be equal parts of loam, leaf-soil and cow manure, with the addition of sand or road grit if the loam is somewhat heavy. The leaf-soil affords coolness to the roots, which relish it greatly.

TOP-DRESSING WITH CHEMICAL MANURES

When top-dressing a plant with chemical fertilisers it is a good plan to loosen the surface slightly, but if this cannot be done without injuring the roots it had better be left alone. A mere sprinkling of the fertiliser will be sufficient. Better to give it at more frequent intervals than to burn the roots by an overdose. In view of the fact that some of these chemicals will injure the leaves of plants, it is a safe plan to avoid getting any of it on the leaves, though it is only fair to say that the majority of these patent fertilisers are not injurious. The time to top-dress with fertilisers or with soil and to feed with liquid manure is only when the pots are well filled with roots. After a dose of chemical manure, watering should be carefully done, or the manure will be washed over the pots.

A FORM OF SIDE-DRESSING

A method of adding more soil to plants when they have well taken hold of the other I have carried out successfully with tomatoes. They were grown in a box formed by standing 9-inch planks on end eight inches apart. When the soil afforded the plants had become well filled with roots I have eased back the planks a couple of inches on both sides, and, after fixing them firmly in place, have filled the space with some good top-dressing soil.

CHAPTER XXV

HOUSING, STAGING AND ARRANGING PLANTS

HOUSING WINTER-FLOWERING PLANTS

As frost is likely to occur any time after 1st September it becomes necessary to speed the arrangements for housing such winter-flowering plants as zonal pelargoniums, salvias, ivy-leaved geraniums, eupatoriums, tree carnations and such like subjects. Chrysanthemums may usually be left outside with perfect safety until the middle of October, and, in fact, as long as the weather is warm and fairly dry it is quite as well that the plants remain outside ; but, in order that no time may be lost when housing time arrives, all preparatory work should be got forward.

CLEANING THE HOUSES

The first consideration is that the house be perfectly clean. To put clean plants into a dirty house is a plan which should find no favour and no excuse with those who value the appearance and the health of their plants. If the house needs painting, let that be taken in hand at once, and let three coats of good paint be applied, filling in every crevice, renewing broken glass, applying fresh putty where needed, and making good all repairs in iron, wood, stone or brick. During this time all shelves, stagings, floor trellisings, and everything of a movable character should be taken outside, thoroughly scrubbed, and afterwards

painted if need be. After the painting has been done the pipes should be lampblacked, the walls whitewashed or painted, the soil on the floor taken out to a depth of three inches, the floor flooded with hot water if insects abound, the ventilators and heating valves greased, and the heating apparatus flushed out. When this has been done the staging may be rebuilt, shelves erected, fresh shingle put on the stagings, fresh soil or ashes on the floor, and everything put ready for the immediate reception of the plants.

WORK AMONG THE PLANTS

Opportunity should be taken of favourable weather to stake and tie the plants, clean off dead leaves, nip out flower buds (in several cases), give a slight top-dressing of fertiliser, and wash the outside and bottom of the pots. It may happen that the plants are pest infested, and in such a case it becomes necessary to syringe, sponge or dust them to destroy the evil. Broken pots and labels should be replaced, and the stake should be of sufficient strength to support the plant until it has given its flower. The washing of the pots must be delayed until the last moment, else a heavy rain will render them as dirty as ever.

In all probability there will be other regular occupants of the house, and these must be treated so that the housing of the outside plants may coincide with a new era of cleanliness. If they are infested with mealy bug, thrip or scale, they must be gone over with a small brush and some methylated spirits, touching each bug or scale, and then sponging them with a good insecticide used to the full limit of strength directed, syringing the plants afterwards with clear soft water. The leaves will scarcely be dry the same night, but on the following evening, when all the leaves are dry, the house should be closed and fumigated to

kill every thrip, mite or other insect likely to succumb to this treatment.

FUMIGATING A GREENHOUSE

The general method of fumigating a greenhouse is by means of some preparation in which nicotine enters largely. There are several such preparations on the market, and there is little to choose between them. An outfit consisting of a spirit-lamp, a conical-shaped tin perforated for the admission of air, and a saucer for containing the liquid, may be cheaply procured. The lamp is half filled with methylated spirits, the wick is allowed to stand clear a quarter of an inch at the top, and the lamp standing solidly on the floor is lighted. When fully aflame the tin frame is placed over it, the saucer is put on, and the needful amount of liquid poured in. The ventilators must be tightly closed and all holes in the roof or sides of the house stopped up. The best time for fumigating is in the evening of a still night so that the lamp may be left in all night. Some few plants are disfigured by this vaporising, such as the young fronds of maidenhair ferns. But as these are not usually infested with pests which fumigation is intended to kill, they may for the time be placed in another house. The main item of caution is to see that the dose given is not overdone. The directions on the bottles show the amount per thousand cubic feet, so no mistake should occur.

MEASURING A HOUSE

The means of ascertaining the cubical capacity of a house is to measure its length by its breadth, and the sum by the mean height. Thus, if a house be 15 feet long and 10 feet wide and 8 feet high at the apex and 5 feet high at the

eaves, the figure is obtained thus: 15 by 10 equals 150. The mean height is obtained by adding 8 and 5, making 13, and dividing it by 2, making it $6\frac{1}{2}$. The 150 is then multiplied

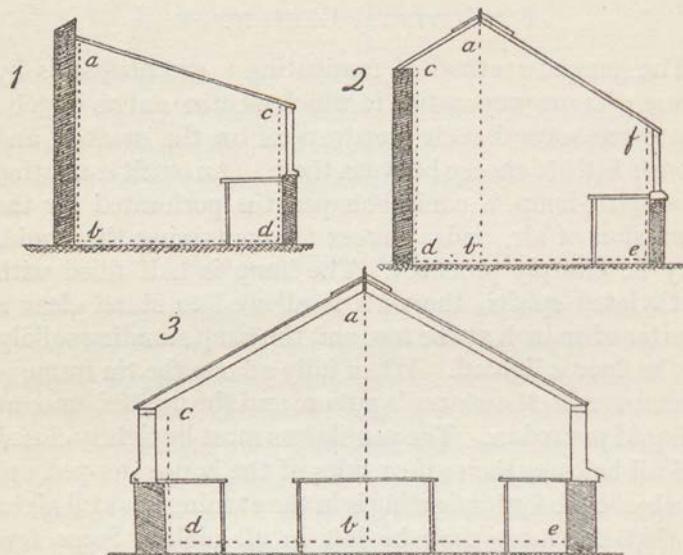


Diagram 51.—Measuring Cubical Contents of Greenhouse: 1. Lean-to: the heights ab and cd are added together and divided by 2. The result is multiplied by the width bd and the product by the length of the house. 2. A three-quarter span. Add ab to je and divide by 2. Multiply result by be and the product by length of house. Again add ab to cd and divide by 2. Multiply the result by db and the product by the length of the house. The two sets of figures thus obtained will, if added together, give the contents of the house. 3. A span roofed. Add ab and cd and divide by 2. Multiply result by de and the product by the length of the house.

by $6\frac{1}{2}$, making a total of 975, which for all practical purposes may be regarded as 1000 cubic feet.

THE ACTUAL WORK OF HOUSING

When it comes to the actual work of housing it will generally be found that there is barely sufficient room for

setting out the plants. This is an annual, in fact, one might well say, a perennial, difficulty. In every garden I have yet known there has been at this season, and right through until the end of spring, a cry for "more glass, more glass." Never yet have I found the gardener who had sufficient glass, nor do I yet expect to do so. It becomes necessary, then, to crowd the plants somewhat, but rather than do this unduly it were better to discard a few of the



Diagram 52.—Gives a good idea of staging pot plants.

poorer plants. It is usual, and it is right, to commence by housing the more important plants, so that the burden of makeshift is brought to bear on those plants which are not so greatly prized. Guided by recent years, it will be known approximately how much space may be spared for each batch, and the arrangement resolves itself largely into a question of arithmetic. Let us suppose there are 100 plants to be put on a tiered stage with seven

shelves. Fifteen are spaced out at equal distances along the central or top shelf, and on the lower shelf, by placing a plant opposite the vacant space in the top shelf we get 14 plants. The lower shelf will again contain 15, the next one 14, and so on. Thus we find space for 101 plants, and the odd vacancy will easily be filled by an overflow from other plants.

Presuming then that such a stage has to be filled with 100 zonal geraniums, the proper method of procedure is to put up the top row, using the tallest plants, then the next row on either side. By working round in this way, and choosing all the while the larger plants, and reserving the best in appearance for the space fronting the entrance, it will be possible to stage them evenly and well. It is always advisable to count the plants and then to arrange them arithmetically according to the space at disposal.

MAKING BEST USE OF SPACE

As previously hinted, it will be found difficult to accommodate all the plants. But somehow or other this will have to be done, even if they do not in all cases find ideal conditions. Let overcrowding be the last resort. There are many methods of making the utmost use of space. Shelves may be put up against the back walls of the greenhouse, and be hung from the roof or the apex. Tiered stagings should be used, for by setting plants on slightly higher levels there is more head room given them without increasing the area. Valuable stage space should not be allowed plants which are drying off, or have already done so. The space beneath the staging or under the pipes or on a shelf in a shed will often suit them quite as well. The conservatory should be overhauled, and all worthless or

unworthy plants thrown away and their places filled with those in flower or progressing rapidly towards that stage. By dint of ingenuity it is generally possible to overcome the difficulty.

HINTS ON HOUSING PLANTS

The following rules may be taken as summarising the work of housing. If they be carried out the grower may safely congratulate himself on having done his duty:—

- (1) Close the house and fumigate it, while the foliage is dry;
- (2) sponge and syringe all plants and remove them to another house;
- (3) stove the house by burning sulphur in it but only when it is absolutely empty and closed and when the fumes cannot get to an adjoining house;
- (4) clear out stagings, shelves, shingle and all movables, also three inches of soil from the bottom;
- (5) wash the house, glass, woodwork, ironwork, walls, pipes, and floor, also the outside of the house;
- (6) repair glass, wood, iron, etc., and point walls;
- (7) paint all wood, iron, piping, etc., and limewash walls;
- (8) flood floor with hot water;
- (9) wash stagings, etc., which were taken out and re-erect them;
- (10) renew any that are unsound;
- (11) wash shingle or put in fresh;
- (12) put fresh soil or ashes on the floor;
- (13) sponge again and return plants originally taken out;
- (14) grease ventilators and heating valves;
- (15) flush out heating apparatus and refill it;
- (16) examine air pipes and air taps, and look for leakages;
- (17) sponge plants to be brought in infested with pests;
- (18) tie and stake if needed;
- (19) clean off dead leaves;
- (20) wash the pots;
- (21) top-dress with chemical plant manure;
- (22) set plants fairly close, but do not overcrowd;
- (23) stage them evenly;
- (24) put shapeliest plants fronting the entrance;
- (25) fumigate the house when dry.

The fatal faults in housing plants are : (1) Neglecting to clean the house or the plants ; (2) neglecting to clean those plants already in the house ; (3) putting clean plants into a dirty house ; (4) putting dirty plants into a clean house ; (5) setting the plants unduly close ; (6) not calculating the space they will require ; (7) putting in plants with broken branches, broken pots or broken labels ; (8) placing them in houses or in positions where they will have to be removed ; (9) taking them in during fine weather when they might have remained outside for several days longer ; and (10) allowing too much heat and too little ventilation.

THE DECORATION OF A CONSERVATORY

A HOUSE OF SPECIAL DISPLAY

I have always had an ambition which I have never been able to realise, and although I doubt if many or any of my readers also will be able to realise it I would fain give it space here as an ideal. That ambition has been to have a small house—quite small—used solely for the display of plants. In this I would arrange plants which had been grown in other houses or in frames, and as far as possible I would have but one class of plants. For instance, at one period the house would be filled with flowering carnations, at another with zonal geraniums or with border or Malmaison carnations. A week or two might advantageously be given over to the display of cyclamen or of primulas, while at another period I would mingle cinerarias with ferns and bring back to my visitors memories of the Temple Show.

THE POSSIBILITIES OF THE PLAN

Imagine the possibilities of such a plan, or conjure up, if you can, the glorious spectacle of a house of bulbs in spring, of achimenes and gloxinias in summer, of chrysanthemums or salvias in autumn, and of Lorraine begonias or calanthes in winter. Whoever has enjoyed lingering in a house devoted to heliotropes or to freesias will understand my enthusiasm. The subjects suitable for such a plan seem to swarm upon us. Jotting them down as they occur, we have roses, lilliums, primulas, coleuses (the blue-flowering and the ornamental-leaved), begonias, amaryllises, cypripediums, schizanthuses, calceolarias, show pelargoniums, fuchsias, gesneras, azaleas, streptocarpi, etc.

MODIFYING THE PLAN

More subjects, in fact, are available than could possibly be used in such a way during a year; but the amateur gardener, thirsting for fresh subjects, could easily leave out for a year such subjects as are grown from seed. Thus, instead of schizanthuses, he might have cinerarias, and *vice versa*; and if something were preferred to the scarlet salvia it would be quite easy to grow simply a couple of plants to preserve the stock.

The plan would, of course, be worked according to the wish or whim of the owner, and no slavish adherence to one class of plants need be tolerated. For instance, with double and single geraniums there might also be ivy geraniums as standards or in baskets, and interspersed among the flowers the scented-leaved pelargoniums could be employed with very artistic effect.

THE ARTISTIC ARRANGEMENT OF PLANTS

It is one thing to grow plants well and quite another to arrange them to good effect. Unfortunately, the two qualities are seldom found together in high excellence. The only explanations I can offer of this is that good culture requires that the cultivator be sullen, dogged, determined, while in the display of plants it is impulse and imagination which betoken success. But this thought should not deter anyone from endeavouring to arrange his plants in at any rate a pleasing manner. Now to give advice in this respect it becomes necessary to deal in generalities, and while propounding principles it must clearly be left to the intelligence of the reader to apply them.

Into the flowering house, of course, all the plants may in turn be brought as they become attractive, and while they cannot fail to give pleasure there is the strictly utilitarian aspect—viz. that while they are being displayed more space is available in the growing house for those plants which are to follow and keep up the succession.

There are, of course, several different ways of arranging plants, and these are governed by the taste of the owner or decorator, and also in a considerable measure by the amount of available room, the number and quality of the plants and the structural arrangement of the conservatory. Personally, I am strongly in favour of so displaying plants that while they do not lose their character individually yet they show collectively so as to exhibit all the beauty of the plants and compel admiration. When a fresh batch of plants are introduced to the conservatory they would scarcely receive any notice if they were merely dotted about promiscuously, but if they are arranged neatly and artistically in a group interspersed with suitable ferns,

grasses or foliage plants they will be sure of such recognitions as their cultural excellence and artistic setting deserve.

There are several things to avoid in arranging plants for effect. Briefly, they are overcrowding, clashing the colours, flatness, too formal an outline, and what we might term nakedness, produced by setting the plants too far apart or leaving holes in the arrangement. By the use of pots, pipes, stands, etc., greater height and prominence may be given to many plants and the sense of flatness or heaviness thus easily dispelled. When a considerable batch of one kind of plant is in flower a bank or mound of them could be made as is often seen at shows, and would, besides giving pleasure, emphasise both the beauty and the utility of the plant in question.

In all these arrangements, however, the fact that the plants will need attention must not be lost sight of, and no method will long prove pretty if the plants cannot be easily got at. The use of baskets filled with such plants as heliotrope, ivy-leaved geraniums, achimenes, lachenalias, ferns, asparagus, sprengeri, begonias, fuchsias, campanulas, and similar subjects of a pendulous nature will give the house a very pleasant appearance and endow it with a wealth of beauty and fragrance.

Again light pillars can be erected if they do not already exist, and to these may be trained many beautiful flowering plants of a climbing character. The use of standard plants in a conservatory allows the flatness to be broken in a happy and easy manner as is now done so frequently in the outside garden.

CHAPTER XXVI

HEATING AND STOKING

To be really useful, a greenhouse must by some means be heated. It is possible to grow plants in an unheated structure, but the winter is a very trying time, not only on account of the difficulty of keeping out frost, but owing also to the great amount of moisture which will accumulate and cause damping off of flowers and foliage. To prevent worry the greenhouse should be heated, even if the fire is only kept in during the severe weather.

THE FIRST PRINCIPLES OF HEATING

Whoever wishes thoroughly to understand how to keep a greenhouse fire so alight that while there is always sufficient heat there will never be too much, and there will never be any serious fluctuations of temperature, must set himself to understand the principles of heating. But as space does not here admit of an exhaustive treatise on the subject, I will confine myself to an explanation of how the heat may be steadily maintained. It will be presumed that a good boiler has been chosen well above its work, that the pipes in sufficient quantity have been fitted, that the valves and air taps work freely, that the flues are clear, that the boiler and pipes are filled with water, and that everything is in readiness for the fire to be kindled. The aim is, by keeping a good fire, to heat the water. The backbone principle of the heating is that hot water rises

and cold water descends. Now the water by the action of the fire will become warm and will rise to the top of the boiler, the colder water sinking to the bottom. But in due course all the water becomes warm. Then, as the water at the top becomes hot it will seek further to expand. This can only be done by working upwards through the flow pipes. In doing this it will move the cold water there, which, by the law of circulation, will flow around through the pipes to make up for the cold water which has forced its way through the return pipe to replace the heated water which has risen. In this way a constant flow is promoted, the water throughout becomes warm, and this warmth is radiated from the pipes into the atmosphere of the house. This is the principle and practice of heating, and all the difficulties involved in heating only mean inability to procure and to maintain a constant circulation.

At the highest point in this pipe a small tap is inserted, so that it may be opened occasionally for the escape of air. Higher than the boiler or any other part of the heating apparatus is a small tank by which the boiler is kept well filled with water. Though often put immediately over the boiler, I prefer it set at the far end of the house and connected with the return pipe so that when the fire is driving the water does not swell over. Where there are several houses the heat is regulated by screw valves on both flow and return pipes. A little practice will soon teach one how to regulate these.

How to Light a Fire

It may seem unnecessary to give directions for so simple an operation, but from experience with people who have never before lit a fire in a greenhouse boiler, I know that such information is necessary. Having seen that the boiler

is filled with water, and flues and ash-box clear, the damper should be pushed in. If this be not done it will often be found that the draught is so strong that it is impossible to keep a lighted match in the boiler. The bars should then be covered with several inches of dry straw, and over this may be placed some dry wood. Light the straw, and when the flame has well taken hold withdraw the damper and close the fire door. Wait until the wood is well alight and then put on some larger pieces. When with these a good blaze is obtained, coke or coal may be added, and the fire may be left driving for some time. Not until a good fire is obtained and the pipes are well on the way to being sufficiently heated should the fire be stopped or slowed down.

HOW TO REGULATE THE FIRE

Boilers differ greatly in design, but the working of them is usually much the same. When a fire is being fully driven the damper is pulled out, the fire doors are shut and the doors of the ash-pit are wide open. In this way the draught coming into the ash-pit passes through and drives the fire and makes directly through the flues to the chimney. When a fire is fully stopped the damper is pushed hard home, the ash-pit doors are tightly closed and the fire doors wide open. To regulate it between these extremes means regulating the damper and the doors, and this can only be learnt by practical experience, for seldom indeed can two boilers be treated exactly alike. Another method of immediately stopping a fire when the aforementioned means are not quick enough is to throw on damp ashes or dusty coal. Coke breeze is also a good material for the purpose.

STOKING THE FIRE

The work of stoking the fire needs some elucidation. The right method is to keep the fire well over the bars ; it is a great waste of firing to fire on the dead-plate. Freedom from clinkers and ashes is another necessity to a well-regulated fire. These are got out by means of a clinker bar. The bar, which at one end is furnished with a cross piece, is thrust beneath the clinkers so as to uplift them. They are then turned over and withdrawn. By repeatedly stirring the fire the ashes are made to escape through the bars into the ash-pit, whence they may be removed. Clinkers and ashes having been extracted, the live coals are levelled, and on these is shovelled more fuel. It is not a good plan to put on a great deal at a time, else the fire will give little heat for a considerable time, and afterwards if clinkers form it will be impossible to remove them until the fire has burned down low.

BANKING A FIRE FOR THE NIGHT

To get a fire to last all night, giving a steady heat and leaving a workable amount of live coals in the morning, is not a difficult matter. It requires only a little experience. A large fire will not serve for banking in, for less fuel can be put on, and beyond giving out a tremendous heat for some little time there is every likelihood of the fire being out in the morning. The fire must be low at the time. Clear it of ashes and clinkers, rake it level, and commence to pile on the fuel. Large lumpy pieces may first be used, but as the filling in nears completion smaller

fuel will be better. At the end some small coal, coke or ashes may be put over the face of the fire. The dampers should be so regulated that there is but a slow draught. Only experience can show exactly the amount of fuel to put on and the way of leaving the doors and dampers.

CHAPTER XXVII

VENTILATING, HARDENING OFF AND SHADING

THE PRINCIPLES OF VENTILATION

IT will, I think, be readily understood that the art of ventilation of glass houses, used for the cultivation of fruit and plants, is a matter of supreme importance in the curriculum of culture. Glass has this peculiarity when formed into an enclosed structure, that while it readily admits the light and heat of the sun, it stops radiation, or, in other words, it does not allow the heat to readily escape. This is a great advantage, for by this means the heat of the sun may be bottled up for a considerable time, and the need for fire-heat is either done away with or considerably diminished. It may, however, happen that all the heat gained in this way is not required, and the only method of regulating the quantity is to reduce it by opening the house at the apex to admit of its gradual escape. Apart also from the maintenance or reduction of the temperature it must be a well-known fact that plants need a supply of fresh air, and they should always have as much as can be afforded without reducing the temperature below the minimum at which the plants are known to succeed. It is this fear of giving too much air which causes stagnation of the atmosphere and militates strongly against good culture, because the plants have nothing to induce them to expand. For plant life as for human beings a movement in favour of more fresh air is sadly needed.

VENTILATING A PLANT HOUSE

There is a decided difference in the ventilating of a fruit house and a plant house, or even that of a hot or a cold house. It is, of course, impossible to give such precise precepts that any novice may undertake to ventilate a house as well as if he had undergone years of experience. The most that can be done with the pen is to show some faults to avoid and to indicate the general principle of ventilation. As much air should be afforded as possible without letting the temperature drop lower than the figure which is known to be the minimum, with this reservation that during bright days the thermometer may safely stand 10° higher than on dull days and at nights. For instance, it is well known that the temperature of stove plants should range between 65° and 70° . This is the night and the normal figure. With the sun striking upon the house the temperature will rapidly rise. When the glass stands at 75° some air should be afforded at the apex of the house —just a little. If it rises still higher the vents may be more widely opened, and the endeavour should then be to keep the house in the neighbourhood of 80° . During dull spells it will be necessary to diminish or entirely take off the ventilation to prevent sharp fluctuations of temperature. Early in the afternoon the house may be shut up entirely so as to bottle up some of the sun-heat, and thus render the use of the fire-heat needless until the night. To counteract the drying and scorching influence of thus closing a house during full sunshine the plants are freely syringed, and all available surfaces are damped, so as to flood the atmosphere with moisture.

The ventilation of a cool house, of course, is worked on a different principle. To maintain the necessary tempera-

ture, closing of the house during the afternoon is not necessary, and the ventilators are only shut to such an extent as to prevent too low a drop of the temperature during the night. In connection with a cold house it is also the custom to put air on at the bottom of the house, or, to be precise, on the sides. Sometimes the side is made to open, while at others a shutter is put in the wall, and when opened the air passing over the hot-water pipes becomes warmed

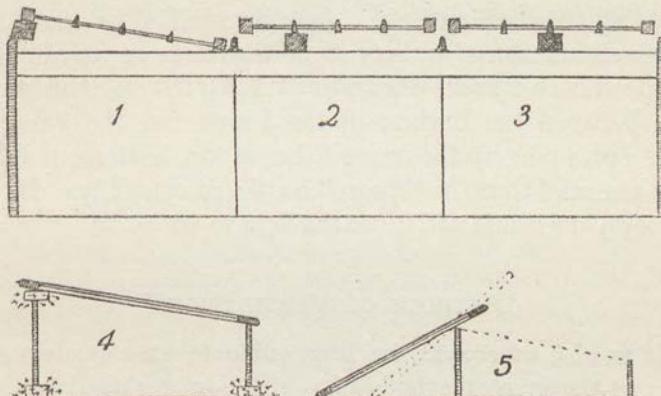


Diagram 53.—Ventilating a Frame: 1. Frame tilted at side according to the wind. 2. The block set near edge of frame; will tend to warp the light. 3. Correct place to set the block or scotch. 4. A frame set on a brick at each corner, so that air may get beneath. 5. Shows how to draw back a light. If left as shown, the wind can easily blow it over.

before it plays upon the plants. In the winter-time this is a great consideration. In ventilating a plant house it is usual to open the top ventilators first, and afterwards the lower ones, but in every case both upper and lower ventilators opened should be on the same side of the house. In a cool house some ventilation should be left on all night, and with skilful management it will scarcely be necessary to take it off entirely even during a frost up to 10° . In

the case of a span-roofed house the ventilators on the leeward side of the house should be opened, with those to the windward usually closed.

VENTILATING A FRAME

There are various methods of ventilating frames, such as pushing the lights alternately up and down, propping them up at the top or at the bottom, tilting them at the side or drawing them off entirely. Another method of affording a free circulation of air is to stand the frame on four bricks—one at each corner—thus admitting air through the space left between the bottom of the frame and the ground. When propping up the frame either at top, bottom, or side, it is essential that the “prop” be placed centrally. If set more on one side it will cause the light to warp.

METHODS OF VENTILATION

It would, of course, be impossible to give readers an idea of the many methods of ventilation, for nearly every horticultural engineer has ideas of his own on the subject. But they all centre round a few main principles. The old-fashioned method of giving ventilation to a house was to have the lights slide up and down. This is now well-nigh obsolete, and I do not remember having seen any houses of recent erection supplied with this method. The plan was to form lean-to houses against a convenient wall, and to have the top lights slide down and the bottom ones up, something after the style of a casement window. The great drawback to this plan is that the lights must always be closed during rain, or the plants will get wet and the house and its occupants a prey to damp. Undoubtedly the best system is that by which the lights at the top of the

house are uplifted for the whole length of the house, and where the lights also at the front open outwards by means of hinges affixed at the top. It is not a wise plan to have only every alternate light to open. Better by far have them open the whole length, so that the house can be fully aired. The remark applies likewise to the lower ventilators. In a span-roofed structure the top lights on both spans and the bottom lights at the sides should be made to open, or the ventilation would have sometimes to be put on the windward side. In a plant house provision should also be made for the air to be admitted at a point (in the wall) where it will be forced to pass over the hot-water pipes before reaching the plants ; but this does not do away with the necessity of the lower lights being made to open, for they will be required when a full flood of air is needed.

Whether the lights be manipulated by means of a screw or a lever matters little, though personally I prefer a lever which, with the aid of a bolt screwing against the bar, can be held in any position. The screw system is strong, but somewhat longer to work and requires frequent greasing.

HARDENING OFF

Readers have been often advised to harden off plants, and it is presumed that they understand the meaning. But while realising its meaning they may not exactly know how to set to work. Many of the subjects which are to be hardened off for eventual planting in the outdoor garden are not in the natural way likely to be killed by frost ; others can under ordinary conditions stand several degrees of frost without injury, while others again, though uninjured by cold, yet are too tender to live during frost.

THE REASON FOR HARDENING OFF

It may be wondered why there should be any necessity for hardening off plants which are of a hardy character or come under the category of hardy plants. Well, the probability is that they have been raised in much heat in order to forward them when progress in plant life outside would be so slow as to be almost imperceptible. Having been thus accustomed to a high temperature, it would mean either positive loss or a very certain and severe check to put them straight away out in inclement or cold weather. It is thus that the hardening off becomes necessary. When plants are hardened off in a correct manner they may be removed by stages from a temperature of not less than 60° to the outside, where it would sometimes go below freezing point without any perceptible check, and probably with considerable advantage to their constitution. Some such method is absolutely essential when the plants have to be set outside fairly early in the season.

HOW TO HARDEN OFF PLANTS

This is, of course, the main point for amateurs. For the sake of more perfect illustration it will be presumed that the plants are in a temperature of 65° (which is regarded as a stove heat), and have eventually to be set out in the open ground. The first stage is to remove them to a cool greenhouse, where the normal temperature would be about 50°; but even here it is advised that they be set in a part where the cold air through the ventilators will not play directly on to them. After a few days they may be put in a more airy part. The next removal will be to a cold greenhouse or a cold frame, but for a couple of days

very little air will be allowed. Then admit more air, and later draw back the lights during fine weather. After a few days of this treatment air may be left on at night, and a little later the lights may be removed entirely, unless a severe frost is imminent, or snow. But even when standing in a cold frame plants are not so fully exposed as they will be when set out in the ground, so that it is advised afterwards to set the plants in the open at a nice distance apart, so that sun, air and wind may get freely between them ; but for a while it is a good plan to make arrangements for covering them with mats should danger from frost be anticipated. The final stage, of course, is to leave them entirely unprotected and to set them out in the open ground.

SHADING THE GREENHOUSE

In order to protect plants from scorching, or to prevent the too rapid withering of the flowers, it will be necessary to provide some means of breaking the brilliance of the sunshine. There are several methods of shading, and while the best is undoubtedly the cheapest, it is at first considerable in cost. It cannot be gainsaid that lath-roller blinds are the best. Once they are put up there is little fear of their breaking, they will well withstand weather, and in the winter will aid in keeping the cold out. The best plan in fixing them is to let them run down on iron rods, at least six inches clear of the glass. A point to remember is to put the pole in an easy position for rolling up, so that it will roll up evenly. It is necessary to renew the cords at least once a year.

Canvas blinds, though by no means ideal, are better than a permanent shading. Tiffany is also useful, though very apt to tear and to rot when left down during showers. The ordinary archangel mats are altogether too heavy

for most plants, and there is danger of glass breakage during windy weather if the weights used to keep them on be not heavy enough.

A permanent shade may be made by mixing slaked lime with sour milk. It should be brought down to a fine wash, and if put on when the glass is clean and dry it will wear well throughout the season. It can be put on more easily than the advertised mixtures, and for all practical purposes it is preferable. The objection to this form of shading is that during sunless periods the plants are robbed of much sunlight which they would relish, and are thereby rendered less robust. All plants which show a disposition to flag should be shaded, if they cannot be kept erect by dewing them over with a syringe; for I find that such plants as do not in the ordinary course need shading are best lightly sprayed over when they flag. Often this will bring the leaves up again. If not, the shading must perforce be used.

CHAPTER XXVIII

STAKING AND TYING

THERE are a great many greenhouse plants which require stakes in order to keep them erect, and on account also of the greater amount of shifting to which they are subjected, it is advisable to stake them if they exhibit any tendency to lop about. There are two methods of staking which are greatly used, according to the varying circumstances. One is to put a stake to each shoot, and the other is to place a stake in centrally and to sling the shoots to this. The former method makes the plants look larger, and it is advised that it be done in the case of worthy specimens ; but when the aim is a massive display rather than the exhibition of the individual plant it would save time, and be by no means prejudicial to artistic effect, to use but one stake. This might be done in the case of chrysanthemums, and especially with that pretty and deservedly popular begonia, *Gloire de Lorraine*. Yet another method of staking and one commonly used for bulbs, such as narcissi, freesias, etc., is to put four stakes round the pot and to twine some raffia grass round them, thus enclosing the plant.

MATERIAL FOR STAKING AND TYING

Undoubtedly the best stakes for the majority of purposes are bamboo canes, which can be bought in varying lengths, and besides being neat they last for a considerable time.

Short pieces split into four come handy for staking short stuff. Other stakes, such as hazel, can often be got from a wood, or bought cheaply. If a privet hedge be allowed to grow somewhat before being clipped, it will afford useful stakes for a variety of purposes, if the leaves be stripped off and the bark peeled from that part which is to be beneath ground. The economic amateur gardener will find a use also for the prunings of apple and pear trees.

The best materials for tying are tar-twine and raffia grass. The former may be had in various sizes, and the latter, which is an improvement on the old bass matting, can be cheaply bought in bundles. Raffia tape, which can be bought in reels, does not fulfil all the advantages claimed for it, and is not likely to come into general use. Carpet thread will be found of service when it is especially desired to make the tying material invisible. Green twist is also a good tying material.

HOW TO TIE PLANTS

Simple as it may seem, it takes some time to get into the way of tying plants securely, neatly and quickly. Almost every young man whom I have initiated into the gentle art of tying has given an affirmative answer when asked if he could tie a knot; but they all failed to do it without a lot of finger-fumbling, and usually ended in making a granny's knot instead of a reef knot. The raffia may be split according to the strength of the subjects to be tied, or according to the strain to which it is likely to be subjected. It may then be deftly twisted in the fingers to reduce its apparent size and increase its strength, and after the tie has been made the raffia should be cut so that the remaining ends are less than a quarter of an inch in length. In cases where the tie is likely to slip down it is advisable

to pass it once right round the stake. Plenty of room must be allowed for the swelling of the branch. To tie so tightly that no allowance is made for an increase in the circumference or diameter of the branch is a far too common mistake.

MISTAKES IN STAKING AND TYING

Unless timely tying is practised the appearance of the plants will be spoiled. There is scarcely any sadder sight in a garden than the attempt to bring into shape plants which, through being allowed to fall and lop about, have their growth anything but upright. In tying chrysanthemums, for instance, it is a frequent error to make the tie some six inches from the point of the shoot, whereas it should be made as high up the shoot as possible, so that considerable growth must be made before another tie is needed. Failure to drive the stake well into the soil, or, in the case of pot plants, right down to the crocks, is frequent, and the consequences may be readily imagined. It only needs mention to show what a disastrous mistake it is to drive a stake through a plant, as could easily be done in the case of lilies and other plants of a bulbous nature. To use stakes out of proportion to the size of the plant, to tie too loosely, to put in the stake obliquely (except sometimes with pot plants), to leave long ends to the tie, to pull the plant out of shape, to crowd the growths, to enclose the leaves, to tie branch to branch instead of to the stake, to use crooked or knotty stakes—these are some of the mistakes which must be avoided.

SPECIAL DEVICES

Being rather a tiresome and laborious work, it is small wonder that many have exercised their inventive genius

with a view to lessening the work of tying and staking. So far, nothing very revolutionary has happened. There are certain advantages in the wire coil stake, in the patent clip, and in the wire arrangement for enclosing the plant ; but when all has been said in their favour we have sadly to admit that nothing has yet been shown to wholly supersede the stake and the tie. There is scope for inventive genius here.

CHAPTER XXIX

CARE OF YOUNG PLANTS

A VERY critical time in the life of a plant is that which follows on its germination from seed. A seed will often germinate under conditions which would spell ruin to young plants, and it is fairly safe to assert that most failures in plant culture date their existence from some error committed shortly after germination. The essential conditions or requirements of young plants are air and light, with sufficient, but not overmuch moisture, and enough heat to keep them gently moving, without undue hurrying. These principles are grossly violated when the glass or paper coverings are kept on too long, so that growth does not take on its natural green colour; when the surface soil is allowed to become dust-dry; when the seedlings are kept far from the glass or beneath the shade of overhanging foliage; when they are placed directly over hot-water pipes; when they become subjected to drip, or to an over-amount of moisture from syringing; when they are suddenly removed to cold conditions; and when they are allowed to grow up in a crowded condition before being pricked off or thinned out. The remedy to all these errors is apparent.

It cannot be too strongly urged that young plants must have careful and constant attention. To postpone attention in the matter of removal to good conditions for several days cannot fail to have a bad effect on the plants. Old plants may bear neglect, but it will never do for young

ones. Personally, I like to prick off most young plants as soon as they can be handled, without waiting for the rough leaf to appear, though this advice would not be safe for those of abnormally slow growth. It applies, however, to most half-hardy annuals and to most vegetables which are started under glass.

Another item worth mentioning is that no stimulants, either in the water or the soil, should be given to very young plants, whether raised from seeds or cuttings. This would almost equal in folly the giving of flesh meat to infants.

Hence we may sum up the advice relative to the care of young plants by saying that they ought to be closely attended to in every matter, and when any operation is needed it should not be delayed. Until the plant has both a good top growth and a well-finished root system, it cannot safely be neglected in the smallest degree.

The reward of good attention is strong, healthy, robust growth, capable of carrying the plant safely through the various and inevitable vicissitudes of its life.

PRICKING OUT SEEDLINGS

For by far the majority of such seeds as are used for making the flower garden beautiful, and the vegetable plot useful, pricking out is needed ; for it is impossible to sow them in such a way as to leave the resulting plants a suitable distance apart and at the same time ensure economy and success. Pricking out, moreover, is a work which cannot be delayed. If we are to have sturdy, bushy plants, we must treat them well in their young stages. To allow the seedlings to lengthen in the stem is to court failure in several ways, for the growth becomes thin and scarcely self-supporting, while in the endeavour to get them to

stand up well there is a temptation to bury them deeply, with harmful results. As soon as it is seen that the seeds have germinated, the protective covering should be removed, and (unless the subject be one which naturally

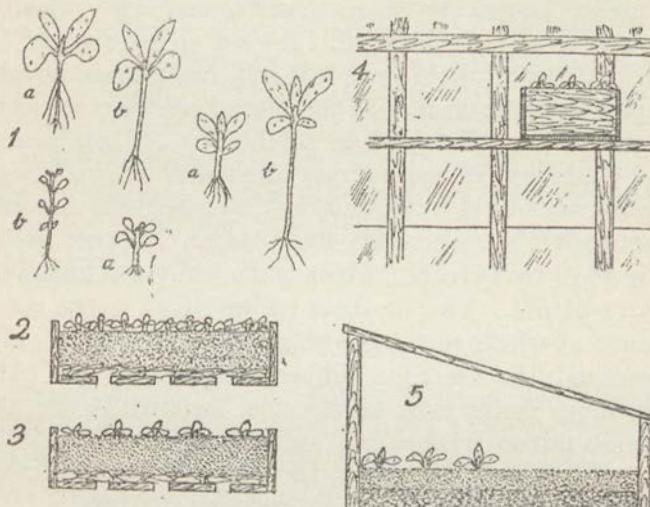


Diagram 54.—Pricking Off Seedlings: 1. Types of seedlings; a, good seedlings for pricking off; b, seedlings which have become drawn. 2. Seedlings pricked out too closely. 3. Set a nice distance apart. 4. Boxes set close to glass after pricking out. 5. A frame for pricking out—soil being set over a bed of half-decayed leaves.

resents strong sunshine) full exposure to light and proximity to the glass should be brought about by putting them on a shelf. When the rough leaves are formed is the best time for pricking out, as there is then little danger of injuring the few roots which will by then have been made.

SOIL AND RECEPTACLES FOR PRICKING OUT

As for seed sowing and for cuttings, a light sandy soil is best for pricking out, though the rule applicable to seeds

and cuttings—that there be no manure of any kind in the soil—need not be strictly enforced. A small addition of horse manure from an old mushroom bed will do no harm to most plants, but will help them to push away gladly. The use of chemical fertilisers in soil intended for pricking off is not to be recommended. A good mixture would be three parts loam, three parts leaf-soil, two parts sand and one part horse manure. In the case of seedlings raised in the greenhouse it is usual to prick them off into boxes. These boxes may be made of any convenient size and shape—a good size would be about $2\frac{1}{2}$ feet by 1 foot, which would accommodate sixty to sixty-five plants. Another useful size is 2 feet by 15 inches, which will usually accommodate seventy plants. Two or three inches apart is the usual distance at which to set the plants. In no case would I recommend the use of a dibber for pricking off. The index finger is far more serviceable, for with its use the roots are not so cramped up, and the work may be done quite as quickly. Moreover, there is not the same need for firming the plants as when inserting cuttings.

FRAME FOR PRICKING OUT

Where facilities do not exist for the use of boxes—which are rendered more useful by the fact that they can be carried to the beds—a frame may be set up for the purpose. It will, let us presume, be standing on a hard bottom, so that it will be necessary to put in some soil. Before the pricking-off soil is put in it is advised to cover the bottom of the frame with leaf-soil or with mushroom manure. Over this may then be spread the soil, which will need to be firmed. If nothing is put at the bottom of the frame, it is quite likely that the roots of the young plants will be made to rest directly on the hard ground, whereas with

leaf-soil or mushroom manure they have a moist rooting medium at their disposal. When pricking out in a frame or on a patch of ground in the open it is necessary to have two boards—one to kneel on and the other on which to set the toes. Immediately after pricking out, the plantlets should receive a good watering, and if the weather be bright a light shading for a day or so will help to pull them together again. Pricking off and removal to a lower temperature should not come too closely together. The young plants must have time to gather themselves up after one check before they are called upon to withstand another. A week should elapse before the young plants are brought to a lower temperature.

ILL-HEALTH IN PLANTS

Those who make a point of having plants in their windows frequently complain about their looking sickly. There may, of course, be many causes for this. It is charitable to suppose that the fumes of gas or of oil lamps or the fluctuations of temperature bring the mischief; but if truth be looked upon as a greater virtue than charity, it would be well to ascribe it in the majority of cases to over-watering, and consequent sourness of soil. In the endeavour to do the plant good and bring about a state of good health, it is usual to give it some stimulant in the way of artificial manure, or the well-nigh inevitable dose of cold tea, or to put it into another pot. To give such a plant stimulants of any kind is altogether wrong and tends to hasten its death. Plants in ill-health resemble people in this respect, that in order to bring about a state of robust health it is necessary to treat them as if they were again quite young. They should be afforded a slightly warmer temperature, be kept close and free from draught,

be lightly shaded, and in many cases have most of the old soil taken from them and replaced with new. Added to this, they should be sparingly watered and freely syringed. Many plants may be nursed back to good health in this way, but as with human beings it is safe to say that after an illness a plant has had its constitution undermined and cannot be so healthy as if the ill-health had not occurred. Contrary to the opinion of some, it may be remarked that once the leaf of a plant goes yellow it will never regain its original greenness.

PART VI

MISCELLANEA

CHAPTER XXX

THE AMATEUR'S FRAME

VALUE OF A FRAME

I HAVE on frequent occasions drawn the attention of amateurs and small growers to the great value of a cold frame in a garden. For the purpose of furnishing plants for the outside garden, be they flowers or vegetables, a frame is almost as useful (relatively to its size) as a greenhouse. Certainly I would consider it a very great violation of the laws of economy to try to manage a garden without a frame. Let us recapitulate the many purposes to which a cold frame—that is, an ordinary wooden frame—may be put. It can be placed on a hotbed for the purpose of sowing seeds and rooting cuttings, for growing cucumbers and melons and for forcing seakale, rhubarb, asparagus, lettuces, carrots, radishes. It may be used for growing potatoes, dwarf beans, turnips, beetroot; for forwarding onions, cabbages, cauliflowers, leeks, celery, tomatoes, peas, broad beans, runner beans; for sweet-peas and the general run of bedding plants. It may be employed in the autumn for rooting cuttings of violas, pentstemons, antirrhinums, calceolarias, marguerites and fuchsias; or for plunging bulbs in pots, strawberries for forcing, carnations for planting out, also Canterbury bells and campanulas grown for the greenhouse; for cuttings of hardy shrubs and roses, and for all kinds of hardy plants grown along in pots for planting in the rockery and herbaceous border in spring.

A frame is also useful for wintering cauliflowers and lettuces, for layering carnations, for pricking off all kinds of young seedlings or rooted cuttings in spring, for violets ; and for growing a very large number of greenhouse plants during the warmer part of the year, such as pelargoniums, cyclamens, primulas, freesias, carnations, chrysanthemums, calceolarias and numerous other plants. With all these possibilities surely there is no further need for me to emphasise the great value of a cold frame.

THE MINIATURE FRAME

I have in a previous chapter spoken of the value of a miniature frame as distinguished from a makeshift frame. Many amateurs have that yearning for glass which is so prevalent among those seriously afflicted with that popular disease known as a love of gardening. But this yearning cannot in many cases be satiated by the erection of a greenhouse and they have therefore to be content with a frame. When even this luxury is denied them the only thing possible is a miniature frame. Even with a small frame there are many possibilities, for, excepting in size, it is as useful, and fulfils the same purposes as a larger frame. It will scarcely be large enough for melon and cucumbers, but will serve most of the other purposes mentioned above.

MAKING A MINIATURE FRAME

The making of a miniature frame involves no great expense. Any handy man with a few carpenter's tools will soon put one together. The only difficult part is the light. It will probably be possible to buy one of these second-hand, or, if a local joiner were asked for a price, it is unlikely that the figure would be abnormally high.

The frame should be built of fairly solid material, and should be so arranged that there is a slight fall from back to front to throw off the rain. There should also be guides at the side to keep the light in place when it is being pulled

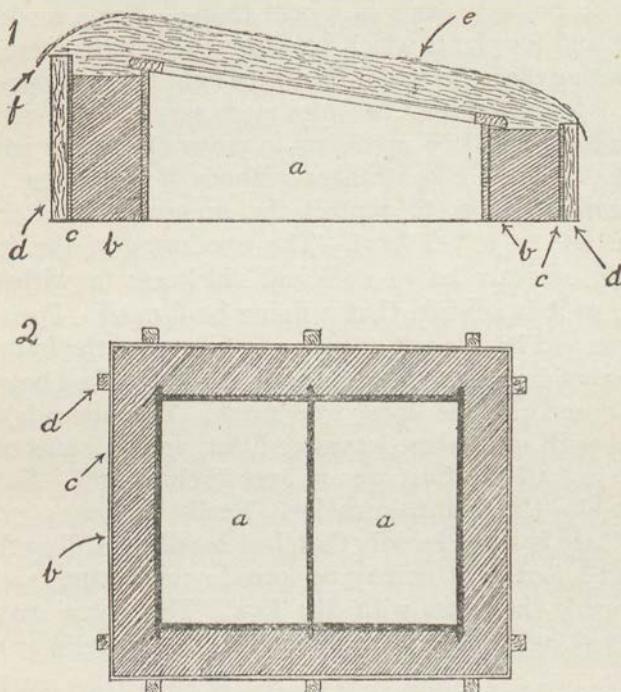


Diagram 55.—Protecting Cold Frame from Frost: 1. Section of frame. 2. Plan of frame. Letters apply to both figures: a, frame; b, ashes or soil; c, wood built up round the frame; d, posts to support the wood; e, litter put over the lights; f, mat to keep litter in place.

up and down. Beyond this the frame should be fairly airtight and painted to increase its durability. With such a frame, no matter how small, the owner should have many advantages over those who have no such convenience.

PROTECTING A COLD FRAME FROM FROST

When our old friend Frost (for really he is not an enemy) has commenced paying us frequent visits it will be necessary to protect plants in a cold frame. For a moderate frost and for plants which are almost hardy the mere fact of closing the lights will suffice if the light be in good repair. But later, when frost becomes more severe and longer in duration, it will be necessary to cover the frame with a mat, or even to take stronger methods of protection. Let us consider how to protect the occupants of a frame from 20° to 30° of frost. The woodwork of the frame would scarcely be of sufficient thickness to withstand this, so it is advised that a lining be formed. Posts are driven and boards put round so as to enclose the frame on its four sides, but to leave a space of about a foot between the frame and the outer woodwork. This space is then filled with soil, ashes, leaves or litter, and will effectually keep out all the frost we are ever likely to get. But we have also the light to consider. Really the best covering for these is some heavily thatched hurdles; failing these, about a foot of litter may be spread over, taking care not to break the glass with the fork. The straw may be covered and kept in place by means of a tarpaulin or mat.

THE CARE OF A FRAME

Quite a respectable little booklet could be written on the subject of the amateur's frame, but to do anything like this here would mean a considerable amount of repetition and overlapping, and is not necessary. After what I have pointed out regarding the possibilities of a frame, surely I may expect that readers who have not got one will proceed

to purchase. Hence it becomes incumbent on me to give a few hints on the management of a frame. The great danger with frames is that plants will suffer from dampness during winter or from scorching during summer and the one and only remedy for both these faults is plenty of fresh air. It is scarcely likely during the winter that there will be any plants in the frame which cannot be subjected to a full flood of air. Therefore I advise that the frame be ventilated freely whenever the glass is above freezing point. In fact, during dry weather it is advisable that the lights be drawn right back. But they must be put on again during rain and frost. It is safe to say that very little water will be needed during winter, but the following precautions may be taken. With pot plants the pots should be so set that they do not touch, so that the pot rapper may be got among them to test each pot. Only those which show unmistakable signs of needing water should receive it, and then it should be afforded in such a way that the foliage be not made wet, that water be not spilled about, and that none be allowed to flow over the rim of the pot. Furthermore, only a fine day should be chosen for watering, and the best time is the morning, so that the plants may dry before night. To further strengthen the armour of defence against the insidious enemy, dampness, it would be well to look over the plants occasionally, pick off all decayed leaves, loosen the soil, wipe the green slime off the pots, and dry the trellis on which they stand. If these means do not allow the grower to keep his plants—well, he may place the blame where he will, but certainly it will be neither his nor mine.

I would like to emphasise the importance of choosing a dry bottom on which to stand the frame, and an open position. Cold is not our enemy, but dampness; and this dampness it is impossible to dispel if the bottom of

the frame be merely garden soil or if it be put beneath the shade of a wall or a tree. Other important points are that there be no means of water draining into the frame, but, on the contrary, facility for its being taken out. To render the frame dry, let its four corners be stood upon bricks. Brick rubble or clinkers should then be put in until they are level with the bottom of the frame. Then a trellis bottom could be stood firmly over the rubble, and on this the plants would stand. Added to these precautions against dampness, the light must be in good repair, else every other precaution is wasted.

CHAPTER XXXI

GREENHOUSE PESTS AND THEIR EXTERMINATION

As in the outside garden, so in the greenhouse, the number of pests is far greater than might be imagined, and though I think none are wholly ineradicable they are so difficult to get rid of that few go to such extremes or adopt such drastic measures as to eradicate them. The general means of eradication, or at any rate of checking their progress are dipping, sponging, fumigation, spraying, trapping and the adoption of preventive measures. Before giving a few words on each of the pests I might refer in general terms to these methods which will save me a considerable amount of repetition. I have already dealt with the question of fumigation, so need not now refer to it. In dipping, sponging and spraying we deal, of course, with insecticides. These proprietary preparations are many of them excellent, and most of them fulfil their purpose, so that it would not be fair to mention any in particular. A glance at the well-filled advertisement pages of the gardening papers will afford plenty of choice in the matter of preparation for the extermination of pests of all kinds. Whatever mixture be chosen, it is the wisest plan to use it strictly according to directions. It is neither safe to the plants nor fair to the vendor to use it in greater proportion. Warm soft water is preferable for mixing insecticides, and for ensuring a thorough fusion the syringe should be used. Draw up a syringeful and force it back again into the can or bucket.

In this way it will soon become thoroughly mixed. This precaution is especially necessary when paraffin forms part of the mixture, as it often does in home-made insecticides ; for the oil has always a tendency to float on the top and may in this way be used in excess. I think the safer way to measure out insecticides is by noting how many parts of water to one part of the preparation. Whenever traders give the quantities in pints, half-pints, etc., I like always to translate it into parts, and to mark the can this way. Thus, if half-a-pint is recommended to two gallons, knowing there are thirty-two half-pints in two gallons, we mark the can 1 in 32. Then, whether we have a cup of a standard measure or not we can be sure of putting in the right quantity by putting, say, one 3-inch potful of the preparation and thirty-two 3-inch potfuls of warm soft water. When sponging plants care must be taken not to tear off the leaves, and it must be remembered that the underside of the leaf is usually the happy hunting ground of these pests. When plants are dipped they should be turned upside down, the hand being held over the top surface of the ball of soil and the pot that it does not come from its pot, and the plant should be moved about for a while in the bucket or tub to enable the insecticide to penetrate everywhere. After spraying, sponging, or dipping it is always advisable, on the score of safety, to syringe the plants with clear soft water. A special nozzle should be fitted to a syringe for spraying, as by giving such a fine spray it not only wets every part of the plant thoroughly but also economises the mixture, which in some cases is rather expensive.

ANTS.—Though very interesting little creatures, they often become quite a plague to gardeners by getting on to ripe fruit, especially peaches. Undoubtedly the best remedy is to pour boiling water into their nests, when these

can be found ; but where they cannot be found, or are in such a place that boiling water cannot be poured on them, must be trapped by setting some tempting baits for them, such as pots smeared with jam, fresh bones, etc. When found, the simplest method is to scald them with boiling water. They may often be kept from getting to the fruit by tying cotton wool around the branch or setting a grease band on the stem of peach-trees.

BLACK-FLY.—Rather troublesome with chrysanthemums in the summer months. It gets into the points of the growths and, of course, cripples them. An easy remedy is to dust the points with tobacco powder or to syringe them forcibly with quassia extract. If taken in hand in the first instance there should be no difficulty in keeping the pest in check.

BEES.—These can hardly be called pests, because they do so much good in setting the fruit. A fruit grower loves nothing better than the hum of bees around his trees when fully in bloom. But we are not so anxious to have our flowers set seeds because their beauty so quickly departs. That is why bees become a nuisance when they visit our freesias, causing them quickly to wither, or tear open our choicest carnations. The only remedy is to screen the plants from them by means of muslin or to keep them out of the greenhouse by tacking tiffany over the ventilating spaces.

BEETLES.—An unqualified pest, for they eat many plants in the greenhouse. Special beetle traps may be bought and will account for a great many, but many may be killed by going into the greenhouse at night and turning a strong light quickly upon the floor or the staging, wherever they are likely to be. Phosphorus paste will also account for a great many. Cockroaches may be got rid of in the same way.

BEGONIA MITE.—Will be found troublesome by those who grow these beautiful plants in quantity. By far the best course to adopt where only a few plants are grown is to throw away the plants and get fresh ones in. Other-

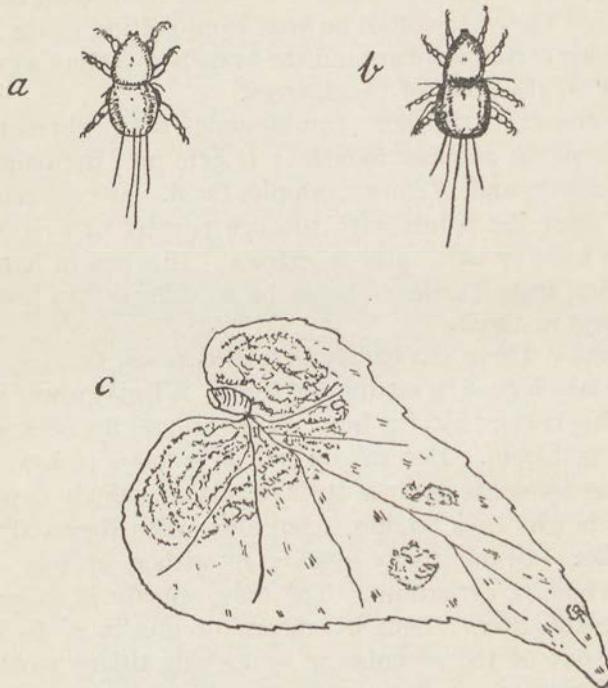


Diagram 56.—Begonia Mite: *a*, larva; *b*, perfect mite (highly magnified); *c*, leaf of begonia attacked.

wise the leaves may be sponged with Gishurst compound and be frequently dusted with sulphur. Almost any insecticide containing sulphur will be useful against this minute but destructive pest.

CATTLEYA FLY.—Those who grow a number of orchids will perhaps find this pest troublesome. There are two

distinct kinds, one attacking the growths and the other the roots. Many may be got rid of by cutting off all swollen roots and growths. This seems to be the only effective way, although it may mean the sacrifice of several plants. I have known the fly which attacks the roots to be entirely got rid of by cutting off every root and starting the plants afresh.

COCKROACHES.—May be got rid of in the same way as beetles.

CRICKETS.—Also a nuisance in the greenhouse, as they

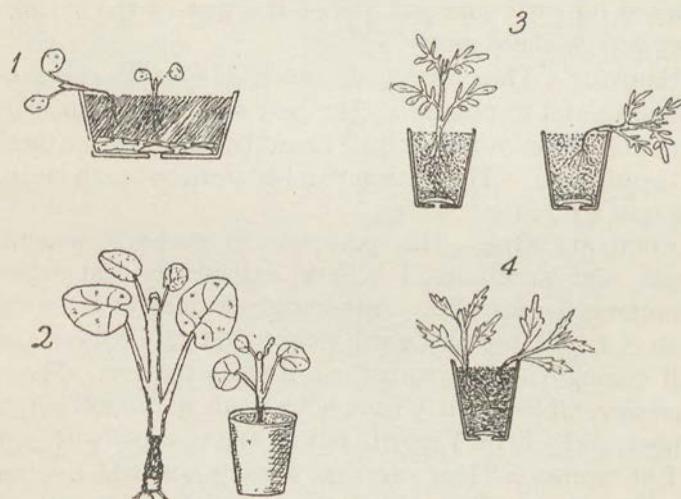


Diagram 57.—Damping Off: 1. Seedling damped off. 2. Geranium cutting damped off. 3. Healthy tomato and one damped off. 4. Healthy and damped off young chrysanthemum.

eat seedlings and disfigure the leaves of plants. I have found the V.T.H. slug traps very useful for catching these. Last season I set one of these traps for slugs in a cucumber frame, and besides a few slugs I found next morning sixty-seven crickets. Naturally I was overjoyed unexpectedly to come across this means of combating the evil.

DAMPING.—This is a fungoid disease which accounts for a great many young plants either as seedlings or cuttings. If the correct atmosphere is maintained there should be very little damping. An atmosphere too close and stuffy, accompanied with excessive moisture, will induce damping, also overhead syringing of young seedlings. To prevent damping a little more air should be put on and the surroundings should be kept drier. In a propagator the glass should either be wiped dry or turned three times a day. Young stocks are very liable to damp, but if they are pricked off early and put out of the way of the syringe they will go ahead nicely.

EARWIGS.—These insects do much damage to chrysanthemums and to peaches. The best way to trap them is to cut off pieces of the stalk of broad beans and place them in their haunts. The earwigs can be blown out each morning into a jar of salt water.

EUCHARIS MITE.—This pest attacks eucharis, pancratiums, and sometimes, I believe, extends its destructive operations to amaryllis. A thorough cleaning of the roots with X.L. All insecticide will help to get rid of it, as also will mixing Vaporite with the soil when potting. Plants already established may have holes made in the soil with a dibber, and a little Vaporite put in and covered with soil.

EEL-WORMS.—These are insidious pests which often attack melons. Once they attack the plants burning is the only remedy. Preventive measures should then be adopted against a further attack, such as sterilising the soil by burning or by steaming or by adding soil fumigants to it a week or ten days before using it. After an attack of eel-worm the site of the attack should be thoroughly cleaned.

GREEN-FLY.—With green-fly we will couple white-fly. These are notoriously troublesome, especially with such

subjects as pelargoniums, cinerarias, arum lilies and calceolarias. Happily they are not difficult to destroy, but if passed unnoticed for a time will greatly disfigure the plants and cause considerable harm. The surest method of exterminating them is to fumigate the house or

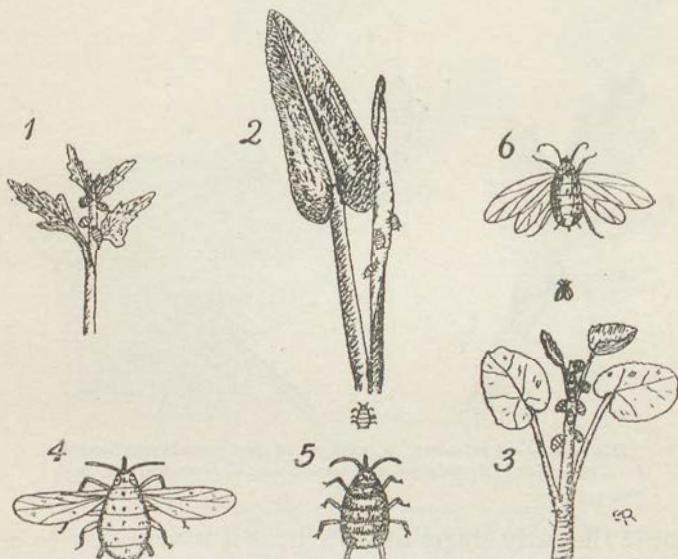


Diagram 58.—Green-fly: 1, 2 and 3. Chrysanthemum, arum and pelargonium attacked. 4. Winged female. 5. Wingless female enlarged and actual size. 6. White-fly, enlarged and natural size.

frame with X.L. All vaporising compound as shown under fumigation. Failing fumigation the plants may be syringed with quassia or, in fact, almost any insecticide. Where only a few pests are seen they can be wiped off with a sponge.

LEAF-MINER.—This pest directs its attention particularly to chrysanthemums, and as it burrows into the tissues of the leaves it is very difficult to deal with. Every

affected leaf should be pulled off and burnt, and the plants should be frequently syringed with quassia to render the leaves distasteful to the pest. A sharp look-out should be

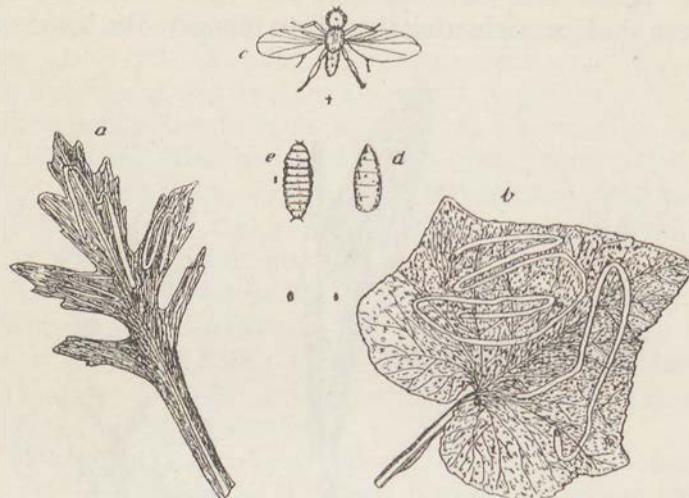


Diagram 59.—Leaf-miner: a, ravages of pest on chrysanthemum; b, on cineraria; c, fly enlarged and natural size; d, larva stage; e, pupa stage.

kept in the early stages of growth, as it is very easy to get a whole batch of plants spoiled. Every leaf and growth taken from infested plants must be burnt.

MEALY BUG.—Probably the most troublesome of greenhouse pests, as it is well-nigh impossible to get rid of it entirely. If the pest has but taken its abode among a few plants it would be quite as well to consign these to the fire, but it usually happens that its area of destruction is large or is confined to choice plants which the amateur cannot afford to part with. The best time for dealing with mealy bug is in the dull months of winter, when pressure of work is not so great and there is not so much growth. All

plants should be specially examined and the foliage, etc., sponged with X.L. All insecticide. Where possible, the soil at the surface should be loosened and burnt or the plants repotted, the old soil, crocks, etc., being burnt.

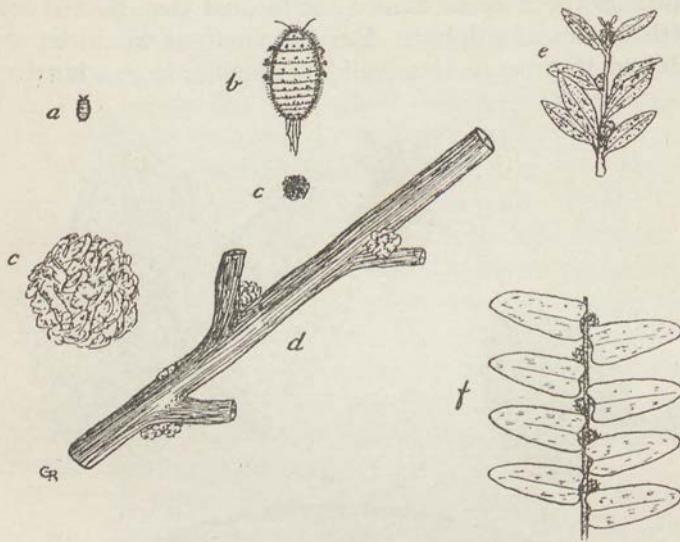


Diagram 60.—Mealy Bug: *a*, natural size; *b*, enlarged; *c*, bug with woolly substance surrounding it; *d*, how it attacks vines; *e*, coleuses; and *f*, ferns.

After the plants get dry fumigate well, and look over them occasionally afterwards, dropping a little methylated spirits on all young bugs that are seen.

MICE.—These animals are troublesome in a good many ways, by eating seeds—tulips, peas, beans, etc. The only sure method is persistently to trap them until all are got rid of. A shilling invested in a dozen break-back traps will prove good value, as the traps can with care be kept for a considerable time.

MILDEW.—A disease which can better be prevented

than cured. It is usually brought about by bad ventilation—by keeping the atmosphere too close and stuffy. The method, of course, is to admit more air on all possible occasions. Should, however, mildew occur in spite of precautions the simplest remedy is to dust the affected area with flowers of sulphur. But the amateur would be well advised to procure some mildew specifics from a horticul-

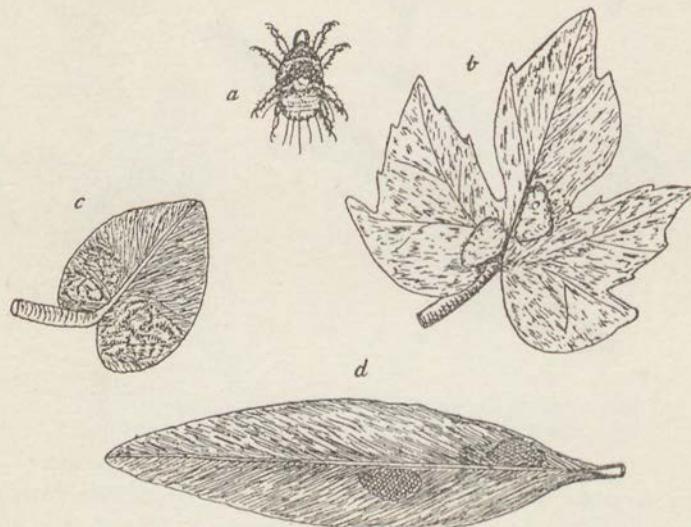


Diagram 61.—Red-spider: a, highly magnified; b, attacking vine leaf; c, violet leaf; d, peach leaf showing web which surrounds it.

tural sundriesman, such as Bentley's of Burrow-on-Humber, which will speedily check the evil.

RATS.—Like mice, are best caught. I do not care to advise poison. By persistence they can usually be trapped in strong gins and then we are sure that we are getting rid of them.

RED-SPIDER.—This is a difficult pest to deal with. It will not yield to the treatment of fumigation unless done

at a dangerous strength, nor will it succumb to syringings of such mild preparations as quassia or soapy water. A preparation known as " Spidacide " is found very effective, but the obnoxious smell it leaves behind lingers for weeks, and thus renders its use less frequent than it would otherwise be. Undoubtedly the best way to wage war on red-spider is to syringe frequently and forcibly with clear water. This will break the web which envelops these minute pests, and make their stay there practically impossible. Of course the best way is to syringe so as to prevent its appearance, but this is not always possible. In the case of flowering plants or ripening fruit it is not advisable to syringe and at such a time red-spider makes rapid headway. Much red-spider may be prevented by keeping that part of the house damp near the hot-water pipes, by syringing the surface of the staging during hot weather, and by treating vines and peaches with a good winter-dressing (from Timothy & Sandwith's, Bracknell) during the time they are dormant.

RUST—A name given to various forms of fungoid disease. The two kinds at present under notice are those which attack chrysanthemums and carnations. The chrysanthemum rust is not now so prevalent as it was a few years ago, when it disfigured and spoilt so many collections. Brown spots emitting powder are produced under the leaf, and if not checked the disease spreads and the plants become denuded of leaves. This, of course, cannot fail to have an injurious effect on the plant, besides being so disfiguring. The disease shows itself most prominently from July onwards, and again just after the cuttings are rooted. Preventive measures are advised. These take the form of picking off and burning every affected leaf as soon as seen, syringing daily with weak soot-water, and once a fortnight with sulphide of potassium

—an ounce to three gallons of water—propagating from healthy plants, burning all growths when the plants are being cut down. Only perseverance in these preventive measures will prove satisfactory. When the disease is

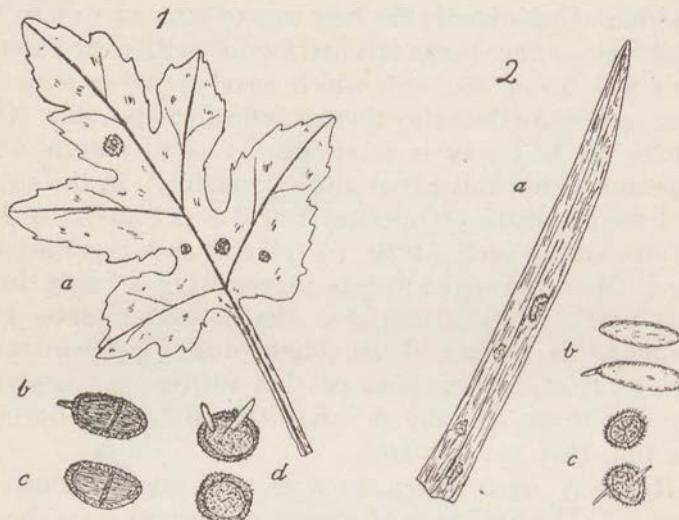


Diagram 62.—Rust: 1. On chrysanthemums; *a*, leaf attacked; *b*, active spores; *c*, dormant spores; *d*, summer spores. 2. Carnation rust: *a*, showing leaf attack; *b*, winter spores; *c*, summer spores.

badly present I would advise syringing with sulphide of potassium at the rate of one ounce to three gallons of water.

CARNATION RUST.—Requires practically the same precautionary measures. I find it a good plan to dip the cuttings in the solution of sulphide of potassium as they are made and to keep a sharp look-out for its appearance afterwards. Fortnightly syringings with the solution will keep it well in hand if it does not completely destroy it. Isolate all plants and cuttings received from other sources until it is certain that they are free from rust.

SCALDING.—Can scarcely be called a disease, but is due rather to errors in ventilation. The vine is particularly affected by this, and it is invariably caused through not opening the ventilators early in the morning. As soon as the sun fairly strikes a viney it should be given air by

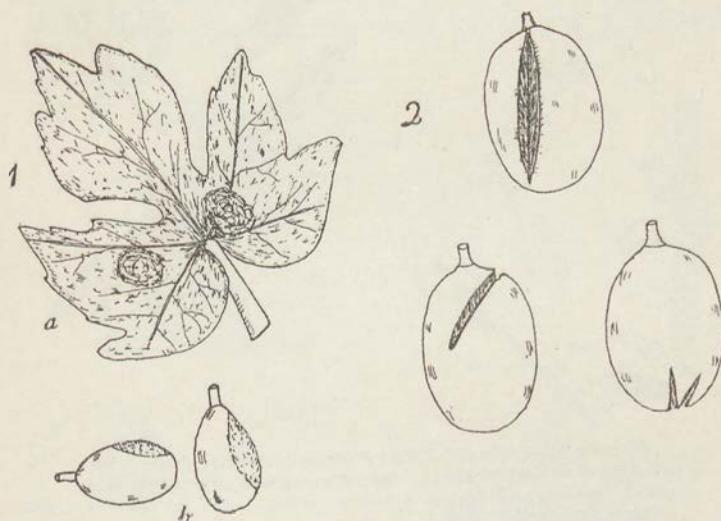


Diagram 63.—Scalding, Shanking, Splitting: 1: a, scalded vine leaf; b, scalded berries of grape. 2. Split berries of grape.

opening the top ventilators slightly. If not opened then, scalding will inevitably occur. Scalding is more likely to take place when the vines are flowering, and when stoning takes place. A sharp eye should be kept on the ventilation on days of alternate sunshine and cloud.

SCALE.—Comes next to mealy bug as being an almost ineradicable greenhouse pest. At first it is of a light yellowish colour, but later it becomes brown, and is very disfiguring. The same means as have been suggested for mealy bug should be used against scale. Undoubtedly the

use of X.L. All insecticide, coupled with the cleaning methods alluded to under Mealy Bug will prove a safe remedy, and there is a strong probability of the pest being

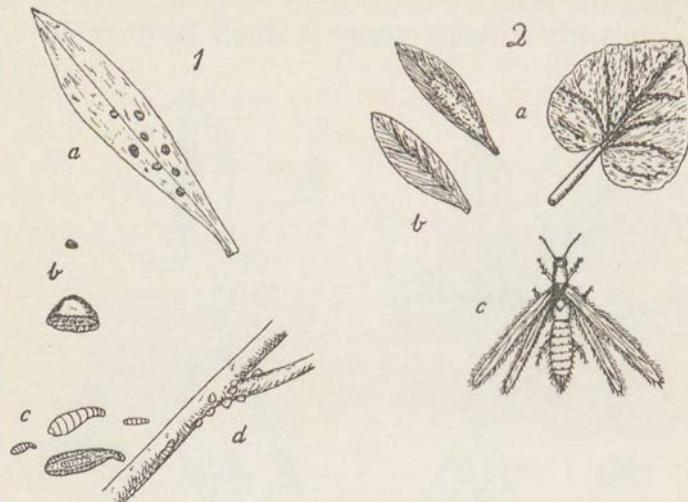


Diagram 64.—Scale and Thrip: 1: a, scale attacking dracæna leaf; b, enlarged and natural size; c, views of oyster scale; d, scale attacking peach branch. 2. Thrip: a, attacking leaves; b, leaf not attacked; c, greatly enlarged.

completely exterminated, and a certainty of its being kept under.

SHANKING.—Refers to a kind of shrivelling of the berries of grapes. Old vines suffer most from this evil, which is very often associated with bad root action or a sour border. If either of these be suspected the remedy, of course, will be to overhaul the border and provide a better rooting medium and to repair the drainage if need be. To minimise the attack choose short, healthy-looking growths when disbudding in preference to the very strong ones. An old grape-vine given badly to shanking had best be got rid of entirely or, if several are in a house, a few could be done

away with each year, so that there would be no great loss of crop.

SPLITTING.—Some varieties of grapes are more liable to split in the berries than others. The disease is caused by an overdose of water during ripening, by undue stopping of growths at such a time, and by too moist an atmosphere.

THRIP.—Whether black or white, this is a very harmful

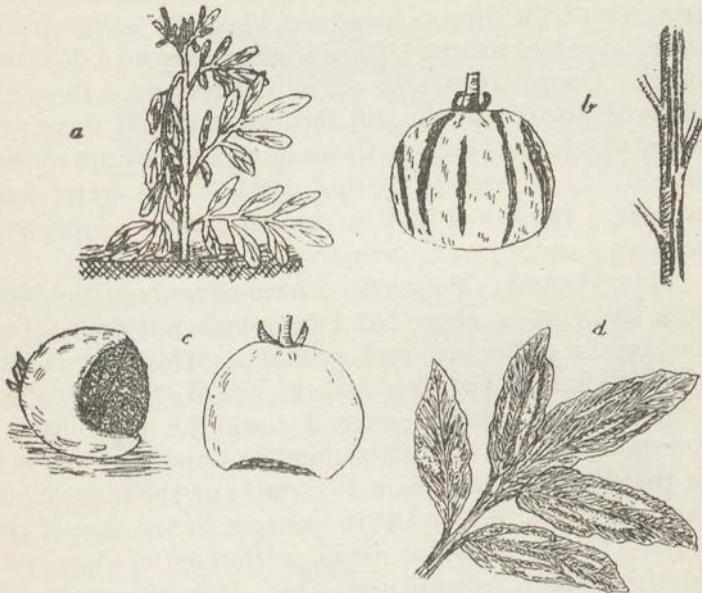


Diagram 65.—Tomato Disease: *a*, plant flagging through disease; *b*, stem and fruit attacked; *c*, examples of diseased fruit; *d*, yellowing of foliage.

and disfiguring pest. The black thrip may easily be cleared off by fumigation, but the small white thrip, which is very minute, does not give way so easily to this method. Therefore sponging with a good insecticide should be undertaken. Again I have to recommend the X.L. All insecticide as being the best, although it should be mentioned

that it has a tendency to make some people sick. The back of the leaf is the favourite resort of this pest, although they are not averse to attacking flowers. Cyclamens are often troubled with white thrip. Its presence may be known by the disfiguring lines in the foliage and the brown marks in the flowers.

TOMATO DISEASE.—By buying from a good source, readers are not so liable to be troubled with disease. The presence of the disease is noticed when the leaves droop for no apparent reason. There is no remedy for a diseased plant. Once it is attacked it is past remedy. Burn all diseased plants and the soil they grow in. If there are many plants the house or frame in which they are grown should be thoroughly washed with soapy water and paraffin. The use of lime in the soil will go a long way towards preventing an occurrence of the pest.

VINE WEEVIL.—Personally I have never been troubled with this pest on vines, but I have known it do mighty damage to cyclamens and primulas. This pest is destructive in both the larva and the weevil stage. During sunny weather a plant is seen to flag, and this may continue for some time, the leaves becoming firm and upright when in the shade. If the plant is turned out the maggots of this weevil will be found at the roots or at the base of the corm. I have found as many as thirteen of these fat, whitish maggots beneath one plant. It is, of course, easy to understand that where they do not cause the collapse of the plant they seriously undermine its constitution. In the larva stage a dose of some soil fumigant such as Vaporite may cause their destruction, but I would not place implicit trust in it. The safest method of dealing with the pest is to adopt preventive methods. These will include killing all the weevils found, examining the soil in which the plants are to be potted, turning out the plants

frequently to kill any maggots seen, burning all plants and soil suspected, cleaning thoroughly the staging where infested plants were stood, and putting a small quantity of soil fumigant in the soil during the later stages of the plants' growth.

WIRE-WORMS.—These are troublesome in potting soils.

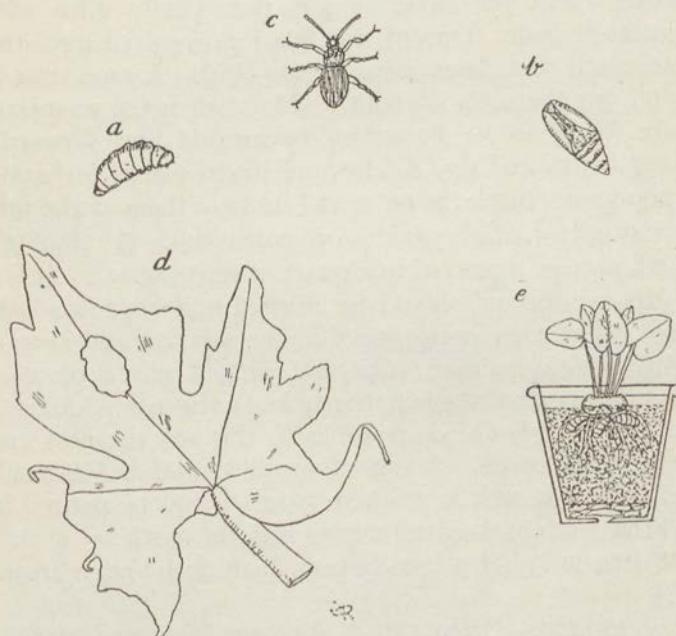


Diagram 66.—Vine Weevil: *a*, larva or maggot stage; *b*, pupa stage; *c*, weevil stage; *d*, how weevils attack vine leaf; *e*, how larva attack cyclamen.

An endeavour should be made to get turf from a pasture where no wire-worm exists. Failing this, it would be a good plan to sprinkle each layer of turf as the stack is being made with Vaporite, Kilogrub or Grubicide. When preparing soil for potting look over it carefully and

pick out all those straw-coloured grubs which will do so much damage if allowed to remain.

WASPS.—These are a great nuisance in a vineyard, where they will quickly spoil many bunches of grapes. The best method of keeping them from the grapes is to tack tiffany over the ventilators. Failing this, I would advise the trapping of the wasps, the destruction of the nests and the setting about the house of jam pots partly filled with sweetened beer. One of the finest preventive measures is to catch the queen wasps during May. A good time to search for the nests is about midday, when the wasps are more likely to be travelling backwards and forwards. River banks and dry ditches are likely places for nests. When found, mark the nests and destroy them at the first opportunity with cyanide of potassium. A shilling's worth may be dissolved in a quart of warm water. It is a deadly poison and should be labelled and kept in a safe place. Put some cotton wool in the solution and keep it tight. Use a pointed stick and with it put a piece of saturated cotton wool in the hole of the nest. After a few hours it should be possible to dig out the nest and destroy the comb. A can of water should be at hand, and when the nest is reached water should be poured in and the comb broken and mixed with the earth.

WHITE-FLY.—Has already been dealt with under Greenfly.

WOOD-LICE.—Often called also sow bugs and slaters. These are very destructive in a greenhouse. Use boiling water to kill them in their haunts and search for them among any rubbish near the hot-water pipes. They have a partiality for decayed wood, and if some flat pieces be placed on the ground there are almost sure to be some found beneath it, and can then be destroyed.

CHAPTER XXXII

A GREENHOUSE CALENDAR

JANUARY

FRUIT.—Water peach-trees, vines and figs prior to starting them into growth. The time of starting a vine or a

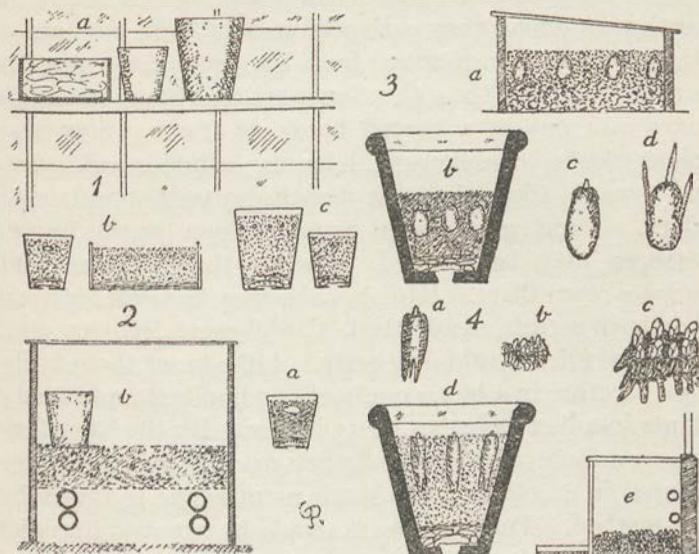


Diagram 67.—January: 1. Sowing dwarf beans and sweet-peas: *a*, position on shelf close to glass; *b*, dwarf beans in pot or box; *c*, sweet-peas singly and severally in a pot. 2. Sowing cucumbers: *a*, cucumber seed put in a pot; *b*, pot set in a frame with bottom heat. 3. Forcing potatoes: *a*, potatoes in a narrow frame; *b*, potatoes in pot; *c*, good; and *d*, bad set. 4. Forcing seakale, rhubarb and asparagus.

peach-tree depends on the time the ripe fruit is required.

I do not advise amateurs generally to start these before February, unless they wish to get them ripe in good season. The advantage of starting early is that there is opportunity for getting forward many things for the greenhouse and garden. Bring pot strawberries into a warm house. Clean, prune, dress with insecticide and tie, peaches, vines, figs and nectarines. Insert vine eyes in pots in a propagator. Sow tomatoes and prick them off when they break into rough leaf.

VEGETABLES.—Sow dwarf beans in small pots or in a box. If sown in a box pot them up early, else the check will be too great. Sow cucumbers and melons singly in 2-inch pots (enveloping each seed in sand) and put into a brisk propagator. Remove from the propagator as soon as they are above the soil. Sow peas and broad beans in boxes and put in a heated house or frame. Sow also onions, leeks, cauliflowers, lettuces, summer cabbages, and towards the end of the month, brussels sprouts and celery. Plant potatoes in pots or in a warm frame. Lettuces may be planted between the potatoes and radishes sown there. Radishes also may be sown between Shorthorn carrots on a hotbed. Cauliflowers, lettuces, etc., should be pricked off fairly early. I like to set them fairly close together in a box, say about one hundred and twenty plants in a box 24 inches by 15 inches. By the time they threaten to become crowded they may be further transplanted in a cold frame. Much room inside is saved by this method. Peas and beans should be removed to cooler quarters as soon as they get above ground. Onions and leeks may be left in heat for some time. A sowing of parsley in a box will make certain of a bed when planted out in the spring. Sow mustard and cress each week to ensure a successional supply. Get in rhubarb, seakale and asparagus for forcing in a frame or beneath the

staging. Rhubarb and seakale will also force in a warm shed.

FLOWERS.—*Sow* Sweet-peas in pots or boxes, East Lothian stocks, freesias, salvias, streptocarpus, gloxinia, begonia, Primula obconica, verbena, polyanthus, and, later in the month, antirrhinums. Cover the seeds lightly with fine soil, water well, shade from sun and see that no insects, slugs, etc., get at them. Remove the covering as soon as germination takes place.

Take cuttings of chrysanthemums if sufficient are not rooted, and especially of early-flowering varieties. Take cuttings also of heliotropes, begonias (Lorraine), lobelia, ageratum, verbena, alternanthera, irisine, also of bedding geraniums if sufficient were not rooted in the autumn. Both blue and scarlet salvias may now be rooted from cuttings.

Force bulbs of narcissi, tulips, hyacinths. The best policy is to work a few along each week sufficient to meet requirements. Those still in the ashes should be looked over. It is more than probable that they will all need to be taken out by the end of the month. As they pass out of flower they should be set aside where they can be watered until they have sufficiently dried off. Except the Paper-white Narcissi, the Double Roman Narcissi and the Roman hyacinths all may be planted in odd parts of the garden. Lilies of the valley may be brought into heat; also deutzias, azaleas, lilacs, spiræas, dielytras, Solomon's seal, *Hydrangea paniculata* and similar forcing subjects.

Pot up bedding geraniums from boxes to 3-inch pots. Move heliotropes intended for standards to larger pot and disbud them, using the side growths for cuttings. Pot up gloxinia corms which were shaken out and started in leaf-soil in December into small pots. Shake out corms obtained from leaf cuttings in summer and start in leaf-

soil. Give pelargoniums a larger pot, both the old plants and those struck from cuttings in the summer, also schizanthuses and Clarkias. Pot *Lilium auratum*, *Harrisii* and *longifolium*, three bulbs in 9-inch pot, and allow room for top-dressing.

Make up a propagator in warm house for striking cuttings, etc.; also make a hotbed and frame for forcing vegetables or for purposes of propagation. Cut back Lorraine begonias which are past their best. Dry off freesias as they pass out of flower, also calanthes. Start into growth amaryllises, begonias and fuchsias. Tie bulbs as they need it. Top-dress with approved chemicals such plants as are root-bound; also feed with liquid manure. Throw away chrysanthemum stools as it is found they are no longer needed. Clean violets in frames, loosen the soil and water if they need it. Give plenty of air to cold frames on all possible occasions, and protect from frost. Put sticks to sweet-peas in pots sown in the autumn. Keep a good but not scorching heat in the greenhouse.

FEBRUARY

FRUIT.—A fresh batch of strawberries should be worked along each fortnight to maintain a succession. Those which were started at the beginning of January will by the end of this month be flowering, and it will then be advisable to cease syringing and to fertilise the fruit by touching each flower with a rabbit's tail at noon. This ensures better shaped fruit. Top-dress the vine border if not already done and start later vines after cleaning and dressing them. Those started earlier and tied down to make them break evenly should be tied in place before the growths get so long as to endanger their being broken. Continue to syringe them twice a day. Sow more

tomatoes, prick off into boxes those which have reached the rough leaf and pot any that are becoming crowded in boxes. Sow melons in small pots. Fertilise peach flowers with rabbit's tail and cease syringing until the fruit has set. Tie the branches of later trees.

VEGETABLES.—Sow celery, sprouts, cauliflowers and



Diagram 68.—February: 1. Top-dressing vine borders: *a*, depth of old soil removed shown by dotted line; *b*, good soil put on shown by heavily shaded portion. 2. Sprouting seed potatoes prior to planting: *a*, tray set on staging; *b*, showing how to place the sets. 3. Dividing begonias: *a*, begonia tuber cut through; *b*, the same placed singly in a small pot. 4. Pinching point out of bedding geraniums. 5. Potting carnations: *a*, plant in 3-inch pot ready for removal to 5-inch; *b*, rooted cutting from propagator to be set in 3-inch pot; *c*, rooted cuttings graded and ready for potting. 6. Pricking off seedlings: *a*, onions and leeks; *b*, East Lothian stocks; *c*, cabbage and cos lettuces.

lettuces, also another box of peas and broad beans and a succession of dwarf beans. Prick off onions, leeks, sprouts, cabbages, cauliflowers, lettuces. Pot up dwarf

beans. Stake those that need it. Top-dress potatoes in pots and stake them. Set potatoes in a tray in greenhouse to sprout. This is a much better method than planting them without sprouting, as a better yield may be expected. Make up hotbed for cucumbers and for forcing vegetables. Harden peas and beans for planting out later. Get in a further supply of rhubarb, seakale and asparagus for forcing. Continue to sow mustard and cress each week.

FLOWERS.—*Prick off* East Lothian stocks quite early, as they are then less liable to damp off. *Sow* asters, stocks, verbena, salpiglossis, nicotiana, lavatera, *Phlox Drummondii* and similar half-hardy plants intended for summer flowering, also more antirrhinums, pentstemons, alyssum, salvia, hollyhock, *Clerodendron fallax* and primulas.

Take cuttings as they become available of salvias, geraniums of all kinds, but especially of those intended for winter flowering. These are obtained from the old plants which will now be cut back hard and be kept dry until they again break into growth. Take cuttings also of heliotrope, lobelia, ageratum, verbena, eupatoriums, coleuses, scented geraniums, ivy-leaved geraniums for autumn flowering in pots and pentstemons from old plants which were potted up in the autumn.

Pot up border carnations, being a second batch to follow those potted in October; tree carnations just rooted into 3-inch pots and those rooted in the autumn to 5-inch pots. Split up and repot ferns of all kinds which are now commencing growth. Pot on coleuses, also chrysanthemums as they become large enough, and bedding geraniums if not done last month.

Start begonias for flowering outside, also fuchsias, any further gloxinias there may be, and caladiums. Begonias may be divided after they have started if the bulbs be



ZONAL PELARGONIUM. MOST USEFUL AS A FLOWERING PLANT FOR AUTUMN AND WINTER, GIVING A RICH AND VARIED DISPLAY

sufficiently large. They are best started in a box of leaf-soil in a warm atmosphere.

Force more flowers and bulbs of all kinds, but introduce them gradually into heat and as they get over let them be hardened gradually until they can be put into a cold house. As the flowers expand introduce them to the conservatory or flowering house. This will give more room in the growing house and enable more plants to be brought forward and a better succession maintained. This refers also to all flowering plants throughout the year.

Cut back zonal geraniums as previously advised. Pinch out the points of sweet-peas when they are a few inches high. In the case of those sown in the autumn the leading growth may be taken entirely away as the basal growths will have well thrown out by this time. It is worth a trial to prepare these pieces and put them in a box as cuttings. They root easily in a temperature of 50°. Cyclamen and primulas will now be flowering freely, and will need supplies of liquid manure. If the vine weevil is present it will be making itself known about this time. Flowering bulbs intended for cut flowers should be grouped together in some convenient place where a mat can be thrown over them so that the supply may be kept up for a longer period. Fumigate the house containing calceolarias and cinerarias and pelargoniums, for they are very likely to be infested with green-fly. The stellata type of cineraria will need a stick to support their long stem. Bedding geraniums may have their points taken out to encourage a more bushy habit. The remark applies also to show pelargoniums. Harden sweet-peas and other plants intended for planting outside. Gladiolus—The Bride, Blushing Bride, Peach Bloom and Ne Plus Ultra—may now be brought from the frames to the greenhouse, also that lovely spiraea, Queen Alexandra. Continue to disbud strepto-

solens, fuchsias, heliotropes and ivy-leaved geraniums, intended as standards for bedding. Clivias will now be throwing up their flower spikes and should be brought into a prominent position. It would be well to sponge the foliage with soft water to which a little milk is added.

MARCH

FRUIT.—Tie down vine growths as they become large



Diagram 69.—March: 1. Celery: *a*, pricked off thickly in box to be afterwards pricked out farther apart on prepared bed (*b*). 2. Cucumber plant from 3-inch pot ready for removal to 6-inch. 3. Marrow seed set singly in small pot and put in hotbed frame or on greenhouse shelf. 4. Potting East Lothian stocks: *a*, in 3-inch pots; *b*, showing resulting bushy plant; *c*, alternative method of planting in a frame. 5. Planting violets from frames: *a*, good piece for planting in trenched ground a foot apart (*b*). 6. Dahlia cutting: *a*, old dahlia root potted up to produce cuttings; *b* and *c*, indifferent and good cuttings.

enough, but in doing this great care is needed to prevent them from snapping. They should be tied down a little

at a time. When the selected growth has been got down nicely to the wire those near it which are not required may be cut out. It is probable that the strawberries will be fully in flower now. If they can be put in a position where they get plenty of light and a gentle supply of air the fruit will be more sure to set. When they have set, the best fruit should be selected to the number of six or seven, and the rest picked off. Those selected should be staked up with pegs made from old birch brooms, and when this is done a top-dressing of Peruvian guano or Clay's fertiliser may be given. After peaches have set their fruit the work of disbudding must be undertaken. The main principle is to pinch out all growths on the front and back of the shoot, and to thin the others out to a foot apart, leaving always the topmost and lowermost one. Syringing of the trees may be continued after the flowering is over.

VEGETABLES.—Boxes of onions, leeks, cauliflowers, cabbages, lettuces and sprouts may now be taken to the cold frame left vacant by peas and broad beans. Whether the onions go out early or late in the month depends on how forward they are. It is probable that the latter part will be sufficiently early. Prick off celery thickly in boxes to save room, and later it may be pricked off farther apart outside. Pot up cucumbers and melons into 5-inch or 6-inch pots prior to planting in the frame or greenhouse. Pot tomatoes farther along. They usually plant best out of 5-inch pots. Forward tomatoes may be planted in deep narrow boxes or in large pots. Prick off another supply of lettuces, cauliflowers and sprouts. Sow marrows at the end of the month single, in small pots, and at the same time sow Globe beet for planting out later. Stake dwarf beans as they need it.

FLOWERS.—This will be a busy month in the greenhouse. More air will now be needed, and very shortly the question

of shading the greenhouse will need attention. A few words on this matter will be found in the body of the book and need not now be repeated. Flowers for the outside form a considerable part of the work in the greenhouse for the next month or two. East Lothian stocks will now be getting along, and I would advise that the best of them be potted into 3-inch pots. If sufficient pots are not available they may be set in a frame at a fair distance apart, but they do not thus transplant so well, although better stuff is obtained than if they were left in boxes. Frames should be prepared for pricking out all manner of seedlings. Where antirrhinums, calceolarias, pentstemons, marguerites and violas have been grown in frames the frame may well be taken off and used for other purposes. Should severe frost happen a few mats may be thrown over the cuttings, but they will be able pretty well to take care of themselves if they have been kept freely ventilated during the winter. Continue to work up a sufficient stock from cuttings of ageratum, heliotropes, fuchsias, lobelia and similar subjects, and prick off all seedlings as they become large enough, giving them nice open sandy soil. Make further sowings at once of any bedding plants which have not come up well from seeds, such as antirrhinums, etc. Violets may be removed from frames and planted on well-trenched ground. The space will then become available for innumerable other subjects. Put sticks to sweet-peas in pots and harden them off preparatory to planting out. If it is intended to grow any for flowering inside no time should be lost in moving them to large pots. These, of course, must be staked at once. Four tall stakes will serve the purpose, and as the growths advance a strand of matting may be passed round them. Pinch cuttings of calceolaria in frames, which will now be growing freely. Get dahlia plants inside to produce cuttings and take off

the cuttings with a heel as soon as they are large enough. They will need a brisk heat. Pinch the tops out of some of the show pelargoniums to prolong the supply of flowers. Pinch also coleuses to induce a bushy habit, and fuchsias, salvias, bush and single chrysanthemums and similar subjects. Box early chrysanthemums to be planted out at end of April. Cyclamens which have given the best of their flowers may now be transferred to a frame and be kept somewhat dry. Shake calanthes from their pots and wash them with insecticide prior to repotting them. They will now be throwing out their growths and may be potted at the end of the month. Care must be taken not to break them, as they are very brittle. Gloxinias will probably need a further shift by this time. They need a close, moist atmosphere. Pot up zonal pelargoniums for winter flowering into 3-inch pots. Hydrangeas from cuttings struck in the autumn and potted into 3-inch pots may now be removed into 6-inch pots in which good flowering plants should be produced. Carnations for the border which have been wintered in a frame may now be stood outside prior to planting them out. Those grown in pots for flowering inside, as well as Malmaisons, will need tying, and top-dressing with a good plant fertiliser. Bring cypripediums to cooler quarters and feed them with liquid cow manure. Greenhouse gladioli must be especially watched, as they are very likely to go bad at the tips of the leaves if not properly attended to in the matter of water. Stake such cinerarias as need it and arrange them in a neat batch in the greenhouse or conservatory. Get up arrears of last month's work.

APRIL

FRUIT.—Tie down vine shoots as they become long enough, eventually getting them straight down to the wires.

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Maintain a drier atmosphere while they are flowering, and shake the rod briskly at noon to ensure a freer setting of fruit. A slight chink of air may be left on at night until flowering is over. Thin, stake and top-dress successive batches of strawberries. They may now be fed with soot-



Diagram 70.—April: 1. Planting cucumbers: *a*, on mound in frame (the better way) or on flat (*b*). 2. Cyclamen removed from 3-inch to 5-inch pot. 3. Achimenes corn potted singly or severally in a pot. 4. Cuttings of *coleus thyrsoides*: *a*, good cutting; *b*, potted singly, or *c*, severally in pot; *d*, position on open staging. 5. Border carnation tied up to flowers inside. Others planted from frames to prepared ground.

water and liquid cow manure until they begin to colour. Those which are ripening should be given a fairly airy situation, and when the fruit has been picked the plants may be hardened off and planted outside. Peaches must be disbudded if not already done, and after flowering of the vines they, with peaches and figs, should receive a good watering. Pot melons along so that they can be planted from 6-inch pots to the frames. Pot tomatoes

into 5-inch pots, and when duly rooted plant into fruiting quarters or into 10-inch pots. No feeding should take place, or any manure be put in the soil until fruit has set —at least one bunch.

VEGETABLES.—Early in the month sow marrows singly in small pots, also dwarf beans three in a pot, and runners singly in a 3-inch pot for planting outside. Plant onions, cauliflowers, cabbages, lettuces, peas and similar subjects which have been forwarded, outside. Rhubarb, seakale and asparagus need not now be forced inside. Do away with dwarf beans which have fruited. Prick out celery in a frame made of planks and syringe it frequently with quassia and soot-water to ward off fly. Plant cucumber in frames, or, if not large enough, pot on to 6-inch pots. Sow for another batch.

FLOWERS.—Work all manner of bedding plants, whether in pots or boxes, to frames, and get them hard and sturdy as quickly as possible. Plant out sweet-peas at first available opportunity. Later sowings of bedding stuff may be pricked off into a cold frame or on a piece of ground where there is convenience for covering up at night. Pot along such special plants as heliotropes and stocks so as to get really fine plants by bedding-out time. Sow annuals in a frame for planting in the border. Plant out border carnations wintered in a frame. Plant out in the shrubbery borders bulbs which have been forced. Split up and plant out violets if not done last month. Continue to take cuttings of dahlias. Plant out pentstemons, blue salvia (*patens*), early 'mums and hollyhocks.

Schizanthuses and cinerarias should now be making a brave show in the greenhouse. Arums also should be doing well. Those that were flowered early may be set outside in a sheltered position. Young cyclamen may be potted from 3-inch to 5-inch pots, so that they will later

make a nice shift into 7-inch pots. A sowing may be made now. Those plants which have passed their best may be kept somewhat dry with all the flowers pulled off. Calanthes are shooting out nicely. If more than one growth shows it would be well to cut out the weaker one. Tie border carnations as they throw up their flower spikes. Pot along fuchsias, heliotropes, eupatoriums, coleuses, chrysanthemums, geraniums of all types and other plants which are pot-bound. Sow primulas and an early batch of cinerarias. Some of the chrysanthemums will probably need a small stake to support them. All plants will now be growing apace and will need more room. This should, as far as possible, be given. Tree carnations may be moved to 5-inch pots. Pot up achimenes. Take cuttings of Coleus *thyrsoideus* and root on the open staging in a warm house. Coleuses with coloured foliage struck in the autumn will now be ready for 9-inch pots, in which they should make handsome specimens. Take cuttings of poinsettias according to the directions given in the body of this book. April will be found a very busy month, as all plants grow so quickly. Especial attention must be given to the ventilation during those days of alternate sunshine and showers, which are so prevalent at this time. Many plants also will need water twice a day. It will be advisable to go over them morning and evening. The stagings and pathways of the house should also be damped twice or three times a day.

MAY

FRUIT.—Plant more tomatoes if there are not already sufficient. Stake and tie others that were planted last month. Not until the roots are seen to be running along the surface should they be top-dressed as described in the

chapter on tomatoes. The side growths should be pinched out as soon as they are large enough to be handled, and every encouragement should be given, by using the rabbit's tail over them, to get them to set a nice lot of fruit. Muscat grapes require care in setting, and here also the use of the rabbit's tail is advised each day. As the berries on the grape vines become as large as sweet-pea seeds they



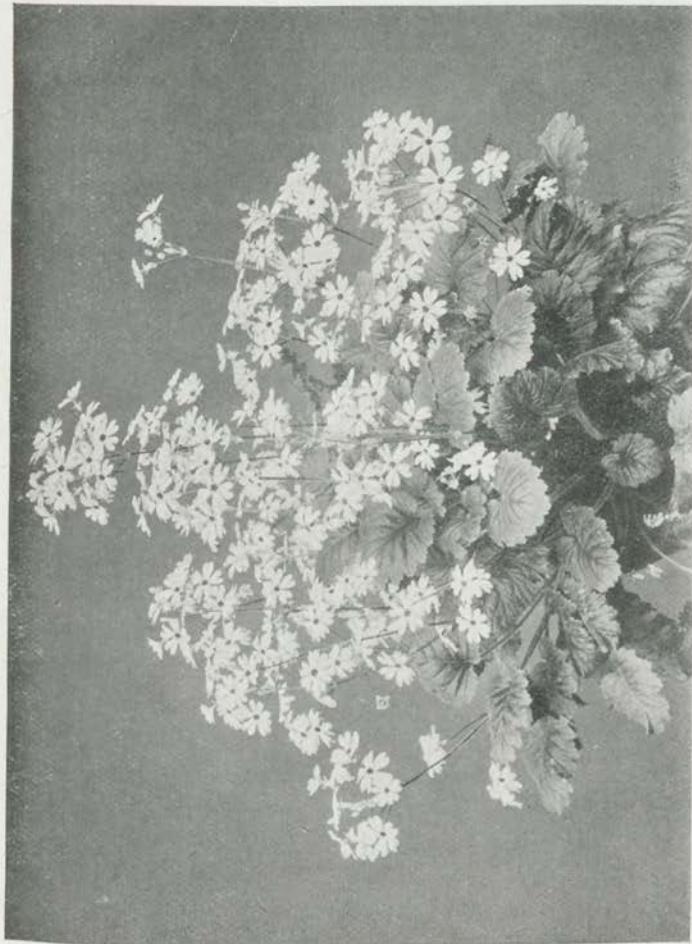
Diagram 71.—May: 1. Thinning peaches: *a*, fruit to be left, others to be removed. 2. Mulching peach-trees after thinning. 3. Pinching side growths (*a*) out of tomatoes. 4. Dahlia cutting rooted and removed to larger pot.

will need thinning. Firstly, the best branches should be selected and the others cut away. Then may the thinning of the berries be undertaken. After this is done the border should be sprinkled with Le Fruitier and mulched with farmyard manure and then well watered. The figs may be treated in like manner. A mulching may also be given to peach-trees when the fruit are the size of walnuts. If

a good set has been obtained some thinning of the fruit will be necessary. Remember that it is decidedly bad management to overcrop vines or peaches. Besides crippling the trees, good fruit well finished cannot be obtained in this way. As strawberries have their fruit removed they may be planted in the garden, where they will probably afford runners this year and fruit the next.

VEGETABLES.—Besides keeping up a supply of French beans and mustard and cress, there will be little to do with vegetables in the greenhouse. Marrows may be hardened off and planted out. A further supply of dwarf beans and runners may be sown in pots and set in frames. I consider this method far more satisfactory than sowing outside, and it entails little less labour while more room is available now under glass than there was a month back. Parsley sown in boxes should be planted out, also Globe beet. This should be carefully done. Celery should be kept well hardened so that sturdy stuff will be available for planting out later. Plant cucumbers in frames if not already done. Syringe them twice a day and pinch the growths as the fruits form.

FLOWERS.—Move *Primula sinensis* and *stellata* to 3-inch pots as soon as they have made sufficient advance in the boxes in which they were pricked off. Sow *calceolarias* to flower next May. They may be grown in a frame beneath the shade of a north wall. They need special attention during their early stages. *Cinerarias* will now be getting past their best and may be replaced in the conservatory by *pelargoniums*, which are now flowering well, and can be depended on to do so till July. Sow another batch of *cinerarias* and *primulas*. The tall *Chimney campanulas* which were sown early in the year may now be removed from 3-inch to 6-inch pots. They flower the year following that in which they were sown. Those which



PRIMULA MALACOIDES—A DAINTY PRIMULA PRODUCING AN ABUNDANCE OF SWEETLY
SCENTED FLOWERS IN GREAT PROFUSION AND OVER A LONG PERIOD

were grown from seed last year will now be in 9-inch pots, and will bear plenty of feeding if stood out in an open position. Begonias which seem to demand it may be moved into larger pots. The greenhouse will now need shading during bright, sunny weather, else there will be great difficulty in keeping the plants sufficiently moist, and moreover there are so many plants which object to much sunshine when in a greenhouse or frame. Chrysanthemums will now bear with standing outside, though it would be well to be prepared to cover them lightly at the approach of frost. Several of them will need short sticks to support them, the permanent stakes being put in when they have been put into their final pots. This operation need not be delayed if the plants have well filled their 6-inch pots with roots. The bush and single 'mums should have their points pinched out, but not the late-flowering ones. Those grown for large blooms should be pinched during the third week if they have not already made natural breaks. Old tree carnations, which will now be getting dilapidated, may be set outside, and will furnish growths for cuttings or layers later on in the summer or early autumn. The young ones may be set outside on a bed of ashes, to be covered during frosty and wet weather. Any that are sufficiently advanced may be removed to 7-inch pots, in which they should make fine plants. I find that zonal geraniums intended for winter flowering do well in the same soil as chrysanthemums, and when this has been prepared a portion should be set apart for them, but it will probably need chopping over again as the soil is left fairly lumpy for the chrysanthemums. Pot up young dahlias rooted from cuttings. The old stools may be planted out in the open after they have been duly hardened. The best of the East Lothian stocks will bear removal to 5-inch or perhaps even 6-inch pots, and will, if

done early this month, be fit for removal to the beds in June. All bedding plants should by now be set outside, provision being made to cover them should necessity arise. *Gladiolus*—The Bride, and others of the same type—will now be flowering well. After flowering they are best thrown away, a fresh lot of bulbs being purchased each year. This remark, however, does not apply to those beautiful spiræas, such as Queen Alexandra, which may, after flowering, be planted out in the garden. Shake out old plants of cyclamen and pot them afresh or start them in a bed of leaf-soil and pot them up later. More cuttings may be taken of *Salvia splendens*, *Coleus thyrsoideus* and *Poinsettia pulcherrima*. Calla lilies, which are mostly over by this date, may either be planted out or dried off in their pots. *Gloxinias* are now flowering well. The best of them should be marked for propagation by leaf, thus improving the batch each year. Sweet-peas inside will also be giving a wealth of flower, and will need frequent waterings of liquid manure. Unless it is desired to save seeds of these, the flowers should be regularly gathered. *Cytisus racemosus* may be stood outside after flowering.

JUNE

FRUIT.—Top-dress successional batches of tomatoes as they need it, and feed frequently with liquid manure. It is probable that many of them will be colouring by this time. The fruit may be left on the plant to fully ripen, or, if desired, they may be cut off and ripened in a cupboard. The growths will need to be tied up regularly, the side growths pinched out and the leaves cut back where they overshadow the fruit. I do not, however, advise severe defoliation. The tops of the Tomatoes may be taken out when about six feet high. It is probable that the grapes

will be commencing to colour this month. As soon as the first tinge of colour is seen, a watering should be given sufficient to last them over the colouring period; this may be made with cow manure and a little lime added to it. It would be advisable to allow a little

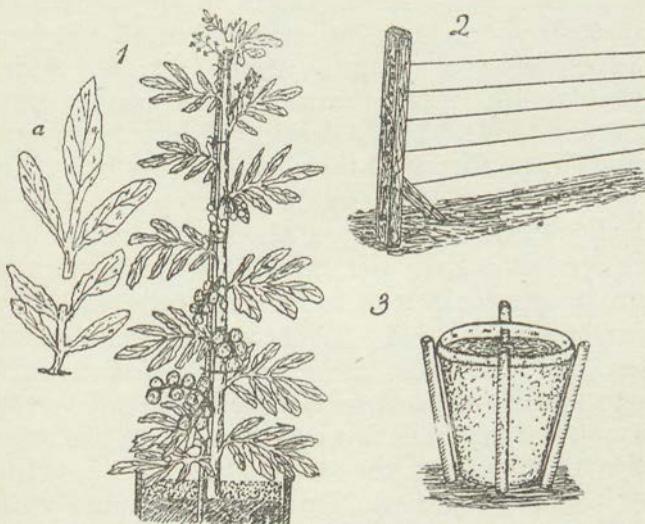
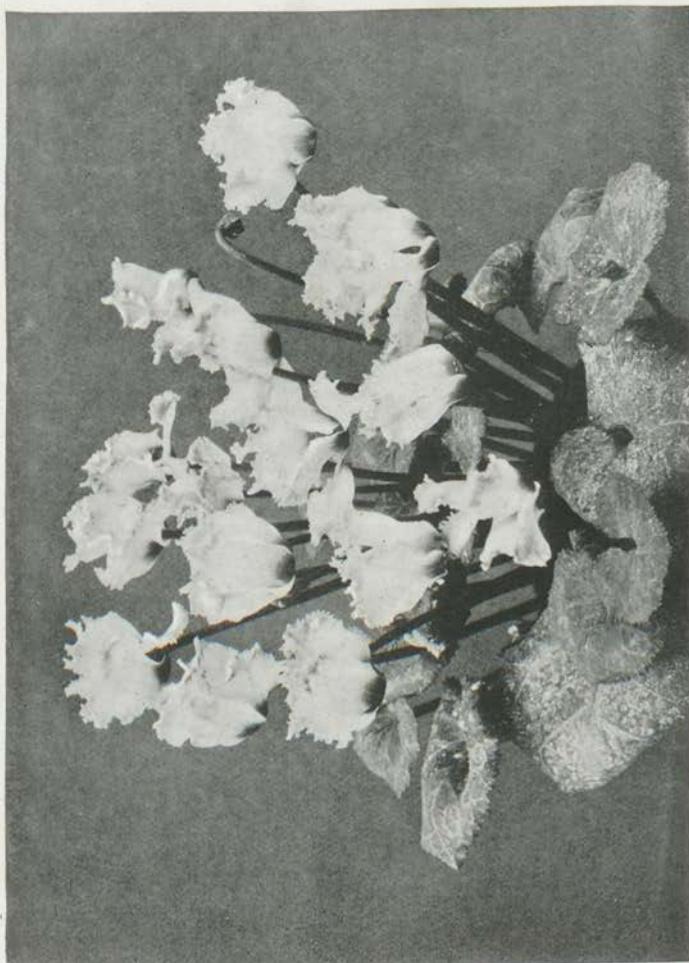


Diagram 72.—June: 1. Tomato duly staked and growing ahead: *a*, showing how to cut the leaves to let light into the fruit. 2. Supporting chrysanthemums. Wire fence erected to which to train the growths. 3. A crude method of supporting the pots not often employed now.

air on the top at night from now onwards. Peaches will need a good watering before they start to show their colour.

VEGETABLES.—Plant out sprouts and celery during favourable weather, also runners and dwarf beans forwarded in pots. Now that the weather is so warm outside we have no need to grow anything in the vegetable line under glass, so that for some months I shall have to leave this portion out of my calendar.

FLOWERS.—There is still, however, plenty to do with flowers. The zonal geraniums cut back early in the year may now be either planted in vases in the garden or be used for conservatory or room decoration. In the latter alternative a top-dressing of Clay's would greatly assist them. If the leaf-miner is present in chrysanthemums all affected leaves should be either taken off and burnt or the pest picked out with the point of a knife. Syringe afterwards with quassia extract. Give more room to all growing plants. It is a decidedly bad policy to grow plants well and then spoil them by overcrowding. Pinch the points out of tree carnations. Stop late-flowering bush chrysanthemums early in the month and the main batch about the end. Get them all set in position and secured to post and wires to prevent their being blown over and broken by wind. Tie the growths securely to the stakes. After flowering inside, border carnations should be set outside until sufficient are available for layering. This may be done at the first opportunity. A like remark applies to Malmaisons, the old plants being layered and the young ones potted on. This potting on from 6-inch to 9-inch pots may be undertaken at any time now. Make a sowing of stocks for winter flowering. Most nurserymen catalogue a special class of stocks for this purpose. Calanthes will now be forming bulbs and may be fed with liquid cow manure. They should have plenty of space, a fair amount of heat, some shade, and a moist atmosphere. If schizanthuses have proved successful I would advise saving seeds from the best of them. Keep cinerarias in a cold frame beneath the shade of a north wall but with ample ventilation. Towards the end of the month pot up the first batch of freesias and put in a cold frame covered with a mat. Sow seeds of cyclamen in a temperature of 60°. Plant out all bedding plants which have been raised



THE CRESTED CYCLAMEN, WHICH FLOWERS QUITE AS FREELY AS THE ORDINARY FORM

or grown under glass. Stand salvias, scented geraniums, ivy-leaved and zonals, on a bed of ashes in the open. Get primulas and cyclamen into a cold frame and shade from bright sunshine. Stake carnations now growing in pots outside. *Brugmansia* will now be flowering well and will benefit by a dressing of Clay's fertiliser. If the weather be warm it will be possible to let the fire out entirely, but if the nights are cold this cannot be advised. During the next month or two is usually a good time to get in a fresh supply of fuel. Red-spider is likely to abound during hot weather, and a sharp look-out should be kept for it. Syringing with Spidacide is undoubtedly the best remedy.

JULY

FRUIT.—Peaches will very shortly be ripening now, but before this happy event proceeds very far the growths which are to be retained should be tied in, sub-laterals should be pinched out and the whole of the trees syringed very forcibly, first of all with clear water to break the webs of any lurking red-spider, and a day later with the insecticide known as Spidacide. This should keep them pretty clear of this insidious pest until the fruit is all gathered. Syringing must now be stopped on all those trees which are colouring, and plenty of air should be given. Where ants have been found troublesome on previous occasions grease bands should be tied round the stems of the trees; the haunts of these little depredators should be looked for and boiling water poured down. Grapes should be ripening or ripe about this time, and this will mean that a drier atmosphere must be maintained and air left on the top of the house at night. If any of the berries show a disposition to split, the water tanks should be covered up and clean, dry straw laid over the border. As far as possible, all

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plants should be removed, especially those which are likely to require much water. Sub-laterals should be cut back to the first leaf, but in the case of grapes splitting it is well not to be too severe in this respect. Give a further top-dressing to tomatoes ; cut back the leaves and expose the fruit to the ripening influence of the sun. Save the best-shaped fruits for seeds, setting them on a sunny shelf to become dead ripe, when the seeds may be extracted and

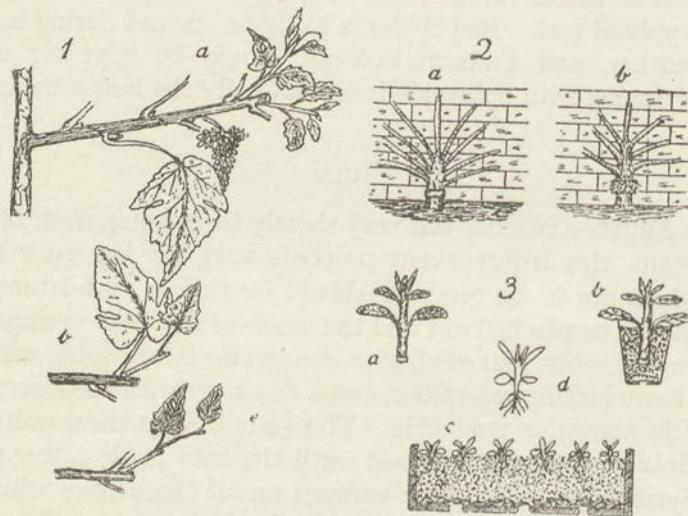


Diagram 73.—July: 1. Stopping vines: a, growth stopped beyond bunch with laterals throwing out; b, lateral pinched back to first leaf; c, sub-lateral treated in similar manner. 2. Protecting peach-trees from ants: a, grease band tied round stem; b, cotton wool tied round the stem. 3. Cuttings and seedlings: a, heliotrope cutting; b, put into small pot; c, seedling stocks for winter flowering; d, strong seedling for pricking off.

cleaned. July is the recognised month for securing the best layers of strawberries destined for forcing. As intimated in the chapter devoted to this subject, I much prefer layering directly into the fruiting pots, using as a compost one barrowful of loam chopped to the size of a

hen's egg, one of lime rubble and wood ashes, one of mushroom manure, half of leaf-soil, six 6-inch pots of dissolved bones or bone meal and a liberal sprinkling of soot. Make the soil quite firm by ramming, set the pots level, peg the layers in place and water thoroughly. A similar method may be applied if layering is done in 3-inch pots, but of course for this the soil must be chopped finer. Melons will now be ripening and syringing must cease, but before ceasing syringe the plants well with Spidacide. Set each fruit on a small sheet of glass, slate or wood, and expose to the sun.

FLOWERS.—*Heliotropes* flowering well in the greenhouse should not be too heavily shaded if the best colour is to be obtained. Towards the end of the month procure cuttings for the purpose of forming standards either for greenhouse or garden display. They are best rooted in a box, and the finest cuttings afterwards selected for the purpose. *Ivy-leaved geranium* cuttings should also be secured for forming tall, columnar plants. Choose the variety *Madame Crousse*, and put three cuttings in each 3-inch pot. Take cuttings of *violas* if it is intended to grow a few for the greenhouse, where they make a pleasing change. Another important work this month is the layering of border carnations and of *Malmaisons* if they were not layered in June. At the same time some of the old tree carnations might be layered while the shorter growths not large enough to be layered might be put in a frame or hand-light beneath the shade of a north wall as cuttings, where most of them may confidently be expected to root. *Chrysanthemums* may now be regularly fed with liquid manure and soot-water, and be sprinkled once a fortnight with *Peruvian guano* or *Clay's fertiliser*. Later they may receive a top-dressing of rich soil which should be applied when they are not dry, and be well watered in. They

should be regularly tied to prevent breakage by wind. Should any buds form on the large flowering type before the last few days of the month they should be pinched out and the topmost growth grown along. About the middle of the month cut hard back the growths of pelargoniums and set the old plants on their sides in the open garden to keep them dry for a couple of months. Use the trimmings to form cuttings, and set them in a box in a cold frame or greenhouse. If properly treated, these should make nice bushy flowering plants by next May. Gloxinias are still flowering well. They are very useful as cut flowers, often lasting from seven to twelve days in an ordinary drawing-room. Small plants may be moved from 3-inch to 6-inch pots. Put in more leaf cuttings if there are not already enough. Box off seedlings of winter-flowering stocks and put them in an open frame, covering them only during heavy rain. If this be done at the beginning of the month they will merit removal to 3-inch pots by the end of July. Make another sowing in case the first lot should flower in the autumn, as they sometimes will. Sow mignonette for winter flowering, and at the end of the month put in a pinch of schizanthus seed. Take cuttings of the best varieties of tuberous begonias. Prick off calceolarias as soon as they are large enough to handle. Move cinerarias to 3-inch or 5-inch pots, according to their size. Pot on Primula obconica, sinensis, Kewensis and malacoides, and keep them cool and shaded. Pot successional batches of freesias. Give a further shift to Coleus *thyrsoideus*, this time to 7-inch pots. Stake lilies and top-dress them. If cuttings of *Salvia splendens* were taken from the points of the plants now standing in the open a few weeks back they will now be ready for 3-inch pots, and will make nice short flowering stuff. Plant another lot of cucumbers in frames. Pinch the points out of zonal geraniums intended

for winter flowering and keep all buds off. They will now bear plenty of feeding. Fumigate the greenhouse to keep down green-fly and thrip. Take the opportunity, now the fire is out, of flushing out the boiler and overhauling the heating apparatus.

AUGUST

This is usually the holiday month, and no more suitable time for amateur gardeners to take their annual holiday could occur, as it is the least busy of all months in the gardening calendar.

FRUIT.—Look over the directions given under last month and get up arrears of work. If wasps are troublesome on grapes, tack some tiffany over the ventilators to exclude them. Where strawberries were layered in 3-inch pots sever them from the parent plant and pot into 6-inch pots, using soil as advised last month. When layered into fruiting pots, stand the plants in an open part of the garden on boards. I much prefer standing them on boards, as there is no fear of their rooting through the drainage hole at the bottom as they would do—much to their detriment (because the roots have eventually to be broken)—if stood over ashes or gravel. As the fruit is gathered from peaches the trees may again be subjected to syringing to keep down red-spider.

FLOWERS.—Cuttings should now be taken of all kinds of bedding plants, such as zonal, scented-leaved and ivy-leaved pelargoniums, fuchsias, coleuses, ageratum, heliotrope, lobelia, begonia, verbena and similar subjects. These may be put in boxes and stood either outside or in a cold frame. Those subjects which are to be set directly in a prepared cold frame may be left until next month. Heliotropes which were rooted a month or six weeks ago may now be potted into 3-inch pots. I refer to those

which are to be grown as standards. An ordinary greenhouse temperature will best suit them for a time. Take cuttings of ornamental coleuses to make large plants for next summer. Those struck from cuttings last year are now huge plants and decidedly ornamental. Pot up an early batch of Roman hyacinths and Paper-white Narcissi

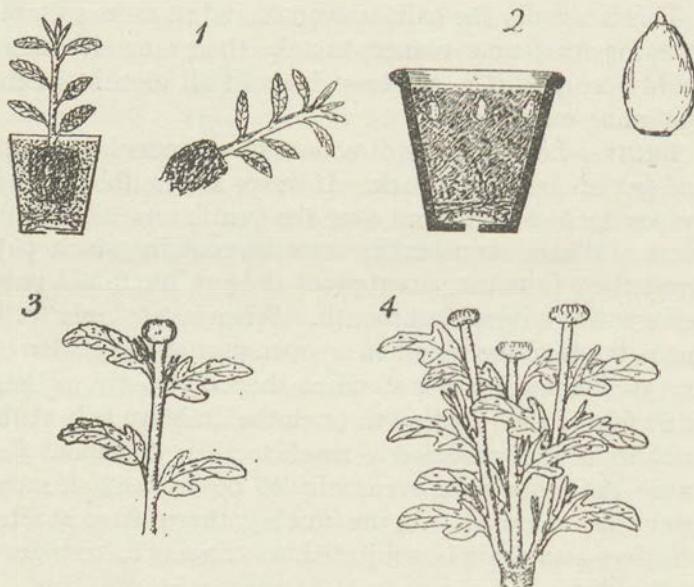


Diagram 74.—August: 1. Heliotrope for standard potted singly in 3-inch pot.
2. Lachenalias potted up six in a pot. 3. Bud of chrysanthemum appearing, showing growths to be pinched out. 4. Pinch out all side growths which subsequently appear.

to provide flowers from November onwards, and after watering plunge them in ashes. Move campanulas intended for conservatory use from 6-inch to 8-inch pots, and stand them outside. Those already in large pots will be making a fine display with their tall, flower-filled spikes. Pot up lachenalias in 5-inch or 6-inch pots and keep in cool

quarters. *Calanthes* will now be showing their flower spikes. Vigorous bulbs will generally throw up two spikes and sometimes small spikes are thrown out from some way up the bulb. They may still be fed liberally until the leaves begin to yellow. At that time they should be watered less frequently and may also be set more closely together. *Chrysanthemums* will fast be showing their buds, and all these should be retained, the side growths which cluster round the bud being pinched out. Beware of earwigs about this time. They do much damage by eating the buds. They must certainly be trapped. If not already done, a top-dressing should be given to them. All side growths should be religiously pulled out. Border carnation and *Malmaison* layers which are rooted may now be potted into 3-inch pots in sandy soil, and be put back into a frame. Pot winter-flowering stocks to 5-inch pots, and after a week pinch out the points of each. Sow *schizanthus* and *Clarkia elegans* for flowering in pots in the spring. Leaf cuttings of *gloxinias* will now be throwing up their growths, and the old leaf will soon die off. They may safely be left in the box until the end of the year. Until the end of this month all flowers should be pinched off such winter-flowering subjects as zonal geraniums, salvias, primulas, cyclamen and Lorraine begonias. All these plants will bear liberal feeding with manure-water, and occasionally a dusting of Clay's. So also will eupatoriums and scented-leaved geraniums. Move *Primula obconica* to 6-inch pots and keep them in a cool and fairly shady situation. Get up some plants of Canterbury bell from the open garden and pot singly in 3-inch or three plants in a 6-inch pot. Make out the order for bulbs for forcing, else the best will be sold. Do not rely on bulbs bought at sales. They are rarely satisfactory and reflect no credit on the grower.

SEPTEMBER

FRUIT.—There is not a great amount of work among the fruit just now. All kinds will need plenty of air, but mildew must be guarded against. Should a succession of rainy days occur it will be necessary again to have recourse

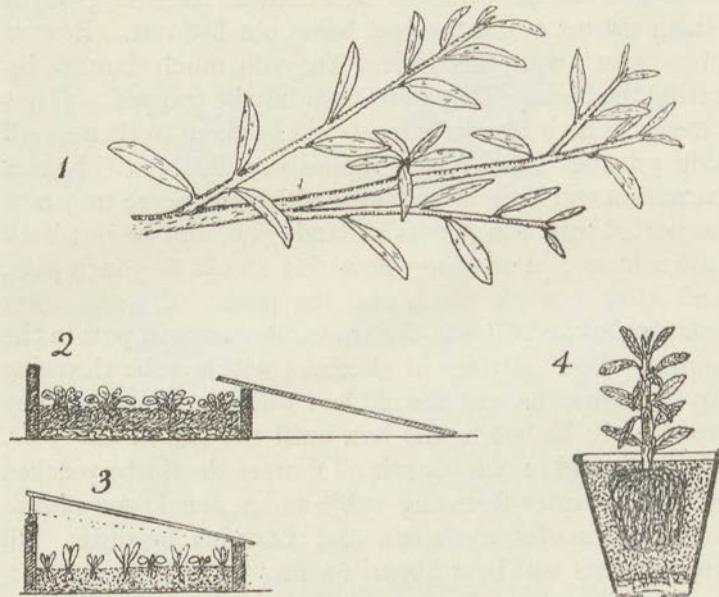


Diagram 75.—September: 1. Cut out old fruiting wood of peach-trees like the central growth. 2. Violets planted in a frame with light drawn off. 3. Cauliflower and lettuces pricked off in a frame with the light propped up to give plenty of air. 4. Standard heliotrope further removed to 5-inch pot.

to the fire and to keep a gentle circulation of heat in the pipes, which will tend to keep the atmosphere in a buoyant state. Bad berries must be cut out of grapes, both for the sake of appearances and to prevent others from going bad. See that all peaches are fully exposed to the sun, and

that no growths or leaves overshadow them. If on the point of ripening, go over them every day and pick all that part easily from the tree. Never gather or attempt to gather peaches with the thumb and fingers. The whole hand should envelop the fruit as it would a cricket ball when bowling. A slight pull and an almost imperceptible twist will soon show whether the fruit is ready for gathering. If all the fruit has been gathered the wood which has fruited may be cut out, which will simplify the winter pruning. Set out strawberries in full sun at such a distance apart that they do not touch. Pinch all runners off. The leaves of tomatoes may be rather drastically trimmed to let in the sun to unripened fruit. Such plants as are not worth keeping may be cut out—the green fruit will be found useful for pickling. Large fruit nearing ripening may be put on a greenhouse shelf to finish. Melons should be cut when ripe, a sign being when a crack appears near the stalk. They improve by being left for a few days before being used.

FLOWERS.—Prick off schizanthuses and Clarkias sown last month. Clarkias do not care for root disturbance, so must be treated carefully. Keep them quite cold and exposed in a frame except to rain. Only by this means can sturdy plants be obtained. Prepare a cold frame for cuttings of violas, pentstemons, antirrhinums, calceolarias and marguerites. If, however, there is a desire not to cut the plants about or sufficient cuttings are not available there need be no hesitation in delaying the work for a month. This is the month when most of the winter-flowering plants which have stood outside during the summer will be brought into the greenhouse. I must refer readers to the part of this book devoted to that subject. The plants referred to are zonal, ivy-leaved and scented geraniums, salvias, eupatoriums, perpetual-flowering carnations and

chrysanthemums. Only the large-flowering chrysanthemums need be brought in towards the end of the month. The bush 'mums and singles may often be safely left out until the end of October. Give the plants a liberal dusting of sulphur before bringing them in. This will check mildew, and a syringing of sulphide of potassium (one ounce to three gallons clear water) will do the same for rust. Sow a further supply of mignonette in pots if this sweet-scented flower is liked. Pot rooted cuttings of pelargoniums into 2½-inch pots. The old plants will now be breaking. Heliotropes intended for tall plants may be moved from 3-inch to 5-inch pots, also ivy-leaved geraniums for a similar purpose. Gloxinias may be dried off in a warm house beneath the staging. Fuchsias and begonias should also be dried off. If it is intended to grow sweet-peas for the greenhouse a sowing should be made this month in a cold frame. The best of the stocks may now be moved to 7-inch pots. All bulbs for forcing are best potted by the end of this month. When only a few bulbs are used in the beds I would advise potting each separately in a 3-inch pot and plunging in ashes until the summer beds have been cleared. Thus the bulbs will have a start of about six weeks. Coleus cuttings rooted last month will be ready for shifting into single pots. The present is a good month for making up a frame for violets and planting them in it. Keep them as sturdy as possible by throwing the lights open on all but occasions of very heavy rain. Cauliflowers sown outside, also lettuces, may be pricked off into a frame to afford some protection during winter. Pot up arum lilies from the open ground, or re-pot them if they have been dried off in pots. Bring a few freesias to warmer quarters but do not attempt to force them hard. Move such cinerarias as deserve it to 6-inch pots. Primulas and cyclamen should be brought from the frame to the greenhouse.



A COLONY OF THE CHASTE WHITE ARUM LILY, KNOWN ALSO AS
CALLA AND RICHARDIA AETHIOPICA

OCTOBER

FRUIT.—When tomatoes are over, the old stems, etc., should be burnt, but unless the plants have been diseased the soil may be set somewhere under cover, and will prove useful for seed boxes in the early part of the year. Vines,

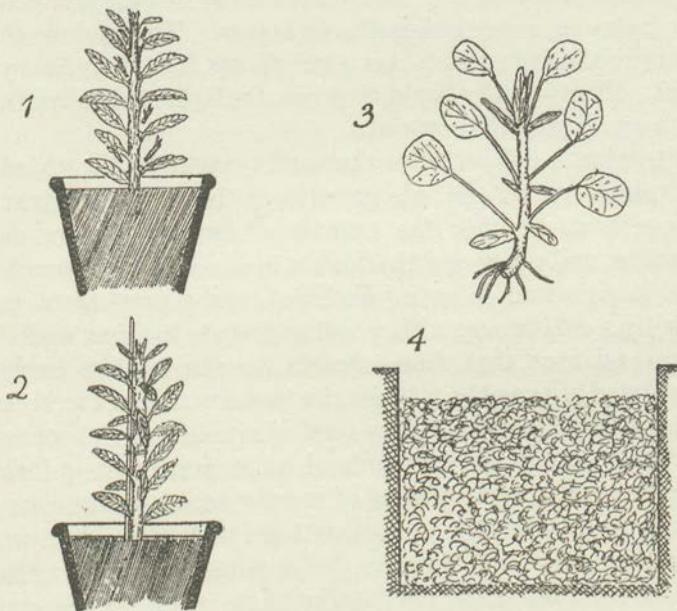


Diagram 76.—October: 1. Standard heliotrope, all side growths pinched out, and (Fig. 2) staked. 3. Viola cutting with few roots attached, pulled from centre of plant. 4. Store tree leaves in a hole, well drained, if no other convenience exists.

peaches and figs should now have a fairly good watering to last them over the winter. The leaves will now be falling off. This process should not be unduly hurried. If the houses are kept fairly open it will occur in due course,

but to keep a tidier appearance many will come off if brushed upwards with a birch or a bass broom. If there is red-spider or scale on them it would be better to burn them all straight away. What grapes are left now would be better cut off the vines and bottled, as they will keep better in a dry room than they would in a house where there are so many plants, and where there would naturally be too much moisture. Strawberries will be best plunged in a frame in some fresh gathered leaves. This is done to preserve the pots and to keep the plants free from heavy rains. Plenty of air should be given, the lights being drawn back on all possible occasions.

FLOWERS.—Stake heliotropes and ivies with thin stakes and pinch out all the side growths of the former. Stake as neatly as possible the growths of begonia, *Gloire de Lorraine*, and allow now the flowers to develop. Sow sweet-peas in pots four in each 5-inch pot, and plunge them in ashes in a cold frame. They will germinate in a few weeks' time, and from that time onwards may be kept as freely ventilated as possible. Cover the frame with a net to keep out sparrows, which are very fond of nipping off the young growths. Move the best pots of mignonette from 5-inch to 7-inch pots, using plenty of mortar rubble in the compost. Select the best rooted cuttings of fuchsias to form standards, and pot them singly in 3-inch pots. Get the decorative and single chrysanthemums inside at the end of the month. Move Calla lilies into the greenhouse. Pot up early-flowering chrysanthemums from outside to afford flowers until the others come on. There will by the end of the month be plenty of viola cuttings, which may be pulled from the centre of the plants with a few roots attached. Small pelargoniums will now bear removal to 3-inch or 4-inch pots. Border carnations at present in 3-inch pots may be moved to 6-inch if it is intended to flower

them in pots. An airy situation in a cold house will best suit them. Two-year-old plants in large pots may be top-dressed with Peruvian guano or Clay's. Tree carnations will also benefit by a similar top-dressing. These will now be giving their flowers very freely, but an eye must be kept on them, else many will be destroyed by earwigs. The present is a very good time for making a stack of turf for potting purposes. If made now with layers of manure between it will be in a good state by the spring. A dusting of lime during the process will benefit it considerably. Gather together all possible tree leaves for forming leaf-soil. It needs to stand a year or even two to be really useful for potting. Clear away old hotbeds, working the material in the ground during digging or trenching. Calanthes are showing colour and will not now require any water. If arranged among maidenhair ferns, they give a decidedly pleasing effect. Roman hyacinths and Paper-white Narcissi may now be removed from the ashes and introduced into the greenhouse after a few days' sojourn in a cold frame. Force retarded crowns of lilies of the valley. Pot up all outdoor plants intended for forcing, and plunge the pots in ashes in a convenient part of the garden. Get up dahlias, cannas, *Salvia patens*, *Lobelia cardinalis* and early-flowering chrysanthemums from the border and put in boxes in a frame, except the dahlias, which may be stored in any dry frost-proof shed. Pot or box old plants from the beds of such as are required for furnishing cuttings in the spring. Move cinerarias to 7-inch pots. Stake freesias now being moved along in the greenhouse. Cypripediums are now throwing up their flower spikes and should be set in such a position as to provide a telling effect. *Primula obconica* will also be flowering freely and may be expected to do so for many months to come. Wash off all permanent shading from green-

houses and frames, and put away canvas blinds when dry. Get in a supply of mats or other suitable coverings for protecting frames from frost. Stake Clarkias, stocks and schizanthuses. Move cuttings of bedding geraniums to a house somewhat warmer than a cold frame, and keep them on the dry side during winter. Clear out cucumbers from frames. Keep the fire going nicely during frosty weather.

NOVEMBER

FRUIT.—After the grapes are cut and stored, the vines may be pruned, cutting each growth back to two eyes. Keep the vines as cold as possible, throwing the house completely open if this can be done. There is no fear of frost hurting them, but if this is done a little heat should be run through the pipes to prevent them being frozen. The rods may now be cleaned and painted over with Timothy & Sandwith's winter dressing. Peach-trees and figs should be similarly treated. If figs are infested with scale, scrub them well with hot, soapy water before applying the winter dressing. Get a frame ready for potatoes and make a commencement with forcing asparagus, seakale, and rhubarb if these are wanted especially early. Put some dwarf beans in boxes for forcing, but pot them up as soon as they are three inches above the soil. At the end of the month sow a few tomatoes for an early supply of fruit.

FLOWERS.—Chrysanthemums are now in full flower and should be staged up so as to present the best appearance. Towards the end of the month a few cuttings may be taken. Use only basal or suckerous growths. Stake out the best of the zonal geraniums, which will now be making a splendid show. Keep the atmosphere dry and the plants also on the dry side. Look over the bulbs in ashes and put in a cold frame all that are sufficiently grown. Bulbs

grown in boxes make a fine display in the greenhouse if fifty or more are grown in one box. If used for conservatory decoration bulbs should be neatly staked, but if for cut flowers only, such neat staking is not needed. Pot up Berlin crowns of lilies of valley and plunge in the open garden, where they will be subjected to frost. Move

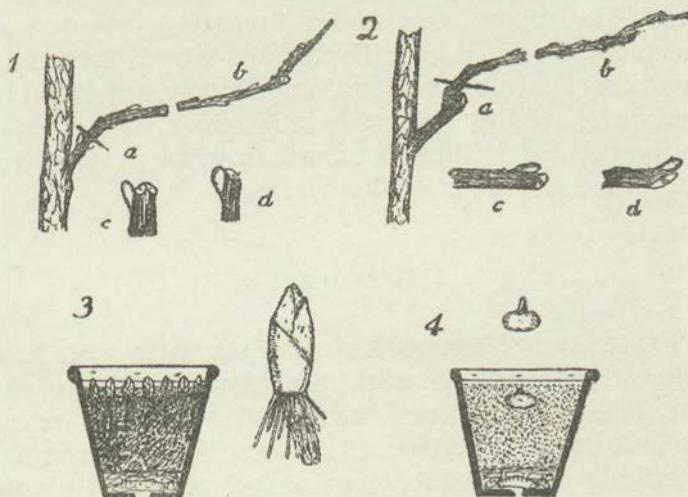


Diagram 77.—November and December: 1. Pruning vine: *a*, where to cut; *b*, portion previously cut off with the bunch of grapes; *c* and *d*, cuts—*c* not being a good one. 2. Pruning back where there is an old spur: *a*, where to cut; *b*, portion previously cut off; *c* and *d*, cuts—*d* being too close to bud. 3. Crown of lily of valley and how to pot them. 4. Gladiolus corm potted. Six may be put in 5-inch pot and be later removed to 7-inch.

coleuses to 6-inch pots and a little later pinch out the points to promote a bushy habit of growth. Buy in lilliums and pot into large pots, three in each. Keep the bulbs low down and just covered, so that they may be top-dressed when growing. Chimney campanulas and Canterbury bells in pots had better be removed to a cold house or frame to preserve the pots. Freesias should flower at the

end of November or early in December. If well grown, with plenty of feeding most of the spikes should produce eight to ten or even twelve flowers. I have had as many as thirty-three buds form from one bulb. Calanthes also repay good treatment. A few years ago I had one bulb produce four spikes with eighty-two flowers on. The best produced thirty-nine, the others twenty-four, ten and nine. The last two were thrown from the upper part of the pseudo-bulb. As the flowers are cut off the plants may be set on their sides beneath the staging, or preferably on a shelf until they start again in March or April. Choose the best rooted cuttings of *Calceolaria amplexicaulis*, and pot up for growing into taller plants.

DECEMBER

FRUIT AND VEGETABLES.—If vines have not been pruned last month the work should be done at once, else they will probably bleed, which means that the sap will exude from the cut surface. This occurs when the vine has practically completed its season of rest and is starting into renewed activity. It will easily be noticed by an observant person. To remedy it, wipe the face of the cut surface quite dry and apply carpenter's "knotting." But avoid pruning so late in the following season. After dressing with winter-dressing as previously advised, tie in the growths of peaches and figs. There is plenty of time in the new year to tie vines permanently into place. Sow a few tomatoes, such as Carter's Sunrise, thinly in a box or pan, and put them in a temperature of 55° to 60°. They will germinate in rather more than a week. Towards the end of the month they may be pricked off in boxes a few inches apart, but do not use any manure of any kind in



LILIUMS SPECIOSUM AND AURATUM WELL GROWN AND EFFECTIVELY GROUPED

the soil. Prick off also any that were sown last month. Chop turf for top-dressing vine borders.

If broad beans and green peas were not sown in boxes last month it would be well to do so now. When they appear move them to cooler quarters. They must not be hastened or they will be too large before they can be planted out. Keep up a succession of French beans by making a small sowing every two or three weeks. Prick off some nice young cauliflowers from the open ground into large pots now free from chrysanthemums, four in each pot, and grow them along steadily until the end of February, when they may be planted without separation in the open. Make a sowing in boxes of Ailsa Craig onion, also of cauliflower and lettuce. Prepare a frame for potatoes, or, if not available, set one or two tubers in large pots. Force asparagus, seakale and rhubarb.

FLOWERS.—December is essentially the month for taking chrysanthemum cuttings. A few may be taken in November, but the bulk will not be available till now. I believe firmly in getting all possible cuttings in during December, be they early or late. If pots are not available—and certainly they are best for the purpose—a good propagator should be able to root a large percentage in boxes. Clean the late-flowering varieties, which should keep us supplied with flowers till February. A few early cuttings put in during November will now be rooted, and may be potted into 2-inch pots. Pot lilliums three in a large pot and put into a cold but frost-proof frame. Make out the seed order at once and thus avoid disappointment and delay. Move cyclamen from pans and small pots to slightly larger ones, but keep them still in a warm temperature. Pot up gladiolus—The Bride, and others of a similar nature. I prefer putting them in 5-inch and moving them to 7-inch pots in the spring. I think the foliage keeps

better by this means. Bring azaleas, deutzias, lilacs, spaphyleas, spiræas and similar forcing plants into heat a few at a time. Pinch the points out of show pelargoniums if the growths are sufficiently advanced. Beware of rats and mice, which are very partial to tulips in the frame. Shake out old corms of gloxinias, soak them well and start them in heat in boxes of leaf-soil. Put a handlight or small frame over Christmas roses to forward the flowers and to keep them clean. Cart all available road grit from the neighbouring roads unless much tar is fused on them. If stored in a dry place it will prove useful for mixing with other soil for potting. During wet weather or evenings make a sufficient quantity of flower boxes. Keep the fire going steadily during the day and more vigorously at night, to prevent sharp fluctuations of temperature, which are especially harmful at this season. Dry all flower pots before using. Often they appear dry when they are not, and if plants are potted in wet, dirty or damp pots they will not turn out without serious breakage of roots. Do not attempt this month to pot plants which may safely be left till the turn of the year. Be very careful to water plants only when they really need it. There is great danger of over-watering just now. Water frames in the morning, as if left wet from an afternoon watering they are more liable to injury from frost. Take an impartial survey of successes and failures during the past year, and try to do better next year. There is always room for improvement. It is the largest room in the world.

GLOSSARY

THIS brief glossary is intended to explain the meaning of words and expressions which, though familiar and commonplace enough to gardeners, are quite unintelligible to outsiders. It will be more convenient to treat the matter in alphabetical order.

ADVENTITIOUS or aerial roots are those which spring from the stem of a tree or plant. They often occur on the grape vine, the tomato and lilies. Their presence is usually a sign that there is not sufficient nourishment in the soil, or the root-action is bad, though it may often also be ascribed to an excessively humid atmosphere. When the roots occur on the rod of a grape vine it would be well to attend more closely to the ventilation. The roots should not be cut off, but in the autumn they will usually rub off. The presence of such roots need not, however, cause any serious alarm.

AERIAL.—Same as Adventitious.

AIR, TO, a house, means to ventilate it. See page 261.

AIR TAP.—A small tap placed in the hot-water pipes at their highest point in the house, so that it may be opened to admit the escape of air which is likely to accumulate in the pipes and stop the circulation of heat. Sometimes an open lead pipe is attached to the pipes at this point and led up the roof of the house, so that the end is higher than the supply tank which feeds the boiler. Personally, I much prefer a tap. These taps should be examined periodically, especially so during winter, when the fire is being driven hard.

ANNUAL.—An annual is a plant which grows and flowers from seed within a year and then dies.

ANTHRACITE.—This is a very hard class of coal often used for greenhouse fires. It has the advantage of lasting a long while

without much attention, and gives a strong heat with practically no smoke or flame. On this account the flues do not get blocked up as with ordinary house coal or with coke. Anthracite coal requires a strong draught, but must not be poked so frequently as other fuel. It is dearer than other coal or than coke, but goes further, and when the question of labour is considered I think it has the advantage over other forms of fuel. The prices, which fluctuate, should be watched so that a yearly supply may be got in when prices rule low. This usually occurs in the summer. Dusty anthracite should be avoided.

APHIS.—A name given to green and black fly, which are very destructive, but if dealt with in good time this pest is not difficult to get rid of. See page 292, under Green-fly.

ARCHANGEL.—Mats made of bast or the inner bark of the lime are given this name. They usually run to a little over a shilling each. A few should be bought each year for covering frames. With care in drying and storing them they will last two or three years.

ARTIFICIAL.—This is a loose term applied generally to chemical manures or those which undergo some process of manufacture and is used to distinguish them from natural manures. Directions for using patent fertilisers which come under this heading are given when the manures are sold, and should be strictly followed. If the dose be overgiven it is quite likely that harm will result. The use of crude "artificial" manures should not be indulged in by those who are inexperienced, although in view of the increasing difficulty of obtaining dung it is advised that an increased knowledge of these manures should be gained by study and experiment.

BANK IN OR BANK UP.—An expression used in connection with making up a greenhouse fire to last through the night. The points to remember are that the fire at the time be rather low, that it be freed from clinkers and ashes, that the live coals are spread evenly over the bars, that the large lumps of coal or coke be put in first, that this be followed by smaller lumps, that a layer of dusty coal, coke or wet ashes be put on last, and

that the fire door, ash-pit door and damper be so regulated that the fuel will burn through, leave a workable fire in the morning, and yet keep the temperature in the greenhouse within five degrees of what it was at the time of banking in.

BASAL.—Growthings springing from the root stock of a plant are called basal growthings and in the case of most herbaceous plants, and especially of chrysanthemums, are far the best growthings to break off as cuttings for propagation.

BASE.—The base of a tree, a branch or a shoot, is the point whence it springs from the ground or from some lower part of the tree.

BAST.—The inner bark of the lime-tree known as bast or matting was at one time greatly used for tying, but is now generally superseded by raffia grass, which is more easily and deftly manipulated.

BATCH.—When a successional supply of plants are required the whole quantity is divided into what are known as "batches," and so brought along or retarded as to extend the use over as long a period as possible.

BELL-GLASSES.—The French word *cloche* has since the booming of French gardening well-nigh superseded the old English word, but both mean a glass cover shaped like a bell to protect or forward plants in the open ground. A few bell-glasses are always useful in the garden, but especially during the spring months.

BENCH SYSTEM.—The practice of growing plants on benches filled with soil is very prevalent in America, but less so in England, where its occasional use is sometimes favoured by nurserymen. With American tree carnations, however, it is sometimes adopted with profitable results by private gardeners. The bench or staging is covered with eight to twelve inches of soil duly supported at the sides by boards, and the carnations are planted therein about a foot apart. The system is not recommended for amateur growers.

BICOLOR.—As the name implies, this is used to denote a

flower which has two distinct colours. An example among sweet-peas would be Mrs Andrew Ireland or Mrs Cuthbertson.

BIENNIAL.—A plant which flowers the year following that in which the seed is sown and dies immediately afterwards is termed a biennial.

BIZARRE.—A term used by florists to denote a flower which has two colours on a white ground. Thus in carnations there are scarlet, purple, crimson and pink bizarre, according to the predominant colour apart from the ground colour.

BLANCH.—To whiten the stems of plants by excluding the light. The only subjects which concern us in the garden under glass are seakale and chicory. These are either grown in a dark shed or have empty pots inverted over them in the greenhouse. Unless whitened in this way the produce would be useless.

BLEACH.—See Blanch.

BLEED.—A plant is said to bleed when sap exudes from a cut surface. We have a familiar example in the vine, which, if pruned late, exudes sap at the cut surface. The best advice that can be given is to prune not later than November for vines which are to be started into growth early in the year. In fact it would be wise to do so as soon as the leaves have nearly all fallen. Bleeding may be noticed by there being always a wet surface with apparently a drop of water there. The surface of the cut should be wiped quite dry and coated with carpenter's knotting.

BLIND.—Plants which have no growing centre and side-growths—in fact, no buds above ground—are said to be blind. Those also are blind which do not flower at their specified time. One often has to throw away strawberry plants intended for forcing because in the spring they show no signs of flowering.

BLOOM.—The waxy coating giving a dull appearance to apples, grapes, plums, etc., is called the bloom. It enhances the appearance of the fruit, and should as far as possible be preserved. It is very easily rubbed off. Density of bloom on grapes is an attribute prized by gardeners.

BOG-PEAT.—This is so named to distinguish it from the upland peat which is found on higher levels. For general greenhouse purposes the upland peat is preferable, as it is more fibrous. Bog-peat cannot be recommended for orchids.

BOILERS.—These are the furnaces combined with cavities in which water is heated and made to circulate through pipes in the greenhouse. There are so many types of boiler that it is very difficult to choose between them. Amateurs, however, would be well advised to have either a small upright boiler or a sectional one. Illustrations and prices may be obtained from firms advertising in the gardening papers. It is essential that the flues of a boiler be kept clear and that the boiler itself be flushed out each autumn. Soft water is advised for use in boilers.

BOTTLING.—The only bottling which directly concerns us as gardeners is the storing of grapes in bottles. A few remarks on the subject will be found on page 163.

BOTTOM HEAT.—It is often found necessary for successful growth that the temperature of the soil exceeds that of the atmosphere. In such a case means must be taken to give heat below the surface. This is usually done by running the hot-water pipes beneath, as in a propagator or a melon-house, but bottom heat may also be obtained by means of strawy horse manure and leaves formed into a hotbed. How to make a hotbed has been described on page 193.

BOX FRAME.—A wooden frame formed like a box. It has the advantage over pits that it can be moved from place to place. Thus if during the winter it has been sheltering sweet-peas in pots, it may be removed in March without disturbing the plants and be set over antirrhinums just pricked off. In May it may be used for covering heliotropes and afterwards for setting over a hotbed and growing cucumbers.

BOX, TO.—To place plants in boxes, such as when seedlings are pricked. Useful sizes for boxing are 30 inches by 12 or 24 by 15. I much prefer the latter figures. The inside

depth should be 3 or 4 inches. Boxes should be dried and stored away after use.

BRACT.—The decorative top of a plant whose leaves surrounding the flower are highly coloured. We have a familiar example in the greenhouse in the poinsettia (*Euphorbia pulcherrima*), where the flowers themselves are insignificant but are surrounded by leaves of a brilliant red.

BREAK.—A term denoting movement into growth. Thus a plant is said to make a break into growth. The terms first break and natural break are often used in connection with the culture of chrysanthemums. The first break is when the plant has been topped and several of the side buds develop into growth. If topping is not done it will usually be found that at some time in spring, or before June has far advanced, the top growth will form a flower bud and the side growths will commence to develop. This bud is termed the break bud and the growth of the side growths is described as a natural break.

BUD.—The incipient growths usually found at the base of the leaves, which eventually develop into leaves or flowers. In the question of buds for chrysanthemums I would refer readers to page 64, where the terms break bud, crown bud and terminal are explained.

BUNKS.—A name applied to pieces of broad bean stems used for the purpose of trapping earwigs among peaches, chrysanthemums, etc. Hollow pieces about four inches in length are chosen and placed among the leaves and branches. Each morning these are taken out and the earwigs are expelled into a jar of salt water by blowing.

BUSH.—A form of growth where the branches grow out in great numbers and the plant takes the form, for instance, of a thorn bush. Bush chrysanthemums are those which are allowed to develop a lot of side growths and produce a lot of flowers. They are so called to distinguish them from the large-flowering section when only three or four large flowers are allowed on each plant.

CALLUS.—Some little time after a cutting has been inserted the base begins to swell preparatory to the emission of roots. This is called "callusing," and it is a fairly certain sign that the cutting will eventually throw out roots. Certainly it is a sign that the species to which the cutting belongs is amenable to this form of propagation.

CAST.—Flower pots are usually sold by the cast. A certain number goes to the cast according to the size. The larger the size of the pot the smaller the number in a cast.

CHECK.—A check is said to be given to a plant when there is some disturbance which temporarily stops its growth. A chill, removal to colder quarters, the state of being root-bound, shortage of water, frost, breakage, repotting, pinching the growths—these are some of the factors which cause a check.

CHIT.—The growths which form on a potato before it is planted are called chits. Often these are encouraged to form to the extent of an inch to induce a better crop. To start the tubers thus they should be set in a shallow tray or box placed in a cool but not hot greenhouse a few weeks prior to planting.

CLINKER.—The hard substances which form on the bars of a greenhouse fire are called clinkers. They occur chiefly when the fire is being driven hard. They are extracted by running the fire bar beneath them when the fire is somewhat low, uplifting them and then pulling them out. They are useful for putting into the bottom of newly made paths.

CLOCHE.—A French word for bell-glass—which see.

COCOA-NUT FIBRE.—The refuse from cocoa-nut fibre is valuable for putting in a propagator, or for mixing with soil for seeds, as it holds moisture well without keeping out air.

CODDLE.—To coddle a plant is to make too much of it—to give it too warm a temperature, or too close an atmosphere. In its effect it is not less harmful than neglect.

COLLAR.—A piece of tin or zinc put round the inner rim of a flower pot and standing an inch or more above it so as to increase its capacity for holding soil is termed a collar. The

same purpose is formed by making a mound over the rim composed of clay and cow manure.

That part of the stem of a plant immediately above the surface soil is called the collar. The term is chiefly used in reference to melons, which are very apt to rot off at this point. This may largely be prevented by mounding a little soil round it to throw off the water and by putting a sprinkling of lime at that point.

CONDENSATION.—A condensation channel is a groove formed on each side of the sash-bars forming the roof of the greenhouse for the purpose of carrying to the bottom, and eventually outside into the gutter, the moisture which condenses on the inner surface of the glass of a hothouse. If this were not thus carried away it would form itself into drops of water and fall on to the plants, probably damaging them.

CORM.—The swollen part of a plant beneath the surface somewhat resembling a bulb, but without any apparent scales as a true bulb has. The crocus and the cyclamen give us examples of corms.

CROCK.—A piece of broken flower pot. To crock a pot is to put pieces of broken pots in it to form drainage.

CROWN.—Plants which have thick root stocks containing buds have often the root stock called the crown. A familiar example is the spiraea.

The crown bud of a chrysanthemum is that which appears after the break bud, or the first that appears after the plants have been pinched. They usually appear in August. If they appear too early they are pinched out, and the next bud that appears is called the second crown bud.

CUTBACK.—It is the practice of some growers to cut back to a few inches of their base all chrysanthemums about the time of moving them to their flowering pots at the end of May. The growths are then allowed to grow straight along without further pinching. Such plants are called "cutbacks."

DAMP DOWN.—To sprinkle water over the floor and other open surfaces of a fruit house for the purpose of promoting a

humid atmosphere. In the case of a viney this is done three times a day—at the time of opening the house, at noon, and when the house is closed for the day.

DAMP OFF.—When seedlings decay close to the soil and wither they are attacked by a disease which gardeners call damping off. To avoid this evil, sow thinly, water carefully, keep an evenly balanced atmosphere and prick off early.

DECORATIVE.—Plants used for purposes of decoration rather than exhibition are termed decorative. A decorative plant should give a wealth of flowers if it is to retain its reputation.

DIBBER.—A stick or setting peg used for making holes into which to set cuttings or seedlings. It should not be sharply pointed.

DIBBLE.—To set seedlings or cuttings into holes with a dibber.

DIP.—A most effective method of ridding a pot plant from a pest is to dip it bodily in an insecticide. Choose a bucket or tub, place the palm of one hand over the surface of the ball of soil, invert it and dip it in the insecticide working it backwards and forwards and up and down for a few minutes.

DISBUD.—This means to take out buds or growths which are not required. For instance after the buds of a chrysanthemum are selected all side growths which appear are pinched out. So with peaches suitably placed growths are allowed and the others pinched out.

DIVISION.—Ferns and similar plants which have a root stock bearing many buds or crowns may be increased by breaking them apart. Every piece which possesses a bud and a few roots will under ordinary conditions grow.

DOT.—A dot plant is one which is raised above its fellows. They are often dotted about along the front of the staging to break the formality of the arrangement.

DRAWN.—A plant is said to be drawn when, instead of being short and stocky, it is long and attenuated. This is usually brought about by too high a temperature, too moist and close an atmosphere, too great a distance from the glass, and an over-

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crowded state. When a plant is seen to be becoming drawn it should at once be given more room, more air, more light.

DRIP.—The question of drip or the falling from the roof of condensed moisture has already been alluded to under "Condensation." It here remains to be said that these grooves or channels should be made in all houses erected. The fall of water from shelves on to plants below should also be avoided either by keeping plants from a position beneath them, or by grooving the shelf to admit of the water running to the ends and being led on to the flooring or a drain.

EVAPORATING PANS.—It is an old rather than a modern idea to have pans built over the hot-water pipes in vineeries or plant houses to be kept filled with water. The idea is that by being over the warm pipes moisture will be discharged into the atmosphere. Modern gardeners, however, find no need for them, and I certainly do not advise them.

EXPANSION JOINTS.—There are two forms of joints generally used in connecting up hot-water pipes. These are known as socket joints and expansion joints. The socket joints are formed by caulking the space with red lead and tow. These are very effective when the work is properly done, but they are very difficult to take apart. The expansion joint is formed by screwing two flanges of iron tightly together round the pipes so as to expand a rubber ring placed on the open end. By this expansion of the rubber the water is kept back. A few minutes only are required to uncouple the pipes.

EXPRESS FORCING.—Forcing plants into growth very quickly. This is done by giving a strong temperature and an atmosphere charged with moisture. Such forcing is strongly to be condemned except in cases of emergency. Certainly amateurs should never need to indulge in express forcing.

EYE.—A popular term used to denote a bud or incipient growth. Propagation from eyes or buds in their elementary form is practised in the case of the grape vine.

FEEDER.—The tank in the heating apparatus by means of which water is supplied to the boiler and pipes is often called

a feeder. Personally I like to have the feeder or supply tank fitted to the return pipes rather than directly on the boiler. When fitted directly over the boiler the water is very likely to swell or boil over to a much greater extent than if put farther away on the return pipe.

FEEDING.—To give food to a plant in the way of animal or chemical manure either in a liquid or dry form. Plants should only be fed when they have pretty well exhausted the nourishment provided in the soil, in other words, when they have filled the soil with roots. Remarks on feeding are given on page 238.

FERTILISE.—To cause fruit to set regularly and evenly by means of artificial pollination. Thus in the melon the male flower is put to the female flower to ensure their setting. The pollination of tomatoes, strawberries and peaches is ensured by touching each flower daily with a rabbit's tail until the petals drop. This individual fertilisation is not needed with grapes, where the pollen is distributed by giving the rod a sharp rap at midday.

FERTILISER.—Patent or proprietary manures are often called fertilisers because they increase the fertility of the soil. Too much must not be expected of these manures, which are at best only supplementary to good soil and good culture.

FIBRE.—See Cocoa-nut Fibre.

FIBROUS LOAM.—Loam endowed with fibre in the way of the roots of grass. The thin narrow wiry roots are termed fibrous to distinguish them from more fleshy roots, such as those of couch-grass, which have but few branches to them. Fibrous loam is preferred because the roots hold it together well and let in the air, and keep the soil more open without sacrificing firmness.

FLAG.—A plant is said to flag when its leaves droop down through any cause. This may occur through lack of water, through direct exposure to sunshine after a dull period or through some pest at the roots. When lack of water is the cause the remedy of applying water is obvious. In the second case a light shading or a spray of lukewarm water will usually

remedy matters. The third cause can only be cured by searching for the pest, but usually by that time the plant is beyond recovery.

FLAKY.—A term applied to leaf-soil before it has become thoroughly decayed and when it possesses flakes of leaves. Flaky leaf-soil is best obtained before the leaves have been stacked a year. When the soil has to last for a considerable time, flaky leaf-soil is preferable to leaf-mould.

FLOW.—The flow pipe in the heating apparatus is that which is attached to the top of the boiler and which gradually rises until it reaches the extreme end of the house. At this point the air-tap or air-pipe is fixed and the water is then carried back to the boiler by means of the return pipe.

FLUES.—The spaces through which the smoke and heat from a greenhouse fire travel until they reach the chimney are called flues. These must be kept clear from soot if the fire is to draw up well. Especially is this the case where ordinary house coal is used. The old-fashioned idea of having flues carried right through the house for the purpose of heating was a serviceable one before the use of the hot-water system was in vogue. The practice is now well-nigh obsolete, and cannot be recommended, for boilers and pipes are now so cheap and so effective as to bring them within the power of everyone's purse.

FORCING.—To bring a plant into growth by artificial heat and close and humid conditions of atmosphere before its natural time. To bring fruit to earlier maturity is also called forcing. Remarks on the subject will be found on pages 121, 146, 174, 193 and 200.

FORE-RIGHT.—A fore-right shoot is one which grows out from the front of a branch instead of from the sides. As they are difficult to train in the case of a fruit-tree trained against a wall they are usually pinched out when but a few inches long.

FUMIGATE.—To fill a house with the fumes of some substance (usually containing nicotine) for the purpose of killing

insect pests without injury to the plants. Remarks on the subject are given on page 247.

GREASE-BAND.—A band of thick grease-proof paper tied round the stem of a fruit-tree and coated with grease which does not readily dry. This is put on to prevent certain female insects from crawling up and depositing their eggs in the branches of the tree. It is not usually necessary in the case of indoor fruit-trees, though a grease-band will often prevent the approach of ants, which are very troublesome to ripe peaches and nectarines.

HANDLIGHT.—This serves the same purpose as a bell-glass or *cloche* (which see), though it is larger and of a different shape. Usually it is square in shape, with a top formed in the shape of a double span. When water-tight and fairly air-tight these appliances are very useful for seed-sowing, for rooting cuttings and for forwarding small plants.

HARDEN.—To harden off plants means to gradually accustom them to outdoor conditions after they have been for some time in a heated structure. Useful remarks on how to do this will be found on page 265.

HEATING MATERIAL.—Beyond hot-water pipes and flues we have the means of heating known as a hotbed. The material used for this is stable litter and tree leaves, and these are known as heating material. Remarks on making a hotbed will be found on page 193.

HEEL.—When it is advised to take a cutting with a heel of the old wood it is meant that a small slice of the old wood is taken off and trimmed. This is done when there is a difficulty in rooting cuttings on the young wood. With a piece of the old wood attached there is not the same loss of sap or danger from the cutting flagging as there would be if only the soft young wood were used. Taking cuttings with a heel is only necessary with difficult subjects.

HIP-ROOFED.—A viney or plant house is called a hip-roofed structure, or a three-quarter span, when there is a wall at the back and a short length of glass leading from it upwards and

obliquely to the apex. The first illustration of Diagram 6, page 13, shows a sectional plan of a hip-roofed structure and gives a good idea of the form.

HUNG UP.—A cutting is said to be hung up when its base does not rest on the soil beneath. This is caused by using a sharp-pointed dibber. By being out of contact with the soil, and having a cavity of air beneath, the cutting has very little chance of rooting. It is essential to successful propagation that the base of the cutting rests firmly on the soil beneath, and that the surrounding soil is made sufficiently firm to prevent the cutting from being easily pulled out. If pulled by the leaf, its leaf should break before a cutting which has been properly put in can be pulled out.

INCURVED.—A flower is said to be incurved when the petals fold over towards the centre of the flower. The incurved chrysanthemum, which most readers will know, is a good example of this type. It is the direct reverse to reflex flowers, where all the petals point away from the centre of the flower.

LARVA.—The maggot stage in the life of an insect, immediately following that of the egg and preceding that of the chrysalis. Many insects are injurious to plant life during the larva stage, notably the wire-worm and the vine weevil. A good illustration of the larva of the vine weevil is given on page 303, *a*.

LATERAL.—As the name implies, a lateral is a side growth springing from the main growth. Any further growths which spring from these laterals are termed sub-laterals.

LAYER.—A layer is a growth pegged into the soil for the purpose of forming roots, and eventually becoming a separate plant. Sometimes a cut is made to facilitate rooting, as in the case of carnations. In other cases this is not done, as in the case of a cucumber, when this form of propagation is adopted. The purpose of layering is to allow the intended new plant to receive nourishment from the parent plant until it has formed sufficient roots to support itself, when the connection between them may be severed. Propagation by layers is explained on page 212.

LEAF CUTTINGS.—With plants of the Gesneraceæ order propagation by means of leaves can readily be effected. The method is explained and shown by illustration on pages 76 and 210.

LEAD.—This word is used chiefly in connection with orchids, and means the growth springing from the plant to eventually become a pseudo bulb. A better idea may be gained by referring to Diagram 45, page 219, where on the right of the plant in Figure 3 a young lead is seen.

LEADING GROWTH.—The main or central growth of a plant.

LEAN-TO.—A greenhouse having but one span and leaning against a high wall is called a lean-to house. An illustration of the sectional plan of a lean-to structure will be found on page 13, Figure 2. A lean-to structure should usually face the south, so as to command plenty of light and sunshine. A lean-to facing north is very useful in an establishment where there are several other glass-houses, but cannot be recommended as a general utility greenhouse.

LEGGY.—A plant is said to be leggy when it has become long, thin and attenuated instead of being dwarf and sturdy.

LEGGINESS is promoted by excessive heat, excessive shade, want of air and a crowded condition. The remedy for all these conditions is obvious.

LIFTING.—When a young fruit-tree—notably a peach-tree—becomes luxuriant in growth, it is a good plan to take it out of the ground in the autumn and plant it afresh. This will check the exuberance and help it to become prolific. Sometimes thick fibreless roots will be found. These must be cut hard back to promote the production of fibrous feeding roots. With quite young trees the mere act of lifting them will sufficiently check the exuberance. The lifting may be done at any time after the leaves have fallen, but preferably before the end of November.

LININGS.—A lining is put to a frame for the purpose of keeping the heat therein. In those days when the use of hot-water heating was not very general, heat was obtained by means

of stable manure. To further prevent any loss of heat it was usual to build brickwork round these frames, at a distance of 18 inches to 2 feet off, and to fill the space thus made with more stable manure or with leaves. This undoubtedly greatly assisted in the maintenance of heat. Though bricked enclosures are not now often found, the principle is still used for the protection of a cold frame from frost. Here the linings are kept up by planks and posts, a good illustration of the manner and matter being found on pages 283 and 284.

MASSING.—A method of grouping plants in the conservatory so as to get a bold effect. All the plants of one sort, and often of the one colour, are staged up together in a bank or mound, interspersed, perhaps, with ferns or suitable foliage plants. It is a plan used with good effect in preference to dotting them about the house indiscriminately, and is now very general with progressive gardeners.

MATTING.—Material for tying. Raffia grass is now most generally employed, but it is still often called matting. The old material for tying was bast, or the inner bark of the lime-tree, but is now superseded. Other materials are used, but do not find so much favour as raffia, which can be bought cheaply in bundles.

MELLOW.—Loam is said to be mellow when it has all the grass in it stifled, but before the fibrous roots are decayed. It is in this state after it has been stacked for several months. In such a form it is best for the generality of greenhouse plants.

MIDRIB.—The main or central artery of a leaf is called the midrib. In the case of the gloxinia and allied subjects propagation may be effected by cutting the midrib and setting it in sand or sandy soil, or by pegging the leaves flat on to the soil.

MILDEW.—A fungoid disease known by the presence of a grey powdery substance on the leaf. If not actually caused it is certainly spread by bad ventilation in the case of greenhouse plants. See page 295.

MOSsing.—When used in reference to orchids this term

means applying fresh moss to the surface of plants which it is undesirable to repot. The term is also applied to putting fresh green moss over the surface of plants in the drawing-room. It is also used to denote putting moss round the stems of such plants as crotons, dracænas, etc., after a piece has been cut out of them or a ring of bark peeled off. This is done to induce roots to be thrown out.

MOULD.—Another term for soil. It is used chiefly in regard to decayed leaves, which are described as leaf-mould. This is best when stacked for at least a year, and preferably for two years.

MULCH.—To apply manure or leaf-soil to the surface of a peach or vine border for the purpose of arresting the evaporation of moisture is in gardeners' language to mulch it. The substance so applied is also to some extent a source of plant food, and it assists also by enticing roots to the surface where they can more easily be fed. Fruit borders are best mulched after the fruits have set.

MUSHROOM MANURE.—This is a short and convenient method of describing the horse manure which has been used for making mushroom beds. After the bed has become exhausted as far as mushroom culture is concerned, the material is very useful for putting in potting soil. As the freshness of the manure has passed away it is very safe and may be used in practically any potting soil. It also has the additional advantage of holding the moisture well.

NETTING.—When melons begin to ripen, the rind or skin becomes wrinkled in the manner of network. When this stage is reached syringing should be discontinued, but as at such a time red-spider is likely to gain a foothold it is best to provide for such a contingency by syringing well just prior to this stage with "Spidacide," a mixture which I have found very efficacious in dealing with this insidious pest.

OFFSETS are young bulbs which form at the side of older ones, as in the case of amaryllises, tulips, hyacinths, nerines, etc. In most cases it is advisable not to detach them until they have a few roots of their own.

OVERPOTTING.—To overpot a plant is to remove it to a larger size of pot before it is ready for the shift or before it has filled the soil in the smaller size with roots. It is an evil which young gardeners or over-zealous amateurs are likely to indulge in because they wish to grow the plants quickly into large specimens. The evil is intensified if bad watering is practised afterwards, and it is this which usually causes the trouble. Until a plant has nicely filled the soil with roots it should not be put into a larger pot.

PERENNIAL.—A plant which grows on year after year is called a perennial, to distinguish it from an annual, which lasts one year, or a biennial, which lasts two years.

PICOTEE.—A term applied to a flower which has a very narrow fringe of another colour along the edge of the petals. It is used chiefly with regard to carnations of the border section.

PINCH.—To pinch a plant is to cut off the top of the growing shoot. It is called pinching because it is usually done with the thumb and finger when the wood is soft, and the object is to induce side growths to be pushed out to form a bush-like plant. Pinching should not be done immediately after potting, else the plant will have to withstand a double check. It is advisable in the case of a plant with several side growths to pinch them all at the same time, to induce the formation of an evenly balanced plant.

PITS.—Brick enclosures covered with lights which slide up and down to admit air and for purposes of attending to the plants. Pits may be heated with hot-water pipes or with heating material. See pages 29 to 31.

PLUNGE.—To put a pot plant up to the rim of the pot in some material such as garden soil, cocoa-nut fibre, coal-ashes, or leaves. This is done to protect the pot from frost or to prevent the soil drying out quickly during hot weather.

POT-BOUND.—When a plant has filled the soil in a pot with roots so as to form quite a mat of them and a solid ball it is said to be pot-bound. It is a sign that it requires removal to

a larger pot or, failing this, the plant should receive some stimulant in the way of a chemical fertiliser or liquid manure. A plant in such a state will need copious supplies of water. The term root-bound has precisely the same meaning.

PRICK OFF.—To prick off plants (the term is usually applied to seedlings) means to set them a few inches apart in a pan or box to induce a sturdier habit than would prevail if they were left to grow in the seed-pan. I strongly advise pricking out early to give the plants plenty of chance to get away nicely and to obviate damping off, which is often induced by overcrowding in the seed-pan.

PSEUDO BULB.—A false bulb. A term applied to the swollen stem or bulblike growth of orchids, such as calanthes, cattleyas, and cœlogynes.

RAFFIA.—A dried grass used for tying plants. It has now almost entirely superseded matting. It can be bought cheaply in bundles. When tying, the raffia should be twisted to strengthen it and to give a neat appearance. It may be split for tying when no great strength is required.

RAPPER.—A pot-rapper is used for testing pot plants before applying water. See page 232 for remarks and illustrations.

REEF KNOT.—This is best described as a square knot, where each loose ends stands out the same way as the corresponding part of the main portion of the tying material. It is a much better knot than the "granny's knot."

RETARD.—To delay the growth, the flowering or the fruiting of a plant by removal to a cooler, airier and sometimes darker place. Plants intended for forcing are often kept in a temperature below freezing point, but this is done by those who have special apparatus, and cannot be carried on to any considerable extent by private growers.

RETURN.—The return pipe in the heating apparatus is that which carries the water back to the bottom of the boiler after the highest point has been reached. Valves are usually set on the return pipes to facilitate control, but they do not need the same attention as those on the flow pipe.

ROOT-BOUND.—See Pot-bound.

ROOT-PRUNE.—To cut off the roots of a tree which has been growing too vigorously. Peach-trees are very prone to make much growth in their young stages, until they get into bearing. This can only be checked by lifting the tree and cutting off any thick fibreless roots there may be. Often the very fact of lifting a tree gives it a check sufficient to stop its exuberant growth. Root-pruning is best done in the autumn after the leaves have fallen.

ROSE.—A sprinkler on a water-pot for the purpose of spreading the water over a wider area and preventing it from falling heavily on to the plants is called a rose. It is necessary to use a rose for plants that are newly potted until the soil has set firmly enough to allow the open spout to be used.

ROUGH-LEAF.—A plant grown from seed usually gives at first two leaves which are known as seed-leaves, and which are unlike the ordinary leaves of the plant. Afterwards the leaves become of the normal shape. These are known as rough-leaves. Some growers delay pricking off plants till the rough-leaf appears, but under skilful treatment this precaution is wholly unnecessary.

RUST.—See page 297.

SCALD.—Marks on leaves caused through being burnt by the sun. See page 299.

SEED-LEAVES.—The first leaves which appear on a plant grown from seed. They contain nutriment to carry the plantlet along until sufficient roots are made to enable it to draw its sustenance from the soil.

SETTING.—The transition from the flower to the fruit is termed setting, and it is generally applied to artificial fertilisation, as in the case of fertilising strawberries and tomatoes by brushing them lightly with a rabbit's tail.

SHANK.—See page 300.

SHOULDER.—The groups of berries on the upper portion of a bunch of grapes which spring from the central stem of the bunch in the form of a branch are called the shoulder. These

should, when thinning the berries takes place, be tied up clear of the other portions of the bunch.

SHY.—A variety of grape vine which does not set its fruit freely is said to be shy. A plant also which does not flower freely is called a shy bloomer.

SPAN-ROOFED.—A house with two equal spans. Diagram 2, page 8, gives a good idea of a span-roofed house.

SPENT.—Manure which has had most of its virtue used is said to be spent. The term is usually applied to horse manure used for mushrooms, after a crop of mushroom have been taken off. As explained under "Mushroom Manure," it is very valuable for mixing with potting soil.

SPLIT.—Ferns and some similar subjects are propagated by division of the root stock. In gardening parlance this is termed splitting up. It is essential that there be at least one bud to each piece, but it is not usual to divide the plants to such an extent as this.

STEM CUTTINGS.—Those growths suitable for cuttings which push out from the stem of the plant are called stem cuttings. This is to distinguish them from basal cuttings, which spring direct from the root stock of the plant, and are usually to be found a few inches away from the stem. For chrysanthemums, the basal cuttings are best, as stem cuttings are very liable throughout the year to throw premature buds and thus upset the calculations of the grower.

STOOL.—After a plant such as a chrysanthemum has had its flowers cut the stem is cut to within a foot of the soil. This old stem and ball of soil is then called the stool. They are preserved for purposes of propagation, for it is from these that the cuttings are obtained.

STOVE.—A stove is a plant house with a minimum temperature of 65° to 70°, and stove plants are those which need this temperature. Stove plants are not now grown to the same extent as they were a few decades back, but there is quite likely to be a revival. The temperature of a stove may be lowered in the winter by about 5°.

STRIKE.—To root a cutting is called by gardeners striking, and a successfully rooted cutting is said to be struck. Hints on rooting cuttings are given on page 207.

SUB-LATERAL.—As explained under "Lateral," a sub-lateral is one which pushes out from a lateral. In the case of the vine these sub-laterals are pinched at the first leaf.

TERMINAL.—A terminal bud is one which is surrounded by other buds and marks the end of the growth of that particular shoot. On decorative chrysanthemums the terminal buds are always used, but with the large-flowering section the buds previous to the terminal are employed.

THIMBLE.—A small flower pot two inches in diameter at the top.

THUMB.—A small flower pot two and a half inches in diameter at the top.

TIE ROD.—Iron stays put in the roof of a glass-house to help support it. By their use the roof can be made lighter in appearance and the woodwork not being so heavy more light is admitted.

TOES.—The thick fleshy roots found on dracænas are called toes. If these are cut off about an inch long and put in a propagator they will form new plants.

TONGUE.—The piece which is left when marking a plant for layering is called a tongue. The layer should be so put in that the tongue is kept away from that part of the plant from which it was cut. In other words the cut should be left open.

TOP-DRESS.—To put soil over the surface for the purpose of nourishing the plant. See page 241.

VAPORISE.—Another word for fumigation. See page 247.

WILT.—To flag. If the leaves of a plant droop through lack of moisture, excess of sunshine or through some disturbance of the root it is said to wilt.

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