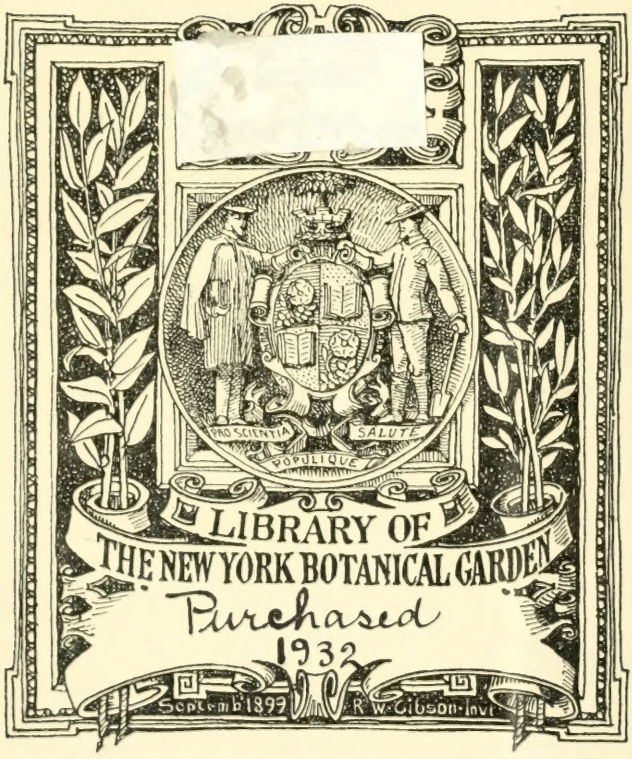
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SELECT CARNATIONS

Picotees & Pinks:

The History & Cultivation of all Sections.

By J. FRASER, F.L.S., F.R.H.S.

Garden Life Office:

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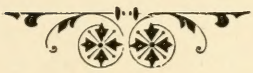

BY

JOHN FRASER, F.L.S., F.R.H.S.,

Editor of "The Gardening World."

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PREFACE.

IT is safe to say that the Carnation has been cultivated in this country for four hundred years, and during that period it has been continuously cared for by man, while during intermittent periods it has enjoyed a great wave of popularity; but at no stage of its history has it been more extensively cultivated in the four quarters of the globe than at present. Few flowers have undergone more extensive modification at the hands of the florist, and fewer have entered more deeply into the hearts of the people. During the past decade and a half its cultivation has extended by leaps and bounds, both in this country and in America. Indeed in these countries it is considered second only to the Rose in popular favour, and some enthusiasts are of opinion that it will presently be more popular even than that old time favourite. This seems but a repetition of the opinion of the father of floriculture, John Gerard, who in 1597 said of the Carnation that it "may be thought not inferior to the Rose in beauty, smell, and varietie."

Never were the sections, nor the varieties more numerous than at the present day. The sections which have come into marked prominence during the past decade and a half are border Carnations, yellow Carnations, and Picotees, American Carnations and Malmaisons, which are still in the full tide of ascendancy. Sweet scented varieties are most numerous amongst the first and two last of these sections, but many of the finest Carnations, speaking generally, have little or no scent at all, which is to be regretted, for the "spicy, pungent, aromatic

odour of Cloves," is too precious a quality to be dismissed in this otherwise splendid flower.

The object of this manual is to make a record of a fairly representative list of the best varieties in each section as they exist to-day, but more especially to give simple and practical details of cultivation in language devoid of technicalities and which may be followed by amateur and professional gardeners alike.

The instructions are entirely confined to Carnations, Picotees and the garden Pink, which is also a florist's flower of long standing, though less extensively cultivated at the present day than its beauty, fragrance and utility would warrant. The loss of scent in the Carnation does not apply to the Pink, for all varieties are alike deliciously scented, and beautify the garden some weeks in advance of those Carnations which may be grown and bloomed in the open air. There is strong evidence, however, that the cultivation of border and laced Pinks is coming more and more to the front every year. The wild or unimproved species of Pink have not been dealt with in this book, as they are too numerous and, though extremely beautiful, they belong more particularly to the alpine or rock garden than to the domain of florists' flowers.

The illustrations are intended to represent the various sections of the Carnation and Pink, and at the same time to show the form and markings as they exist in the varieties employed as far as the camera can fix them. Grateful acknowledgement must be accorded those who have assisted in this part of the work by lending illustrations or flowers, namely, to Mr. James Douglas, Great Pookham, for border Carnations; to Mr. Charles Young, West Derby, for the Malmaison Princess of Wales; to Messrs .Sutton and Sons, Reading, for Marguerite Carnations; and to Messrs. Hugh Low and Co., Bush Hill Park, and Messrs. T. S. Ware, Ltd., Feltham, for flowers of American Carnations.

CONTENTS.

LIST OF ILLUSTRATIONS.

Select Carnations, Picotees, and Pinks.

I.—HISTORY.

The Carnation (Dianthus Caryophyllus, Linnaeus) is a native of North and West Normandy, in France, and South and East Punjaub in India. Other really wild European habitats are North Italy and parts of Austria bordering on the Mediterranean, It grows on limestone cliffs and banks, as well as old castle ruins in Normandy such as Chateau Gaillard on the Seine, and Falaise in which William the Conqueror first saw the light. In England it has long been naturalised on Rochester Castle, built by the Normans, being recorded as early at least as 1788, with pale and deep red, single flowers.

The botanical name is comparatively recent, having been given by Linnaeus, and published in his "Species Plantarum," dated 1753. The single, wild flower has five, toothed, beardless, rose coloured or white petals, forming a close, circular bloom. The plant is tufted in habit, glaucous, and quite smooth, with a branching flower stem about 12in. high.

The generally accepted meaning of Dianthus is the divine flower, from *dios anthos*. The specific name Caryophyllus was used in a generic sense by the older botanical writers previous to the time of Linnaeus, and seems to have been given in allusion to the scent of the Carnation resembling that of the cloves of commerce (the old name of the tree producing the spice being Caryophyllus aromaticus).

The meaning of the word Carnation has been much disputed, some writers deriving it from the Latin *caro, carnis*, flesh, in allusion to the colour. The name Carnation first occurs in "The Historie of Plantes," by D. Rembert Dodoens, translated by Henry Lyte of London, and dated 1578. In this work a plant with double flowers is named Vetonica

altilis, Carnations, and the double Cloave Gillofers. Two pages further on Dodoens mentions other names in use such as "Vetonica Coronaria; in English garden Gillofers, Cloave Gillofers, and the greatest and bravest sorte of them are called Coronations or Cornations." From these various spellings it is evident that the word Carnation is a corruption of coronaria, a garland flower. Gillofers in like manner would seem to be a corruption of Carophyllus, which underwent a variety of spelling, such as Garryophyllis, Gelovers, Gelouers, and Gelyflours, till in Gerard's time we find the words still further corrupted to Gillefloure and Gillofloure. John Parkinson used Gilloflower (*quasi* July flower); hence the modern Gillyflower and July flower.

At what period the Carnation took rank as a garden flower there is no record, but it was probably amongst the earliest cultivated for its delicious aromatic fragrance and beauty. About 1568 Turner, in his "Herball," says "The gardin Gelovers are made so pleasant and swete with the labours and the witt of man, and not by nature." Like most other flowers of 300 or 400 years ago, it was regarded as of medicinal value, for Dodoens says that "the conserve of the flowers, made with sugar, comforted the harte, and the use thereof is good against hoate fevers and the pestilence."

Alphonse de Candolle does not mention it in "The Origin of Cultivated Plants." It must have been cultivated for a considerable period previous to 1578, for in Dodoens' "Historie of Plantes" of that date, an illustration shows a sturdy plant with good foliage and double flowers not unlike the Old Clove of modern times, but having more deeply fringed petals.

At that time this double type was known as Gillofers, double Clove Gillofers, garden Gillofers and Carnations. Even then divers sorts of various colours existed, such as white, carnation, lively flesh colour, bright red, dark red and speckled. All were sweet-scented like cloves. The latter name would seem to have been suggested both from the shape of the flower buds and the scent like that of the clove of commerce. The Clove Gillofers of those days were only known as cultivated subjects, being "set and planted in the gardens of this country." In 1727, Bradley spelt the word Jully-flower and the trans-

position to July-flower was easy, seeing that the Carnation blooms in July. In the far north I have occasionally heard the word pronounced Jully-flower as recently as 1870.

Writing from his house in Holborn in 1597, then a suburb of London, John Gerard copied the double Carnation from Dodoens' "Historie of Plantes," and called it the double Clove Gillofloure. Alongside of it he figured "the great double Carnation," also calling it the "Carnation Gillo-floure," showing that advances continued to be made in those far off times. The "Clove Gillo-floure," he continued, merely differed in its smaller size, and was well known, so that London must have been given to floriculture for years before his time.

He gives good figures likewise of the single "Gillofloure or Pinke" (D. Caryophyllus), the garden Pink (D. plumarius) in several colours, D. Superbus and others renowned no less for their varied colours than for their fragrance. Even in those times he was obliged to make selections as he stated that a large volume would be necessary to go into particulars about each of them. Every year and climate brought forth new ones.

The yellow Carnation was recorded by him for the first time. Mr. Nicholas Lete, a merchant of London, brought it from Poland and gave Gerard some for his garden. A yellow Gillofloure had never previously been heard of in this country. It would be interesting to learn how such a colour had first arisen. Dr. Williams, who has written the most recent revision of the genus Dianthus, avers that no yellow flowered species is found amongst the wild types. The yellow Pink (Dianthus Knappii) introduced from Eastern Europe in 1899, has, however, light yellow flowers. Some authorities regard it as a yellow variety of D. liburnicus.

Gerard, further referring to the varieties of colours, recommends those interested to repair at the proper season to the garden of Mistresse Tuggy, in Westminster, whose collection exceeded anything he had ever seen, whose deceased husband had exceeded most, if not all of his time, in raising, increasing and preserving Carnations and other plants. Even then it would seem that single Carnations were scarce or little understood inasmuch as one was termed a Pink, though it arose from the seed of the double ones.

The Carnation Gillofloure was as notable for its delicious fragrance as the double Gillofloure. It was kept in pots during winter, while Clove Gillofloures were hardier and planted in gardens. Another writer, Johannes Ruellius, said that the Gillofloure was unknown to the old writers, and marvelled that "such a famous floure so pleasant and sweet, should lie hid, and not be made knowne by the old writers; which may be thought not inferiour to the Rose in beauty, smell and varietie."

Dr. Turner was of opinion that Caryophyllus was the Cantabrica of Pliny, who related that it was discovered in Spain in the time of Cæsar Augustus. As above stated, Ruellius was doubtful on this point. The Carnation is not now truly wild in Spain, according to modern botanists.

John "Parkinson's Garden of Pleasant Flowers" was published in 1629 just four years in advance of Johnson's edition of Gerard, yet Parkinson gives us a better insight into the nature of the varieties of Carnation, which charmed the raisers and the London public of those days. He classes them into three groups, namely Carnations, Gilloflowers, and the yellow or orange tawny Gilloflower. The type of the first named was the great Harwich or old English Carnation, which, with its offspring was characterised by the greater size of the plant and its flowers. The red or Clove Gilloflower was characterised by its smaller size and much greater fragrance of its flowers. The old English Carnation was also known as the Gray Hulo, and had deep red flowers, thickly striped and speckled with white, These variegated flowers were evidently the favourites, for most of the 21 varieties figured, the 49 described and numerous unnamed sorts were marked in a great variety of ways. These striped and marked flowers ultimately gave rise to the name picatee or picotee which simply means painted. Parkinson also recorded such names as the Red Hulo, Blew Hulo, the Fragrant, the Stript Saudage, the King's Carnation, the Chrystall, the Lustie Gallant or Westminster, the Bristow (Bristol) Blew, Master Pradshawe his Dainty Lady, the London White, the Blew Gilloflower, Master Tuggies Princess, the Flaked Tawny, Master Tuggie his Rose Gilloflower and many others. The names would indicate that several raisers were at work, though Master Tuggy, of Westminster, would seem

to have been the most successful florist. Three years later we find that the widowed Mistress Tuggy carried on the business.

The recorded names would also indicate that the blue Carnation was not merely a desideratum in those days, but a reality, as the word blew is attached to several varieties of Carnation and Gilloflower. The descriptions, however, dispel the illusion, for these flowers were merely purple, or light purple, tending to blue. Many of these speckled flowers were inconstant and reverted to purple, blush or other self-colour. The favourite varieties of Gilloflower were also striped, spotted or powdered like the Carnation, the white ground sometimes being the dominant hue and at other times the dark colours predominated.

All of the varieties were feathered, jagged or toothed at the edges of the petals with one exception, namely, "Master Tuggie his Rose Gilloflower," which was a self rose-coloured flower, without markings and with perfectly smooth or entire petals. Master Tuggy was the only one who possessed it, having raised it from the strain known as Tawnies. This unique combination marked a great advance in the Carnation, but though Parkinson emphasised the difference between it and other Carnations, he displayed no enthusiasm with regard to these characteristics which florists of the nineteenth century carried to such perfection and regarded as indispensable to an exhibition or florist's flower.

The native home of these flowers was unknown with the exception of the Pool flower which grew upon rocks near Cogshot Castle in the Isle of Wight, and the yellow Carnation which came from Silesia. All the rest were nursed in gardens and many of them were difficult to preserve or increase.

The "yellow or Orenge Tawny Gilloflower" had flowers similar in size to those of the Clove Gilloflower, and of a "pale yellowish Carnation colour, tending to an Orenge." Unlike many of the others it produced seeds abundantly and gave rise to a numerous progeny of self or speckled, spotted and striped, single and double flowers.

It is evident that the Carnation has now been cultivated in this country for considerably over 300 years, and that the production of the florist were already very numerous in Gerard and Parkinson's time. Shakespeare's "Winter's Tale" was written

in 1601 only three years after the publication of Gerard's Herbal, and the words put in the mouth of Perdita would show that these productions of the florist were so common as to be unworthy of her regard, and merely "nature's bastards."—

"The fairest flowers o' the season.
Are our Carnations and streaked Gillyflowers,
Which some call nature's bastards; of that kind,
Our rustic garden's barren; and I care not
to get slips of them."

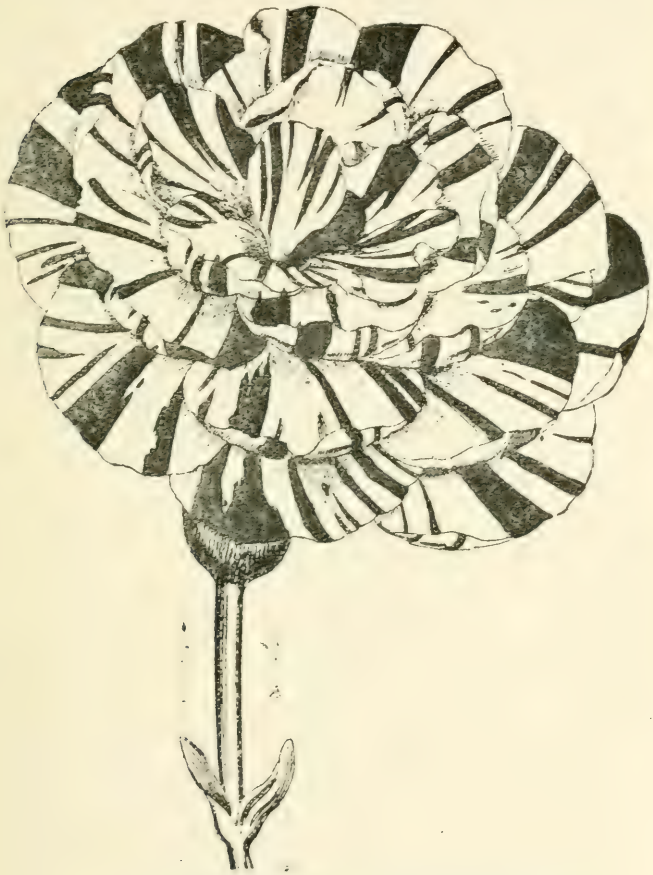
In 1676, John Rea cultivated 360 varieties of Carnations, thus showing that the love for this flower continued to grow and that the raisers continued their labours with unabated zeal.

Philip Miller in the 7th edition of "The Gardeners' Dictionary" (1759) describes four sections into which Carnations were classified in his day and devotes the most of his space to particulars of cultivation. The principal classes were Flakes, Bizarres, and Piquettes, the latter having a white ground and spotted or pounced with scarlet, red, purple or other colours. Flakes had two colours only, the flakes being broad and running through the length of the petal. The Bizarres had striped or variegated flowers with three or four colours in irregular spots or stripes. The fourth class was known as Painted Ladies, and were red or purple on the upper side and white beneath. For some years the Piquettes were most in vogue and later on the Flakes were most esteemed. To enumerate the varieties he considered needless since new ones appeared every year, and every country produced new ones annually, so that in the course of two or three years they became so common as to be of little value, especially if they were defective in any one property. The properties of a good flower were classed under five heads.

In those days new Carnations were largely introduced from France and preference was given to those of moderate size which did not burst their pods (whole blowers). These small flowers had first been discarded for large ones, and as the latter lost in favour with the florists they depreciated in value and were sold at a dozen a shilling. The small flowers again became the fashion and Miller accused the florists for having variable fancies.

On July 21st, 1818, Edward Barnard brought a collection of his Picatee Carnations before the

Horticultural Society of London. They were described in the "Transactions" of the Society as very superior, both for size and brilliancy of colour. One bloom in particular, had a circumference of 11in. This gentleman had raised them from Ger-



OLD ENGLISH BIZARRE CARNATION
(From Thomas Hogg's "Treatise on the Carnation," 1824

man seed. The ground colour of the flowers was yellow ,varied with crimson, scarlet, purple, slate, and black in different shades. The seedlings were vigorous enough but the layers were unusually difficult to preserve.

Before Thomas Hogg, the florist of Paddington Green, Middlesex, published his "Treatise on the Growth and Culture of the Carnation" and other florists' flowers, the Carnation, in the Flake and Bizarre classes, had reached its present day state of perfection, judging by a coloured plate of a Bizarre Carnation (see illustration p. 7) and the description in his book. Indeed, we have even earlier evidence of it in Franklin's Tartar, a scarlet Bizarre Carnation, raised by Mr. Franklin, of Lambeth Marsh, and figured in the *Botanical Magazine*, ii., t. 39. This plate was published in 1788, and showed a bloom fully 3in. in diameter, with numerous scarlet and a few maroon flakes.

Hogg's classes of show Carnations were Flakes, Bizarres and Picotees. His Bizarres had three distinct shades of colour (including the white ground); Flakes two; and the Picotee was still the "spotted Carnation" of Gerard's time. The Yellow Picotee (see illustration p. 9), honoured with a coloured plate, was striped in a variety of ways with two or three colours on a bright yellow ground and deeply indented or fringed on the edges. It was what we should now describe as a yellow ground fancy Carnation. His definition of a fine flower were:—

Brightness and distinctness of colours, form of the petals, clear white ground colour, every petal striped according to its class, unburst calyx, and not less than 3in. in diameter. The petals should neither be too numerous so as to burst the calyx, nor too few; they must be largest round the outside with the inner ones smaller and rising above one another in the centre like tiles on a roof and not fringed at the margin. The flower stalk had to be strong, straight and elastic to support the blossoms. A flower possessed of all the regulations laid down by the societies, he said, was seldom or never met with. It may here be remarked that the stems of his Carnations varied from 2½ft. to 5ft. in height, but the latter were probably exceptional.

The growers of Hogg's day were much troubled by the "running" of the flowers, and scarlet Bizarres of high colours were apparently more prone to it than other types. That is a malady which has existed from Parkinson's time, at least, to the present day. The scarlet Bizarre frequently changed into a self-coloured flower like the Clove. It may

be regarded as a reversion, whereby the colours become blended in one and equally diffused all over the petals. The process is akin to what gardeners term "sporting" in Chrysanthemums.

In Hogg's time yellow Picotees were grown in Italy, Germany, Prussia, Flanders, and France, from whence they were constantly imported to this

OLD ENGLISH YELLOW PICOTEE.
(From Thomas Hogg's "Treatise on the Carnation," 1824.)

country by the nobility and gentry in their excursions, but did not live long. The Empress Josephine had a fine collection of this class at Malmaison. Our own Queen Charlotte and the Princesses had a splendid collection of yellow Picotees at Frogmore, procured chiefly from Germany. This type was, apparently, very much at

home in most of the gardens of Madeira about this time.

Hogg was very partial to the white-ground Picotee, "pencilled and marked by the inimitable hand of Nature in her more sportive mood." His remarks, however, seemed to forestall the Picotee of modern times, for some of his varieties had "the edges or extremity only of the flower leaves. . . . tinged and laced all round." He catalogued 335 named varieties of Carnations and Picotees which he said were the choicest in England; then he enumerates four French Carnations and 50 new varieties, which he considered first rate flowers, making 389 in all. An allegorical chapter devoted to a discussion of the merits of old and new varieties, showed that the florists of those days had a great partiality for old favourites, though some of them might come good only once in seven years.

In 1834, Loudon mentions a tree Carnation with suffruticose stems, which could be trained to a wall or trellis to a height of 5ft. or 6ft. A writer in Hovey's Magazine for 1862, quoting from *The Gardeners' Chronicle*, supposes that the first tree Carnation made its appearance in 1822, but was neglected. M. Chabaud, a Frenchman, finds that tree Carnations were cultivated at Ollioules, France, in 1750, under the name of Carnation Mahonnais.

In 1834, the Cambridge Horticultural Society appointed a sub-committee to formulate a standard of excellence to which all florists' flowers should conform. In the case of Bizarre and Flake Carnations the high water mark had already been reached and was well defined by Hogg, in his book, except that freckles and spots were denounced in those varieties that still possessed them. The wire edged Picotee was also a reality, but most of the named varieties were still spotted and marked in a great variety of ways. The refined condition of the modern Picotee may therefore be considered as having originated about 70 or 80 years ago. Its original range of variation was therefore greatly limited, and the inbreeding necessary to secure edged varieties only is no doubt responsible for the delicate constitution of a large number of the best modern varieties. The word Picotee, meaning *painted*, is now a misnomer, though originally very expressive from the time of Gerard to that of Hogg.

As near as can now be determined the first Malmaison Carnation was raised about 1860. The American race of tree Carnations was originated about 1840, by a French gardener, named M. Dalmais, of Lyons. The true yellow-ground Picotee is of more recent origin, the first few having been raised by Richard Smith, of Witney, Oxfordshire, who commenced in 1848 and continued for ten or twelve years. In 1868, Mr. Perkins put Prince of Orange into commerce, and nearly all that have since been raised in this country have descended from this variety. Mr. Martin R. Smith, of Hayes, and Mr. J. Douglas, of Bookham, have raised several varieties as highly refined as the wire-edged, white-ground Picotees.

The founding of the National Carnation and Picotee Society on the 25th of July, 1850, gave a fresh impetus to Carnation culture. A northern division of the society was founded in 1874. The Midland Carnation and Picotee Society was founded in 1890. The Southern Counties Carnation Society founded in 1896, finally amalgamated with the Southampton Royal Horticultural Society.

II.—PROPAGATION BY SEED.

The Carnation is propagated from seed chiefly with the view of raising new and superior varieties that will surpass the older ones of the same colour or introduce shades of colour not already in existence. Some gardeners raise seedlings with the object of getting a great quantity of flowers for cutting from a small number of plants, because well grown seedlings produce a great profusion of blossom owing to the numerous crowns or shoots which seedlings develop the second year from seed.

Admirers of any particular flower are usually actuated at first with a desire to learn how to grow it and take delight in their own handiwork, but sooner or later, if at all enthusiastic in their hobby, they are fired with an ambition to raise something worth perpetuating or even good enough to take its place alongside of the finest florists' flowers, or even to secure the prize for the premier bloom of its class on the exhibition table. Such an ambition is laudable enough, and, with perseverance, the young aspirant may be rewarded beyond his expectations. Though not entirely a matter of chance, the beginner may succeed in securing something of real merit, before many years have passed, by persevering intelligently along the lines which, in all human knowledge are likely to give the desired result. To do this he must first secure a few good varieties, on the flowers of which he may set to work, or else procure a packet or two of seed from some grower or seedsman who has a reputation to sustain. Possibly not a single seedling of surpassing excellence may turn up in the lot, though that may not be the fault of the grower who supplied the seed. There is no object either in growing or in crossing bad varieties, where the collection is already replete with good ones. A beginner may actually bloom a first-class variety and get the credit for it, though the honour might be due to the grower of the seed as in the case of Admiral Curzon (Easom). It was raised by James Milwood, of Derby, but sold to Easom before it flowered, in 1844, and is still one of the finest of its class extant.

There is no more fascinating phase of gardening

than the raising of seedlings, watching their growth, the different habits they assume and finally the bursting of the buds for the first time. Hope may often be defered though there may be surprises in store, and a glimmering of success in a second year's trial or a second cross from the finest of the seedlings raised. The Carnation grower may bloom five or six generations of his favourite flower by the time a raiser of Tulips has proved his first. He is thus enabled to correct previous mistakes at rapidly recurrent intervals of time, and to press towards his goal with increased experience each succeeding year. The incentive to grow a fine Carnation of one's own raising is always greater and the pleasure keener than in growing the masterpiece of others; nevertheless the true measure of its worth can only be gauged by growing the others under similar conditions for comparison.

Some few admirers may have a liking for all classes of Carnations if they have the convenience to grow them and the leisure to attend to their requirements; but those who desire to enter the field of raisers should do so after giving the matter careful consideration on lines which experience of the past has demonstrated as the most likely to lead to success. Crossing Flakes or Bizarres with selfs, yellow-ground with white-ground Picotees, or border with tree Carnations is not likely to be productive of anything but rubbish and waste of time and space. Each class is so far removed from another that a combination of their respective qualities and properties has a neutralising effect, and the offspring can possess neither beauty nor merit. To perpetuate any good quality the grower should select parents belonging to the same section, and to colours that will harmonise when blended. Violent contrasts should be avoided, such as scarlet or crimson with yellow, scarlet with rose, and purple with red. The progeny of a scarlet self and a white ground Picotee would almost to a certainty be much inferior to either parent.

It is of the rarest occurrence to get all the qualities of a first-class Carnation combined in one and the same seedling; but the intelligent experimenter should endeavour to combine good colours with compact habit, vigorous constitution, free flowering properties, and blooms that expand regularly without bursting the calyx and falling to pieces. The calyx

should be one inch long or nearly, cylindrical, strong and parting at the apex into teeth of equal length. A short, swollen and stumpy calyx is almost certain to burst on one side from base to apex, thus letting the petals fall down on one side with the expansion of the bloom. Such flowers also contain more petals as a rule than can be disposed in a symmetrical bloom. As a border Carnation it would be perfectly useless and equally worthless for cutting. True, the fault could be partly corrected by not disbudding, but the terminal, and what should be the best bloom, will always be faulty. A sufficient number of petals to build up a good bloom—neither too few nor too numerous—should be the aim of the raiser.

Show Carnations are most often grown in pots, and that, while keeping the flowers more directly under the eye and giving an opportunity of remedying defects as they arise, serves in a measure to check the tendency of the calyx to burst irregularly. Nevertheless even here the raiser of new varieties must be equally exacting, both in the selection of intended parents and the retention of their offspring possessing decided merit. Scarlet Bizarres are the height of the florist's ambition, being considered the most highly developed of their class. Trying to improve upon them is like gilding refined gold, but attempts may be made to get different arrangements of colour and plants of more vigorous constitution, which would be a boon to less experienced growers. Both parents should be scarlet Bizarres, but an endeavour should be made to procure plants as distantly related as possible in pedigree so as to avoid inbreeding and get increased vigour in the progeny. Success in this direction might be attained by using a variety deficient in the number of petals, though possessed of bright and well defined colours, as the pollen bearer. Similar ideas should be kept in view by those who enter the field of experiment in any given section of the Carnations. The main idea in selecting the parents, should be to consider what advantage is to be gained by a combination of their respective characteristics.

The operation of effecting a cross amongst Carnations is a very simple one provided the beginner is acquainted with the essential organs of the flower. In a fully developed flower two long thread-like bodies, finely downy on the upper or convex side may be observed. These belong to the seed-bear-

ing part of the flower, and they alone should be dusted with pollen from the other intended parent. The pollen is contained in little sacs at the end of slender, white filaments, and in a perfectly or fully double flower they have to be searched for amongst the petals, that constitute the showy part of the flower. The handiest instrument for transferring the pollen from these sacs to the seed bearer is a small camel's-hair brush, which should be carefully washed before using it on any other set of intended parents to avoid mixing the pollen. To facilitate the work a number of these brushes should be kept at hand. Some varieties produce pollen very sparingly or not at all, and these may rank amongst the best varieties. Semidouble flowers are most likely to bear pollen in greater quantities, but it should only be used where the colours are so distinct and well defined as to warrant it. The middle of bright days is the best time to look for pollen and to effect crossing. The pollen grains should be carefully gathered up with the point of the brush, and applied to the tip and upper sides of the thread-like, curved stigmas.

Cross-fertilisation may be effected in open air cultures, and this is sometimes practiced, but those who carry it out on an extensive scale grow their plants in pots and house them, at least when they come into bloom, in properly constructed, well-lighted and ventilated houses. Not only are the conveniences greater, but insects are less troublesome, if at all, and the seed is far more likely to get properly ripened by the heat and shelter from rain thus afforded. A small label bearing a number should be attached to the stem of every flower fertilised, and this number should be entered in a notebook, recording the name of the seed bearer and the variety from which the pollen was taken. The operation may not in every case be successful, but the operator should make a point of examining the flower next day and if still quite fresh the operation should be repeated. If the pollen has taken, the petals will be drooping and limp or the flower partly closed up. As soon as the flower is completely withered up the petals should be carefully pulled out so as to avoid injury to the seed vessel and to facilitate the expansion of the same. If allowed to remain the petals would most likely harbour moisture and cause the seed vessel to rot.

It may also be necessary to slit the calyx open for similar reasons, or to cut it away altogether.

Carnations take a long time to ripen their seeds, so that the work of fertilising them should be commenced when the first and best flowers open. When left to their own resources the fine modern Carnations do not produce much seed as a rule, though all varieties are not alike even in this respect. The more perfectly double they are the less chance of seed if unassisted artificially. When the seed pods turn to a light brown hue and commence to open at the tips it is an indication that the seeds are mature. This takes place sometime in September, when the pods may be gathered and placed on sheets of paper in a dry, warm and airy house exposed to sunlight. Here the pods will part with their moisture and burst open to allow the seeds to escape. These are thin, much flattened and black, as a rule, though some garden varieties may have gray seeds. In these operations the original labels representing each separate cross should accompany the seeds so that no mistake may be made in the record. When perfectly dry the seeds may be shaken or rubbed out of the pods, the latter removed and the seeds placed in paper bags, with the number written on, and stored in a dry cool place till wanted for sowing.

Crossing Varieties in the Open.

The grower who lacks the convenience of a glass-house may undertake the cross-fertilisation and the harvesting of the seeds in the open garden. This of course, could only be done in the case of border varieties, of hardy, robust constitution, though he may in fine summers be successful even with Flakes, Bizarres, and Picotees. This has always been difficult, however, and the production of seed is a slow operation under the circumstances. The plan of operations may be much the same as when conducted under glass, but the work must be commenced as early as flowers are obtainable to give the plants the benefit of all the heat and sunlight possible in our climate, together with length of time. In order to prevent any possible cross-fertilisation by insects, it would be necessary to cover the opening blooms with gauze or muslin. The operator can then rest assured that no foreign pollen will be carried to the flowers to nullify his labours while he

waits the full development of the stigmas. If the first operation is unsuccessful it may be repeated next day. After the flowers are fairly withered the gauze may be removed as foreign pollen will now be entirely without effect. The removal of the withered petals and the slitting of the calyx are even more important in the open air than under glass, particularly in wet seasons. Carnation seed takes a long time to ripen in the open.

Raising the Seedlings.

About the middle of March is the best time to sow the seed and not more than three weeks later if possible. At that period the advantage of artificial heat will be great, as it insures quick germination less liability of damping among the seedlings if the spring should prove damp and cold. Those who have the convenience of a stove or propagating pit, can stand the seed pots or pans on the surface of the bed or partly plunge the same, and the seedlings will come up all the sooner. In the absence of such convenience a hotbed should be made up as for Melons, Cucumbers, or Potatos, standing a frame on the top of it. Cover the manure with 4—6in. of soil in which the seed pans may be sunk more or less. If not wholly occupied with Carnations, the frame may be filled up with seeds of half-hardy annuals or other seeds requiring heat.

Carefully crock some pots or seed pans, putting some moss or lumpy material over the crocks. They may then be filled up with any light, sandy soil with a third of leaf mould; both should be sifted before mixing them. If in any way heavy a good proportion of sand should be added to the compost, mixing it thoroughly. Press it down rather firmly, filling the pans within ¼in. of the rim. Sow the seeds rather thinly, avoiding overcrowding and cover with a thin layer of the finer particles of the same material. If the soil is fairly moist no watering will be required in the moist atmosphere of a hotbed.

As soon as the cotyledons or seed leaves are fully developed the seedlings may be transplanted, 2in. apart each way, into boxes of rather more substantial soil. By transplanting thus early the seedlings will be less liable to damp off than if they were allowed to remain a week or two longer in the seed pans. The boxes should be kept under the same

conditions of temperature till the seedlings have taken to the fresh soil, after which they should get a gradually increasing amount of ventilation to harden them. In three or four weeks time, according to progress, they should be transferred to cold frames with a greater or less amount of air according to the weather, to keep them growing steadily under genial conditions. Towards the end of May the seedlings will have made appreciable progress and should be hardened off by giving increased ventilation, and finely full exposure to make them fit for transferring to their permanent or flowering positions in the open garden.

Soil and Situation.

Carnations will grow in any good garden soil, provided it is trenched and well pulverised to a depth of 1½-2ft., and enriched with plenty of well decayed cow manure. The latter should be put well down when trenching to prevent it from coming in direct contact with the roots of the young plants. This operation should be accomplished in autumn, and if the soil is very heavy it may be laid up roughly or even in ridges to expose it to the action of frost. About the end of May the soil may be levelled down and well broken up with the fork, then raked and marked off for planting. For a week at least before planting, the seedlings should be well hardened off in cold frames, finally leaving the sashes off day and night.

When selecting a piece of land or a bed for Carnations, choose an open situation, not overhung nor shaded in any way by trees, shrubs, or buildings. They love the sunshine which warms the ground and in every way is favourable to their wellbeing. Even layers root better when the soil is bare and not covered with a top dressing or mulching of any kind, other than soil. Should the natural staple be heavy a top-dressing of some good rich soil with plenty of sand in it should be placed along the lines before commencing to plant. Old potting bench soil, such as that which has been used for Chrysanthemums the previous year will answer admirably if a good proportion of sand and some leaf mould is well mixed with it.

Mark off the ground in lines 12—15in. apart each way, according to the area which can be spared. The greater width may seem too much, but it must

be remembered that seedlings cover a good area of ground, and plenty of space facilitates layering in July or August.

Planting Out Seedlings.—When about to commence planting have the boxes of seedlings carried to the site. They may then be carefully lifted with a trowel, getting out the roots with soil attached to them as intact as possible. They may be laid one by one into a small, shallow box, which the planter can easily move along with him while planting with a trowel. Make the soil quite firm about the roots, levelling the soil, and the operation is complete. The seedlings should be planted at the same depth as they were in the boxes, being careful not to bury the leaves.

Instead of making one large plantation of seedlings the cultivator may desire to plant them in beds, but the same general plan of operations may be followed. If lines or clumps in the ordinary borders skirting the walks be preferred, care should be taken to have the sites deeply dug and manured; at the same time some fresh soil lightly dug into the surface soil would be a great advantage, as Carnations delight in fresh soil.

Keep the Dutch hoe frequently at work amongst the plants throughout the summer to keep down weeds, aerate the soil and prevent the evaporation of the moisture. By the end of the season they will have formed large tufts with many crowns that will develop an enormous quantity of flowers in July and August following. Most of the plants will produce from 100 to 200 flowers, by giving them the above simple treatment in good soil, with plenty of room.

The above details apply to border Carnations, and all such as are sufficiently hardy to be grown in the open air. They should not be disturbed from the time they are planted out till they have finished flowering, the worthless ones are thrown away, and the layers of the good ones severed from their parent stools in September or October. Indeed they may all be left till this stage of growth, even if the best have been fertilised for the production of seed, if precaution is taken to cover up the flowers to be operated upon as detailed above.

III.—PROPAGATION BY CUTTINGS AND LAYERS.

The two leading methods of perpetuating choice varieties of Carnations true to name are by cuttings and layers. The latter is the universal method of propagating named varieties in the open ground, as it is the least troublesome and the more certain method of getting the highest percentage of rooted plants. Scarcely any check to growth is given by the process of layering, so that the layers develop to a fine size by the time they are rooted. Cuttings take longer time to attain the same size as layers and they are also later in coming into bloom, but they make rather more shapely plants for pot work. In the case of border Carnations the cuttings may be taken and inserted during the fourth week of July.

Soil.—Before commencing propagation by either of the above methods a compost for the operation should be prepared, consisting of good loam, leaf mould and sharp silver sand in equal proportions. The loam and the leaf mould should be passed through a quarter inch sieve or riddle, before mixing, to remove the coarse material.

Cuttings.

When young shoots occur too high upon the stem to be conveniently layered, they may be taken off as cuttings and rooted. The method is important, chiefly in the case of new or scarce varieties of which the largest possible number of young plants may be desired. Where stock of border Carnations is plentiful cuttings are scarcely worth the trouble. Cuttings of 2—3in. in length will be suitable. Cut the ends horizontally below a joint and trim off a few of the lowest leaves. The pots should be ready crocked with some moss or the lumpy siftings over the drainage. Fill the pots to the rims with the perpared compost and press it quite firmly with the fingers. Level the surface and cover it with a layer of sand. With a blunt dibber insert the cuttings firmly and give the soil a good watering with the rosed watering pot to settle the soil. The pots may be stored in an unheated frame, covered with hand-

lights, and also with the sashes, which should be kept close until the cuttings commence to grow, when air may be gradually given to harden the cuttings. A partly spent Mushroom or Cucumber bed that would afford an appreciable degree of bottom heat would greatly facilitate the process of rooting. The pots should be plunged in this and likewise covered with hand-lights. Those who do not have any of these conveniences may yet succeed by procuring a few hand-lights, make up a bed of the above compost, about 3 or 4in. deep on the surface of the ground in a shady position, press it down quite firmly, proceed to insert the cuttings and when sufficient to fill a hand-light, the lower or bottom half of the latter may be placed in position and the cuttings watered through the rose. Shading by artificial means will only be necessary during the heat of the day if the sun shines upon the glass.

Tree or winter-flowering and Malmaison Carnations are propagated chiefly by cuttings because the latter are usually situated high above the soil.

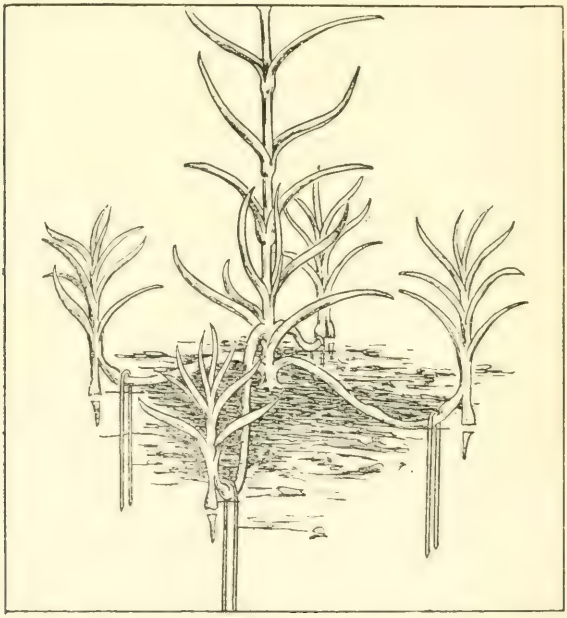
Layers.

A commencement may be made to layer Carnations in the open ground about the 21st July, and the work completed as early in August as possible to give them all the benefit of summer heat to hasten the process of rooting which will take four to six weeks, according to the geniality of the weather and the amount of sunshine. Plants in pots may be layered at the same time. These include show, fancy, and self varieties grown for exhibition, many of the two latter classes being really border Carnations.

Before commencing to layer in the open ground make a shallow basin round the plant by means of a trowel and fill up the cavity with a similar compost to that prepared for cuttings. Then with a sharp knife cut away the leaves on the lower part of the shoots to be layered, preserving all those on the upper four or five joints. The next process is to make a tongue on the lower side of each shoot, Enter the knife a little below a joint, passing up through the latter as near the centre of the shoot as possible, and for ½in. above it. If the tip of the tongue is cut off close below the joint so much the better, as the new roots will be given off here; and

if the cut is rather under than over ½in. long the firmer the tongue will be and less liable to break away when the layers are being severed from the parent and lifted after the process of rooting is complete. When the tongue has been made bend the layer and push it into the loose soil and fix it down with a hooked peg.

A punnet filled with pegs previously prepared should be kept close at hand. They may be made from bracken, old birch brooms, or brushwood.



METHOD OF LAYERING CARNATIONS.

Wire pegs may also be bought ready made from the horticultural sundriesman, thus saving a deal of time. They last several years and answer the purpose admirably. Hair-pins are often used for pegging down Carnations, and may be bought cheaply. When all the layers on a plant have thus been laid down cover them with the prepared compost, keeping the points of the layers upright. Make the edges of the basin rather high to prevent the water supplied from running away. Deal with all the rest of the plants in the same fashion. Before leaving

off work give the layered plants a good watering, using a rosed watering pot to settle the soil. Should the weather be dry and warm about this time the layers should be watered every day for a week or two to encourage the process of rooting. After that less frequent watering will suffice.

Pot plants may be layered at the same time as those in the open. With a pointed peg pick out about 2in. of the surface soil and fill this up with the fresh compost. Trim the layers, tongue them and peg them into position all round the sides of the pot, just inside the rim. Cover them with compost and water down the soil as in the open ground. Shoots that are too short for layering may be made into cuttings if the variety is scarce.

Towards the end of September or in the beginning of October the layers will have made sufficient roots to be severed from the parents and potted up singly in 60 size pots or planted out where they are to bloom as the case may be.

IV.—DEFINITION OF THE CLASSES OF CARNATIONS.

I. Show Carnations are limited to those having broad stripes or flakes of one or two colours on a white ground, and running from apex to base of the blade of the petals. They are subdivided into Bizarres with two, and Flakes with one, colours on a white ground.

Bizarres are again divided into scarlet, crimson, pink, and purple varieties according to their principal colour; and Flakes may be purple, scarlet or rose.

II. Picotees or White-Ground Picotees merely differ from show Carnations in the arrangement of their colours in a line round the outer edge of the petals. They are divided into red, purple, rose, and scarlet edged Picotees. These are again subdivided into *light* or *wire* edged, medium, and heavy edged according as the marginal line is narrow, medium or wide.

III. Border Carnations may include any class of sufficiently hardy constitution to live, thrive, and bloom in the open air or border.

Flowers of one uniform or self-colour are most universally popular for outdoor or border culture. More recently yellow, and yellow ground Carnations and Picotees of vigorous constitution have been pressed into the service. Show Carnations and Picotees are often grown for border decoration.

IV. Yellow and Yellow-Ground Carnations and Picotees may be of any shade of yellow, the darker the better, self, striped, lined or flaked with other colours in a variety of ways.

They are selfs when the colour is uniform. They are termed *fancy* yellow-ground Carnations when striped with two or more colours, or when densely lined or marked all over the yellow-ground. Yellow-ground Picotees have an edging of scarlet, crimson, or rose, either light or heavy. The varieties that have reached this ideal of perfection are not yet very numerous. Many of the yellow-ground Picotees, still allowed to pass muster, are more or less striped or lined with other colours and the line of demarkation between them and the fancy yellow-ground Carnations is arbitrary and of convenience.

V. Tree or Winter-Flowering Carnations have more or less tall leafy stems of branching habit, and as the side branches keep up a succession of bloom over a long period in autumn and winter they are sometimes termed perpetual.

VI. Malmaison Carnations are akin to the tree Carnations in being of tall, shrubby habit, but they are characterised by flowers of exceptional size, broad leaves, and usually strong clove scent.

VII. Marguerite Carnations have small, fringed, fragrant flowers of many and varied colours, produced in six months from seed.

They originated in Italy and are supposed to have been derived from the Carnation, crossed with the Indian Pink, but the latter trait has now filtered out.

VIII. American Carnations differ chiefly from European tree Carnations by having larger, more decidedly fringed flowers of brighter colours, with longer stems.

V.—BORDER CARNATIONS

Desirable Properties.

To be suitable for border cultivation a Carnation must possess many points of excellence and be eminently fitted for the conditions under which it is placed. Soil and climate in combination exercise a powerful influence on the welfare of all Carnations and, though practically hardy, a mere existence under adverse conditions would not justify their retention for border culture. They should be of vigorous constitution, produce plenty of leafy shoots (popularly termed grass) for layering and bloom abundantly, an effective display being of primary importance. Varieties that habitually burst their calyx are worthless for this mode of culture and should be discarded unless otherwise sufficiently meritorious for pot culture. Very large flowers with a super-abundance of petals are usually associated with a short, stumpy calyx, and no attempt should be made to cultivate them in borders.

The petals should be smooth (not fringed), of good substance, the outer broadest and the rest gradually smaller towards the centre of the bloom. Decided colours should always be selected. The plants should also be of dwarf compact habit, say anything between 15in. and 2½ft., and the stems strong enough to hold the bloom erect and show the upper face only. Flowers that hang their heads too much can never make an effective display, whether grown in beds or borders. For cut flower work they might prove serviceable, when cut with long stems and arranged in tall vases or other vessels a little above the level of the eye, so that the flowers look down on the beholder, and thus be seen to advantage.

Carnations that require excessive staking to hold the blooms in proper position should not be planted in borders; nor such as require a deal of manipulation to preserve the form of the flower. Except for exhibition purposes very little if any disbudding should be done. Number rather than size of bloom should be the object in border culture. The lateral buds being produced in succession serve to

prolong the display, which is usually all too short in a hot, dry summer.

Types to Select.

The lover of Carnations who is limited in the matter of space, and has to grow a collection in one or two beds of moderate dimensions, must of necessity grow them in mixture, and the effect cannot be otherwise than bizarre. An effective display can more easily be produced by a few well chosen varieties than a large number. This may be modified, however, by growing different shades of closely related colours in contiguous lines, provided the colours blend and harmonise when seen from a short distance. In the larger and more pretentious gardens a border or two are sometimes devoted to Carnations, and where many varieties have to be accommodated, the usual plan is to grow them in blocks of a colour. This certainly affords them more extensive scope for a display of skill and taste in the arrangement of colours, and if the scheme is carefully thought out beforehand and committed to paper, the plan may be accomplished without a hitch when planting time comes.

A complicated plan of this sort should only be carried out with well tried varieties that are known to succeed in the district or even in the planter's garden. A reserve piece of ground or a bed may always be utilised for experimenting with new varieties.

Selfs or those of one, more or less uniform, colour throughout, stand out pre-eminently for border work, because a certain effect can be produced by massing them in borders, or filling beds entirely with one variety. Bright or clearly defined colours are more effective from a distance than very dark crimsons or dull reds, though very much depends upon the background in showing up the colours. For instance, The Burn or Raby Castle would contrast well with grass, shrubs or the garden wall, if in proximity. The Old Clove would be more or less obscured under like conditions a short way off, and at a distance would recede from view altogether. White, yellow, pink, rose, bright red, scarlet, and even bright crimson, on the other hand, are telling colours.

The numerous varieties of show Carnations such as Bizarres and Flakes, neutralise one another when

BORDER CARNATION BOOKHAM CLOVE.

seen from a distance by blending into one shade of some light colour. The same applies to the heavy and wire edged white-ground Picotees, which would appear white from a distance. Self yellow Carnations would undoubtedly be effective, if vigorous and free flowering; and the lighter streaked and edged yellow-grounds would be slightly less decided. A pleasing picture may be produced with any or all of these, however, by those desirous of growing them. Even some of the tree Carnations have been found very serviceable, such as Winter Cheer and Uriah Pike.

The great point in growing border Carnations is to select those that are known to give satisfaction under the conditions imposed, or which the grower has proved in his own experiences. Yellow Carnations have always been difficult to manage out of doors, and this necessarily applies to the yellow-ground Picotees and fancy yellow-ground Carnations. A great advance, however, has been made in this section during recent years, and perseverance may give us varieties as vigorous in constitution and as easily managed as the selfs. Many of those we already possess are indeed cultivated with great success in the open air.

The old Malmaison Carnations have been tried by many cultivators, but though the plants live through the winter in beds and borders, they fail to flower satisfactorily. Not only is this trait in their disfavour, but the short bursting calyx entirely debars them from this mode of culture.

Our climate is too liable to fluctuations of temperature and moisture for plants of weakly constitution to pass through the winter, without being more or less permanently injured, if not killed outright. A fertile soil tells in their favour during summer, but promotes a soft, sappy and luxuriant growth, which is ill calculated to pass the winter unscathed. Alternate freezing and thawing are at the root of the mischief, and tend to destroy the root system in the overmoist and fertile soil. In a wild state the Carnation grows on rocks and old castle walls where the roots are kept relatively dry in winter, but though this could be imitated in gardens, the results would be gratifying neither to the amateur nor professional who desires large double flowers and plenty of them. Under these circumstances it is evident that rigid selection must be the

BORDER CARNATION KAFFIR.

order of the day. Raisers should also bear this in mind when selecting parents with the object of raising new border varieties.

Renovating Old Borders.

Carnations like other plants grown under artificial conditions, abstract the available plant food in the soil at a greater rate than can be maintained without artificial assistance. The available mineral ingredients of the soil are absorbed by the root system and built up into roots, stems, leaves, flowers and seeds, all of which ultimately get carried off the ground. During a single year there is a considerable loss of soil fertility, if the crop removed has been heavy or even good. This loss must be returned in some form or other if an equally good display of Carnations is expected from the same ground the following year. Gardeners usually restore the fertility by the application of natural and artificial manures when digging or trenching the ground; and also by the application of fertilisers in the liquid form during the period of growth. In unusually dry seasons the plants may be unable to avail themselves of the fertility of the soil owing to the lack of sufficient moisture, which is the vehicle for carrying the mineral ingredients into the plant body. For the same reason they may only become soluble and available in small quantity, and the plants cannot make satisfactory growth. Artificial watering then becomes a necessity, and even that has less effect than rain on account of the aridity of the atmosphere which soon evaporates the water artificially applied to an overheated soil.

Amateurs unacquainted with manures and the proper use of them have recourse to fresh or virgin loam, frequently at considerable expense. This is undoubtedly an excellent plan for restoring the soil to its pristine fertility, but many object to it on the score of labour, time and expense, as well as on the score that it introduces that aggravating and destructive pest, wireworm, if the soil is taken, as it should be from an old pasture, full of the roots of grass and other herbage. (See chapter xvi. on "Insects and other Pests"). Much can be done, in the first place, by carefully selecting the ground on which Carnations are to be grown. Although they will make fair growth in almost any garden soil the mechanical and physical character of the same

BORDER CARNATION LADY HERMIONE.

varies in different parts of any large garden, and the selection should be made accordingly. Those soils which are relatively impervious to air and water should be discarded and preference given to those which are friable or which, though of a substantial character, contain sufficient sand to make them porous to allow the passage of superfluous moisture and permit the beneficent action of the atmosphere. This is highly advantageous in the early stages of growth, by allowing the heated air in the spring time to penetrate and warm the soil. Those made up of fine particles, inclined to clay and deficient in decaying vegetable matter or humus, are liable to become hard and compact with the rising temperature in spring and the gradual loss of moisture. Such soils should be avoided if possible and selection made of those which contain humus and grit in which the natural agencies that convert inert matter into soluble plant food can work.

Having resolved upon the natural fitness of the soil and secured a good display of Carnations from it, the next question is how to restore it to its previous fertility for the coming season's crop. Carnations dislike rank stable or cow manure, but that obtainable from old hotbeds may be used liberally. Digging, double digging or trenching may be accomplished according to the condition of the soil. If at all inclined to be heavy a good dressing of old mortar may be given together with road scrapings, where macadam constitutes the surfacing. Wood ashes are also valuable, and may be obtained in every garden where the prunings of trees and shrubs and the decayed stems of various garden plants are burned on a smother heap. The most valuable ingredient of wood ashes is potash. Phosphate may be applied at the same time in the form of bone meal, particularly that which has been prepared by steaming previous to grinding, and calcined bone or animal charcoal.

If the re-making of the border by introducing fresh soil every year is out of the question, a good top-dressing of it worked into the top spit will have an appreciable effect on the growth of the Carnations. All these operations should be effected sometime previous to the making of fresh plantations of layers in autumn, and not later than the beginning of February for spring planting.

The intelligent cultivator will also remember that

a judicious rotation of crops allows the land a rest from the particular requirements of Carnations, while a fresh border, if the soil is suitable, will also be highly advantageous to them. At the same time the fresh border should be trenched if it has not been recently done. When trenching and manuring has been completed the soil should be levelled and

BORDER CARNATION—QUEEN ALEXANDRA.

trodden firmly and equally all over. Carnations stand the winter best in firm soil.

Time and Method of Planting.

Layers, if they have been made at the proper time, will be ready to sever from the parent plants some time early in October, and, if the planter's soil is of a light, warm, and friable nature, the new plantations may be made during the first fortnight

of that month. The plants will then have time to become established in their fresh quarters, while the ground is yet sufficiently warm and before the advent of winter. Pull out the pegs before lifting to avoid breaking the roots from the layers.

Should the soil be heavy and liable to be wet in winter, the safest plan is to pot the layers in 2½in. and 3½in. pots, and winter them in cold frames where they can be protected from rain, snow, and, in a measure, from the severities of our uncertain climate in winter. It must not be supposed that Carnations are unable to withstand all the frost we are likely to get in this country, provided they are fairly dry at the roots and not subjected to sudden fluctuations of temperature and excessive wet at the roots in a fertile soil. While in frames, the layers should be ventilated night and day except during hard frost to keep them healthy and sturdy. During rainy weather the sashes should merely be tilted at the back, but at other times one sash may be drawn up and another pushed down alternately to induce a circulation of air.

Planting in October secures the best results the following summer if the soil and climate are suitable, or if the beds or borders have been made up artificially of the proper materials. In beds it is usual to plant the layers 1ft. apart each way to effectually cover the ground, but if space can be afforded in borders the layers may profitably be planted in lines 15in. apart each way, and should be planted alternately in each succeeding line to give them the full advantage of space.

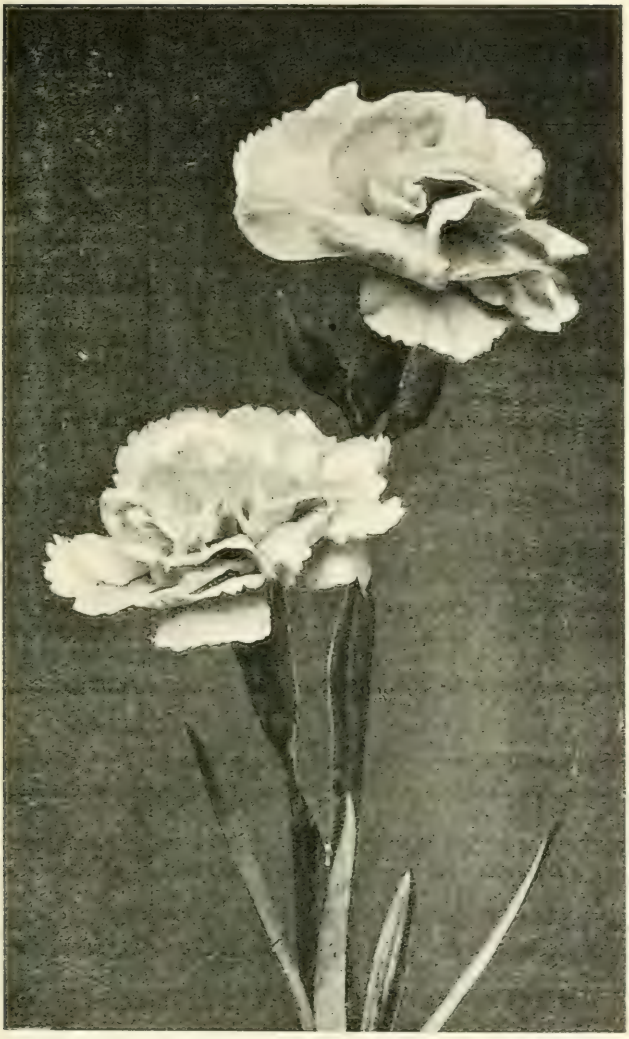
Select the best rooted layers and those of even size for any given piece of ground as this equalises the plants and gives the plantation a more effective and workman-like appearance. Each layer should carry a good ball of soil and no check to growth will be experienced in transplanting them. Those which are not well rooted may be planted in the reserve garden or potted up and many of them may make serviceable plants before spring. A trowel should be used for making holes so that the roots may retain their natural position when put in the ground. Make the soil perfectly firm by pressing it down with the fingers or the handle of the trowel. This practice cannot be too strongly emphasised, for upon firm planting depends the future welfare of the plant, especially in passing safely through the winter.

with less risk of being raised out of the soil by frost. The plants should be fairly deeply planted, covering the stem up to the lower leaves. Those that get elevated by frost should again be pressed down by the fingers after a thaw. Should the following winter prove in any way severe, it is almost certain that some of the layers may die, leaving blanks in the beds or borders. It is well to be provided against such a contingency by potting up a number of layers to be wintered in frames by way of a reserve. When filling up the blanks, some of the layers that are still green may, nevertheless, be crippled and dying. This may be detected by those having wrinkled or flabby leaves that would most certainly perish when the drying winds of March begin to tell upon them. These may at once be removed and their places taken by healthy plants. Making good any defects in the beds or borders should be accomplished towards the end of February.

After Treatment.

On the advent of drier and warmer weather, the surface of the ground is liable to cake and crack, while seedling weeds will spring up apace. Ply the Dutch hoe frequently and both these evils will be non-existant, while the ground freely aerated in this way will encourage a vigorous growth of the Carnations. In naturally dry and light soils it has been found advantageous to mulch the ground with well decayed manure to conserve the moisture. Watering with the hose or garden engine is also a necessity, especially in droughty seasons previous to the period of flowering. Syringing is also of great benefit after sundown on bright, warm days. It also serves to keep the foliage clean and clear of insect enemies, which are always most active and numerous previous to the flowering period.

As the flower stems run up and before they have time to be beaten down by wind, rain, or the process of watering, they should be neatly and securely staked. Each stem of plants from layers should be given a separate stake, and for that reason wooden ones painted a dark green should be employed to make them as inconspicuous as possible. The ties should be placed above a pair of leaves in convenient positions and merely looped loosely to the stakes to allow the ties to rise with the lengthening of the stems. Wire stakes, twisted in spiral form and



BORDER CARNATION—THE BURN.

painted dark green are now obtainable at reasonable cost and are both serviceable and durable. Another advantage they possess is that the stems may be twisted into the spiral quickly and without the necessity of tying.

Disbudding.

For ordinary border decoration or for cut flower purposes supernumerary buds enhance the appearance of the flowers rather than otherwise. Except for exhibition purposes, therefore, very little disbudding need be accomplished. Whether necessary or not will largely depend upon the variety, or occasionally by accident the terminal buds may have others so close to them that the removal of the supernumeraries would prove beneficial. This should be effected in the early rather than the later stages of growth. Every bud with at least 2in. of stem may fairly be left, to provide a rich display of blossom and a longer succession.

DESCRIPTIVE LISTS OF BORDER CARNATIONS.

Selfs.

Agnes Sorrel (M. R. Smith).—Petals of thick texture, smooth, well formed and dark maroon.

Ann Boleyn (M. R. Smith).—Flowers large, of good shape, and of a pleasing shade of salmon.

Banner (M. R. Smith).—Flowers very large, well formed and brilliant scarlet.

Bella Donna (M. R. Smith).—Flowers large, very double, bright red; plant of good habit and well adapted for borders.

Eendigo.—Bluish purple self, and the nearest approach to blue in cultivation.

Black Prince (M. R. Smith, 1905).—Colour rich maroon and handsome.

Boadicea (M. R. Smith).—Plant admirably adapted for border work, having stout flower stems, and large rosy-scarlet flowers.

Bookham Clove (Douglas).—Flowers pure white, large, beautifully formed, and sweet scented. (See illustration).

Boreas (M. R. Smith).—Flowers crimson, beautiful in form, and rosy scarlet; plant with stout flower stems and amongst the best of its colour for borders.

Bridegroom (M. R. Smith).—Plant of vigorous constitution, well adapted for border work, with very large, beautifully formed pink flowers.

Cantab (Gifford).—Flowers bright scarlet, clove scented; habit dwarf.

Carabas (R. C. Cartwright).—Soft, light pink, very choice and finely formed.

Cassandra (Douglas).—Flowers of a pale flesh colour, very large, choice and late in appearing; plant of strong growth.

Comet (M. R. Smith).—Well suited for border culture; flowers large, shapely and dark maroon.

Countess of Paris.—Flowers freely produced in the open border, of fine form and of a delicate blush.

Duke of Norfolk (M. R. Smith).—Flowers bright scarlet of excellent quality, and among the largest.

Ensign (M. R. Smith).—Flowers pure white, sweet-scented and of large size; calyx does not burst; one of the best whites.

Etna (M. R. Smith).—Flowers bright scarlet and of very handsome form.

Fiery Cross.—Flowers large, handsomely formed, brilliant scarlet, freely produced; petals smooth; calyx does not burst; plant vigorous.

Gil Polo (M. R. Smith).—Of finer form than Agnes Sorrel, smooth, and rich dark crimson.

Gloire de Nancy.—Handsome, large, pure white, fragrant; also good for pot culture.

Gloriosa.—Creamy blush self of fine form.

Hayes Scarlet (M. R. Smith).—Rich scarlet with fine smooth petals; plant of vigorous constitution, and excellent for border culture.

Herbert J. Cutbush (Cutbush).—Flowers large, handsome, finely formed, with broad petals of glowing scarlet; a grand border variety.

Hildegarde (M. R. Smith).—Petals smooth, handsomely formed, and pure white; the best white border Carnation.

Isinglass.—Bright crimson-scarlet and handsome flowers; plant vigorous.

John Pope.—Rose self of splendid form.

Kaffir (Douglas).—A finely formed, smooth flower of a rich crimson maroon; excellent for border culture. (See illustration).

Ketton Rose.—A beautiful old border variety with rosy white or silvery rose flowers.

Lady Carrington.—Flowers finely formed, pink, fragrant, 3½-4in. in diameter; calyx does not burst.

Lady Hermione (M. R. Smith).—Flowers beautiful in outline, smooth and bright rose in colour. (See illustration).

Lady Hindlip (M. R. Smith).—Flowers large of smooth and excellent form, glowing crimson-scarlet.

Lady Nina Balfour.—Large, charming blush and fragrant flower with long stems to each; calyx does not burst; good for pot culture.

Mary Morris Smythe).—Deep rose, fragrant and choice; a pretty old border variety.

Mephisto (M. R. Smith).—Flowers large, dark crimson, plant vigorous, and hardy even in Scotland.

Miss Schiffner.—Blooms of large size, pink, sweet-scented, produced in abundance, even when grown in the border.

Mrs. Eric Hambro (M. R. Smith).—A beautifully refined pure white Carnation of large size, with faultless, smooth petals.

Mrs. F. W. Flight.—Suitable alike for border or exhibition: flowers pink.

Mrs. Guy Sebright (Charrington).—Plant of vigorous growth, free flowering, light rose.

Mrs. L. E. Best (Best).—Broad, smooth, brilliant scarlet petals and handsome.

Mrs. Lora Armstrong (Watson and Sons).—Large, handsome, salmon-apricot and fragrant flowers; calyx non-bursting; growth sturdy and vigorous.

Mrs. Muir.—Pure white, smooth petals; plant floriferous and sturdy.

Mrs. Nicholson.—Very free flowering, clear pink with broad petals; plant vigorous, with strong grass in the border or in pots.

Much the Miller.—Good for border or exhibition; pure white, large and smooth flowers.

Nox.—Very rich, dark maroon; the most nearly black Carnation.

Old Clove.—Not a highly refined flower, but dark crimson and deliciously fragrant.

Pink Pearl.—Rose-pink, and beautifully refined.

Queen Alexandra.—Flowers pure white, freely produced; habit vigorous. (See illustration).

Raby Castle (Westcott).—Salmon-pink, fragrant and beautifully fringed; a floriferous and handsome bedder of strong growth.

Seagull (M. R. Smith).—Pale blush, very choice flower; petals concave or shell-shaped; plant of good habit, floriferous.

Sheila.—Flowers very large, freely produced on strong stems, and white; plant dwarf and vigorous; effective bedder.

Sir Bevys (M. R. Smith).—Rich crimson, with bold and telling flowers, well adapted for border work.

Sir Galahad (M. R. Smith, 1905).—Pure white self and one of the most perfect for exhibition.

Sir Richard Waldie Griffith (Laing and Mather, 1901).—Handsome orange-scarlet flowers, tinted amber, fragrant; plant hardy, free flowering, vigorous.

The Burn.—Bright pink and good for border culture or for forcing; best known as Duchess of Fife. See illustration).

The Dawn (Douglas).—Very floriferous in the open garden ,with warm pink flowers.

The Old Guard.—Broad, nearly smooth deep scarlet petals; stems stout; calyx firm.

Triton (M. R. Smith).—An excellent border variety, with well formed maroon flowers.

Trojan (M R. Smith).—One of the best pure white Carnations; plant of good habit.

Vesta.—A fine border variety of upright habit, with large and shapely white flowers.

Wild Swan (M. R. Smith).—Flowers massive, handsome, well formed and pure white.

W. H. Paiton (Herbert).—Deep crimson-maroon; a fine exhibition flower.

Fancies.

Artemis (M. R. Smith).—Flowers large, of refined form, scarlet, flaked and lined with lavender, handsome.

Banshee (M. R .Smith).—Petals of refined form and flaked with scarlet on a lavender ground.

Charles Martel (M. R .Smith).—Heavily edged with scarlet, and lined scarlet on a nearly white ground.

Elf King (M. R. Smith).—Flowers large, well formed, flaked scarlet on a dark lavender ground.

Ivo Sebright (Charrington).—Flaked heliotrope on rose; a sport from Mrs. Guy Sebright.

Lady Cadogan.—Edged and pencilled scarlet on a white ground. (See illustration).

Millie.—Petals smooth, barred rose and sometimes purple down the centre on a white ground.

Persimmon (M. R. Smith).—Flowers very double, flaked with crimson-scarlet and slaty blue.

Yeoman (Douglas).—Plant producing plenty of grass; flowers shapely, heavily lined with crimson on white.

FANCY BORDER CARNATION—LADY CADOGAN.

VI.—SHOW CARNATIONS AND PICOTEES.

Definitions of Fine Carnations.

These terms are intended to refer only to Bizarre and Flake Carnations and white-ground Picotees, which were the favourite races with the florist when Hogg published his "Treatise on the Carnation" in 1820. Selfs were but lightly esteemed in those days, and seem only to have taken rank as first-class florist's flowers, within the last two decades, since which time the history of Carnation culture has become revolutionised owing to the fresh vigour which has been infused into the new race. Indeed, the streaked, pounced, spotted, and flaked flowers seem to have fascinated the imagination of the florist from the time of Gerard and Parkinson. The self-coloured Carnations are equally as well suited for pot culture and exhibition purposes as the so-called show Carnations and Picotees, but they are of much more vigorous and robust constitution and therefore better adapted for border culture, and are consequently dealt with in the chapter on "Border Carnations."

In the time of Hogg Bizarre and Flake Carnations had reached a high state of perfection; indeed they are scarcely more perfect or more highly refined at the present day, though represented by varieties of more recent origin. They are or seem to be less numerous. The white ground Picotee as we understand it to-day had then only begun to develop into the laced and refined form which alone takes the fancy of the modern florist. In spite of the growing favour of the edged flower amongst its devotees, Hogg declared that he could not be induced "to forego the pleasure of beholding the varied, the fanciful, and beautiful blossom of the Picotee, which presents itself in all the delicate and softer tints of the Carnation, not indeed disposed with that preciseness and regularity, but pencilled and marked by the inimitable hand of Nature in her more sportive mood; at one time, on a snow white ground, a vast profusion of small, irregular spots appear—red, black, or purple; at another a few straight lines or dashes of the pencil only are seen on some of the larger petals; then a fanciful mixture of both

together, most beautifully blended; at another time, the edges or extremity only of the flower leaves shall be tinged and laced all round, or the whole covered with a netted and motley mixture of shining colours."

This confession of the old florist throws a side-light on the prevailing forms of the Picotee and the tendency amongst his brother florists of those days. The reader will also glean that the white-ground Picotee was then in the stage occupied by the yellow-ground Picotee at the present day.

Hogg's "Description of a fine Carnation" shows how closely the Bizarre and Flake of those days accord with the modern conception of those two classes:—"The excellency of a Carnation is judged and estimated by the brightness and distinctness of its various tints and hues, and by the formation or construction of the flower leaves or petals; the ground colour should be of a clear white. . . . . and the flakes or stripes must run longitudinally through the leaves. . . . . In a perfect flower, or one that approaches nearest to perfection, every leaf should be striped according to its class, whether flake or bizarre; plain or self-coloured leaves are accounted a great defect. The calyx or cup after the petals are unfolded, must remain entire and unburst, and the large external petals or guard leaves must be without crack or blemish; and the diameter of a show flower should never be less than 3in. It is also considered a great defect when the corolla is overcharged with petals. . . . . for the blossom in expanding generally bursts the cup; and it is no less so when it contains too few . . . though possessing the most brilliant and distinct colours. It is unnecessary perhaps to state here that those flowers which are thin of leaves, produce the most seed, on which account they are valuable.

"The flower must be sufficiently double to form a kind of crown in the centre. . . . the petals rising above one another in regular order; the guard leaves in particular should be broad and long, and of a stout texture, to support the rest. . . . . the edges of which must not be indented or fringed. . . . . but plain and circular, like the leaves of a Provence Rose. A flower whose corolla or pod is long, generally shoots forth the finest flower, and occasions the least trouble in attending

it. The flower or foot stalk must be strong, straight, and elastic, to support the blossoms firmly and gracefully, notwithstanding the stick which is applied to sustain it; the height of the stalk varies from 2ft. 6in. to 4ft. 6in. according to the habit of their growth.

"The value of a flower is also greatly enhanced, when it exhales a sweet and fragrant perfume. . . All Carnations possess this quality, but in very different degrees, in some it is scarcely perceptible, while in others it is strikingly powerful. Odour seems to prevail most in strongly bizarred scarlets, where there is a frequent recurrence of the clove stripe in the petals. The preference which one class of flowers, at times, is said to obtain over another, depends entirely on the taste and fancy of the person who gives that preference. The scarlet bizarre is a favourite with one, the crimson with another, the purple flake with another, and so on in like manner with the rest. There can be no certain or fixed rule why one is to be adjudged in this respect superior to another, where taste is the only criterion to go by. A flower possessed of all the properties laid down in the Societies, where they are exhibited for prizes, is seldom or never met with."

For 20 years or so after the publication of Hogg's book, and previous to that, a great wave of popularity for the show Carnation and Picotee passed over England, and rules or definitions for the gauging of fine flowers were laid down by horticultural societies and writers of authority. Cambridge became a great centre for the cultivation and advancement of the race. In Don's *Gardeners' Dictionary*, published in 1830, the criterion of a fine double Carnation is given as follows:—

"The stem should be strong, tall, and straight, not less than 30in. or more than 45in. high; the footstalks supporting the flowers should be strong, elastic, and of a proportionate length. The flower should at least be 3in. in diameter, consisting of a great number of large, well-formed petals, bu neither so many as to give it too full an appearance nor so few as to make it appear thin and empty The petals should be long, broad, and substantial, particularly those of the lower and outer circle, commonly called the guard leaves; these should rise perpendicular about half an inch above the calyx, and then turn off gracefully in a horizontal direction, sup-

porting the interior petals, and altogether forming a convex and nearly horizontal corolla. The interior petals should rather decrease in size as they approach the centre of the flower, which should be well filled with them. The petals should be regularly disposed alike on every side, imbricating each other in such a manner that both their respective and united beauties may captivate the eye at the same instant; they should be nearly flat, however, a small degree of concavity, or inflection, at the broad end is allowable, but their edges should be perfectly entire, that is to say, free from fringe or indenture. The calyx should be at least one inch in length, terminating in broad points sufficiently strong to hold the narrow bases of the petals, in a close and circular body. Whatever colours the flowers may be possessed of, they should be perfectly distinct, and disposed in long, regular stripes, broadest at the edge of the lamina, and gradually becoming narrower as they approach the unguis or base of the petal, there terminating in a fine point. Each petal should have a due proportion of white; that is, one-half or nearly so, which should be perfectly clear and free from spots."

The Cambridge Horticultural Society, in 1834, had a standard drawn up for various florists' flowers including Bizarre and Flake Carnations and Picotees. In the case of Carnations the definitions did not differ from those laid down by Don, but their description of Bizarres and Flakes shows that the rules apply to this section at the present day. It is as follows:—

"Bizarres should have three colours in every petal, Flakes two, colours strong and bright, the fewer freckles or spots the better, all the colours nearly equal, or the most brilliant colour should predominate, the white pure and bright."

Picotees were governed by the same rules as to the size, shape, build, and quality of the flowers. They were still in the transition stage as in Hogg's time, but more advanced, as the following sentence shows:—"Those flowers which are free from blotch or stripe down the petal below the coloured edging are greatly to be preferred to those which are marked and pouncy." These definitions were published in the *Floricultural Cabinet* for 1834.

In 1849, the Rev. George Jeans gave a series of essays on the "Philosophy of Florists' Flowers" in

the *Florist and Pomologist* in which he discusses the subject at great length. "Form and colour" he considered were the means whereby a flower was rendered pleasant to the eye. Colour produced its effect by "contrast and combination." Form was the characteristic to which all other properties of the flower had to be subservient. This again branched into "unity and variety." Perfection of "unity" lay in all the parts of the flower being present to maintain an unbroken outline. "Variety" might consist of forms, numbers or colours, or any combination of them.

He further stated that "The Carnation owes much, though not all, of its superiority to the Picotee or the Pink, to the fact that, without violence to its general unity, it has no two petals, and no two stripes on the same petal, alike in the form of their colours. With respect to the general forms of flowers, different shapes are best suited to different purposes. The cup-edged or rose-leaved petal, elegant as it is, is unsuited to show the colours of the Polyanthus, the Auricula, or the disked Cineraria, though it enhances the beauty of the Carnation, the Picotee or Pink."

He also thought that the particular arrangement of the colours in a Carnation imparted an adventtious magnitude to them. The flakes, bars, and lines run outwards towards infinitely, are parallel, do not cross one another, and are not terminated by any visible end. In the Picotee, on the contrary, the marginal lacing of the flowers, is transverse to the length of the petal to which it forms a visible termination as well as to the colours. For this reason a Picotee, really as large as the largest Carnation, "will necessarily appear small and confined by comparison."

The late E. S. Dodwell, of Oxford, a grower of considerable repute gave some definitions of a good Carnation:—

"Quality, high quality, is of the first importance, and demands the highest consideration; its presence depends upon the existence of a rich texture, lustrous colours, pure white ground, and smoothness, both of the surface and edge of the petals." "Size, as a point of excellence, deserves the least consideration. Any limit between 2¼in. as a minimum and 3½in. as a maximum, will be found to afford ample ground

for admiration. In competition, other points being equal, of course, the larger size would win."

"In flowers—Bizarres and Flakes—brought into competition, the "disqualifications" of the florist are:—

1. The presence of any petal without any white.
2. The presence of any petal without any colour.
3. In the case of bizarred flowers the presence of any petal in which there shall not be two colours, in addition to white.
4. The splitting of the calyx (or pod) so low as to touch the sub-calyx"

Culture in Pots.

Some cultivators grow all their Carnations and Picotees in beds or borders out of doors. Where the soil is heavy or the garden under the influence of the filthy atmosphere of London or other large towns, the layers are potted up as soon as rooted, say in October, and wintered in cold frames till February or March.

Those who intend to enter their flowers for exhibition will find it the most convenient plan to grow them in pots throughout the year, or at least a sufficient number to furnish the desired quantity of flowers. By having them in pots under shelter the plants are not subjected to alternate rapid freezing and thawing and the subsequent danger of destruction in a wet soil. The question of shelter is even of greater importance as the plants approach the flowering stage when they may be subject to thunderstorms and gales of wind at the most critical stage of their existence, whereby the flowers may be rendered useless for exhibition. Shading when necessary, is also more completely under control, if the plants are in pots and can be placed under glass.

The First Operation with the young plants or layers is to pot them in a compost of sandy, fibrous loam, and a fifth part of leaf mould Upon the adhesiveness of the loam will depend how much sharp silver sand may be necessary to render the compost sufficiently porous to allow superfluous moisture to pass freely away. Use small 60-size pots, or those measuring 2½in. to 3in. in diameter, inside at the top, according to the size of the layer and the quantity of roots. A bed of ashes should be made up in cold frames and the pots stood fairly close together. Pot firmly in all cases. Should warm

weather prevail at the time, shading may be necessary, but the frames should be kept close for a few days till the roots have taken fresh hold. If the soil is on the dry side at the time of potting the plants may be watered with the rosed can to settle the soil, but if on the damp side, watering may be deferred for some days. In the course of a week a little ventilation may be given and gradually increased, till at the end of two or three weeks they may have the lights drawn right off to keep them sturdy and healthy.

From this time onward they should be attended to in the matter of watering, when required, and ventilation. The better plan is to keep them on the dry side, but never allow them to become dust dry or the roots will suffer. In fine mild weather the lights may be left off during the day, but drawn on at night to prevent them from getting sodden with rain, or weighted down with snow. Except in hard frost the sashes should be tilted up at the back night and day. A southern exposure is best in winter, as the plants need all the light and air they can get to dry and harden the foliage. During severe frost the frames may be covered with mats, and if the sun should be bright by day, the mats may remain to prevent sudden thawing or undue excitement by the heat of the sun. Keep the plants perfectly clean by the removal of decaying leaves. Should the shrivelling or discolouration of the leaves indicate the presence of the Carnation Maggot, the enemy should be searched for and destroyed.

Compost for the Second Potting.—About the beginning of the year or earlier, the enthusiastic cultivator will be getting together the ingredients of the compost for the second and final potting. It should be taken to a dry shed to get it in proper condition for the operation. This should consist of good fibrous loam, taken from an old pasture and stacked for nine or twelve months to mellow by the decay of the fibrous tissue. Use this at the rate of three barrow-loads to one barrow-load each of leaf mould, old hot-bed manure and sand. Should the loam be light less sand will suffice. Many growers of repute also use a quantity of pounded oyster shells, old mortar rubbish, or charcoal to ensure porosity. Either of them are good, but the two first named supply lime, which is a plant food and highly beneficial to Carnations. Mix these ingredients till

thoroughly incorporated, and leave the heap till required. Other feeding may be given in the liquid state while the plants are making growth.

Sterilising the Soil.—Every Carnation grower is aware of the danger of introducing wireworm and other pests, with virgin soil from a grass pasture or other source where the land has long lain in grass. Fresh turf should be stacked for a twelvemonth before using it for potting purposes, especially if it is much permeated by the roots of grass and other plants. When breaking it up for potting purposes the careful cultivator will pay close attention to the presence of wireworms, earthworms, and other undesirable creatures and have them destroyed. Such soil may, however, contain various other insects, slugs, eelworms, seeds of weeds, and possibly the spores of fungi which the eye will be unable to detect. At least two methods of sterilising the soil by means of heat have been devised. The older idea was to bake the soil on plates of iron over a fire, or on flues. While this destroys insects, worms and probably seeds of weeds and spores of fungi, it has the disadvantage of rendering the soil rather inert for the cultivation of plants.

The other method of sterilising soil is by means of steam. This plan is rather extensively pursued in America, where large quantities of soil are required for cultivating Carnations and other plants on benches. For pot culture, a few hundred plants would require but a moderate quantity of soil, and means might be devised on many establishments for sterilising soil on relatively a small scale.

A large wooden box without a bottom could be stood on wooden, stone, or even earth flooring. A short length of inch piping could be fitted up in this and connected with a steam boiler used for pumping water or driving machinery for the generation of electricity. The pipe should have holes drilled in it about ⅜in. in diameter at intervals of 8in. along each side. These holes might be bored in opposite pairs in the piping, and smaller short pipes made to screw into the holes. The main pipe should be closed at either end by caps and the steam introduced about the middle. The short, lateral pipes should be open at the ends, and lie horizontally on the bottom of the box or on the ground, so as to distribute the steam laterally, and make it permeate the soil instead of escaping by the top under pressure from the boiler.

Fill the box with soil, cover with tarpaulin or coarse, wet sacking to retain the steam. When all is in readiness open the valve at the boiler to admit the steam to the soil. A pressure of 50lbs. per square inch in the boiler would answer, though less might suffice. Allow the steam to play into the soil for 25 to 30 minutes, and if the temperature of the soil is raised somewhat between 200° and 212°, all germs, insects, and worms should be destroyed.

After the operation the soil will be quite wet and should be exposed to the air by the removal of the box. When fairly workable it could then be spread out to dry in readiness for mixing with other ingredients of the desired compost, and for potting operations.

Time and Method of Potting.—By the beginning of February, if the winter has been fairly open, the Carnations in frames will have made considerable growth and the roots will have filled their pots. A commencement may be made to shift the more forward into their flowering pots, and the operation may be continued from the beginning of February to the middle of March—a period of six weeks. This gives the plants an opportunity of filling the pots with roots before throwing up their flower stems, and enables the operator to complete his work in good time, even if the collection is a large one.

Seven, eight, and nine inch pots may be used according to the size or vigour of the plants. Two or three plants should be put in each, the latter number making a more evenly balanced potful. Plants of equal size should be matched for each pot. Drain the pots well and cover the crocks with moss or rough leaves to keep the drainage clean. Place some compost on the top of this and proceed to turn out the plants, placing them equidistant in the pots. Fill in the spaces between the plants and round the sides, pressing it all down very firmly, as Carnations delight in a well compacted soil. When all is finished the compost should be half an inch below the rim of the pot to allow for watering. Some varieties are naturally of small and weak growth so that a 6in. pot may suffice for three plants. This must be left to the discretion of the operator, who should be familiar with the nature and peculiarities of all in his collection, except the recent arrivals. A year or two of experience and observation will enable the cultivator to do this. Plants that are

unusually weakly should not be stimulated with manure or manure water, but the flower stems removed to encourage the production of healthy leafy shoots. An enthusiastic or earnest grower will not grudge this attention, which, indeed, is necessary with Chrysanthemums or any other florists' flower.

When the operation is completed the pots should be returned to the cold frames and treated as formerly. No water should be given for a few days till the compost shows signs of becoming dry. Should the sun be gaining power by this time the frames may be turned round to face the north, if movable, as they should be.

At the end of April the weather will be sufficiently mild and genial for the plants to be stood on a bed of ashes in the open, fully exposed to sunshine and air. This will keep them growing sturdily. In early summer the flower stems will commence to push up, and the plants must have regular attention in the matter of watering, weeding, and general cleanliness. When everything is in the full flush of growth in early summer, greenfly (Rhopalosiphon Dianthi and possibly other species) will be active on the tender flower stems, foliage and buds, and will soon do irreparable damage unless thoroughly kept under. The safest plan is to brush them off, being particularly careful of the buds. Stamp on the aphides to prevent them from crawling back again. (See also the chapter on "Insects and other Pests).

Stake the flower stems before there is any chance of toppling over with their own weight, or by the force of wind and rain. If once they are allowed to get bent they can never appear so neat and tidy again, and if the stems get broken a year's labour will have been lost.

Disbudding.—Whether they are disbudded or not will depend entirely upon the purpose for which the flowers are intended. For exhibition purposes it is indispensable to insure the size and perfect form of the flower. About the end of June or the beginning of July the terminal or top bud will begin to be an object of all absorbing interest to the grower for exhibition. As it attains its full length and shows signs of opening at the top it should be assisted by turning back the teeth of the calyx, and if inclined to burst it should be tied with raffia, not too tightly, to prevent the further swelling of the bud, but to

secure it against bursting along one side and thus rendering the flower useless. Small india-rubber bands are sometimes employed for the purpose, and should be slipped over the bud before expansion. All side buds should be removed as early as possible when it can be done without injury to the terminal one. Each plant, under this system, is allowed to bring only one flower to perfection, that is, two or three to the pot, according to the number of plants in it. Vigorous plants may bring two or three flowers to perfection if situated widely apart.

If grown for purely decorative effect, for cut flowers or for the production of seed, very little, if any disbudding is necessary. In some cases the stalks of the lateral buds are very short and occasionally a flower or two will be too close to the top one to permit of equal or regular expansion. Under the circumstances the removal of these badly placed buds becomes a necessity and the grower need not hesitate in the matter. About this time all healthy plants may be fed with weak liquid manure to advantage, especially if the compost is not over rich. In warm, dry weather the plants may frequently be syringed to assist in keeping them clear of insect pests, and maintain the vigour of the stem and foliage.

Housing and Shading.—During the first half of July the flowers begin to show colour, and the careful grower houses the plants. This is necessary to guard exhibition flowers against wind and rain. Should bright weather prevail at the time, the flowers will advance rapidly, and may be too early for the show. To prevent this they must be retarded by timely shading, which can be more easily, quickly, and effectively applied under glass than in the open. In dull, cloudy weather, on the contrary, the flowers have a difficulty in reaching perfection by the given time. Where and whenever shading is employed, a free circulation of air must still be maintained by ample ventilation.

The best form of house for Carnations is a low, span-roofed structure, with a path down the middle and side benches for the plants. Open staging is best as it permits of a free circulation of air. For the sake of the foliage, the plants should be as close to the glass as the flower stems will permit. In larger or wider houses a central stage may be built

along the middle, with a path all round it, and staging round the sides. The central staging should be built in tiers if the roof is fairly high. Those who have no Carnation house like either of the above should construct a temporary or permanent framework over the plants in the open so that tiffany or calico shading may be placed over the same, both to shade the flowers and break the force of rain. Wooden staging on which to stand the pots is an advantage under this form of protection. In calm and settled weather the awning may be taken off after sundown and not replaced till shading again becomes necessary. If this plan cannot be carried out in its entirety, the shading may be removed for a time after the sun loses its power well on in the afternoon, replacing it at night to guard against rain. Similar exposure for a short time in the morning will also assist in developing the proper colour of the flowers and in keeping the foliage healthy.

Dressing for Exhibition.—The art of dressing Carnations for exhibition has been practised close upon 90 years, at least, for Thomas Hogg relates that "One Christopher Nunn, of Enfield, Middlesex, a noted florist in his day, was eminent for his skill and dexterity in dressing Pinks and Carnations for prize exhibitions; some will even tell you that Kit was the father of the art. Upon such occasions he had as many applications to dress flowers, as he had to dress wigs; for he was a barber and a friseur by trade, and withal a good natured, facetious, prating barber, and could both shave and lay a Carnation with the greatest nicety. The novices of that day, who, being unacquainted with his secret art, trusted to Dame Nature to open, expand and perfect their flowers, were no match for Nunez; for he began where she left off, and perfected what she had left imperfect. His arrangement and disposition of the petals were admirable, and astonished those novices. Kit's art of dressing is still an enviable art attainable only by a few."

Notwithstanding this fine eulogium on, and justification of, the practice of dressing flowers, and the fact that it has been stoutly defended by enthusiastic and successful cultivators and writers of more recent times, a wordy war has been of frequent occurrence between them and journalistic writers, who are

mostly neither growers nor exhibitors. This frequently arises from an imperfect knowledge of the aim and object for which flowers are dressed and the fine qualities it displays rather than creates. The canon of the florist is that "There must be nothing extraneous introduced into the flower, neither petal nor pellet, nor any such thing." Deformed petals may be removed or those that exhibit any defect in colour or the arrangement of the same. The harmony of petals and colours may be maintained, but only such as are inherent or intrinsic of the flower. Could a commercial florist do less, who uses a gum pot to make his flowers hold together.

The method of dressing, as told by Hogg, was to cut the flowers and put them in water for two hours, after which, "take your etui [tweezers], and pull the guard leaves quite round and circular; then place the second, third, and fourth tier of petals in an imbricated form, that is, like slates upon a roof, or scales upon a fish, a leaf covering each division of the leaves in each row or tier, till they are arranged in a convex form like the outside of a dome or cupola; place the bizarred and finely striped leaves in full sight, pluck out all white or self-coloured, all pouncy and superfluous dull leaves, and those that will not lie."

The words used by the modern florist are somewhat different, but the creed and the instructions given are practically identical with those of Hogg. First turn back the teeth of the calyx with tweezers. Then the lower or outside petals must be gently pulled towards the edge of the card or collar, neatly and regularly arranged; and upon these the remaining petals are to be regularly and alternately disposed tier upon tier, removing deformed petals, also those that have "run" or become self-coloured, as well as those that are wholly white. A bad petal may hide a much finer one beneath it. This tends to increase or emphasise the unity of the flower as a whole with its variety of contrasting colours. Ruffled, folded, or deformed petals few can admire, and all such should be removed. This then is really displaying the best of what is already in and part of the flower. The real beauty of a bizarred or flaked Carnation can scarcely be seen or appreciated till one comes to arrange the petals, and build up a symmetrical bloom. A really bad flower could not be transformed into a perfect or even a good one of its kind.

What has been said of bizarred and flaked flowers applies with equal force to the Picotee, the beauty and design of the flower being emphasised by the regulation and symmetrical disposition of the edged petals. Even a self-coloured flower has its beauty greatly enhanced by the regular disposal of twisted or folded petals.

It has been urged that the dressing of flowers, and the use of paper collars and show boards are altogether inartistic; but a more correct way of putting it would be that such a mode of exhibiting them was lacking in picturesque effect. The particular lines of beauty which the florist has laboured to create, during a long period of years, would be entirely lost if the peculiar beauty of the individual were ignored for the sake of spectacular effect. Rather should the promoters of exhibitions strive to bring out the many-sided features of the Carnation, which has varied into so many types of beauty, by encouraging all phases of the flower, including the symmetrical and refined creations of the florist together with vases of blooms cut with long, leafy stems. Types with strong stems carrying their blooms stiffly erect are merely another type of beauty, that may be superseded in another direction by long, drooping, or gracefully arching stems for artistic, picturesque and spectacular effect, according to the design or purpose for which they are used. An exhibition of Carnations that represented only one particular phase of this many-sided flower would be equally monotonous, whether made up wholly of flowers in vases, or blooms on show boards. Dressed individual blooms are admirably adapted for the comparison of different varieties, and also aid the eye in singling out the various fine points of a flower. Gracefully disposed bunches of flowers are more fitted for spectacular effect as a whole.

Since dressing was first commenced, Dodwell, a master of the art, quoting a brother florist, says that there has been an advance in everything that "constitues beauty in the flower, as stoutness of petal, smoothness, fine texture, richness and regularity of colouring, and harmonious distribution, resulting in greater symmetry, and contrast and variety, and therefore eliciting increased delight and a larger measure of approbation."

No skilled exhibitor would think of placing on the exhibition tables flowers from the open border that

had been blown about by the wind, and their petals disordered. On the other hand flowers may be overdressed, or unskilfully manipulated, thereby injuring or bruising the petals with the instruments used. Dressing must be done with a firm and steady hand, yet with a delicacy of touch to avoid tearing, splitting, or notching the petals while placing them in position by means of the tweezers.

The Dressing Instruments need not be numerous. A pair of steel tweezers will be necessary for turning back the teeth of the calyx, and for pulling out narrow and deformed petals as well as self-coloured ones. A pair of smooth ivory tweezers are indispensable for grasping the petals while carefully placing them in position. Dust and pollen may be removed from the petals by means of a camel's-hair brush.

Two sizes of cards or collars are necessary for the proper dressing of exhibition blooms. The larger size should have a circular hole punched in the middle, sufficiently large to pass over without squeezing the calyx, and on this the petals should be arranged. The smaller cards should be punched in the centre, star-fashion, so that when pushed over the calyx, the rays or points of the star will be pushed outwards and thus catch on the base of the calyx and serve to keep the larger cards close up to the petals. A substitute for this might be found in a wire twisted into a ring at the top, while the free end may be tied to the stem of the flower, somewhat similar to the wire supports for Chrysanthemums, but smaller.

Exhibition Boxes.—For the sake of uniformity the boxes on which Carnations are to be staged should be uniform in size and as nearly so in colour as possible. The surface on which the flowers are to be displayed should be neatly planed and painted a light green, though the rest of the box may be darker if so desired.

The size of a box for 12 blooms, as stipulated by the National Carnation and Picotee Society, should be 15¾in. outside measurement; width 12in.; and depth, 4¾in. Each box should have three rows of four blooms each; and the holes to receive the tubes should be 3¾in. from centre to centre; and from the centres to the edge of the box, 2¼in. Boxes for half a dozen blooms should be exactly half the size of

those for 12, and contain three rows of two each. The distances from centre to centre of the holes and the edges of the box should be identical with those in the box for twelve blooms.

Staging the Flowers.—The aim of the exhibitor should be to get his flowers in any one stand as nearly uniform in size as possible, and at the same time of the largest size, all other things being equal. Varieties naturally differ in size and even the same variety may produce blooms of unequal size though otherwise relatively perfect. By skillful arrangement they may be made to appear fairly well balanced.

The largest bloom should take the left hand corner in the back row of the box and all the other large ones should occupy the back row, furthest from the eye. The rest should be graduated, the medium sized ones occupying the middle row, and the smallest ones the front of the box. Should the blooms be all of one size or nearly so, the hand and eye may then be concentrated on the even distribution of colours throughout the box. This will more particularly apply to self-colours in which the contrast is more marked than in Bizarres, Flakes, and Picotees, though it should by no means be ignored in these old types of show flowers.

Treatment after Flowering.—Unless the plants are wanted to produce seed, those that are housed should again be placed in the open air immediately after they have ceased flowering; and if any have been protected in the open by temporary shading the latter should be removed.

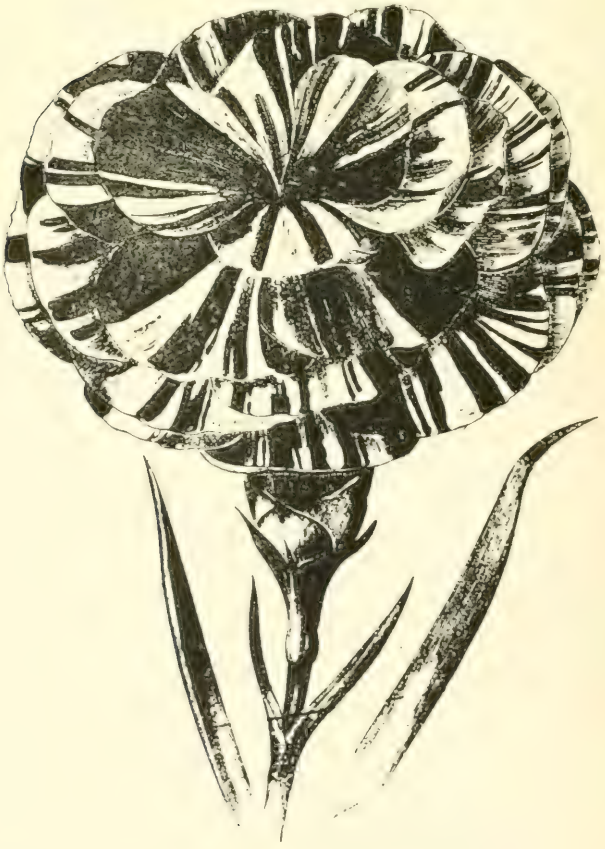
If the young shoots are ready for layering, as they usually are by the time the plants have passed out of bloom, they should be layered in the pots. About an inch of the old soil should be picked off the top and a compost of equal parts of leaf mould and sand prepared in which to embed the layers. Hair pins may be used for pegging down the layers, or wires bent, with a hook and a handle for pulling them out, made and sold for the purpose, should be secured in sufficient quantity previous to commencing the work. The leafy points of the layers should be set as upright as possible. The operation of layering is precisely the same as for layering Carnations in the open. (See chapter on Border Carnations). Plants

in pots will usually be a little more forward than those in the borders, and may be layered in advance of those, according to the observations and discretion of the cultivator. Those who grow their flowers chiefly for exhibition do not care to interfere with the plants till the shows are over. Others again layer their plants contemporaneously with flowering in order to insure early rooting of the layers. If the operation is carefully performed the flowers will receive little or no check. The work may be commenced about the last week of July, but should be completed by the second week of August. A convenient method with pot plants in houses would be to layer them while still on the benches in any case and have them carried out of doors as the work is completed, provided the flowers are past or have ceased to be effective. Water them with a rosed watering pot immediately after layering to settle the loose soil about the layers, and repeat the operation whenever necessary to encourage the process of rooting.

DESCRIPTIVE LISTS OF SHOW CARNATIONS AND PICOTEES.

SHOW CARNATIONS.

The names in brackets following the variety are those of the raisers. An * denotes a specially fine variety.



SCARLET BIZARRE CARNATION—ROBERT HOULGRAVE.

Scarlet Bizarres.

*Admiral Curzon (Easom, 1844).
*Dr. Hogg (Turner), dark colours.
*Edward Adams (Dodwell, 1879).
*Robert Lord (Dodwell).
*George (Dodwell, 1879).
Joseph Crossland (Simonite).
*Robert Houlgrave (Barlow, 1885). See illustration.

Crimson Bizarres.

*Arline (Lord)
*C. F. Thurston (Lord).
J. D. Hextall (Simonite, 1874).
J. S. Hedderley (Dodwell, 1884).
J. W. Bentley (Lord).
*Master Fred (Hewitt, 1879).
Phœbe (Martin R. Smith).
Thaddeus (Lord).
Virgil (Douglas).
William, Wardill (Dodwell), 1885).

Pink and Purple Bizarres.

*Fred Phillips (Chaundy).
*Harmony (Douglas).
*Melody (Douglas).
Niobe (Douglas).
Princess Beatrice.
*Sarah Payne (Ward, 1845).
*Squire Penson (Dodwell).
*William Skirving (Gorton), pink.

Purple Flakes.

Agricola (Douglas).
*Charles Henwood (Douglas)
Earl Stamford.
*George Melville (Dodwell, 1883).
*Gordon Lewis (Dodwell).
*James Douglas (Simonite, 1876).
Mayor of Nottingham (Taylor, 1857).
*Squire Whitbourn (Dodwell, 1884).

Scarlet Flakes.

Alisemond (Douglas).
Cannell, Jun. (Dodwell).
*Ceres (Douglas).
*Flambeau (Bentley).
*Guardsman.
Huntsman (Douglas).
John Ball (Dodwell, 1879).
*Matador (Abercrombie).
Mrs. Keen.
*Sportsman (Hedderley, 1855).

Rose Flakes.

James Maguire—New, very double.
*John Keet (Whitehead).
*Lady Mary Currie (Douglas).
Merton.
*Mrs. Rowan (Dodwell).
*Mrs. Tom Lord (Lord).
*Pandora (Lord).
Rob Roy (Gorton, 1879).
*Thalia (Douglas).
Tim Bobbin (Gorton, 1879).
William of Wykeham (Douglas).

WHITE-GROUND PICOTEES.

The names in brackets following the variety are those of the raisers. L, means light or wire edged; H, heavy or broad edged. M, medium. An * denotes a specially fine variety.

Red Edged.

*Acme (Fellowes), L.
*Brunette (Kirtland), H.
*Charles Hardman (Kenyon), H.
*Dr. Epps (Smith, 1857), H.
*Etna (Douglas), H.
*Ganymede (Douglas), H.
*Grace Darling (Douglas), L
*Isabel Lakin (Lakin, 1887), H.
*John Smith (Bower, 1862), H.
Lena (Dodwell), L or M.
*Mrs. Bower (Bower, 1872), L
*Mrs. Gorton (Simonite, 1876), L.
*Mrs. Lovatt (Dodwell), H
Ne Plus Ultra, H.
Princess of Wales (Fellowes, 1870), H
*Thomas William (Flowdy), 1861), L
*Violet Douglas (Simonite), L.

Purple Edged.

*Amelia (Payne), H.
*Amy Robsart (Dodwell), 1887)
*Ann Lord (Lord, 1874), L.
Baroness B. Coutts. (Payne, 1879), M or L.
Beau Nash, H.
*Calypso (Douglas), H.
Clara Penson (Willmer, 1881), L.
Esther, L.
*Fanny Tett (Dodwell), H.
*Harry Kenyon (Kenyon), L.
Her Majesty (Addis), L.
*Lavinia (Douglas), L. Miriam, H.
*Mrs. Openshaw (Geggie), H.
*Mrs. T. J. Farquhar, L.
*Muriel (Hewitt, 1880), H.
Nymph (Lord, 1871)), H.
*Pride of Leyton (Headland), L.
*Somerhill (Dodwell), L.
*Zerlina (Lord, 1872), H.

Rose and Scarlet Edged.

Bessie, H, scarlet.
Clio (Fellowes), scarlet.
Daisy (Dodwell, 1870), rose.
*Duchess of York (Fellowes), H, scarlet.
*Ethel (Fellowes, 1870), L or M.
*Favourite (Liddington, 1884), L, salmon.
*Fortrose (Douglas), L.
Gordon Lewis, H.
*Grace Ward, L.
Lady Louisa (Abercrombie, 1878), H.
*Liddinton's Favourite, L.
*Little Phil (Dodwell), H, rose.
Madeline (Turner), H, rose.
*Miss Lee (Lord), L.
*Mrs. Beswick (Kenyon), H.
Mrs. A. R. Brown (Campbell), H.
*Mrs. Payne (Fellowes, 1878), H, rose.
*Mrs. Rudd (Rudd, 1882), L.
*Mrs. Sharpe (Sharpe), H, scarlet.
*Mrs. Wm. Brown (Mackie), H, scarlet.
Psyche (Douglas), L
*W. H. Johnson (Gottwaltz), H, scarlet.

VII.—YELLOW CARNATIONS AND PICOTEES.

How or when yellow as a colour first originated in the Carnation, is now lost in obscurity. All that seems to be known is that John Gerard in 1597 recorded that Mr. Nicolas Lete, a worshipful merchant of London, procured a "Gillofloure with yellow floures" from Poland, and gave him some for his own garden, as previously mentioned in the chapter on "History." A yellow Carnation in the wild state is unknown. Wherever the first yellow variety may have originated, it is certain that it spread over a great part of Europe, and in Parkinson's time had given rise to many varieties, single and double. The yellow race would appear to have been cultivated in this country from the time of Gerard till in the early part of the nineteenth century it had attained considerable notoriety, particularly among the gentry or nobility of the land, whose collections were frequently replenished by fresh importations, brought by travellers from the Continent. There was no difficulty in raising and flowering the plants from seed, but they rapidly dwindled and disappeared when attempts were made to perpetuate varieties by layering.

Evolution of the Yellow-Ground Picotee.

In 1819 Thomas Hogg, of Paddington, applied the name Picotee to the striped and spotted yellow ground Carnations and published a coloured plate (reproduced on p. 9). In concluding his chapter on the management of the Yellow Picotee, he lamented his lack of success in the following brief statement:—"I confess I am at a loss to say what compost is proper to grow it in, and yet, after all, the fault perhaps does not rest with the soil, but the climate, which, take it the year round, is too harsh and moist for this delicate exotic." His coloured illustration represents a flower striped and lined with various colours, though the yellow ground was rich yellow. The edges of the petals were rather deeply fringed or fimbriated.

Dr. Horner, another noted florist, writing in the Midland Florist in 1848, addressed a strong appeal

to his brother florists, urging that the yellow Picotee should no longer be left in obscurity and neglect "because of its many, although remediable defects." Referring to the great perfection and the success of the white-ground Picotee, as the result of twenty years' united endeavour, he argued that the yellow one should be similarly taken in hand and improved. Continuing, he said, "I would applaud the attention which has been bestowed upon this fine flower, and which has raised it from its once serrated, pounced and striped state, to its present, faultless condition. This ought florists to have done, but they ought not to have left the other undone; for in what, it may well be inquired, does the yellow Picotee differ in comparison with its fellow—the white one?

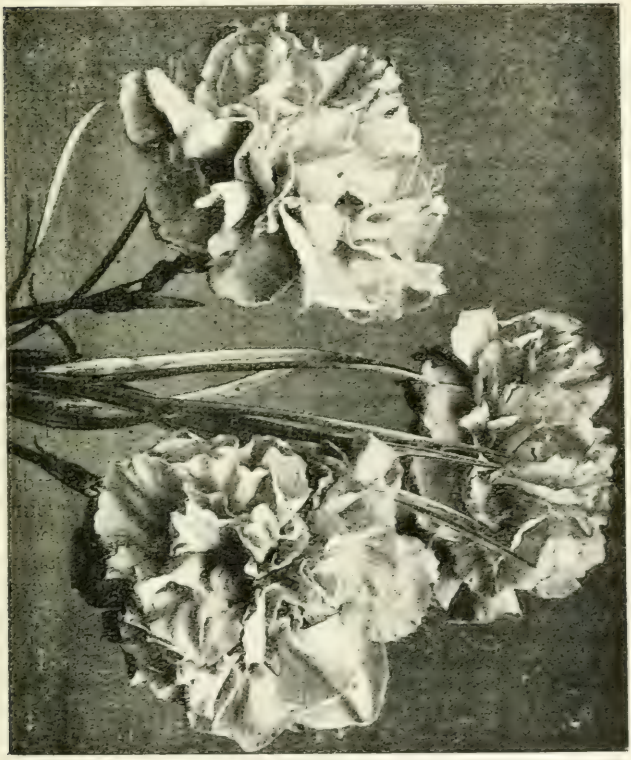
"Write them together, it's as fair a name;
Sound them, it doth become the mouth as well."
"Nay, in truth, it possesses attractions and properties which must be acknowledged to be superior to its congener."

About this time, possibly as a result of Dr. Horner's earnest appeal, the late Mr. Richard Smith, of Witney, Oxfordshire, set to work upon the yellow ground Carnation in the hope of evolving a true yellow ground Picotee. Recognising or soon discovering the potency of pollen he crossed the white yellow-ground Picotee. Recognising or soon distransferring the edging of the white-ground Picotee to its yellow relative. In this he succeeded to a remarkable degree, notwithstanding the fact that the yellow ground was in many cases very pale. The probability is that the deepest yellow would often give pale yellow progeny, even if both parents were of the richest shade.

In 1858 Smith exhibited his yellow-ground Picotees, winning all the more important prizes in open competition. His success made a great impression upon the florists and the discerning public of those days. The problem of a yellow-ground Picotee seemed at last to have been solved and its existence realised. Fine flowers with smooth petals of great breadth and substance, with regular and well defined markings raised high hopes amongst his brother florists. These varieties still lacked constitution as other growers very soon proved, who undertook their cultivation. Mr. Smith soon afterwards died and the care of his Picotees was taken over by Mr. J. D. Hextall, of Ashby-de-la-Zouch,

another noted florist, but in spite of every care they languished and were no more seen in public.

About this time a revolution in outdoor gardening occurred, and the evolution of the yellow-ground Picotee, as indeed of any Picotee, was set back. The craze for summer bedding, which spread like wild fire over the land, caused the borders and beds of



YELLOW CARNATION CECILIA.

hardy flowers to be despoiled of their erstwhile occupants to make way for much more tender exotics than that mentioned by Hogg. The collections of fine named Carnations had to make way for Pelargoniums, Calceolarias, and Coleus. Some gardeners were satisfied with the Old Clove, which was used as an edging to the Dahlia border, while many gardens possessed not a single Carnation.

The love for their favourite flower still animated the breasts of the old florists who remained true to the early love. Amongst these may be mentioned Charles Turner, Dr. Abercrombie, Hooper, E. S. Dodwell, and others. Many fine varieties were raised by these men, but time always served to thin their ranks. The late E. S. Dodwell commenced work among the yellow grounds in 1884, while still at Clapham. In that year he first obtained seed which furnished him with plants of vigorous constitution. Later he removed to Oxford where he still carried on the work, but unfortunately he recorded his varieties under number only, and though many of them were of fine colours, their identity cannot now be traced as in the case of his work amongst the show Carnations and Picotees.

At Oxford he organised the Carnation and Picotee Union, which held an annual show there. Previous to this in 1866, Mrs. Gyles, of Kilmurry House, Waterford, Ireland, sent a fine batch of yellow, buff and apricot seedlings to Dodwell, which he considered the finest he had seen up till that time. Desiring to test the varieties he obtained stock, and by 1887 they more than realised his expectations of them. Later on Mrs. Gyles requested Dodwell to offer the stock for the benefit of the Carnation and Picotee Union. This was accomplished and the Kilmurry special prize fund became an inducement for growers of this race to compete. The show in 1889 was a great success as 26 exhibits turned up in competition for the 18 prizes offered. Enthusiasm ran high, and judges were appointed to give the prizes to the most effective flowers. As standards of quality in this class had not then been solved two of the judges declared themselves incompetent to select the premier blooms. The question of classification was then raised, but though the subject was warmly discussed in the Gardening Press, and some important points of existing methods revised it became evident that yellow-ground Carnations and Picotees had not then been sufficiently evolved to make classification possible.

E. S. Dodwell, nevertheless entertained a very high opinion of the future of this race and hesitated not to express it, though regarded by some of his fellow florists as being possessed of heretic opinions regarding the range of variation that should be permitted. In "A retrospect and a forecast" on the

YELLOW CARNATION DAFFODIL.

yellow-ground Carnation he said, "Curvilinear markings will have their place in the glory of the yellow-grounds beyond all doubt, but the more valued will be the rich deep breadths, shot, feathered, flamed or flashed with one or more colours redolent of variety, almost voluptuous in beauty. Longitudinal markings will be as much esteemed in the yellow grounds, and will occupy the same place with similar markings in the present day amongst the white, and to these may be added pure selfs in an almost infinite variety of shades, and others unmarked otherwise than with shade upon their grounds. . . . Comparatively recent experience has compelled me to feel that in the possibilities of a relatively near future, there is a glory to be reached in the development of the yellow grounds, as far surpassing that of the white as the glory of the sun outshines the effulgence of the moon. May my brothers speedily enter upon the harvest!"

The above opinion was expressed in 1888, and much has been done since then. Finality is an impossibility in a flower still in the making. This was also more recently emphasised by Dr. Horner, who said:—"What shall be the super-excellence of the future, of this alone we present labourers may not write. That will ever remain an unfinished tale of any florist flower—a story without an end, so long as there shall be florists who, in their day, will lead their flowers on, and make record of advances gained."

All this agitation about the yellow-ground Carnation was not without effect, for during the eighties and early nineties of last century many recruits to the cause had been made, both in this country and on the Continent. Previous to 1902 a large number of varieties were in cultivation and amongst raisers, Benary, of Erfurt, Chaundy, James Douglas, Ellis, Fisher, Hooper, Nowell, Proctor, Thomson, Wallington, and Dodwell, may be named, together with the Irish strain from Kilmurry. Few of the varieties then recorded are now in cultivation, though notable exceptions are Germania, Stadtrath Bail, Almira, Mrs. Reynolds Hole, Countess of Jersey, Lady Armstrong, and Dorothy, which still find admirers in many parts of the country, notwithstanding the immense influx of new and greatly improved varieties.

Harking back to 1867, or about that time, very few of the then existing yellow-ground Picotees were worthy of cultivation. Probably only one of them now exists, namely, Prince of Orange (Perkins) which is still grown in several collections, by virtue of the interest attached to it and its vigorous constitution. Had the latter quality been lacking, it would have passed into oblivion long ago. It is therefore the oldest existing yellow-ground Picotee of any note, and the progenitor of most of the best varieties of the present day. The history of Carnations and Carnation culture in the open border has been revolutionised since Mr. Martin R. Smith, of Hayes, undertook their improvement by cross-breeding and selection.

Nearly all classes have had additions made to their numbers by him, but his success with the yellow-ground fancies and yellow-ground Picotees has been phenomenal. Prince of Orange was used as a parent from which to procure new and more refined varieties of vigorous constitution. The yellow-ground race has long ago surpassed the white-ground Picotee in vigour of growth, and since 1899 varieties of equal beauty and refinement have also been raised and put into commerce. As yet they are few in number, and include such refined forms as Lord Napier, Childe Harold, Mrs. Walter Heriot and Abbot. The florist may yet be called upon to give similar vigour and constitution to its old white-ground relative as is now possessed by the yellow-ground Picotee.

At present a very large number of the yellow-ground Picotees that appear on the exhibition table as such are permissible only by convention or abitrary agreement. They are handsome and effective flowers, generally perfect in every respect except in colour, which is not strictly confined to the broad or narrow edge which is so characteristic of the old race of white-ground Picotees. Their ultimate refinement, however, is only a question of time and perseverance, as the florist is now practically pledged to carry on and accomplish the work so brilliantly begun, or rather, well established. The varieties yet imperfect in the matter of edging may ultimately be relegated to the class or section for fancy yellow-ground Carnations, when the true yellow type exists in sufficient numbers to fill the ex-

hibition boxes in the classes set apart for them. A nucleus for this refined race is now a reality.

Classification.

A simple classification has recently become possible, and though the primary divisions of the yellow Carnation are usually given as yellow-ground fancy Carnations and yellow-ground Picotees, there seems no reason why the selfs, or those of uniform colour, should be excluded from this section. All the Carnations have descended from the original wild Dianthus Caryophyllus. The white and yellow ground colours form a ready and distinct means of division into two leading sections.

The self yellow varieties mentioned in this handbook have been listed and described under "Yellow Carnations, and Picotees" but all forms of the yellow Carnation, of sufficiently hardy constitution, may be classed properly as border Carnations. Any and every shade of yellow and allied colours of uniform hue are grouped below under the general term of selfs. These again are subdivided into yellow, buff and terracotta.

The yellow-ground fancy Carnations have one, two, or more colours on a yellow ground. These colours take the form of stripes, lines, and markings of various shapes and sizes, and though they mostly traverse the petals in a longitudinal direction, there is frequently a heavy or light, curvilinear edging or lacing to the outer margin in addition to any other markings they may possess. Nevertheless, these fancies must possess smoothness and breadth of petal, texture, and other qualities of intrinsic merit and beauty, including distinct and well defined colours, otherwise they fail to win favour with the florist. Indeed, a very large number of them are of fascinating beauty that could hardly fail to excite the admiration of the flower loving public. The ground colour may be yellow or buff of any shade.

The yellow-ground Picotee should have a marginal lacing, heavy or light, but distinctly defined, around the extreme edge of the outer end of the petal. A perfect or ideal type should have a clear or bright yellow ground, with no other marking whatever than the lacing.

Varieties that conform exactly to this ideal are yet very scarce, but new ones continue to arise with more frequency than formerly. In a broader sense

Picotees are yet admissible with a ground colour lacking in intensity, a lacing not always neatly defined, and having a few streaks or bars upon the petals. Already there are varieties with rose, red, scarlet, purple, and crimson lacing and other intermediate shades, so that they may ultimately be classified under those colours precisely in the same way as the white-ground Picotee. The range of variation is great, and no one can as yet forsee the developments that may arise in the near future.

YELLOW-GROUND FANCY CARNATION GRONOW.

A race of yellow-ground bizarres and flakes may yet be evolved from the yellow-ground fancies if popular favour demands it and the florist approves. Seedling variations may yet give rise to a perpetual flowering race, or the beautiful colours of the yellow-ground fancies and picotees may be communicated to the already existing strains of tree and perpetual flowering Carnations. Too close in breeding should be avoided in order not to impair the constitution of new varieties.

Culture.

All the types of the yellow Carnation may be grown and treated exactly like border Carnations provided the individual varieties are of hardy and vigorous constitution. Many of them comply with these conditions, and occasion no more trouble than the hardiest of the older and well-known border flowers. They come into bloom slightly later than the selfs and white ground races to which they form a succession.

For exhibition purposes they are grown in pots like show Carnations and white-ground Picotees, the cultural treatment being alike in both cases. (See chapter on "Show Carnations and Picotees.") Pot culture is a matter of convenience to enable the cultivator to protect his flowers during the critical period of flowering so as to get them in perfection for exhibition. At all other times the health of the plants is best maintained in the open air.

Those who desire to grow them in pots for the decoration of the Conservatory when in bloom, should take particular care not to mix or crowd them amongst the ordinary occupants of that structure, particularly if they have broad leaves. Nothing suffers so soon as the foliage of Carnations when shaded by other plants. A better method is to group them together in some part of the house, as close to the glass as possible. A low, span-roofed house would even be more to their liking; and one or more Carnation houses of this description are built expressly for their accomodation by those who grow them on a more or less extensive scale. The plants should not be housed till the buds commence to burst and show colour. Nor should they be kept a day longer under glass after they have finished flowering. The beginner should learn first to cultivate them in the open border where it is easier to keep them in health, and afterwards become acquainted with their requirements in pots. For border culture the layers should be planted at the beginning of October to enable them to get established before winter. This applies to gardens where the soil, climate and surroundings are suitable to the welfare of the plants, otherwise they may be kept in unheated frames till March. Seedlings may be planted out in May to stand the winter and flower in the following year.

DESCRIPTIVE LISTS OF YELLOW CARNATIONS AND PICOTEES.

Yellow, Buff, and Terra Cotta Selfs.

Almoner (M. R. Smith).—Flowers of large size, with finely formed yellow petals.

Benbow (M. R. Smith).—Petals smooth and otherwise well formed, of a pleasing shade of buff.

Blondin.—Flowers large, clear yellow, and well formed.

Britannia.—Flowers large, bold, and bright yellow; growth vigorous.

Cecilia (M. R. Smith).—The boldest of all the yellow border Carnations, though most perfect in pots; flower as large as a Malmaison. (See illustration).

Copperhead (M. R. Smith).—Flowers large, dark apricot, of handsome form; plant well suited for border culture.

Daffodil (M. R. Smith).—Flowers large, clear yellow, smooth and handsomely formed; the best yellow Carnation. (See illustration).

Francis Samuelson (Brotherston).—Flowers of handsome form, freely produced, soft apricot; calyx good.

Germania (Benary).—Flowers soft, clear yellow, of beautiful, smooth form; plant dwarf and succeeds best in pots.

Goldfinch.—Flowers large, with well-formed yellow petals.

Goliath (M. R. Smith).—Yellow flowers of splendid proportions and handsomely formed; plant of vigorous growth.

Lady Nora Fitzherbert (Laing and Mather.)—A hardy, sturdy, very dwarf, floriferous yellow variety; useful for bedding, requires no staking; also good for pot culture.

Lady Stewart (W. H. Cumming).—Large, clear, yellow, quite double and handsome; good habit and excellent for borders.

Leander (Gifford).—Rich yellow flowers that stand the weather well; plant hardy and vigorous.

Midas (M. R. Smith).—Colour a handsome shade of apricot or orange-buff; flowers of great size and handsome.

Miss Alley.—Large and handsome yellow flowers; good for border culture.

Miss Audrey Campbell (M. R. Smith).—Flowers of handsome size and form, bright yellow and somewhat wavy; one of the best border yellows.

Mrs. Colby Sharpin.—Large and beautifully formed, rich cinnamon or terra cotta flowers, suitable for border or exhibition.

Mrs. M. V. Charrington (Charrington).—Flowers large, yellow, and of beautiful form.

Mrs. R. C. Cartwright (Cartwright).—Rich apricot, smooth petalled and perfectly formed flower.

Mrs. Reynolds Hole.—Flowers terra cotta and useful for general purposes.

Regina.—A large, very double, well-formed and handsome yellow flower; petals of good texture; plant sturdy.

Seymour Corkran (M. R. Smith).—An amber-coloured flower of fine form, smooth-petalled and handsome.

The Hunter (M. R. Smith).—Flowers of a rich shade of apricot.

Yellow and Buff Ground Fancies.

Almira (Douglas).—Flowers large, bright yellow, edged and flaked rose.

Argosy.—Flowers of great size, yellow and edged with bright scarlet; petals ample and of great excellence.

Bonnie Scotland.—Flowers heavily lined and edged scarlet on a yellow ground.

Brodrick.—An attractive yellow-ground variety, with well-formed petals lined rosy red.

Cantatrice.—Flowers large, quite full, with broad, rich yellow petals, heavily lined and edged crimson and maroon.

Czarina.—Heavily edged and lined with rich scarlet on a yellow ground, with large flowers.

Don Juan (M. R. Smith).—Flaked and lined red-purple on a buff ground, large and shapely; good for exhibition.

Duchess of Roxburgh (Gow).—Lined and marked rose and lavender on a primrose ground; calyx does not burst.

Duke of Alva.—A handsome yellow ground, lined with purple and bright rose.

Eldorado.—Flowers of large size, very double, of excellent form, clearly lined and edged with rich rose on deep yellow.

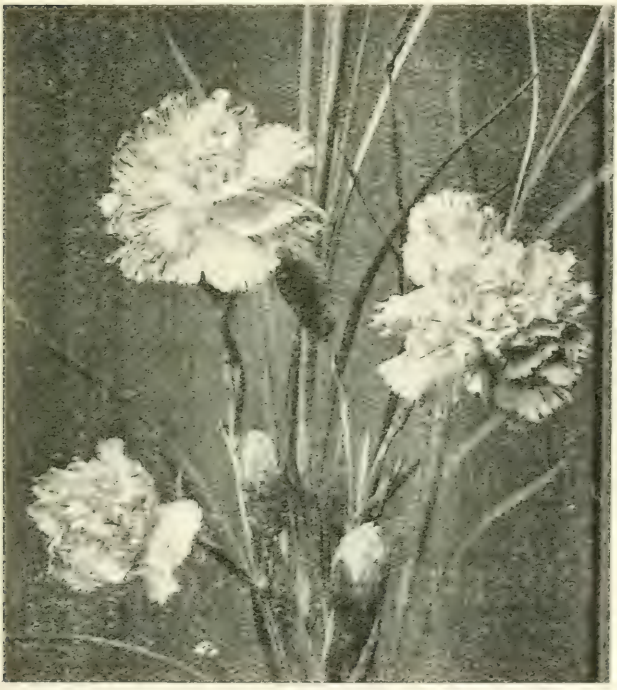
Evangeline (M. R. Smith).—Flowers of excellent form, and heavily edged with rose on buff.

Fashion.—A showy yellow flower, with a heavy scarlet edge.

Galileo (M. R. Smith).—A handsome yellow-ground flower, with broad purple margin.

Goldylocks (M. R. Smith).—Flowers large, well-formed and freely marked on a yellow ground; good for border culture.

Guinevere (M. R. Smith).—Petals flaked and lined pink on a buff-yellow ground.



YELLOW-GROUND PICOTEE ALCINOUS.

Harlequin.—The light yellow ground of this variety is heavily edged with rose and has rich purple markings.

Henry Falkland (M. R. Smith).—The bright yellow ground edged with rich rose; calyx does not burst; plant robust

Hidalgo (M. R. Smith).—Flowers of good size, heavily lined with maroon and red on dark yellow.

Horsa (M. R. Smith)—Petals with broad crimson edge and heavily lined with crimson on rich yellow. (See illustration).

King Solomon.—Striped and marked with crimson and maroon on an apricot ground, very striking.

Lady Ardilaun (Weguelin).—Flowers bold and massive, marked with heliotrope on an orange ground; calyx never bursts.

Launce.—Rose edge and markings on a yellow ground.

May Queen.—Light rosy edge and markings on a rich yellow ground, with large and shapely petals.

Melbourne.—Much marked with broad red lines from the edge inwards on rich yellow.

Mrs. Charles Baring (M. R. Smith).—Flowers large, edged and lined crimson on a rich yellow; plant vigorous.

Mrs. Dranfield.—Soft rose edge to the petals, and flowers handsomely built.

Mrs. Francis Wellesley.—Handsomely lined with scarlet and crimson on a buff-yellow ground; good for border or exhibition.

Mrs. Tremayne.—Deep yellow ground with broad scarlet edge and markings.

Molly Maguire.—Handsomely flaked with rose on a yellow ground; the flowers large and finely built.

Monarch (Benary).—Lined crimson on a buff ground.

Mountjoy (M. R. Smith).—A large and well formed flower edged and lined purple on yellow; good for exhibition.

Orient.—Edged and lined with purple on a yellow ground; flowers shapely and attractive.

Ormonde (M. R. Smith).—Flowers heavily lined and edged rose-red on buff, handsome.

Pamela (M. R. Smith).—Edge of rose-lilac extending down the petals on a warm primrose ground.

Perseus (M. R. Smith).—A very striking and well-formed yellow-ground, edged red and lavender, refined.

Primrose League.—Lined and edged rose-red on yellow; flowers very double and well built.

Prince of Orange (Perkins).—Lined buff and slate on a yellow ground, and edged deep carmine; the parent of most of the yellow grounds.

YELLOW-GROUND FANCY CARNATION HORSA.

Professor Cooper (Hay).—Flowers heavily flaked with pink and lavender on dark buff and excellent in form.

Rayon d' Or.—Very attractively edged and lined scarlet on a deep yellow ground.

Richness (Blackmore and Langdon).—Flowers rich yellow with heavy scarlet edge and often a bar on the middle of the petal.

Stradtrath Bail (Benary).—A fine golden yellow-ground fancy, marked scarlet.

Sunset (M. R. Smith).—A singular combination of red, rose and lilac on buff; flowers large and handsome.

Sweet Lavender.—Flowers heavily lined with lavender on light apricot, striking and handsome.

The Baron (M. R. Smith).—Petals with broad, dark crimson edge, and also freely lined on light buff.

The Khedive (M. R. Smith).—Flowers finely built, heavily striped and tinted rose on rich yellow.

Virgo.—Flowers large, very double, heavily edged, and lined with clear rose on bright yellow.

Voltaire (M. R. Smith).—A large and very double, refined and handsome fancy, edged and pencilled rosy scarlet on bright yellow.

Yolande (M. R. Smith).—Flowers very double, heavily edged and lined with crimson on deep yellow; very hardy.

Yellow-Ground Picotees.

Abbot (M. R. Smith).—Flower of beautifully refined form, with purple edge.

Alberta.—Edged scarlet on a deep yellow ground.

Alcinous (M. R. Smith).—Rich purple edge on lemon-yellow ground. (See illustration).

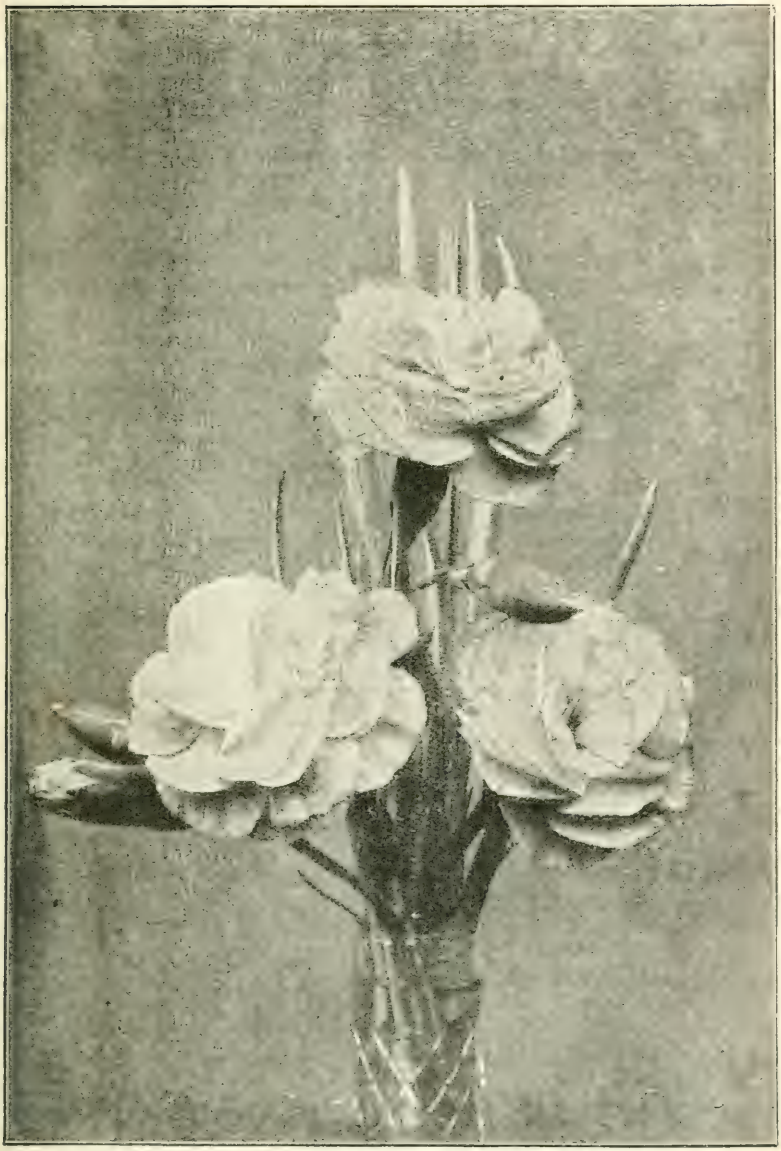
Aldeboran (M. R. Smith).—Edged with rosy scarlet on clear yellow; flowers of large size and beautiful shape.

Castilian.—Bright amber yellow, with light red edge but no other marking.

Childe Harold (M. R. Smith).—Beautifully refined deep rose edge on a yellow-ground; flowers of beautiful shape and choice.

Countess of Verulam.—Heavy scarlet edge on a rich yellow ground; one of the most refined of its class.

Dalkeith.—Heavily edged crimson on a clear yellow and handsome.



YELLOW-GROUND PICOTEE MRS. WALTER HERIOT.

Daniel Defoe (M. R. Smith).—Edge rose-red and broad on a bright yellow ground; flowers large and well built.

Empress Eugenie (M. R. Smith).—Rosy edge on deep yellow, well formed, broad petals; flowers choice and beautiful.

Evelyn (M. R. Smith).—Very broad petals distinctly edged with rich rose on yellow; flowers large and shapely.

Galatea (M. R. Smith).—Rosy red edge of moderate width, on bright yellow; a choice and attractive flower.

Gertrude (M. R. Smith).—Petals broad, heavily edged with rich rose on yellow, and concave; a large and handsome flower.

Glee Maiden (M. R. Smith).—Flower and petals of fine form, edged and slightly lined with rose on yellow.

Gronow (M. R. Smith).—Broadly edged with rose-red on a rich yellow ground; flowers shapely and handsome. (See illustration).

Heather Bell (M. R. Smith).—Flowers of the first size, very double, well formed with bright rose edges.

Hesperia (M. R. Smith).—Petals edged with rosy lilac and perfect in form; flowers large and attractive.

Ida (M. R. Smith, 1905).—Edge bright rose; flower of splendid form and useful for exhibition.

Isolt (M. R. Smith, 1905).—A very choice and refined yellow ground, one of the best of its class.

Lady Avebury (M. R. Smith).—Petals yellow, of beautiful form, with a light or wire rose margin; flower handsome.

Lady St. Oswald (M. R. Smith).—Petals of beautiful form, edged with warm red on bright yellow; a splendid Picotee.

Lauzan (M. R. Smith).—Petals of excellent form and edged rich purple on clear yellow; flowers of handsome form.

Lord Napier (M. R. Smith).—One of the most refined of the yellow ground Picotees, clear yellow with a light or wire edge of rose, but no other marking.

Lucy Glitters.—Rose edge of medium width, with large, well-formed flowers.

Mr. Nigel.—Very large flowers of a deep yellow, heavily edged crimson; well adapted for border culture.

Mrs. Douglas.—Rose edge of moderate width on clear yellow; flowers of handsome form.

Mrs. Durrant (M. R. Smith).—Flowers of large size without other marking than a rose red edge of medium width, on clear yellow.

Mrs. Gooden.—Scarlet edge of medium width on rich yellow; flowers large and very double.

Mrs. Robert Sydenham.—A very handsome bright yellow ground, with a heavy, bright, rose edge.

Mrs. Walter Heriot (M. R. Smith).—Petals yellow, edged with clear rose; flowers large, handsomely built; a favourite with exhibitors. (See illustration).

Mohican (M. R. Smith).—Edge of light rose-red on rich yellow; flowers large and very double.

Onda (M. R. Smith).—Petals bright yellow, with wire edge of deep rose; flowers finely built.

Othello (M. R. Smith).—Petals with a broad or heavy crimson edge on a rich yellow ground and handsome.

Perfection.—Petals with a broad scarlet edge on a deep yellow ground; flowers well defined and handsome.

Pilgrim (M. R. Smith).—Flowers clear yellow, with a light edging of deep carmine and pretty.

Verena (Martin R. Smith, 1905).—Flowers heavily edged and handsome; first-class for exhibition.

VIII.—TREE OR WINTER-FLOWERING CARNATIONS.

There can be no doubt that the so-called tree Carnation originated from some of the cultivated strains of Dianthus Caryophyllus, and is purely a creation of the florist. Amongst plantations of seedling Carnations plants of very diverse habits make their appearance, including seedlings that produce more or less elongated leafy stems instead of the short grass with which we are familiar amongst the border, and show Carnations and yellow-ground Carnations and Picotees. Instead of going to rest in the autumn tree Carnations keep on growing, and lateral shoots or branches are developed in succession. The main stem first reaches the flowering stage and the branches in due time also terminate in flowers, thus prolonging the display of bloom. The low temperature of our winter would also serve incidentally to prolong the display. Should the temperature of glass-houses be raised above the optimum necessary for the welfare of the Carnation, the opening of the buds will be accelerated, but the flowers would be smaller, the stems more elongated and the leaves more slender. This unduly attenuated growth is doubtless due in part to the feeble condition of the light in winter and the lack of sunshine in which the Carnation delights and puts on its most healthy appearance, with deep sea green foliage.

Should seedlings of the above mentioned type be saved, propagated, cross-breed and the best of them selected the winter-flowering habit would be fixed and a strain of more or less perpetual flowering varieties developed. By similar methods of procedure all the different races of Carnations now in existence have been evolved. From amongst the many thousands of seedlings which have been raised during the last 300 years or more, the florist has simply waited upon the operations of Nature and selected those types which presented desirable features. The tree or winter-flowering Carnation is one of those types, which originated naturally as a

result, or response to the changed conditions of life induced by cultivation. The florist has merely accentuated or emphasised the traits which presented themselves.

Speaking in 1834, Loudon recorded a sub-shrubby Carnation with a stem 5ft. to 6ft. high, to which the term "tree Carnation" was already applied. A writer in "The Gardeners' Chronicle" carried the origin of the race as far back, at least, as 1822, though he admitted that the culture of the tree

TREE CARNATION CUTTING.

Carnations of those days had been allowed to die out, and had only been again revived about 1862.

It is not surprising that a Carnation 5ft. to 6ft. high was doomed to a varying fortune or favour in those days; and it was only natural that enthusiastic florists would endeavour to reduce its stature as has been done with the Cineraria, herbaceous Calceolaria, Chinese Primulas and other popular flowers. Even as recently as 1867 the tree Carnation was characterised by tall and leggy habit, with

greatly elongated internodes, a scattered clothing of foliage, and a poor display of blossom. The late Charles Turner applied himself to the work, with more enthusiasm, perhaps, than any other of those days, and succeeded to a remarkable degree in evolving a race of more compact and bushy habit, with finer and more handsome flowers.

Immense improvements have been made within the last decade and a half, for the varieties then held in highest esteem have mostly been displaced by others of more recent origin. The numbers have been greatly increased and the size and quality of the blooms, and productiveness of the plants have all been profoundly modified and improved. Raisers and cultivators are now much more numerous, and as a result of their work the variation in colour has been greatly extended.

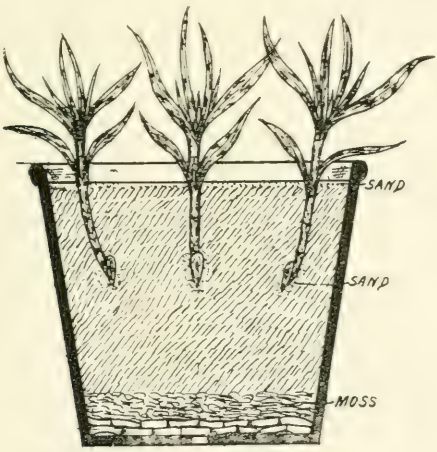
Propagation.

Tree Carnations may be propagated at any time of the year by means of cuttings or pipings, when obtainable of a suitable degree of maturity. In practice, the months of January, February, and March constitute the best time to accomplish this work. Different cultivators advocate one or other of these months, but it is largely a matter of customs, convenience, or requirement. Fairly strong cuttings about 3in. long may be selected and pulled off with the fingers or cut with a sharp knife, making a point in each case of securing a small heel of the old wood which should be slightly trimmed if in any way ragged. Pipings may also be pulled out of the axils of the leaves, laying hold of them with the finger and thumb and giving them a slight jerk sideways. Remove a pair or two of the lower leaves, and the cutting will be ready for insertion. (See illustration).

The cuttings may be inserted singly in thumb pots or preferably ten round the sides of a 60 size pot. Use a compost of loam and leaf mould in equal proportions and half a part of sand. Sift the ingredients through a fine meshed sieve and thoroughly mix the compost. Carefully crock the pots and cover the drainage with moss or the rough siftings of the soil. Press the compost rather firmly and cover it with a layer of sharp silver sand, a little of which should be worked into the holes made for the cuttings. As soon as a small heap of cuttings

have been made they should be inserted before the leaves become limp and flag. Press the cuttings to the bottom of the holes and make the soil firm about them by means of the dibber. The lower leaves of the cuttings should just touch the surface sand. (See illustration). Water with a fine rosed can to settle the soil about the cuttings, and plunge the pots to the rims in a hot bed of sand or cocoanut fibre in the close case of a propagating pit or stove.

Some advocate a bottom heat of 60° to 70° Fah., but 60° is quite sufficient even if the cuttings take a little longer to root. A top heat of 55° will suffice in this case. In bright weather use shading



TREE CARNATION CUTTINGS INSERTED IN A POT.

and also sprinkle the foliage with the syringe to prevent flagging. Roots will be produced in the course of a month, though some varieties will root in three weeks with the higher temperature. Others may take five or six weeks, dependent upon variety and the condition of the cuttings when inserted. For these reasons only one variety should be dibbled into each pot, carefully labelling them to prevent mistakes.

Seed Sowing.

This method of propagation is adopted only with the object of raising new and improved varieties. Parents should be selected with some definite object

in view. Hap-hazard cross-breeding entails a deal of wasted time and labour as all the seedlings must be grown to the flowering stage to learn whether they are worth retaining for another year's trial. In both cases they have to be bloomed in pots under glass, with the same care as is accorded to the best named varieties. The intended seed bearer should be selected for its bushy habit, vigorous constitution, free and continuous blooming qualities. The pollen bearer should also be selected, as far as possible, with these qualities to recommend it, but above all should it be chosen for some desirable colour the operator wishes to combine in the progeny. Artificial pollination may be effected in precisely the same way as with border Carnations, and the seed should likewise be ripened off under glass.

Having obtained the seed it should be sown in seed pans or pots of light sandy soil, well drained. If the seed pans are plunged in a bottom of heat of 60° to 70°, the seedlings will soon make their appearance, and to prevent them from getting drawn they must be placed on a shelf near the glass where a temperature of 50° to 55° is maintained. When the first pair of rough leaves are formed the seedlings should be carefully lifted and dibbled into boxes of moderate depth, well drained and filled with a light compost of loam, leaf soil and sand. If planted 2in. apart each way they will be sturdy little plants fit to put outside in May or June, if previously well hardened off in cold frames.

A bed or piece of ground should be prepared for their reception during the winter months. Rake the ground level and plant out the seedlings in lines about 12in. apart each way. Provided the season is of average warmth the seedlings will have made bushy specimens before the end of summer. Sometime in the last fortnight of September they should be potted up and housed in a light airy structure with a temperature suitable for this class in winter, and most of them will bloom in time to permit of cuttings being taken from the most meritorious for further trial. Their behaviour when raised from cuttings may be different from that of seedlings, and this has to be well tested before their value is known.

First Potting of Rooted Cuttings.

As soon as the cuttings are rooted pot them off

singly in small 60 size pots (3in. and return them to the cases for a few days till re-established. Gradually inure them to the air of the house and then transfer them to a shelf or bench close to the glass where the night temperature is not allowed to sink below 50°. When they commence to grow pinch out the tips to induce a bushy habit. When the roots reach the sides of the pots the latter should be transferred to a frame with a temperature of 45° by night, rising to 50° by day.

During the above stages the plants are liable to be infested with greenfly, red spider, and thrips. A light fumigation may be given occasionally to hold these pests in check; but a safer plan is to dust the plants with flowers of sulphur for red spider and to rub off the greenfly with the fingers or a small brush. The last named is the most troublesome and persistent enemy, soon ruining the young plants if allowed to multiply.

While the plants are making progress in the frames it may be necessary to pinch the shoots again, especially those that are taking the lead and giving the plants a straggling appearance. The second stopping depends much on the variety and the weather. Some time in April, according to the age of the plants, they will require repotting. This becomes necessary before the roots get matted round the sides of the pots, the object being to keep them growing. It may be accomplished to best advantage just after the pinched plants commence pushing out fresh side shoots. Plenty of air night and day at this season is necessary to maintain a healthy, sturdy growth.

The Second Potting.

At the second shift they will require 48-size pots, and a more substantial or richer compost. Equal portions of fibrous loam and leaf soil will still suffice with sufficient sand to make it porous. Many growers add peat if the loam is at all heavy, together with a good proportion of well-decayed cow manure, dried and broken up finely so that it will pass through a fine meshed sieve or riddle. Pot firmly and stand the plants back in the frame, keeping it close till the roots commence moving again. No water should be given for a few days as shading may be given to prevent flagging.

During May and June the warmth of the sun will

exert a powerful influence upon growth, and the grower can determine whether a second stopping is necessary or not, if not done earlier, especially in the case of plants from cuttings inserted early in January. Late flowering varieties if wanted by a given time should not be stopped a second time. Should the growth of all be retarded by sunless and wet weather stopping should not be attempted after May.

The Third Potting.

The plants should be transferred to their flowering pots about the fourth week in June, and these should be 7½in. to 8in. in diameter, inside top measurement. Compost for the final potting may be similar to the previous one, but some half inch bones and soot may be mixed with it. A little of some approved artificial fertiliser at this stage will also give a filip to growth, but the cultivator should be careful always not to overfeed as it reduces the constitution of the plant. After potting, if convenient return the pots to the frames for a few days till the roots take fresh hold. If the soil is suitably moist at the time of potting water may be withheld for a day or two, especially if the weather is cloudy. In the meantime prepare a bed of clean ashes on which to stand the plants for the remainder of the summer. Here they will acquire a sturdy vigour and firmness of foliage unattainable under glass. They will flower much more freely after being housed for being summered out of doors.

During fine weather the syringe may be plied twice a day to keep down red spider and greenfly. As the plants throw up their flower stems and require support bamboo canes may be placed, one in each pot, and the stems neatly looped to it. The stakes should vary in proportion to the accustomed height of each variety. Feeding with some artificial fertiliser may be commenced well into August, by which time the pots will be filled with roots, making the application of it safe. Careful watering must at all times be practised, especially before the root system has been well developed, and again in late autumn and winter when the atmosphere is laden with moisture and light feeble.

The plants may safely remain in the open till towards the end of September, when they should be housed in a low-roofed, well-lighted and freely

ventilated structure. Everything should be made fresh and clean to receive them. A light fumigation will rid them of insect pests, and if repeated a fortnight later so much the better. They may be housed at the beginning of September for early flowering. A night temperature of 50° with a rise of 5° by day will be quite sufficient to promote growth and flowering during autumn and winter. Ventilate night and day, leaving top and bottom ventilators slightly open all night, and increasing the amount by day.

Disbudding to some extent is necessary if large flowers are desired. The terminal bud should always be retained, removing all others situated close to it on short stalks, and leaving one or two others at suitable intervals down the stem. Much depends on the form of the inflorescence, the habit of the variety and the length of the flower stalks as to the number of buds which should be retained. The flowers will commence to open during the second or third week of October and will flower more or less profusely till Christmas; and those varieties which are perpetual bloomers will continue to furnish a supply of flowers till April or later. Early, mid-season and late varieties should be grown for the purpose of lengthening the display.

Propagating at different periods and giving the plants somewhat different treatment also serve to prolong the flowering period.

The largest and best flowers are obtained from plants raised annually from cuttings; but the old plants may be grown for a number of years by those who like large specimens. In two or three years they will grow into bushes 4ft. or 5ft. high, by repotting into larger sized pots as they require it.

DESCRIPTIVE LIST OF TREE CARNATIONS.

Alfred de Rothschild.—Flowers bold, handsome and bright scarlet; calyx never bursts; plant of vigorous constitution with fine foliage.

Deutsche Braut.—Flowers pure white, very fragrant, and choice.

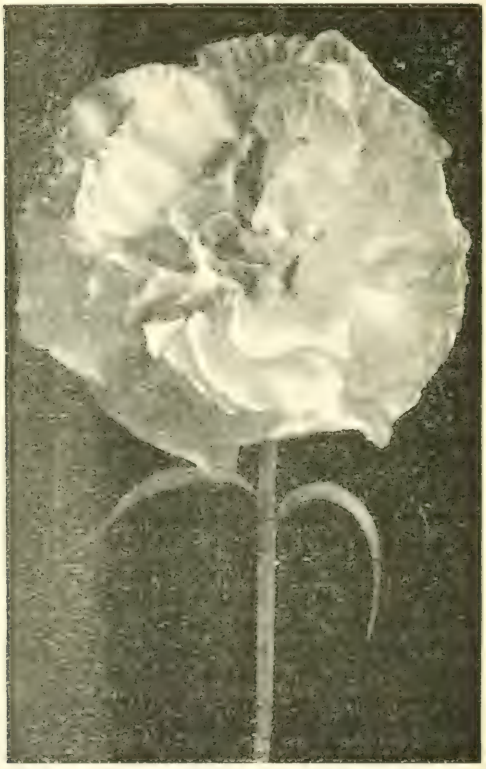
Duchess of Devonshire.—Flowers soft pink fading to white at the edges and very choice for winter-flowering.

Duke of York.—Flowers large, of excellent form,

rich crimson and deliciously scented; plant excellent.

General French.—Very free flowering, with large, well built crimson flowers.

Germania.—Flowers large, perfectly smooth, clear yellow and very handsome for pot culture.



TREE CARNATION MRS. S. J BROOKS.

Julian.—Flowers very large, crimson-scarlet and highly attractive.

Lady Carlisle.—Large and attractive flowers of a rich pink and fragrant.

Madame Therese Franco.—Practically a perpetual flowering variety, with large and handsome rose-pink flowers.

Syn.—Mrs. Leopold de Rothschild).

Miss Joliffe Improved.—Clear soft pink and very floriferous.

Miss M. Hubbard.—Well formed yellow flowers, flaked rich pink; plant floriferous, and of strong constitution.

Miss Magan Owen.—Pure white with blush centre, fragrant.

Mrs. S. J. Brooks.—Flowers 2-3in. across, pure white, of excellent form, deliciously scented; calyx never bursts; a free and persistent bloomer. (See illustration).

Patrocles.—Flowers scarlet with a moderate number of petals of beautiful form; calyx never bursts; growth free.

President Carnot.—One of the darkest shades of crimson.

Princess of Wales.—Flowers well formed, crimson; habit faultless.

Queen Alexandra (Ware).—A beautiful shade of heliotrope, very fragrant; seedling from Uriah Pike.

Scylla.—Flowers large, pure white, with petals of excellent texture.

Sir Henry Calcroft.—Of strong and vigorous growth, with rich dark scarlet flowers.

Surrey Comet.—Handsome bright scarlet flowers.

Sylvanus.—Flowers of large size, high quality and purple.

Uriah Pike.—Maroon-crimson, deliciously scented, and floriferous; often bedded out.

William Robinson.—Large and well formed, bright scarlet flowers, and highly attractive.

Winter Cheer.—Of dwarf habit, early flowering and crimson scarlet; flowers well in the open border.

Yule Tide.—A splendid variety with flowers of excellent form, freely produced on long stems and fiery scarlet; plant vigorous, and perpetual flowering.

IX.—MALMAISON CARNATIONS.

History of the Race.

Much mystery hangs round the origin of this splendid type of Carnation, and almost every writer on the subject asks for information on the point, or presumes the probable place of origin. In 1890 a Belgian periodical of good repute stated that the original Souvenir de la Malmaison Carnation was raised about 30 years ago by a gardener in the suburbs of Paris, who offered it to M. Dubos, a florist at Pierrefite, near St. Denis, who refused it because it was defective in some respects. Louis Van Houtte, ultimately acquired it from the raiser and put it into commerce. This would make the date of its origin 1860, or somewhere about that period.

Another account is given by Mr. R. P. Brotherston in his work "The Book of the Carnation" as follows:—"There long remained the utmost uncertainty accompanied by the vaguest guesses as to where and when the original Souvenir de la Malmaison with its blush coloured flower originated. It is now clear that it is not nearly so old a plant as some have conceived, it having been raised from seed by M. Laine, a Frenchman, in 1857. Mr. David Thomson cultivated the plant at Archerfield in 1864, having received the stock from Mr. William Young, of Edinburgh."

As the Empress Josephine lived at Malmaison and was very fond of Carnations, it is presumed by some that it was raised at Malmaison and named in remembrance of the place. Assuming this to be correct, the variety must really be older than the above account would indicate. It is certain that the Empress did have a fine collection and spared no pains in procuring the best types from every and any obtainable source, and might have procured this one amongst others. On the other hand a Paris gardener may have raised it and simply named it Souvenir de la Malmaison in remembrance of the place which at one time enjoyed such a reputation for Carnations. The origin of the variety may have

been well known at the time, but soon forgotten simply because not recorded in any work of a permanent character. Being a new type and the proper method of cultivating it not then discovered or understood, it may never have been presented in its best form. Its natural defect in having a short,

MALMAISON CARNATION LORD ROSEBERY.

splitting calyx must also have militated against its acceptance by the florists of those days. This alone would have caused it to linger on for years in obscurity till some cultivator discovered how to grow and present it in its best form. In this country it may be grown entirely as a border plant though it fails under such conditions to give anything like a satisfactory account of itself except in fine seasons.

In France or Belgium it could scarcely behave any better than here, and this fact alone might account for its early history being overlooked and soon forgotten. Properly speaking all of the Malmaisons are greenhouse plants at the best and must receive greenhouse culture.

The true original Souvenir de la Malmaison has blush-white flowers and produces no seeds; hence cultivators have never been able to multiply this type except by using the pollen on some similarly robust and broad leaved variety. The original Blush has, however, given rise to sports named respectively Pink, Princess of Wales and Crimson, the two former being the best. All the other Malmaisons may be regarded as imitations of the original rather than lineal descendants. The first of these originated in Belgium and was named Mme. Arthur Warocque or the Scarlet Malmaison, and is still cherished for its dwarf, branching habit and fragrant reddish-scarlet flowers. It also submits more readily to forcing than the old Malmaisons. The variety was first bloomed in this country in 1890.

About 1893 Mr. Martin R. Smith, of Hayes, commenced raising new Malmaisons by using varieties that do produce seed. His first batch numbered something like 200 seedlings and from these he selected ten of superior merit, which have scarcely been excelled by any that have since made their appearance. This lucky hit at once established the reputation of an amateur cultivator and raiser, and the production of new and improved varieties belonging to other sections of the Carnation at Hayes, has since been marvellous.

A Plea for the Malmaisons.

A houseful of well grown Malmaison Carnations presents a gorgeous and effective appearance. Many writers affect to despise them simply on account of their size, but that would apply equally to all other florists' flowers. The late Mr. F. W. Burbidge described the original type or race as the empress of all Carnations, and many others speak of them in equally eulogistic terms. The number of cultivators is annually increasing and probably at no period of their history have they been grown in greater quantity or variety. This alone would

prove that they are serivceable and certainly that their number of admirers is large and on the increase.

The flowers are the largest of all Carnations, and now embrace all shades of colour from white and the original blush, to rose, scarlet, crimson, maroon, yellow, apricot, and terra cotta. The petals are very numerous and often shell-shaped or incurved at the edges, which gives the flower a different conformation from that permissible in purely exhibition flowers such as Bizares, Flakes, and Picotees. The Malmaisons, in a word are Tree Carnations of remarkably robust habit of growth, with stout stems, very broad leaves, and massive flowers very frequently sweet scented and in many cases as fragrant as a Clove.

Though correctly described as tree Carnations, they are not perpetual flowering, but the plants themselves may be grown into huge bushes, and each side shoot when strong enough will furnish a truss or bunch of flowers, if left to develop naturally. Where large flowers are desired they must be reduced to the terminal one by disbudding as early as the buds can be conveniently fingered without injury to the stem or top bud. Their natural season of flowering is during May, June, and July. They, therefore, fill a gap between the tree and American Carnations on the one hand, with a little overlapping, and border and show Carnations on the other. Owing to the flowering season being so late they may be grown in very cool houses from which frost is just excluded. The natural rise of temperature in May is sufficient to develop the massive flowers. By some growers they are accorded a regular temperature by artificial means, not necessarily high, and this would induce an early display. On no account must the general batch be subjected to a temperature equivalent to forcing or the flowers will be poor and short lived, while the plants would be more or less injured or weakened. Mme. Arthur Warocque and Princess May submit to forcing better, perhaps, than any others of the section. The old or true Malmaisons may be retarded by placing them in a greenhouse facing north, in May.

Propagation.

Seed is sown with the sole object of raising new

varieties. Some of the newer types bear seed if properly fertilised, but others, especially the original types, produce pollen only.

Increase by means of cuttings is sometimes practised in the same way as tree Carnations are propagated, particularly when the stock plants are large and cannot conveniently or possibly be layered. Not all of them, however, produce roots freely by this system except under careful management. The stout, fleshy stems and the large sappy leaves are unfavourable to the method of propagation which answers so admirably with tree and American Carnations. The cuttings should be taken off with a heel of older wood, trimmed and inserted in pots of light sandy soil covered with ¼in. of sharp silver sand. Plunge the pots in a brisk bottom heat of 60° in a propagating case and they will root in four to six weeks. Those who have no house or pit with a good command of heat can make up a hotbed of stable manure and leaves, cover it with a layer of sandy soil and plunge the pots in it. May is the best month for taking cuttings.

Layering is now the most popular method of propagating Malmaisons and the most easily accomplished. This should be done in June after the plants have finished flowering. Some growers plunge the pots, if not too large, in a cold frame and layer the shoots in the surrounding soil. The process will be hastened if the layering is done in the soil overlaying a spent hotbed of dung, with this gentle stimulating bottom heat, the aid of the sun will be all sufficient.

Stronger layers may be rooted than in the case of cuttings. Strip off the lower leaves to a suitable point for making the cut, as in the case of border Carnations; but avoid weakening the layer and the plant to which it will give rise by removing all the leaves except a tuft at the tip. This is bad practice, and nothing whatever is gained by it. Every pair of leaves retained will add to the bulk and the vigour of the prospective plant. On the other hand the cut should not be made in wood that is hard or overripened, but just such as would be secured in the case of cuttings. If the internodes are short the cut may pass through one joint or knot, upwards to the base of the next. In any case the knife should pass up the centre of the stem to insure a firm tongue to carry the roots without breaking off. The tongue

will open when the layer is bent, and should be pressed into a loose compost of sandy soil and leaf mould. Carefully peg the layer in position, with the leafy crown upright and cover the bare portion of the layer up to the leaves. Those layered on an

MALMAISON CARNATION MRS. MARTIN SMITH.

old hotbed will root soonest, but in any case they should be examined occasionally and the layers severed from the parents as soon as they are well rooted, though the operator may allow them to remain in position for a few days if not quite ready to carry out the operation of potting them up.

Potting the Cuttings and Layers.

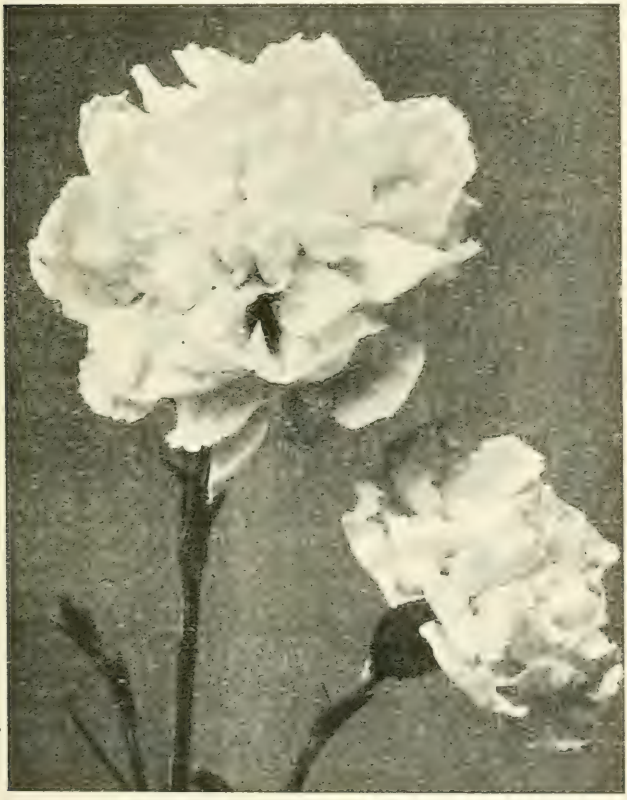
Get ready the necessary number of pots, 3in. to 3½in. in diameter, according to the size of the young plants, and have them carefully crocked. One rooted layer is sufficient for a pot, and all those too small to fill it properly should be discarded unless stock of any particular variety is scarce.

For the first potting use a compost of good fibrous, mellow loam, and leaf soil in equal portions with sufficient clean silver sand to render it porous. The finer portions of the compost should be placed immediately over the roots, unless the latter carry a good ball of soil, which they should do. Pot firmly and take the plants in batches to a cold frame or other structure where they can be kept close and shaded till the roots have commenced to move in the fresh soil. If the latter was properly moist when being used no water should be given for a few days; but the grower must use his own discretion and not allow the soil to get too dry or the young roots will get crippled. The weather by this time may be warm or even hot and even though shaded the soil will sooner part with its moisture than in spring. When the soil begins to get dry give a good watering, using a rosed watering-pot to settle the soil, thus avoiding the risk of washing it out of the pots by watering through the open spout. When the grower has evidence that the plants have taken kindly to the soil, a little ventilation should be given and gradually increased. Shading at the same time should be discontinued.

When the roots have reached the sides of the pots and before they become matted, another shift should be given into 4½in. or 5in. pots. Large shifts are undesirable, and these sizes will be sufficient to keep them growing. If young plants are allowed to become pot bound they get stunted in growth. A third potting should be given when the roots are again well through the soil and beginning to curve round the pots. This time 6in. and 7in. pots should be employed if the size and vigour of any of the plants warrant the larger size. By giving three shifts of gradually increasing size, the soil is kept sweet until the roots are ready to take possession.

When the stems begin to run up they should be staked to avoid accident. The plants may remain

in cold frames till the end of September, after which they should be transferred to a well lighted greenhouse, freely ventilated. Here they will be more directly under the eye, and their wants as to watering can be supplied with discrimination. As the days get shorter and the light more feeble less



MALMAISON CARNATION NELL GWYNNE.

and less water will be required. In winter they should be kept on the dry side but not dust dry or the roots will suffer. The atmosphere of the house should be kept cool, dry, and airy to tide the plants through the worst period of the year. Watering must really be carried out with fine discrimination,

and only the most experienced hand allowed to attend the Malmaisons. If the grower is really in love with the work, he or she is in a better position to perform the work unerringly than a stranger put to do the work, it may be, for a week only. The grower or gardener who is enthusiastic over his work knows practically every plant individually and deals with it sympathetically. The practice of frequently changing the party in charge is radically wrong in the case of any class of plants, and more so with those which require careful treatment in winter.

Rust, red spider and eel-worms are the most likely enemies of Malmaison Carnations in winter and spring; and for these the grower must ever be on the alert. Whenever rust makes its appearance in patches on a leaf, the latter should be cut off and burnt immediately to prevent the scattering of the spores on healthy plants. In large batches of plants unhealthy specimens should be eyed with great suspicion, especially those with pale coloured and blistered leaves near the surface of the soil. This is generally a sign that something is radically wrong, and in all probability the plants are affected with eel-worms. All such plants should be destroyed by burning. Indeed all unhealthy specimens that show signs of flagging when the soil is sufficiently moist should be destroyed or isolated from the rest till the true cause of their unhealthiness becomes manifest. All Carnations are liable to this malady, the eel-worms being introduced with the soil, manure, or the water used. For fuller instructions on these points see chapters on "Fungoid Diseases" and "Insect Pests" respectively.

Should the owner or cultivator desire a batch of plants to come into bloom early, the requisite number should be placed in a house where the temperature at night is kept at 50°. This may be done at the new year, and when the plants respond to the treatment the minimum night temperature should be gradually raised to 55°, but never higher.

By skilful management some of the varieties may be had in bloom during the last three months of the year, and onward through the first four months of the next, till the natural flowering period of the section in May, June, and July. For the earliest work the old Blush and Princess of Wales Malmaisons, with the newer Mme. Arthur Warocque and Princess May should be selected, as they submit

to forcing better than the majority of the other varieties. The old or true Malmaisons may also be retarded by placing them in a well lighted, airy greenhouse facing the north, in April or May according to the state of the weather. The extra trouble of flowering this section of Carnations in winter is, however, scarcely warranted, except for special reasons or for particular purposes. The ordinary tree and the American varieties are more easily managed, and supply all the Carnations wanted for almost any purpose.

DESCRIPTIVE LIST OF MALMAISON CARNATIONS.

Albion (M. R. Smith).—Rich dark salmon, finely formed flower; plant of dwarf compact habit.

Blush.—The original and well known Souvenir de la Malmaison with blush flowers.

Crimson.—A bright crimson, fragrant sport from Souvenir de la Malmaison, with broad petals but not so double. (Syn. Marchioness of Londonderry).

Dragut.—Large, rich cherry-red, very fragrant, with well formed petals.

Duchess of Norfolk (Weguelin).—Flowers large, quite full, rich orange; petals incurved at the edges, nearly smooth.

Duchess of Westminster (F. N. Parnes).—Rich rose-pink, tinted salmon, very early, fragrant; calyx does not burst.

Florizel (M. R. Smith).—Flowers of an attractive shade of rose, with well formed petals.

H. J. Jones.—A large and handsome dark crimson fragrant flower.

Horace Hutchinson (M. R. Smith).—Petals of beautiful form and glowing scarlet, making a splendid flower; plant robust.

King Oscar (M. R. Smith).—Flowers handsomely built and deep crimson.

Lady Grimston (M. R. Smith).—Flowers large, very double, silvery pink, marked or variegated with warm rose, and fragrant; plant vigorous.

Lady Rose (M. R. Smith).—One of the largest, with bright rose flowers, and massive petals of good shape.

Lord Rosebery (M. R. Smith).—Bright dark rose flowers, of handsome form and deliciously scented; petals concave. (See illustration).

Lord Welby (M. R. Smith).—A handsome dark crimson variety, with large flowers.

Mme. Arthur Warocque.—Flowers reddish scarlet of medium size, fragrant; plant of dwarf, branching habit and floriferous. First flowered in this country in 1890.

Maggie Hodgson (Measures).—Flowers of splendid size; velvety crimson, and deliciously scented; plant of vigorous constitution.

Monk (M. R. Smith).—A beautiful shade of salmon, with large, well-formed flowers; plant of free and vigorous growth.

Mrs. de Satge (M. R. Smith).—The large bright scarlet flowers keep their colour well.

Mrs. Everard Hambro (M. R. Smith).—The carmine-rose petals of this variety make up a massive flower of fine form.

Mrs. Martin R. Smith (M. R. Smith).—Flowers of huge size, bright rose, and highly attractive; leaves of remarkable size and nearly green. (See illustration).

Mrs. Trelawny (M. R. Smith).—Dark Salmon flowers of beautiful form and high good texture.

Nell Gwynne (M. R. Smith).—One of the best pure white Malmaisons, of large size and refined form; plant vigorous. (See illustration).

Pink.—One of the best sports from Souevnir de la Malmaison, with pink flowers.

President Loubet.—A glowing scarlet with well-formed flowers.

President McKinley.—Flowers of a beautiful apricot shade and well formed; plant vigorous.

Prime Minister.—Brilliant scarlet, with broad, massive petals, fragrant; the most suitable Malmaison for outdoor culture.

Princess of Wales.—A rose-pink sport from Souvenir de la Malmaison; the best of the true old Malmaisons. (See illustration of a pot plant).

Princess May (M. R. Smith).—Deep rose flowers of large size and handsome form.

Ritt Meister.—Clear apricot and well built flowers; plant of strong vigorous growth.

Robert Burns. Flowers bright salmon, of handsome and beautiful form.

Sir Charles Freemantle (M. R. Smith).—Flowers amongst the largest of this section, well-formed and dark rose-pink.

Sir Evelyn Wood (M. R. Smith).—One of the best of the striped Malmaisons, being striped with pink on a salmon ground, large and handsome.

Soult.—Large and very double flowers of a light salmon.

The Churchwarden (M. R. Smith).—Flowers lively crimson-scarlet, quite double and of handsome proportions.

MALMAISON CARNATION PRINCESS OF WALES

The Queen.—Large, bold and handsome terra cotta flowers; leaves broad and robust.

Thora (M. R. Smith).—Blush, changing to pure white and running Nell Gwynne very close for first place.

Trumpeter (M. R. Smith).—Flowers rich dark scarlet, of splendid size, well built and fragrant; growth vigorous.

Yaller Gal (M. R. Smith).—Flowers of large and handsome form, bright yellow; growth robust.

X.—MARGUERITE CARNATIONS.

History of the Race.

Under the name of Dianthus Caryophyllus Margaritae the above new race of Carnations first came under my notice on the 9th September, 1890, when Messrs. J. Veitch and Sons exhibited a group of cut flowers and received an Award of Merit from the Royal Horticultural Society for the strain. The fringed, sweet scented flowers exhibited rose, pink, scarlet, purple, salmon, white, striped and other shades of colour. The seeds had been sown in a warm frame early in March of that year, and after they were well germinated they were transferred to a cold frame and finally planted outside early in June. The plants were in full bloom at the time the flowers were shown, just six months after the seeds were sown.

Immediately after this their cultivation was taken up in the Sparkhill Nurseries, Birmingham, under the name of Margaret Carnations. They had been crossed with the Scarlet Bizarre Robert Houlgrave, and on the 12th November, 1892, a promising batch of seedlings was then in full bloom. They were dwarf, and carried scarlet self, flaked and other hued flowers of large size and well formed. The seeds had been sown in February, and bloomed from September till Christmas.

The culture of this race was also taken up at an early date by Messrs. Sutton and Sons, who grew a mixed strain of Marguerites in many colours. In 1894 they offered the White Marguerite as a novelty. Since then they have been improving both of the strains and in 1898 spoke of them as Improved Marguerite, mixed, and Improved Marguerite, Pure White. The name "Marguerite" is now generally employed for the race.

Soon after the introduction of these Carnations a story of Continental origin described them as having originated from a dwarf early flowering form of Dianthus Caryophyllus (the Carnation), found wild in Italy and crossed with the China Pink (D. sinensis). Trials of seedlings in the early days of their introduction, coming under my notice, seemed

to warrant the story that the Marguerites were a race of hybrids, as many of the seedlings were of weak procumbent habit with green foliage, resembling the China Pink. As a set off against

MARGUERITE CARNATION IMPROVED WHITE.

this it is well known that varieties of the ordinary Carnation have more or less decidedly green foliage. There is little or no evidence of hybridism in the race now, and if it existed originally it is well known that hybrids between members of the

Caryophylleae can only be perpetuated by cuttings, layers or divisions; and that if raised from seeds the hybrid characters soon become dissociated or separated and liable to be lost. Plants of weak habit like the China Pink would not have their seeds gathered but left to perish in the beds.

Character and Uses.

A beautiful and useful Carnation, like any other flower having similar valuable properties, requires no recommendation to insure its cultivation; but if a plea might be put forward on behalf of the Marguerite Carnation, one might point to its easy cultivation, dwarf compact early flowering habit, profusion of blossom, decided and agreeable fragrance, variety of colours and its suitability for garden decoration in the open, or as a pot plant for the embellishment of the greenhouse and conservatory at various periods, but particularly in autumn and winter.

The whole race may be treated as an annual or biennial according to the time the flowers are wanted, for it does not seem capable of giving satisfaction after having expended its energies in flowering, and less so after having perfected seeds. This may be due to the system of perpetuating it from seed from its origin to the present time rather than to hybridism, even if that could be satisfactorily proved. Border and show Carnations as well as Picotees produce a greater profusion of flowers the first time from seed than when subsequently propagated from layers or cuttings. Seedling Carnations produce a great number of crowns, most of which are inclined to run up for bloom, leaving little or no grass for propagation. Many of the fine named old varieties of the florist have this defect, and only the more recent border varieties, belonging to various sections, originating within the last 16 years, have redeemed the Carnation from its bad name in this respect. The Old Clove is, of course, a notable exception, for it usually produces plenty of grass in most parts of Britain. The trait of producing flowerless shoots for propagation has been ignored in the Marguerite, so that we cannot be surprised at its lack of longevity.

The precocious or early flowering tendency of the Marguerite is one of its greatest recommendations, and this can readily be perpetuated and even

augmented by propagation from seed and selection of those individuals which bloom in advance of others sown at the same time. The season at which the seeds are sown has a distinct effect upon the number of weeks or months necessary to bring them to the flowering stage. In general terms the race may be bloomed in six months, and seeds sown in January or February will require about this time to reach that stage. If sown in March or April, when the days are longer and the light much more intense, growth is proportionately accelerated, and the younger seedlings take less time to come into bloom, even though they may never overtake the first sown batch. Nevertheless, when the first flush of bloom of the latter is over the later sown Marguerites will be in perfection and constitute a succession. Should the summer be warm, or if growth is hastened by growing the plants in pots and sheltered by frames, they will bloom in four or five months. If allowed to come along naturally they will bloom later and continue flowering more or less freely till the new year. To flower during the following spring seeds should be sown in August, grown in pots and wintered in frames or greenhouses from which frost is excluded.

Seed Sowing.

For any purpose it is advantageous to rear the young plants under glass in order to encourage a free and vigorous growth from the start. This may be done at any time from January till April according to the time the plants are required to be in bloom. Sow the seeds in pans of light sandy soil and leaf mould, standing the pans on a bottom heat of 60° during the earlier months of the year.

After Treatment.

When the seedlings have made one or two pairs of leaves they may be transplanted to boxes of similar soil 1½in. apart each way. The temperature of the house need never exceed 50° except from sun heat, and the seedlings should be stood close to the glass to keep them dwarf and sturdy. Free ventilation is also imperative as the spring advances and the temperature rises, as this encourages the production of side shoots or crowns. The seedlings may be potted up singly from the seed pans, and certainly it is highly advantageous to grow them in pots

for some time previous to planting them in the open ground if there is any intention to transplant them into beds or borders just previous to their coming into bloom. When Carnations have once been in pots they transplant with a ball of soil and receive less check in the operation than if the soil were to fall away from the roots.

The early batches should therefore be potted once or twice, never allowing them to become pot bound, the object being to keep them growing in order to build up strong, bushy plants. About the end of March or beginning of April the seedlings should be thoroughly hardened off in readiness to plant them out when the weather becomes settled and genial in April. The latest batches should be planted out in May. For garden decoration they should be put into their permanent or flowering position. About a foot apart each way will usually be sufficient space as they usually grow only 18in. high. All they require after this is to be kept clean by hoeing, thus stirring the surface soil at frequent intervals. In hot, dry weather an occasional watering would be highly advantageous. A short, neat stake to each bush would prevent the stems from being blown down by the wind in exposed positions.

It often happens that beds have to be refilled a second time during the season in public parks and gardens, various plants being held in reserve for the purpose. A very suitable subject for this mode of gardening is the Marguerite Carnation. With this object in view a batch of plants might be grown in pots, and no check to growth would be experienced even in dry, hot weather, by transferring the plants to their new quarters in the beds.

Culture in Pots.

Those who intend to use their Marguerites for greenhouse or conservatory decoration in autumn and winter should grow the plants entirely in pots, on a bed of ashes in the open, and transfer them to their winter quarters at the end of September or early in October according to the weather. At the same time it is equally practicable to grow the seedlings in a piece of well prepared ground or in beds, lifting and potting them up in September to get them thoroughly established in the fresh soil before the advent of short days and cloudy skies with feeble light. Needless to say the later sown batches of seedlings are best adapted for this purpose, because

the plants are in no way exhausted or impaired by previous flowering. The operation of potting should be accomplished before the plants commence to bloom, and before the stems and foliage get beaten down and injured by autumn wind and rain. Marguerites are hardy or relatively so, but they retain their fresh appearance under glass much better if placed under shelter before being buffeted by rough weather. Plants in pots can be housed on the shortest notice when this becomes necessary, and both they and those newly potted up from the open ground will find ample protection in frames for some weeks longer. In the absence of other accommodation a temporary framework, on which sashes or even mats can be placed, may be erected. Even then the sashes may be drawn off during the day in the absence of heavy rain, and the exposure to light and air will strengthen the plants for the strain of flowering during the short, dull days to come.

A low, span-roofed structure is the best place for them after the middle of October, and as they approach the flowering stage a minimum night temperature of 50° Fah. should be maintained. Wooden staging would be less likely to harbour damp and encourage fungoid diseases than if the benches were covered with ashes or gravel, though Marguerites are usually very healthy and little liable to disease. Aphides may be kept down by fumigation or better still by the slow evaporation of nicotine fumes, if the plants are in bloom.

I have seen Marguerites flowering splendidly in Perthshire towards the end of November under this system of treatment. The buds of tree Carnations, even when well grown, often fail to open in the short days and cloudy skies of winter in Scotland. The Marguerite Carnations make good substitutes. Seeds sown there from March to the end of April come into bloom in November and continue to furnish flowers till March or April. A compost often used is three parts of good turfy loam, one part well rotted manure, and a little soot and sand. The best results are obtained from plants in pots, giving them the final shift into 6in. pots at the end of July, sheltering them from windy, wet weather, and housing them in a suitable structure in November.

During August and September the plants bloom much more profusely than they could in autumn and winter, by reason of the more favourable conditions. The season of flowering is, of course, proportionately

shorter. Plants from seeds sown in February or March and given good treatment by frequent potting in early spring, and planting in good soil in April will make strong bushy plants capable of carrying 100 to 150 blooms and buds or more by the beginning of September.

When treated as an annual the Marguerite Carnation also makes a splendid town plant, as it escapes the smoke and filth of our skies in winter and blooms to perfection in summer. It succeeds well in the London parks and gardens.

XI.—THE AMERICAN CARNATION.

For the last 16 years or more the American varieties of Carnation have been finding their way into this country in greater or less numbers, but few of them in the early days of their introduction met with general favour. The fringed petals were a great bar against their acceptance by the florist, and those whose ideas of a Carnation of fine quality were built up on smooth petals without fringe or indenture. This was quite natural on the part of the florist and general public after being accustomed for so many generations to the refined flowers of home or Continental production.

Within the last few years several nurserymen and market growers have not been slow to perceive the handsome and decorative effect of these introductions from the Western Hemisphere. Besides placing them on the market, the growers took to exhibiting them at flower shows in various parts of the country, both in the shape of plants and cut flowers. The size, handsome form, colour, and fragrance of the flowers, carried upon long and graceful stems, and their tasteful arrangement in vases and other receptacles, have captivated the general public, particularly those who carry out floral decorations. The natural consequence is that they are now looked upon as indispensable for the production of flowers in winter. They are also finding their way largely into private establishments all over the country.

History of the Race.

The first of the race of Carnations now known as the American, was introduced from France to that country, about 1852 by Charles Marc, a French florist, of Bloomingdale, New York. The origin of the race may be given in the words of Mr. Charles Willis Ward in his admirable and exhaustive book on the subject, "The American Carnation":—

"The American Carnation, which is known as the perpetual flowering, or winter blooming Carnation, is a distinct race, and differs materially from the types of European origination now usually known

among European gardeners. The American Carnation is a descendant of, and is derived from, the French race of Carnations, which is known as remontant, or monthly, and which was originated about the year 1840 by a French gardener, M. Dalmais, of Lyons, France, who introduced the first real constant blooming Carnation about 1844. Dalmais is said to have secured this variety by artificially crossing the Carnation Devianon with the variety Biohon, and the result of this crossing was again hybridised with the Flemish Carnation, and the progeny was repeatedly crossed until the type was fixed. In 1846, he obtained a great number of varieties of this race, comprising many and varied colours."

He also tells us that the work was continued by M. Schmidt and M. Alphonse Megatiere, both of Lyons; and that the number of varieties had greatly increased, and the name "tree Carnation" applied to the race in 1866.

In speaking of the types of Carnation (in the above quotation) of European origin and usually known among European gardeners, Mr. Ward is evidently alluding to the show Carnation and Picotee of the florist, and possibly may not be aware of the numerous races we have now been cultivating for many years. He does, however, record the cultivation of tree Carnations in this country as early as 1862. Since then the tree Carnation has been vastly improved and widely cultivated in Britain. The tree race of Malmaisons must also be taken into account. Perpetual flowering and winter blooming are also terms that have long been used in connection with the tree Carnation.

The chief differences of the American Carnation from our tree Carnation are the larger flowers with more or less deeply fringed, often plaited or fluited petals, and the longer flower stems. A large proportion of them are sweetly scented, but that may also be claimed for tree and Malmaison Carnations.

The firm of Dailledouze, Zeller, and Gard, soon after introduced both seed and plants from Lyons and were the first to raise seedlings from seed of their own saving on American soil. The first was named Mrs. Degraw, a pure white, fringed and free flowering variety. This was in 1858. Others followed, including Flatbush, Louise Zeller, Mrs.

Zeller, and General Grant, grown chiefly as pot plants and attracting a considerable amount of attention. Altogether the firm offered 54 varieties for sale somewhere between 1862 and 1872.

About the same time a seedling was raised and

AMERICAN CARNATION GENERAL MACEO.

named Victor Emanuel (Syn. Astoria) by Donati, a florist of Astoria, Long Island. It was flaked and striped with red on a yellow ground and became one of the most famous of the early American Carnations. Mr. Ward considers it probably the

ancestor of most of the yellow American varieties of to-day. On American soil the early history and development of the race commenced in 1858 on Long Island, and has gone on continuously expanding till it has become one of the principal centres of the Carnation Industry in America.

It is interesting to learn that Mr. Ward used pollen of the English variety Winter Cheer upon American varieties, thereby obtaining some of the most perpetual blooming Carnations of this race, including General Maceo, General Gomez, Governor Roosevelt, and their offspring.

The work of improvement was carried on by Messrs. Charles T. Starr, John Thorpe, William Swayne, W. P. Simmons, and Sewell Fisher. In 1890, Mr. John McGowan bought the stock of a white Carnation from Mr. Carl Schaeffer, a gardener who raised it. He named it Lizzie McGowan, and put it into commerce. For a period of ten years it was more extensively cultivated in America than any other white variety. About the same date or soon after, it was introduced to this country and is still in cultivation.

About this period the popularity of the American Carnation advanced by leaps and bounds, and while many of the older florists continued their labours in raising new varieties, others entered the field as beginners at this engrossing work. Where dates are given they indicate the commencement of work by the following raisers of Carnation seedlings:—

Joseph Tailby, 1876; Frederick Dorner, 1889; W. R. Shelmire; E. G. Hill, 1890; Peter Fisher, the raiser of the famous Mrs. Thomas W. Lawson, in 1895; Richard Witterstaetter, 1890; Rudolph Fischer; and Charles Willis Ward, the author of "The American Carnation," 1890. Most of these florists are still ardently at work amongst their favourite flower.

A considerable number of the new varieties have been sold at what would be considered fancy prices in this country, though, apparently, more on a commercial basis than the fancy prices recently paid for new Potatos in this country. The stock of five new varieties at least has been sold at prices ranging from £1,666 13s. 4d., to £2,083 6s. 8d. The recently raised Robert Craig sold for £4,166 13s. 4d. The first big price and the highest for any one variety was £6,250, this being for Mrs. T. W. Lawson.

It has frequently been stated that the Carnation is second in importance only to the Rose in America. In any case the sale of cut flowers alone represents a vast industry, valued last year by Mr. C. W. Ward, at five to six million dollars. Adding to the above the sales of plants and the capital invested in land and buildings, the value of the Carnation industry mounts up to fifteen or twenty million dollars. The equivalent of these figures in our

AMERICAN CARNATION HARLOWARDEN.

money would be £3,125,000 and £4,166,666 13s. 4d. respectively.

The same writer estimates that between seven and eight million square feet of glass are devoted solely to Carnation culture in America. About 2,000 establishments do little or nothing else but grow Carnations, employing something between five and six thousand workers. Between seven and eight

million Carnation plants are grown; and these are calculated to produce about 100,000,000 blooms, which are sold in the markets of the United States and Canada. Well grown Carnations should sell at prices between 2s. 1d. and 4s. 2d. per dozen retail. They are sometimes sold considerably under these prices, as a result of competition to draw the buyers. Fancy prices are occasionally obtained for specially fine flowers, it may be of some new variety of attractive colour.

Propagation.

One of the most engrossing phases of Carnation growing is the production of new varieties by cross-breeding, seed sowing, and waiting for the result of these operations. While new varieties are annually raised in such numbers in America and plants brought to our shores in a few days, home growers may scarcely think it worth the trouble, time and space necessary to produce seedlings in sufficient numbers to constitute a fair field for the selection of new and improved varieties. To those having the leisure and the means, however, there is a most interesting hobby and possibly something to be gained. The size and colour of American Carnations are splendid, but there is still room for refinement; and the spicy Clove scent might yet be considerably augmented by varieties possessing it in a more marked degree in winter than those already in existence.

The operation of cross-breeding American varieties is identical with that of border Carnations, but the conditions imposed by pot culture in winter would more nearly co-ordinate the operation with that of tree Carnations.

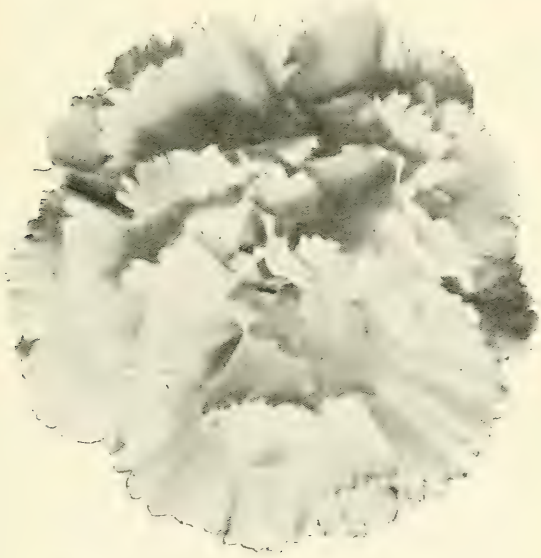
After fertilisation has been effected the seed pods of this race take six to eight or even ten weeks to swell up and ripen. Maturity is indicated by the apex of the pod turning brown and shrivelling. They should then be gathered with a short piece of stem and laid in earthenware saucers or in shallow boxes to ripen and thoroughly part with their moisture. After this the seeds may be rubbed out and cleaned from all extraneous matter preparatory to sowing or storing till the desired time. The packets in which the seeds are kept should be numbered and a record of the same made in a book, giving particulars of the parentage and the time of gathering.

The operation of fertilising the flowers may be

carried on at any time between September and March, omitting November and December as the least suitable in our climate, and most likely to result in the damping of the seed pods. The seed may conveniently be sown at any time during February, March, and the beginning of April. Later than that is inadvisable, because the seedlings have not sufficient time to make good growth before the succeeding winter.

Seed Sowing.

The seed should be sown in pots or seed pans, the latter being the more conenvient if square or



American Carnation Lady Bountiful.

rectangular, as they fully occupy the space at command without wasting it. Put in plenty of drainage to allow the free passage of water and prevent the soil becoming sour. Any light sandy soil will suffice for compost if sifted through a fine meshed sieve to remove all stones and lumps of soil. Make the compost firm and draw out furrows about $\frac{1}{8}$in. deep with the point of a small dibber, and $1\frac{1}{2}$in. apart. See that the furrows are of uniform depth throughout and sow the seeds about $\frac{1}{2}$in. apart in the

rows. Cover the seeds with the same compost and lightly water the surface through a very fine rose. The seed pans may be stood on the surface of a propagating bed in a house kept at 50° to 60° at night. A hotbed covered with a frame would be equally suitable. When the sun is bright shade the pans with thin white paper to preserve the moisture. The seedlings will make their appearance in 8 to 10 days. When this takes place the papers should be removed and the seed pans placed on shelves close to the glass on the shaded side of the house. The soil should be kept sufficiently moist but not so wet as to induce damping.

Transplanting Seedlings.

When the seedlings have made one or two pairs of rough leaves they should be transplanted into other pans or boxes filled with soil similar to that used in the first place. The seedlings should be lifted with all the roots possible and dibbled into the fresh soil, 2in. apart either way. After they have made some growth and before they get at all crowded the seedlings should be potted off singly in thumb pots. Early batches may require another shift into 2½in. pots if the plants cannot be transferred to the open ground on account of the weather. By having the seedlings thoroughly hardened off as soon as ready, they may be planted in prepared ground any time between the beginning of May and the beginning of June, selecting an open situation, freely exposed to sunlight and air. The soil should have been prepared in autumn or early winter as for border Carnations. If only a hundred or two of seedlings are reared they may be planted at 12in. to 15in. apart each way; but if thousands are raised it would be well to allow 2ft. between the lines and 1ft. from plant to plant in the lines. This will permit the stirring of the soil between the rows by means of a "planet junior" or some other make of hoe upon wheels. The Dutch hoe may also be used between the plants to stir the soil and keep down weeds in spots that cannot be reached by the hoe upon wheels.

Seedling American Carnations require stopping only once until they have bloomed. The main or primary stem should be cut back to encourage the development of the side shoots which are allowed to bear the first crop of flowers.

Growers and raisers of seedlings on a small scale

may elect to grow their plants entirely in pots, repotting them as often as this becomes necessary until the flowering size is reached, as discussed under "Tree Carnations."

Flowering of Seedlings.

The earliest batches, sown in February, should commence flowering at the end of July or the beginning of August, especially the more precocious seedlings, that is, those which are naturally early bloomers. This will prove an exciting time to the ardent or enthusiastic plantsman, who will now be on the outlook for the most promising varieties, worthy of further trial. The largest, best formed and most fully double flowers as well as the most desirable colours should be selected and labelled with the number marked upon the label corresponding to that recorded in the book containing the history of the various crosses made. The stems should be long and stout or firm and wiry to meet the requirements of floral decoration. Over and above all, the calyx must be long, firm and not liable to burst irregularly, as by this alone the fortune of the flower may be made or marred. The habit of the plant must be good, branching freely or producing plenty of grass, and the constitution of the plant must be vigorous. Free and continuous blooming properties, and petals of good substance, are also indispensable. It is rare to find all these desirable points centred in one plant; consequently a very large proportion of the seedlings may be at once discarded after the first flush of flowers has expanded. Where the plantation is a large one the grower will be on the alert every day, keeping the seedlings under close observation till the whole of them have come into bloom, or at least, while the weather continues sufficiently mild to permit the expansion of the flowers. The best varieties should be lifted from time to time, immediately their qualities have been determined, potted up and transferred at once to a greenhouse where they should be kept moist and shaded till they have taken to the fresh soil. This work should be continued throughout August and September, during which time the stock transferred to the greenhouse may be of considerable extent. Those in the field which have not bloomed by the middle of October may be disregarded as late and shy bloomers.

Under glass the seedlings should have similar treatment to that accorded the standard or named

varieties in the collection. Here the work of observation must be continued unremittingly, noting the characters and qualities of the varieties selected as they reveal themselves and recording the same. Those which fall below expectations uncompromisingly, may be discarded as unworthy of further care.

By the end of January the selected seedlings will have bloomed sufficiently to enable the raiser to determine upon those worthy of a second year's trial. Having discarded the worthless ones, the remainder should be propagated by cuttings about the first week of February. During the second season the raiser should be able to fix upon the varieties, if any, worthy of perpetuating, multiplying, and putting into commerce.

In America the "profitable commercial life of a Carnation," after being put into trade, is considered to range from four to six years. This, in the case of specially fine varieties, may be prolonged for ten or a dozen years or even more, if care is taken in the selection of stock for cutting, and by carefully cultivating the plants with the view of maintaining their vigour and keeping them true to the original type. After a number of years, however, most or all of them are liable to be superseded by newer and better varieties. Before being put into commerce the selected seedlings are thoroughly tested for two or three years in succession; and during the trials they are subjected to a drastic process of weeding out, until out of 6,000 to 8,000 seedlings perhaps only two or three varieties are retained for propagation. The raisers are satisfied with this number if they prove an advance upon existing varieties.

Propagation by Cuttings.

As with tree Carnations so with the American Carnation, the most popular and most convenient method of propagation is by means of cuttings. Layering is very little practised in America, for the simple reason that the summers are too hot and dry for the success of the operation. Those who have their plants in pots may plunge the latter in soil and layer the young shoots in the same manner as is done with Malmaison Carnations.

Cuttings may be taken at any time from the middle of January to the middle of April. Those inserted during January and February will produce

the largest plants, which will come into bloom during September, and reach their stage of greater productiveness about Christmas or the new year. Better results are usually obtained from cuttings inserted in February and the first half of March, because the light is improving by that time and the cuttings grow away with more vigour. Those taken later, say during the second half of March, and the first half of April serve to continue the display of flowers till well into spring. As in the case of Chrysanthemums

American Carnation Mrs. M. A. Patten

the flowers may be timed to bloom at a given period by inserting the cuttings during a given month, by stopping the shoots at stated times, a certain number of times, and housing early or late according to the individual characteristics of the variety. Early varieties may be propagated late and stopped a greater number of times than late flowering sorts, which require a longer period to come to maturity and to be stopped earlier for the last time. In other words they do not require stopping so often as

early varieties, as a greater length of time must elapse between the last stopping and the period of blooming. All this presumes a knowledge on the part of the cultivator of the peculiarities of the varieties under cultivation. Seasons also vary to some extent and exercise a decided effect on the rate of progress. Moreover, a continuity of bloom over the longest possible period is more desirable in this country rather than a glut of bloom at any given period. This can be secured by growing early, mid-season, and late varieties, and by propagation at different times during the winter and spring months, and by stopping at different periods.

The medium in which to insert the cuttings should be prepared in advance. The cuttings may be inserted in pots of any light sandy soil, but equal proportions of mellow loam, leaf soil and sand will give good results, with a layer of clean sharp silver sand on the top. Where the quantity to be propagated is great, a bed of some size should be made up in the propagating pit or stove over the hot-water pipes so as to secure a bottom heat of 60. If the atmosphere of the house is kept at 50° to 55° as the minimum by night it will suffice. The material of the bed should consist of clean sand, which should be pressed down firmly and thoroughly watered with a rosed watering pot to settle the soil. As soon as the superfluous water has drained away the cuttings may be inserted and made firm.

Selection of Cuttings.

The selection of the cuttings is an important operation, and should be conducted with great care. Healthy and vigorous plants only should furnish the necessary stock, all stunted and diseased plants being discarded. Bud variations are of frequent occurrence amongst American Carnations, and if any plant produced flowers of an undesirable colour, no cuttings should be taken from it.

Selfs may give rise to white, striped, or variegated flowers, and if any of them are sufficiently meritorious to be worthy of preservation, cuttings should be inserted and grown to the flowering stage, and those which fail to come true to the types selected, should be weeded out, and the process repeated the following year, should this be necessary. By this means the sport will become fixed in a year or two. If cuttings are taken from the base of the plants, and the plan repeated in succeeding years, the plants rapidly

degenerate and produce grass but no flowers. The smaller shoots on the top of the flower stem should also be discarded. Very small and weak cuttings on any part of the plant should at once be rejected as unworthy of house room.

Cuttings from the middle portion of the stem have been found from considerable experience to give the best results in the matter of healthy vigorous plants producing long flower stems. The cuttings are in the best condition for the production of roots when the plants are just commencing to open their flowers. They should be taken off with a heel of the old wood, by pulling them downwards with the fingers. The heel, if ragged may be slightly dressed with a sharp knife and a few of the old leaves removed.

Only a moderate quantity of cuttings should be taken off at any one time, because they must be inserted before the leaves flag or wilt, as that is inimical to their welfare. If this cannot be done immediately the cuttings should be placed in a cool house or shed, sprayed with cold water and covered with a damp mat. They will keep fresh under these conditions for one night, but must be inserted early next morning. Water with a rosed watering pot to settle the soil.

During Winter

at least, the cuttings should be kept in a house facing south, or as near that aspect as possible, because they are less liable to fungous attack than if the house faced the north, owing to the prevalence of moisture in the atmosphere and all parts of the building. Temporary shading with tiffany can always be erected to ward off bright sunshine when that occurs previous to the rooting of the cuttings. Shading is more particularly necessary in spring and early summer than in winter in our climate, but the careful propagator will always be prepared to fix it up and use it when necessary, and to remove it when the sun loses power. On dull, cloudy days shading is injurious rather than beneficial. Very dense shading is undesirable at any time.

During bright weather the cuttings should be lightly sprayed in the morning and again in the afternoon to prevent flagging. Watering must not be overlooked at any time, but given when necessary. At the same time care must be exercised not to overdo it or damping of the cuttings will be the result. The atmosphere of the house should

always be kept moist in bright warm weather, in spring, and early summer. This is best accomplished by damping down the paths and other available places in the early morning and again about mid-day.

In the course of ten days or a fortnight the cuttings will show signs of commencing to form roots by the leaves being firmer and less inclined to flag. It is really a sign that the cuttings have commenced to callus previous to the emission of roots. They may be kept a little drier and given a little ventilation, more especially if they are inside a propagating case. In the course of three weeks, with a bottom heat of 60° and top heat of 50°, roots will have commenced to form, when less water and more air should be given to harden the cuttings. Most varieties of American Carnation will be fairly well rooted in the course of three to five weeks, and the tops will also commence growing at the same time. The hardening off process should keep pace with the formation of the roots, because the cuttings should not be kept a day longer in the propagating material after they are well rooted. This is more particularly the case where they have been inserted in pure sand. When the roots are half an inch long the cuttings should be potted singly, using pots proportionate to their size, and exercising care not to break away the young and brittle roots. The young plants will very soon start into fresh growth if potted at this stage. Leaving the cuttings in the propagating material till the roots harden, gives a check to growth, and makes it proceed more tardily after the operation of potting.

Enemies.

The more persistent enemies of the Carnation while still in the propagating bed are green fly and thrips. They may be kept in check by fumigating lightly on mild and calm nights. A better plan is to paint the hotwater pipes once a week with some preparation of nicotine, which gives off mild fumes not so liable to injure cuttings as tobacco smoke when the atmosphere of the house gets too densely filled with it. Evaporating troughs placed on the hotwater pipes and filled with diluted tobacco water or nicotine extract will give off gentle and continuous fumes that hold the insect enemies in check.

American Carnation Mrs. T. W. Lawson.

Potting off the Cuttings.

Rooted cuttings should be potted with great care, and certainly not more than ¼in. deeper than they were before. A moderate amount of watering in the early stages will suffice. When too deeply inserted in badly drained or overwatered soil, the young plants are liable to rot off at the neck. When the roots show well through the surface of the soil the plants should be repotted to prevent them becoming potbound. The same compost may be used as for tree Carnations. If the plants are intended to be grown in pots throughout the season they should be dealt with in the same way as tree Carnations. This also applies to plantations in the open ground.

Stopping or Cutting Back.

Whether in pots or planted out the young plants should be gone over once a week, and those shoots that are taking the lead should be cut back to induce a bushy habit of growth and secure a succession of bloom in winter. In the case of early varieties, like Mrs. T. W. Lawson, Enchantress, Abundance, New York, Alpine Glow, and Harry Fenn, this stopping may be continued to the end of August. Pinching and stopping late varieties like Flamingo and Prosperity should be discontinued after the middle of July, and in some cases even earlier, more especially if the season is cold, dull and wet. The latest period at which the plants in pots or the open ground may be cut back, thus hinges largely upon the variety and the successful cultivator will not fail to ascertain the peculiarities of every one under his charge and treat them accordingly.

Disbudding.

When flowers of the largest size are desired the lateral buds of each cluster must be removed at the earliest possible period, that it can be done without injuring the stem or the terminal bud. One bloom only should be left upon each flowering shoot —the terminal one. Naturally late flowering varieties may be induced to advance more rapidly by the timely removal of the supernumerary buds. This operation is not so drastic as in the case of show Carnations and Picotees, because the American varieties produce many flowering shoots on a plant.

LIST OF AMERICAN CARNATIONS.

Abundance (R. Fisher).—Flowers large, pure white, early, produced with remarkable freedom on long stiff stems.

Adonis (Witterstaetter).—Large, handsome in form, rich red or scarlet, fragrant, produced on long stems.

American Carnation Prosperity.

Alpine Glow (C. W. Ward).—Bloom salmon pink at first, the reddish tint deepening when fully developed and lasting well, early, profuse, continuous, 2½-2¾in. across.

America (E. G. Hill, 1899).—Flowers large and handsome, salmon scarlet, very productive.

Britannia (A. Smith).—Flowers bright red, with broad nearly smooth petals, floriferous, and 3-3½in. across.

Candace.—Flowers clear pink and of fine quality, thrown up on long, wiry stems; constitution robust.

Cardinal.—Flowers rich scarlet, well built, 2½in. to 3in. in diameter; plant of upright habit, with 2ft. to 3ft. stems.

Christmas Eve.—Bright scarlet, very productive and valuable for cut flowers for market.

Crusader.—Blooms large, bright scarlet, of high quality; plant early, perpetual blooming and of easy cultivation; stems 20 to 30in. high.

Empress.—Bright crimson, shading to fiery scarlet at the base, strongly fringed, fragrant, 3-3½in. across; plant very vigorous with stems 2½-3ft. long.

Enchantress (Peter Fisher).—Flowers large, delicate silvery pink, produced on long, wiry, gracefully arching stems. (Syn. Fascination).

Ethel Croker.—Flowers peach-pink; plant of easy cultivation.

Ethel Ward—Blooms rich rose-pink, well formed, very strongly fragrant, and keeping well when exposed to the sun.

Evelina (R. Witterstaeter).—Large, pure white well built flowers, of good texture and fragrant; plant of free growth, early, vigorous and of good habit.

Fair Maid.—Of large and handsome size, well built, rosy pink and attractive.

Fiancée (Fred Dorner).—A beautiful, clear, warm pink of very large size; plant robust and flowering continuously.

Firefly.—Free, early and continuous; flowers large, rich scarlet, 2½in. across.

Flamingo.—Large brilliant scarlet or crimson-scarlet flowers, toothed on the edges and fragrant; a very handsome variety.

Floriana.—Flowers well built; rosy pink, 2½-3in. across and resisting the sun; a charming Carnation.

General Gomez (C. W. Ward).—Brilliant scarlet, shading to maroon, durable in colour, full, fringed, fragrant, and 2½-2¾in. in diameter; calyx does not burst.

General Kuroki.—Flowers fiery scarlet, slightly toothed at the edges, fragrant and over 3in. in diameter.

General Maceo (C. W. Ward).—Brilliant scarlet,

shaded maroon, deeply fringed, 2½-2¾in. across, produced on wiry stems, 1-1½ft. long; growth vigorous. Parentage Winter Cheer x Meteor. (It is the parent of many of Ward's most valuable varieties.) See illustration.

G. H. Crane (F. Dorner, 1899).—A large-flowered, fragrant, very productive, early and perpetual variety of a brilliant scarlet; calyx does not burst; plant robust and of good habit.

American Carnation Queen Louise.

Gold Nugget (F. Dorner, 1898).—Rich yellow, with a few red markings, early and continuous.

Governor Roosevelt (C. W. Ward, 1901).—Flowers of great size, deeply fringed, rich dark crimson, very double and highly attractive.

Harlowarden.—Dark crimson, tinted with maroon towards the edges, with deeply toothed petals; calyx very firm; one of the best of its colour. (See illustration).

Harry Fenn (C. W. Ward).—Early, free, and perpetual bloomer, at its best about the beginning of November; flower crimson-scarlet, on stems 1½-2ft. long.

Helen M. Gould.—A clear pink sport from Enchantress, striped or variegated carmine; appears dark pink at a short distance.

Her Majesty.—Large, well built flowers, pure white or sometimes faintly striped, and produced on stout stems, 2½ft. long.

Indianapolis.—Clear, bright pink, 3in. across and does not burst; stems 2½ft. high.

Jessica.—Flowers 3½-4in. across, well formed, and pencilled scarlet on pure white.

Judge Hinsdale.—Flowers white, heavily edged pink, fragrant, lasting well.

Lady Bountiful (Fred Dorner).—A large, pure, glistening white flower, at its best after December 1st; calyx does not burst. This and White Perfection take the lead amongst white varieties. (See illustration).

Liberty.—Blooms large, bright red, free, early and perpetual; plant dwarf, bushy and of easy culture.

Lillian Pond.—Blooms pure white, very fragrant and highly attractive.

Lizzie McGowan (Carl Schaeffer).—Flowers large, pure white, fragrant; petals not too numerous; calyx does not burst. Put into commerce 1890 and shown at Chiswick in 1891.

Madam Melba.—Flowers of a charming pink shade, large, finely formed, very fragrant; stems long and stout; blooms early, free and continuously.

Melody (W. C. Hill).—Delicate salmon pink, early not very liable to burst, and produces more flowers than Enchantress, from which it is a sport.

Mrs. H. Burnett (Burnett).—Soft salmon-pink, large, moderately full, with slightly toothed petals and refined in appearance; calyx over 1in. long.

Mrs. M. A. Patten.—Large, marked with bright pink on a white ground, scented and of attractive appearance. (See illustration).

Mrs. Theodore Roosevelt (C. W. Ward).—Brilliant cerise, tinted with carmine in the centre, very double with broad outer petals and 3in. to 3½in. across; calyx well built; stem stout.

Mrs. Thomas W. Lawson (Peter Fisher, 1895).—Flowers bright rose pink, large, fragrant; stems stout; growth vigorous. (The 30,000 dollar Carnation). See illustration.

Nelson Fisher.)—Flowers dark rose or cerise, 3-3½in. across, handsome; calyx rarely bursts; plant of vigorous constitution.

New York.—Light but bright cerise, early, free and perpetual blooming and 2½-3in. across; calyx well built; habit erect, vigorous.

Octoroon.—Large, beautifully formed, very double, fringed and finely scented flowers; calyx long, stout and seldom bursts.

Prosperity.—Marked with pink and rose in radiating lines on a white ground, fringed and fragrant; a late blooming variety. (See illustration).

Queen Louise.—An early and continuous bloomer, clear white, floriferous. (See illustration).

Robert Craig (C. W. Ward).—Flowers of large exhibition size, bright scarlet, very fragrant, bluntly and shallowly toothed, very full and freely produced in winter.

Royalty.—Salmon-pink, beautifully formed, strongly scented and borne on long, wiry stems.

Sunbird.—Flowers large, well formed, freely and continuously produced, early and bright yellow; the best of this colour.

The Belle (Fred Dorner).—Flowers large, pure white, freely produced and little liable to burst the calyx.

The President (C. W. Ward).—Large, dark crimson, fragrant, recalling Uriah Pike in colour and of prepossessing appearance.

Vesper.—Large, pure white flowers of fine quality, profusely produced on good stems; calyx does not burst; grass plentiful. Considered one of the best market white varieties in America.

Victory.—Flowers large, very full, floriferous, brilliant scarlet, with broad shallowly toothed petals; calyx long, firmly built.

White Enchantress.—A white sport from Enchantress.

White Lawson.—Usually pure white, but sometimes with a bar or two of red.

White Perfection (Fred Dorner).—Flowers of splendid form, 3½in. across, pure white, more

floriferous than Lady Bountiful, of good habit, early and continuous; calyx does not burst.

Winsor.—Clear silvery pink—a shade between Enchantress and Lawson. Flowers larger than the latter, and freely produced considering their size.

XII.—THE CARNATION IN TOWN.

It has been proved by all classes of cultivators that the Carnation can be grown with success in towns, even if not to the same perfection as in the country. Some even describe it as delighting in the smoky, filthy atmosphere of large towns, but that view of its likings is scarcely correct. The probabilities of its success as a town flower are better expressed in the words of the late Shirley Hibberd in a lecture delivered to the National Carnation and Picotee Society in July, 1881:—"It is an interesting and somewhat remarkable fact that the Carnation and its several relations, as Pinks, Picotees, and the like, endure with patience the smoke and dust of great towns. Mr. E. S. Dodwell has put the capabilities of the flower in this respect to the severest test imaginable, for he brings forth from year to year the most perfect blooms, taking a fair share of the prizes, as in the memorable year 1850; and his garden is favoured by a railway company with a perennial shower of black night and day the whole year round."

Mr. Dodwell at that time had a garden at Clapham where he grew the show Carnations and Picotees with which he figured as one of the two ardent florists who took all the leading prizes at Slough and Derby where the two first shows of the National Carnation and Picotee Society were held in 1850, the year of its foundation. Show Carnations and Picotees of the old florists' type are usually regarded as amongst the most difficult to cultivate. Mr. Dodwell found the yellow ground Carnations the most troublesome in his garden at Clapham, but this was only a repetition of Hogg's oft quoted statement that the yellow Picotee was a delicate exotic." Hogg lived at Paddington Green.

Mr. Martin Rowan lived for many years in the same district of London as E. S. Dodwell, and being an ardent florist and a successful competitor, grew the same class of flowers. Mr. Rowan said that while the Rose, and other old favourites, were being

ousted from the smoky town, the Carnation dressed itself in its best garb.

More recently the exhibition table has been graced with winning stands of Carnations grown at Streatham Hill.

I have also witnessed healthy and vigorous Carnations in the Victoria Embankment Gardens at Charing Cross, and likewise at Roehampton, both under glass and in the open. Old Cloves, selfs, fancies, and other Carnations, Pinks and hybrids of the Dianthus family, were grown in quantity for more than 20 years, by the Royal Horticultural Society at Chiswick, before relinquishing their gardens there. A more unlikely place for Carnations than Chelsea could scarcely be imagined, yet show Carnations, white and yellow ground Picotees, border and tree Carnations in great variety and considerable quantity have been grown with remarkable success for many years in that densely populated part of London, and overgrown field of bricks and mortar. Highgate has long been a great centre for the popular flower, and fine beds of Marguerite Carnations have been bloomed in Finsbury Park. Old Clove and other border Carnations also flourish in the open at Kew. Many first-class seedlings of show Carnations, which annually take prizes at the leading exhibitions, specially devoted to this flower, were raised by Dodwell, while still at Clapham. In the provinces again we are confronted with the fact that Mr. Simonite raised some of the finest existing varieties of Carnations in the smoky, filthy atmosphere of Sheffield. The weavers and other artisans of Yorkshire and Lancashire have long been known as ardent cultivators of Carnations and other florists' flowers.

Harking back to the olden times one cannot overlook the fact that Mr. and Mrs. Tuggie, of Westminster, contemporaries of Gerard in 1597 and later, were the most noted florists of those days, and amongst other flowers grew a splendid collection of Carnations, where now there is scarcely room to plant a greenhouse. Gerard also grew a collection of Carnations, including the yellow one, in his garden at Holborn, then a suburb of London.

The Carnation in a wild or untended condition is also said to haunt the habitats of man, but that is merely because old walls and castle ruins furnish

congenial foothold of stone and mortar similar to the conditions it finds on its native banks and rocks of limestone. The wild Carnation is abundant in some parts of Normandy and has been witnessed as recently as 1874 by Ellacombe on the old castle walls of Falaise in which William the Conqueror was born. The late Mr. Burbidge also observed it growing in abundance on the donjon keep of Chateau Gaillard, high above the bed of the Seine. He also speaks of it as flourishing, healthy, and happy on the limestone walls of the Trinity College Gardens, Dublin. It has long been recorded as naturalised on the ruins of Rochester Castle, Kent, and still existed there quite recently.

In all these habitats the Carnation flourishes without any attention on the part of man. Flowers are produced in abundance every year, and the foliage assumes that natural rich sea-green hue characteristic of health. There is no damping off in winter, and eel-worms have no chance of penetrating the roots or destroying the foliage. Though subjected to a scorching sun in summer, a very low temperature in winter and exposed to every gale that blows, the Carnation maintains a healthy and vigorous independence.

All this should furnish us with a useful object lesson as to the natural likings and requirements of the Carnation. It is a plant of the rock and wall, like the Wallflower, Snapdragon, Pink, and Erinus. In the rich soils of our gardens, subjected to a mild, moist climate in winter, it is like a pampered and overfed domestic animal, liable to many ailments, which its constitution undermined by highly artificial conditions, is unable to resist. For these same reasons it should not be planted in heavy clay soils to stand the winter, but grown in small pots and sheltered from rain and melting snows, in cold frames with a maximum of ventilation except when the soil is frozen hard. Under the latter conditions, that is, when a bright day succeeds a very low night temperature, it would be well to tilt up the lights at the back, and throw a light shading over them to prevent a material rise of the temperature, which would be detrimental rather than beneficial to the plants. The hardiness of the wild plant is unquestionable, but even the high bred varieties of the florist have not been materially altered in this respect. The more succulent stems and foliage of the cultivated forms have to be

reckoned with, as well as individual variation arising under cultivation, and forms selected and preserved by the care of man. This even applies to the cultivated races of the wild Cabbage, native to the rocks and chalk cliffs of our own sea shores.

Another obvious reason for the successful cultivation of the Carnation in large or smoky towns, is the smooth character and more or less upright habit of the leaves. The surface does not retain the soot, dust, and other filth, which falls from the atmosphere during foggy times, to anything like the extent that plants with soft and hairy or wrinkled leaves do. Every shower that falls serves to wash the foliage, thus allowing it to perform its respiratory and other functions.

The foregoing remarks also prove that all the races of the Carnation may be cultivated with success in town gardens, large or small, provided they are placed under conditions suitable to their welfare. Those who are most familiar with the old florists' varieties are most emphatic in their declaration that such types are as hardy and as easy of cultivation as the self and other border varieties. The success of these types in the open air in the north of England, is a revelation to those who have seen them. Complete success also attends the cultivation of seedling Carnations, not merely in the south but in the far north of Scotland, where the temperature often falls considerably below zero in winter. Before the summer bedding craze made its influence felt, fine named varieties of Carnation were grown for exhibition purposes, even although they were propagated in the old fashioned way from cuttings, previous to the adoption of the system of layering. At the present day Carnations of the finest named varieties are extensively cultivated in the south and west of Scotland. This should dispose of the question of hardiness. The districts in which they are grown to the greatest extent are overrun with the smoke fiend, belched out from smelting furnaces, mining chimney stalks, and manufactories.

No one with a due observance of the possibilities of our climate in winter would think of planting out Malmaisons tree and American Carnations and Marguerites, because they grow and flower at a period when healthy or satisfactory growth and serviceable flowers would be impossible. Artifically

induced habit requires artificial treatment for the preservation of the selected types.

Situation and Aspect.

Sunshine and air are primary requisites in the successful cultivation of Carnations, and these may be secured by the careful selection of site or position, even in the smallest gardens, unless too closely shut in by houses or overshadowed by tall trees. Whether grown in beds or borders, the plants should have an open exposure to the south or some point between south east and south west, even if only for half of the day. The close proximity of trees or hedges is undesirable, both on account of the shade and the dry and impoverished condition of the soil permeated by the roots. These are conditions which the careful cultivator and observer will soon learn to avoid. Light and air are necessary to harden the foliage, strengthen the stems, fortify the constitution, and enable the layers to develop a full and vigorous root system. Nor must the plants be weakened in winter by too long continued and unnecessary coverings under the mistaken idea of affording protection.

Cultivation.

Any good garden soil will serve to grow Carnations in town gardens, and the same method of dealing with it for border Carnations will also serve in this case. In like manner, if the soil is light they may be planted in September or early in October; and if heavy, the plants may be wintered in small pots in cold frames. The last named method will be found the most practicable in densely populated and low lying districts, where fog and smoke hang long and heavily over the neighbourhood.

Those who intend to grow for exhibition will find it the most convenient and best method to grow the requisite number of plants in pots, and to treat them precisely as described under "Show Carnations and Picotees.'

A few cultivators advocate the plan of mulching the ground with stable or cow manure, but the plan is scarcely to be recommended, as it keeps the ground cold, prevents its aeration, and encourages fungoid enemies, insect pests, and ell-worms around the neck of the plant and the lower leaves. Overfed soil, especially heavy ones and those which contain much decaying vegetable matter or humus,

are always detrimental to the welfare of Carnations, more especially in towns where the light is weak during the long damp winter. Damp rather than a low temperature is the great enemy of the Carnation in winter.

Frequent stirring of the surface soil with the Dutch hoe or planet junior, is of primary importance in keeping down weeds, aerating the soil, and preventing the loss of soil moisture by evaporation. In unusually warm and droughty summers, a mulching of the ground may be given with cocoanut fibre or road and street sweepings, which usually contain much horse droppings and grit. Both these materials are light and open, thus permitting the aeration of the soil and roots. The top-dressing may be put down in June and removed at the end of the flowering season or just prior to the propagation of the plants by layering. An occasional top-dressing or dusting of soot during the growing season, is a safe and effective fertiliser, stimulating growth and giving colour to the foliage.

Enemies.

Besides eel-worms already mentioned, leather jackets, wireworms, and aphides are arch enemies of the Carnation, and occasionally find their way into town gardens, introduced by soil, water, or manure. These enemies and the remedies for them are discussed under "Insect and other Pests of the Carnation." This also applies to aphides or green fly, which are the most persistent enemies to Carnations in the open and under glass, summer and winter. The undue amount of shelter always attendant upon small and confined town gardens is highly favourable to the multiplication of aphides, but with close attention and ready measures they can be held in check.

XIII.—HABIT CHANGED BY METHOD OF PROPAGATION.

There is a peculiar trait or characteristic of the Carnation under cultivation, which does not seem to have received general recognition amongst the numerous growers of this favourite garden flower. Gardeners are familiar with what are known as sports among Chrysanthemums. Buds arise on new varieties, a few years after they have been raised from seeds, which produce flowers of a different colour from that originally borne by the plant. Cuttings taken from shoots developed from such buds usually grow into plants which reproduce the new colour and the sport is said to be fixed.

The above refers entirely to colour variation, but some plants give rise by bud-sporting to shoots, branches or stems, which differ entirely in habit from that of the parent. Such sports arise naturally and can be perpetuated by budding or grafting; but in some plants a distinct habit of growth may be induced by the method of propagation, in other words by artificial means. This latter trait is, apparently, most often met with amongst plants, which have long been subjected to artificial treatment under cultivation. Either in a state of nature or in plantations or shrubberies, trees often give rise to branches of pendent or drooping habit, and may be perpetuated by the usual methods of budding or grafting, thus forming weeping trees. Many Roses after having been grown as bushes for longer or shorter periods develop tall, rampant growing stems, which continue this habit of growth when made to carry on a separate existence by propagation. Instances are Climbing Devoniensis, Climbing Caroline Testout, and Climbing Captain Christy.

Carnations furnish more remarkable examples, for they can be dwarfed or made to grow taller by the will of the cultivator. The late E. S. Dodwell stated that Carnations of the florists' type, if propagated by pipings or cuttings taken from the

flowering stems, had a tendency to develop a "tree" habit, throwing out shoots from stems that continued to elongate, and which could not be layered in the ordinary way, but had to be perpetuated in the same manner as a tree Carnation. This was discovered when propagating seedlings, which flowered on all the basal shoots and had to be perpetuated by means of pipings from the flower stem.

The above was confirmed by the experience of one of his correspondents. It was also the experience of the latter that layers constantly gave rise to plants with an abundance of grass at the base of the stems. Another striking fact was that pipings taken from the flower stems bloomed ten to twenty days later than plants from layers; and the period of flowering was retarded till September or October, when pipings were taken late in the season. This was more decidedly emphasised when the plants furnishing the pipings were of weak growth. It also occurred to this correspondent that fine exhibition varieties might be systematically propagated in this way with the view of getting plants to flower in mid-winter or early spring.

Mr. C. W. Ward, the author of "The American Carnation" also had a curious and interesting experience. He was in the habit of raising large numbers of seedlings annually and growing them like Tuberous Begonias in the open field for the purpose of selecting the best for further trial. One autumn, after all the promising varieties had been placed under glass, he discovered a plant with a large brilliant scarlet flower at the end of a long trailing stem. It was lifted from the frozen ground and propagated by bud sports till it assumed a dwarf habit and became one of his most profitable varieties, both commercially and as a parent from which many of his best productions have since descended.

He further observed that like produced like when selecting cuttings for the propagation of named sorts. Strong cuttings from vigorous plants repeated the characters of their parents, and those from diseased, stunted, or weak plants repeated themselves. Buds giving rise to colour variations could be fixed by continued selection of cuttings from the sport. By repeatedly selecting cuttings from abnormally leafy shoots, showing little inclination to bloom, plants were obtained that failed to bloom after being cultivated for two years. Several

strains can, indeed, be raised from one parent by selecting bud variations.

All these facts are not merely of scientific interest, but may be turned to practical utility by intelligent and observant propagators. In the early days of Carnation culture in America cuttings were taken from the base of the plant, all the rest being retained for the production of flowers. Where this practice was continued over a number of years the plants degenerated to leafy flowerless bushes. At the present time the basal shoots are disregarded as well as those towards the top of the flowering stem. Cuttings are now selected from the middle of the flowering stem by the growers, and the result is healthy plants of vigorous growth, producing an abundance of bloom, carried on long stems. The cuttings are considered fit for removal from the plants and in a suitable stage of maturity for rooting when the flower buds are nearly on the point of expansion. Some varieties, however, are so late in developing suitable wood for propagation, that the flower buds have to be removed to encourage the growth of leafy shoots for cuttings.

The leafy and flowerless condition of the American Carnation is by no means of rare occurrence, for the inexperienced and those who are unaware of this liability of the plants to degenerate, propagate these vigorous looking plants until their stock becomes practically worthless. In the early days of Lizzie McGowan, a grower, thinking he had discovered a vigorous form of the variety naturally secured all the cuttings he could get until he had a houseful, and when rooted they grew into vigorous branching plants like the parent, but they failed to bloom. More recently another grower had a similar experience with a variety of more recent origin. The flower stalks ran up to a height of 18in. and then produced leafy shoots of similar character to the first but no flower buds. This is an experience which can only happen to the grower who has recently taken up the cultivation of Carnations, and has not previously made himself acquainted with the peculiarities of this particular flower. In any large batch of plants one or more individuals of this strong growing leafy character may make their appearance, and the propagator is tempted to avail himself of what appears to be a fine lot of healthy cuttings, but he should be warned to let them severely alone.

XIV.—SPORTING OR RUNNING OF CARNATIONS.

Carnations are as liable to sport or more so, perhaps, than any other florists' flower, and for a great number of years has given considerable trouble or disappointment to growers of this favourite flower. Of two or three plants raised from cuttings or layers the previous year and grown under the same conditions of soil, temperature and moisture precisely, one may bear flowers of a different colour from the rest, though all were cut from the same plant. The aberration, if such it may be termed, is of long standing and of frequent occurrence, having been mentioned by Thomas Hogg, writing in 1819.

Other flowers offering parallel cases at the present day are the old English or florists' Tulips, Pansies, Violas, Dahlias, Chrysanthemums, and Sweet Peas. The most interesting and remarkable case, perhaps, is that presented by Laburnum Adami, which has dusky purple flowers, giving rise on the one hand to the large yellow flowers of Laburnum vulgare, and on the other to the smaller, pale purple flowers of Cytisus purpureus. It is likewise of very frequent occurrence in Ten-Weeks and East Lothian Stocks, which being annually raised from seed give the grower less uneasiness than when his favourites are valuable named varieties perpetuated by cuttings or layers.

Any variety of Carnation may give rise to sports, but most disappointment has been caused by the sporting or "running" of the fine Scarlet and crimson Bizarres and Flakes. The white ground colour of the former may be obscured and marred by the suffusing or running of some of their colours over it, thus destroying one of the essential properties of a Bizarre. Flakes may behave in the same way or give rise to flowers of a uniform hue, or self colour.

Some writers and growers have attributed this behaviour to an over rich compost, and others to a poor and infertile soil; but when an attempt was made to prove this theory by experiment the

results did not justify the supposition. Composts have been made up of two-thirds decayed animal manure and one-third loam, and the proportions have been reversed, but in both cases an equal number of flowers were run. Too much animal manure in the compost cannot be otherwise than injurious to the health of the Carnation, though this need not necessarily take the form of run flowers. A large proportion of manure may cause rank, sappy growth, liable to encourage fungous attack, or even to import eel-worms or nematoids; or on the other hand to destroy the root system by retaining too much moisture about them during winter.

Cold, wet summers have been regarded as the principal cause of this evil, but experienced cultivators, from the time of Thomas Hogg downwards, have observed that sporting has been more prevalent in dry, hot seasons, than in cold, wet ones. Violas, Ten-Weeks Stocks, and East Lothian Stocks often give a large percentage of striped or variegated flowers in dry, hot weather, and in shady situations as if constitution were being weakened or played out for lack of sufficient moisture in the one case and sunshine or general exposure in the other.

There is another and more important fact in connection with all florists' flowers, that have been cultivated and intercrossed with one another, over a long series of years, and which seems to be overlooked or ignored by writers on the Carnations. Colours are stable in proportion to the length of time they have existed, or, in other words, to their antiquity. The more they are intercrossed and the more recently, the more unstable, as if unable to maintain their highly complicated and recently acquired characters. It is impossible now to trace the genealogy of modern Carnations, except to comparatively recent parents; but there can be no doubt that accidental and systematic crossing have rendered the colours highly unstable by the blending of colours and characters that may be antagonistic to one another, so that in time the more prepotent gain the mastery so to speak.

The original, wild Carnation had pink or pale rose flowers, the colour being equally diffused over the whole petal. In rare cases an albino or white variety occurs, but more frequently in batches of garden seedlings If the white and the rose varieties

are intercrossed an element of instability is immediately introduced. Some of the progeny may be intermediate, but others in all probability will approach either parent in colour. After some years any of the varieties may give rise to bud sports in which the colours of the two parents have become separated. This is much more likely to occur in crosses of recent origin. A dark flowered variety may sport, giving rise to a white flower or a variegated one. Mrs. T. W. Lawson may be cited as an instance; it was raised in 1895, and after a few years cultivation gave rise to a red, a white and a variegated variety, which have been perpetuated as distinct colour varieties. Cultivators of Bizarre and Flake Carnations in this country have always looked askance at these variations, and do not propagate them, because they do not conform to the rules or canons which insist that the ground colour of these flowers should be white. When the ground becomes equally suffused with pink, rose, or other colour it may be regarded as an attempt at reversion. A pure self sport of any colour may also be regarded as a reversion to one or other of the parents or to some ancestral type. The same or a similar explanation would seem to apply to Bizarres and Flakes themselves, in which the separation of colours is only partial, and still highly unstable. Picotees are not or scarcely at all liable to have the white ground colour overrun by some other shade by sporting though this is of frequent occurrence amongst seedlings. The albinism of Picotees is on a par with that of the Shirley Poppy, where the colour is transverse to the petal and confined to the edge.

Many cultivators are of opinion that run flowers never revert to their immediate parent, but this is not strictly correct. Robert Houlgrave, a scarlet Bizarre, gave many run flowers when first put into commerce, but most of these defaulters reverted to the colour of the parent. Furthermore if run-flowered varieties are propagated they may return to the original next year. The sport is often unstable, but if worthy of cultivation it may be fixed by repeated propagation and weeding out the rogues that may arise. New varieties of annuals, raised from seed are fixed by a similar process.

XV.—FUNGOID DISEASES OF THE CARNATION.

That Carnations may be affected by fungoid disease has been known in this country for the last 36 years, seeing that the Rev. M. G. Berkeley described Helminthosporium echinulatum in 1870. Since then several other forms of fungoid diseases have done a greater or less amount of damage amongst Carnations, notably Carnation Spot (Septoria Dianthi) which is fairly common but not so much dreaded as the Helminthosporium. Both of these fungi live in the interior or tissue of the leaves and thus render their immediate eradication impossible, though by persistent attention both may finally be got rid of. With the great increase of Carnation culture it is to be expected that enemies will increase in numbers and kind, but a knowledge of the conditions under which they thrive and multiply or extend enables the Carnation grower to hold them in check, eradicate them or prevent them from getting a footing. The less experienced or less careful growers may always expect to suffer from the ravages of these diseases, but if they would enjoy imunity they must avail themselves of the knowledge put at their service by the experience of others and profit from it by diligently applying the remedy.

Carnation Rust.

The above name has been applied to two distinct species of fungi at least, owing to the similarity of the spores produced in the earlier or summer stage of growth of both, which belong to the same natural order. Carnation Rust applies very appropriately to Uromyces caryophyllinus (Schrank). It appears first as a slight elevation on the stem or leaf; and this swelling first becomes pale then dark brown as the spores mature beneath the skin. Later on the swellings burst disclosing dark brown powdery spots consisting of masses of spores. Two forms of spore are produced by the fungus, the first or uredospore being thin walled and capable of germinating at once if the conditions as to heat and moisture are favourable to its growth. In the presence of a moist atmosphere these spores quickly

germinate and thus communicate the disease to healthy plants. Later on another form of spore, the teleutospore, is produced of a darker colour with thick walls. This is the resting spore or stage in the life cycle of the fungus, and enables the latter to tide over dry or cold periods when it cannot grow. With the advent of favourable conditions the teleutospores germinate and recommence the life history of the fungus.

Rust has given a considerable amount of trouble in America to Carnations in every stage of growth. The United States Department of Agriculture found by experiment that the best plan is to allow the fungus to exhaust itself after which it becomes played out. Mr. C. W. Ward says that after this stage some healthy plants will remain and if propagated will be found more or less disease resisting. He had never seen plants entirely killed by this disease, even though the growth was checked for a time. The plants ultimately grow out of it.

REMEDIES.—The best of all precautions is prevention, by maintaining a sweet and airy atmosphere and a night temperature not lower than 50deg. by night. A close moist atmosphere and a high temperature are favourable to the fungus which, therefore, often proves troublesome to cuttings while being rooted. Bordeaux Mixture is often recommended to be used in the form of a spray upon affected plants, after cutting off and burning the worst of the leaves. This is made by dissolving 6lbs. of sulphate of copper in water; 4lbs. of quicklime in another vessel, and then mixing the two. Water is then added to make up the bulk to 22 gallons. The mixture should be thoroughly agitated to prevent the fungicide from settling down in the form of a sediment during the process of spraying.

Potassium sulphide at the rate of ½oz. to the gallon of water is another remedy. The sulphide should be dissolved in hot water In the application of this as well as Bordeaux Mixture it must be remembered that only the spores can be killed after they break through the tissues of the plant. Diseased plants should be sprayed, however, before the scattering of the spores, but as near the time of the bursting of the swellings as possible; and if healthy plants are sprayed at the same time the spores will be unable to germinate upon them.

Carnation Spot.

The above is a well-known disease of Carnations on both sides of the Atlantic. It is also known as Leaf-spot, Septoria Dianthi Desm. and Uredo Dianthi. The fungus lives in the tissue of the leaves and when about to develop its spores it produces circular or oval spots surrounded by a dark purplish band. The grayish centre is marked with black specks, which consist of the fungus breaking through the skin of the leaf to develop and scatter the spores. This fungus also attacks the stem, though the spots are less well defined than on the leaf. If the disease happens to extend across the leaf the portion above the spot dies.

Whether in pots or in the open ground, Carnations get affected by Spot under unfavourable conditions. In the open they are most likely to get attacked during long spells of cold wet weather during summer or autumn. Under glass a stagnant, moist atmosphere is most to be dreaded by Carnation growers, and means should be taken to dispel the moisture. This applies not merely to the plants themselevs but also to the cuttings of tree and American Carnations while being rooted during winter or spring, under the moist conditions of the propagating case or in pits.

REMEDIES.—Whether in the open or under glass Carnation Spot may be combated by the same fungicides as recommended for Carnation Rust. Spraying with Bordeaux Mixture or potassium sulphide can only act by destroying the spores, preventing them from germinating, and thus holding the fungus in check. Cuttings being rooted should have the worst leaves removed and burned. The spraying should be done early in the day, so that the foliage may get perfectly dry before night. A bright day should be selected for the operation.

Carnations in pots should be kept cool and dry, avoiding spilling water in the house. Less water will be required by the roots in winter, but they must not be allowed to suffer. The worst leaves may always be removed and burnt, especially when attacked in autumn. When the plants commence growing in spring the disease often disappears. Plenty of ventilation night and day, except in the severest weather, is of the utmost importance in maintaining the health of Carnations. The crowding of the plants must at all times be avoided, and

the old-fashioned custom of mixing Carnations with broader-leaved subjects must not be tolerated. A low temperature, except in the case of plants in bloom, and plenty of light and air are good preventives of spot.

"Carvita" and "Veltha Emulsion" are fungicides which have been found very serviceable by gardeners for checking rust and spot. The plants must be taken off the benches before spraying them with Veltha Emulsion to avoid wetting the paint of the woodwork, which it turns brown. This precaution should, indeed, be taken with most fungicides.

Overfeeding, especially in winter, when light is

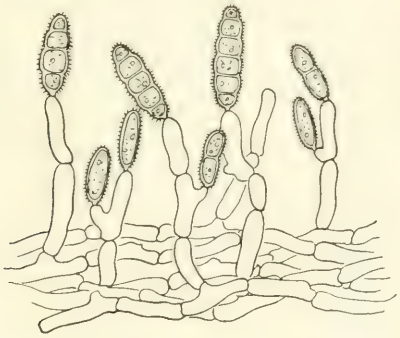
FAIRY RING SPOT OF CARNATION.
(Heterosporium echinulatum.)

weak, is another fertile source of disease by weakening the plants. Individual specimens, even in contact with diseased ones, may, and often do, remain healthy, but this may be due to the firm and mature condition of the wood and foliage. Rare varieties threatened with extinction may be put into heat to encourage fresh growth, and healthy cuttings secured for rooting and getting up a fresh stock.

Fairy Ring Spot.

The above disease was described by Berkeley in 1870 under the name of Helminthosporium echinulatum. In the United States, Heterosporium echinulatum, Cooke is the name adopted. Carnation disease and Leaf-mould are popular names for it,

but Fairy Ring Spot is very appropriate and distinctive. (See illustration of Fairy Ring Spot.) In its early stage Fairy Ring Spot may be detected as a small elevated knob, or discoloured blister, and nearly circular in outline. The spot becomes brown and indicates that the spores are escaping owing to the bursting of the skin of the leaf. As the opening becomes larger the dark brown spores cover a larger area of the leaf surface, and the spot presents different shades of colour according to the density or number of the spores. The fungus radiates from the centre, and the spot becomes an oval patch, or two or more patches may unite in one of irregular outline. The dark and light colours of each original spot, however, are arranged concentrically, like miniature fairy rings, hence the applicability of the



FAIRY RING SPOT OF CARNATION.
(Heterosporium echinulatum.)

popular name. The whole surface of the leaf, both the upper and under sides, may soon get covered with these brown patches, and its case becomes hopeless owing to the destruction of the leaf tissue.

The mycelium of the fungus forms an interlacing, felted mass, and gives off erect branches ,at the tips of which oval or oblong teleutospores are formed. These spores vary with two to six cells, according to their length, and the outer thick walls are covered with projecting points.

REMEDIES.—Fairy Ring Spot is a more destructive fungus than the ordinary Carnation Spot, but it may be combated by the safe remedies already mentioned. The causes which favour Carnation Spot also encourage Fairy Ring Spot.

Bacteriosis.

For many years past a disease has existed in this country, the nature of which was little, if at all, understood. The leaves, especially those of Malmaison Carnations, become more or less covered with pale yellow, or colourless specks, which increase in number till the whole surface becomes involved, turns yellow, and dies. This happens usually during the dull days of autumn and winter. The presence of the malady may first be detected by holding up a leaf against the light, when minute subtransparent specks are apparent to the naked eye.

Bacteriosis has been determined to be due to a minute, one-celled fungus, Bacterium Dianthi, Arth. and Boll. There is no remedy beyond picking off the affected leaves and burning them. Aphides, thrips, and red spider are blamed for puncturing the leaves, and thus making an entrance for the enemy. The careful cultivator will therefore keep these enemies in check, and endeavour to maintain his plants in clean and healthy condition. Prevention rather than remedy is the golden rule in this, as in many other cases of plant diseases. Plenty of light and air, the avoiding of over-feeding, especially in winter, the presence of a moderate amount of atmospheric moisture, are essential to the welfare of Carnations in winter. This applies more particularly to Malmaisons, tree and American Carnations in greenhouses. A night temperature of 50 deg. will be sufficient for most varieties of tree and American Carnations, even when in bloom, but if some of the varieites require a higher temperature to prevent the splitting of the calyx, 55 deg. will generally be sufficient. A considerably higher temperature may be allowed during the day, especially with sunshine, if plenty of ventilation is given .

XVI.—INSECT AND OTHER PESTS.

The insect and other animal enemies of the Carnation are fairly numerous, but not at all in proportion to those which infest the Rose. Strenuous measures, must, however, be taken to suppress them, and if the cultivator keeps a close eye upon his plants for evidence of the first attack it will save him a deal of trouble afterwards. If they are neglected till the pest has become thoroughly established the latter will be more difficult to deal with, and the crippled plants will be less able to resist the maurauders and give but a poor return in blooms.

Aphides

Several species of aphides, or green fly, may at times be found upon Carnations under glass, though the most common and persistent is Rhopalosiphon Dianthi, both under glass and out of doors Under the latter conditions a glaucous variety, closely resembling the colour of the stems and leaves, is very prevalent in this country, so that the cultivator should be careful not to overlook it.

Remedies.—The young colonies usually settle about the growing points and the flower buds, and if taken in time may be rubbed off between the finger and thumb, squeezing them at the same time. Fumigation may be accomplished at intervals amongst Carnations in greenhouses during winter on the first appearance of aphides, or even as a precaution previous to the flowering stage of the plants. Tobacco or nicotine vapour in some form or other may be employed. Where tree and American Carnations are grown a mild form of treatment consists in laying tobacco stems in some quantity over the hot-water pipes and occasionally damping them down, thus causing gentle fumes to rise. Dusting the growing points with tobacco powder is also an efficient remedy. Tobacco extract, or nicotine, may also be evaporated in pans over the hot-water pipes.

After the plants come into bloom the burning of tobacco in the house should cease, as it injures both the scent and the colour of the flowers. Nicotine

vapour, if not too strong, is harmless. The hot-water pipes might even be painted or wetted with a dilute solution in water, repeating the operation once a week. Cuttings put in propogating cases early in the season should first be thoroughly cleaned upon the least sign of aphides.

Carnation Maggot.

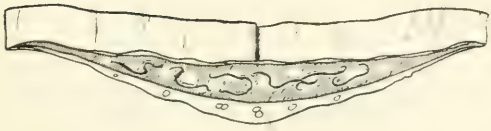
In some gardens and in some seasons this proves a destructive and inveterate pest that must be hunted down and destroyed. The enemy is the grub of a fly (Hylemyia nigrescens), of a brown colour, and similar to the Onion fly. The grub is yellow-white, with a horny process at the mouth, by which it gnaws its way into the interior of the Carnation. The mother fly lays eggs on the leaves, very often the young unfolded ones, and the grub hatching out gnaws its way into the interior, passing downwards until it gets into the stem or axis of the shoot. Cuttings or layers, more especially those in the open air, are most liable to attack. Passing down the pith, and feeding, as it goes, the grub ultimately causes the death of the layer or young plant. For a time after the mischief has been done it takes a keen eye to detect the presence of the enemy, although later in the season the layers show signs of distress by the discolouration and dying of the leaves. The whole central crown comes away in the hand when lightly pulled. The cultivator who is on the alert will carefully test his plants in this way early in the season and immediately commence to hunt for the culprit.

Remedies and Prevention.—There is no insecticide that can prove effective after the enemy has got securely ensconced inside the plant. By applying the above test the cultivator, armed with a sharp knife and a pin, may commence cutting off the stem piece by piece, or cutting it open till he finds the grub The latter may sometimes be picked out with a pin, thereby saving a portion at least of the plant. Occasionally two grubs may be found in the same hole. The grub, if taken in time, may often be intercepted in its passage down the leaf, and thereby prevented from getting into the stem. Its presence may be detected by a pale line on the leaf caused by a burrow under the skin.

Hitherto little seems to have been done in the way of preventive measures; but as many plant enemies may be deterred from laying their eggs by

syringing the plants with something distasteful to them, it might well be made the subject of experiment with Carnation maggot. Syringing the plants with tobacco water, weak petroleum emulsion, or dusting the plants with soot might well be tried. The first application should be made as soon after the plants are

1



2

EELWORM OF CARNATION
(Tylenchus devastatrix.)

1. Plant attacked with Eelworm.
2. Section of leaf, showing eggs at 2, and Eelworms in the middle of the tissue.

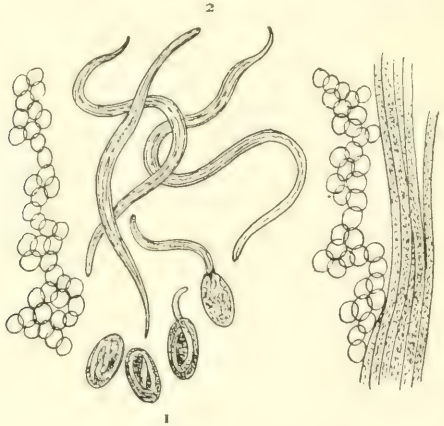
layered, and continued at intervals of a fortnight, where Carnation maggot is known to exist.

Earwigs.

The great enemy of the Dahlia is sometimes a decided enemy of the Carnation, especially in town gardens, where plant enemies are always rife. The

earwig (Forficula auricularia) sometimes attacks the flowers, eating the petals. More often it goes down the centre of the flower, hiding in the cup-shaped calyx, where it gnaws through the claw of the petals, allowing them to fall out.

REMEDIES.—Where the grower finds evidence of damage to the flowers he should examine the calyx, probe it with a piece of wire, or shake the flower, and the culprit will generally be destroyed. Bean stalks or hollow pieces of bamboo should be stuck in the ground close to the flower stems, and large numbers will be caught if present. These traps should be examined every morning and the earwigs destroyed.



EELWORM OF CARNATION.
(Tylenchus devastatrix.)

1. Eggs with eelworms ready to hatch out.
2. Eelworms liberated from eggs.

Eelworms or Gout.

For many years past gardeners in various parts of the country have been troubled with the plants suddenly showing signs of distress and sometimes dying off wholesale, even in the case of Malmaison Carnations in pots. This disposes of the idea that the malady known as "gout" is due, in the first place, to sappy soft growth, and, secondly, to a sudden check to growth by cold weather. The outward evidence of the presence of the malady consists in pale or discoloured patches on the leaves near the surface of the ground. In most, or all cases it will be found that the tissue of the leaves is swarming with nema-

toid worms, otherwise known as eelworms (Tylenchus devastatrix), which are colourless and microscopic in size. They may be found in all stages from the egg to the eel-like creatures still rolled up in the egg shells, and liberated eelworms swimming about freely in the juices of the plant. (See illustration of eelworms.)

REMEDIES.—Cure is impossible after the plants are thoroughly infested with these destructive creatures. Not only are the lower leaves ruined, but the upper ones may be more or less distorted or flagging, especially after sunshine. This is generally a sure indication that the stem itself has also been penetrated, and possibly the roots, by these nematoids, thus cutting off the necessary supply of water to the foliage. Eelworms are brought to the plants in a variety of ways, but the most fertile sources of infection are from the soil, the manure, and by water, artificially applied. The eelworms may be in the tank or in the pond from which the water is obtained.

As cure is impossible, the first aim of the grower should be to save the healthy portions of the plant or plants, if of any scarce variety, and otherwise worth the trouble. The healthy shoots should be layered at once, if that is possible, and the layers severed from the parent and lifted as soon as rooted. If this cannot be done, then cuttings should be taken of healthy shoots clear above the region of infestation. In the case of Malmaison, tree, and American Carnations this is the better plan.

As soon as layers have been rooted in the open ground, or cuttings taken from pot plants, the old stools should be burned. The soil in pots should not be used again for anything, but taken to a distance from the garden.

Watering the plants with lime water should help in destroying eel-worms in the soil. Vaporite sprinkled on the ground and pointed in should even prove more effective. The soil from which diseased plants have been taken in the open ground should receive a good dressing of either, or both, these ingredients, which serve to destroy these low organisms. Sterilising the soil, animal manures, and leaf soil before use should be adopted where eelworms are prevalent and troublesome.

Frog-Hoppers.

The presence of these enemies in the larva state

is so easily detected that only the most careless can overlook them. Happily, except in rare cases, this enemy is not present in sufficient numbers to do any material injury. The damage is done chiefly by the larva or grub of Aphrophora spumaria. This grub is pale yellow or greenish, and may be found on the stems and leaves under a mass of white froth or spittle, hence often named Spittle-fly. It pierces the tissues of the plant and sucks the juices. The perfect insect is a four-winged fly, which moves quickly by leaping, hence the name of Frog-hopper.

REMEDIES.—The grub may be picked out of the froth and destroyed, or the froth may be brushed off on a bright day, thus exposing the grub to the scorching or drying rays of the sun. The perfect insect should also be caught when detected .

Hares and Rabbits.

These are most troublesome in rural districts where woods and plantations abound, or where they come close to the garden. Where game is strictly preserved the grower is unable to protect himself by shooting these destructive creatures, which are usually most troublesome in winter and spring. Wire netting is the only safeguard to prevent them from eating the Carnations and Pinks to which they have access.

Leather-Jackets.

The above is a name given to the grubs of Daddy-long-legs, or Cranefly (Tipula oleracea), which is by far the most common but not the only species. The eggs are laid on or near the base of the plants in August or September, and hatching out about the beginning of May, feed upon the roots, stems, and leaves of Carnations in the open ground, and a host of other plants, till July, August, or the beginning of September, when they pass into the pupa stage, and emerge as long-legged, winged flies soon after. The grubs are slender, wingless creatures, of a dirty earthy, or pale slate colour, and encased in a tough leathery skin, hence the name Leather-jackets.

REMEDIES.—Clean culture is a great preventive of this pest by offering little food or shelter to the perfect insect, and offering the female fly little encouragement to lay her eggs there. Of course, the Carnations will always afford a certain amount of inducement to do this. Nevertheless, weeds of all kinds should be rigidly kept down, and hedges in the vicinity should always be kept clean.

Watering with solutions of common salt, nitrate of soda, and guano are believed to be distatsteful to the Leather-jackets, but Vaporite is even more effective. Seagulls, starlings, and various other birds feed largely on the grubs of this insect, and should be encouraged where possible. A tame seagull might even be kept in the garden. Traps of Potatos, Carrots ,Turnips, and other roots should be set near infested plants, as is done for wireworms, and the traps examined at intervals. With this object in view a peg should be pushed into the Potatos and other baits to facilitate finding them when buried in the soil. Pieces of turf or boards should also be used, as the grubs are given to wandering about at night and hiding beneath anything that affords shelter during the day.

These traps can be examined every morning and the grubs destroyed. The grower will also be able to secure many of the marauders by scraping away the soil round the neck of the plants, where they often lay up in large numbers during the day.

Red Spider.

Carnations kept in a growing state in hothouses during winter are more likely to get infested with red spider (Tetranychus telarius) than those out of doors. Tree and American varieties, kept in a temperature suitable for flowering, and in the dry atmosphere necessary during winter, are those most likely to suffer from this insidious pest .

REMEDIES.—Painting the hotwater pipes with sulphur is a good method of keeping red spider in check. Should aphides be present at the same time the two enemies may be combatted by mixing sulphur and tobacco extract, or nicotine, in water, and painting the pipes with the mixture at intervals. Strong solutions of soft soap and Gishurst compound may also be used for syringing the plants, when the weather is sufficiently bright to evaporate the moisture and dry the plants before night. The solutions should be applied rather forcibly, but in a fine spray, to make it penetrate the fine web beneath which the red spider lives and preys upon the plants.

Common, or table salt is a remedy which has been used with considerable success against red spider by Mr. C. W. Ward in America. He dissolves the salt at the rate of four 6-in. potfuls to 25 gallons of water, and thoroughly sprays the plants through a fine rose. After four days of fine, or two days of

cloudy, weather he washes the plants thoroughly with clean water. The foliage should be firm before this is done.

Sparrows.

During winter and spring, especially if dry, many gardens are terribly infested with sparrows, which eat or destroy the leaves of Carnations, amongst other things, until nothing but the stems are left.

REMEDIES.—Most cultivators and I have found black thread effective in keeping the marauders away. Some inconspicuous pegs should be pushed into the ground to hold the thread just clear of the foliage. The thread should be run crosswise all over the plants.

Soot is sometimes used for dusting the foliage, but even if effective, it cannot otherwise but be detrimental to the welfare of the leaves.

Vaporite should serve to drive the sparrows away by its offensive odour. This insecticide consists of naphthalin combined with a waste product of alkali manufacture, which also gives off a vapour of its own, and the two combined give off a vapour for some months.

Thrips.

During hot and dry weather thrips multiply exceedingly and do great damage to the flowers of Carnations, extracting the colour of red, carmine, and other dark flowers, forming white streaks and spots on the petals. They even penetrate the expanding buds and commit their depredations under cover. Hundreds of them may sometimes be found in newly-expanded flowers. They also suck the juices of the leaves and young shoots, causing them to be distorted. They are very small ,black ,lively creatures in the winged state, and follow the flowers even to the exhibition table. There are numerous species, but Heliothrips haemorrhoidalis is one of the most persistent in this country.

REMEDIES.—Under glass the plants may be repeatedly fumigated with tobacco in some of its many forms. The first application may be given while the flowers are yet in the bud state.

Fumigation once a fortnight with "XL All", a preparation of nicotine, has also proved very effective in holding the enemy in check.

Daily syringings with clean water have been given with fairly good results upon Carnations in the open

air while still in bud. Soft soap and sulphur, as well as Gishurst Compound, have even greater effect, but cannot be used after the flowers expand. The buds may be dusted with tobacco powder while wet. During the flowering season the Carnation grower must combat this pest assiduously.

Wireworms.

These are the larvæ or grubs of certain beetles, known as Click Beetles, Skipjacks, and Snap Beetles. They are slender, yellow, encased in a hard, polished skin, wiry in texture, and furnished with six short legs on the thorax, a little behind the head. Amongst the more common and destructive are the grubs, or wireworms, of Elater sputator, E. obscurus, E. lineatus, and others all known also by the name of Agriotes. They live in grass pastures and corn fields, often doing considerable damage. They are imported to the garden and to Carnation beds along with soil and manure, and get into potting soil with the turf.

Remedies.—In beds, borders, and plantations of Carnations wireworms may be persistently trapped and hunted for by precisely the same methods as adopted in the case of Leather-jackets, than which they are more easily detected owing to their bright colour. As they live in the larva state, under the soil, for three to five years, every wireworm that is caught saves a deal of after trouble. The grubs vary from half to one inch in length, according to the species and their age. They gnaw their way into the stems at the surface of the ground and thus destroy many plants, where the pest is plentiful, often before their presence is detected. Where plants are shrivelling up or break over at the ground line, the stems should be examined for wireworms to prevent them from serving other plants in a similar manner.

Where the ground can be fallowed for a year it can be heavily dressed with gas-lime, forking the latter into the soil. Vaporite should prove even more effective in destroying the wireworms. The ground should also be frequently forked over to expose the grubs to birds, while those detected by the operator should be pickel up and destroyed. The forking over of the soil would destroy many while in the pupa state by disturbing them during this critical stage of their existence. This operation should prove serviceable if conducted during June, July and August.

The perfect beetle is harmless, but many of them could be prevented from laying their eggs by trapping and destroying them at any time from April to August while on the wing. This can be done by laying handfuls of clover in shallow boxes or other vessels in places frequented by the beetles, which lay up under this bait and may be thus secured

Soil for potting purposes should be well examined for wireworm before it is used. Sterilising the soil, either on hot plates over a fire, or by steaming, is worth consideration by every cultivator who suffers much from this troublesome pest. Vaporite might be mixed with the compost a month previous to potting.

XVII —CALENDAR OF OPERATIONS FOR ALL CLASSES.

The object of this chapter is merely to remind readers that certain operations must be conducted during each month of the year if Carnation culture is meant to be a success. Details of the several operations cannot be given here, as all will be found in the operations dealing with the respective classes of Carnations.

The plants must at all times be kept scrupulously clean, and good culture given, both with the view of keeping down insect pests and preventing fungoid diseases. Not every grower has the convenience to grow all classes of Carnations, even if he desired to do so; but those who have an open and sunny garden, even if in a town, can grow border and show Carnations and Picotees. Till within recent years yellow ground Carnations and Picotees were a source of endless trouble, but many of the more recent are of robust and hardy constitution.

JANUARY.

Border Carnations.

Plantations in the open ground will require very little attention beyond keeping the ground stirred and aerated during open and fairly dry weather. Decaying foliage should be cut off with a sharp knife or scissors to prevent it from contaminating the rest or fostering disease. Where the soil is heavy and inclined to clay, or the garden is situated in a smoky town the plants will be wintered in cold frames. Ventilation night and day is absolutely essential to their welfare, even if the sashes are only tilted up at the back. In mild weather the sashes may even be left off entirely, except in the event of heavy rain or snow. Mats may be used during long continued frost, and if the sun should be bright during the day the mats should remain to avoid exciting the plants by the rise of temperature. Very little, if any, watering will be required.

Show Carnations and Picotees.

What has been said with regard to border Carna-

tions in frames will also apply to show Carnations and Picotees in 2½ or 3-in. pots wintered in cold frames.

Turf and leaf mould intended for compost late in February or early in March should be taken under cover to protect them from rain and enable them to get sufficiently dry for the second and final potting of the plants into their flowering pots.

Tree Carnations.

The old plants will still be flowering, but a commencement should be made to propagate them by means of cuttings. Those about 3 inches long are the best, and should be pulled off the main stems with a slight heel, which may be trimmed if ragged, and a few of the lower pairs of leaves removed. Insert them firmly in pots of sandy soil, and plunge the pots in hand-lights on a propagating bed. This will preserve the moisture and keep the leaves plump till roots are formed. The lights may be taken off for an hour or two each morning and wiped dry inside. Panes of glass supported on pegs over the cuttings will serve the purpose admirably in the absence of hand-lights. Each variety should be inserted in a separate pot, as they vary from three to six weeks in forming roots. As soon as rooted place them on a shelf close to the glass. The bottom heat—that is, the heat of the bed—should be about 60 deg., but the atmosphere of the house need not be more than 50 deg. to 55 deg.

Malmaison Carnations.

The plants should be well lighted and ventilated, except in severe weather ,when the ventilators may be closed to avoid the use of fire heat as much as possible. Keep the foliage perfectly dry and the roots on the dry side. If allowed to get dust dry, however, the roots would suffer. A temperature of 40 deg. to 45 deg. will be sufficient, except in the case of those being forced.

American Carnations.

The first batch of cuttings should be prepared and inserted during the month. They require very similar treatment to that given the ordinary tree varieties. Cuttings must not be taken from the strong shoots at the base of the plants, but from the middle of the main stem, as these produce the best flowering plants. The pit will be warm enough at 50 deg. to

55 deg., but the sand of the bench or the bed in which the pots are plunged should be higher, though not over 60 deg., and fluctuations should be avoided as much as possible.

FEBRUARY.

Border Carnations.

After the middle of this month the beds and borders intended for Carnations, still in the cold frames, should be put in order whenever the soil is workable, and the Carnations planted. In the North of England and in Scotland a month later will do. Tread the soil firmly previous to the operation. Where the plantations were made in autumn look them over and make good any blanks that may have been caused by deaths. Then hoe the ground to loosen up the surface.

Show Carnations and Picotees.

Should the weather be mild and open the plants in frames will commence growing this month. Under such conditions the sashes may be drawn entirely off so that the plants may get the benefit of light showers, with the wind in the west or south-west. They should, nevertheless, be sheltered from cutting east winds. Clean the plants, water those that are in any way dry, and prepare them generally for the final potting. Get ready a sufficient number of 6, 7, and 8½ or 9in. pots in which to flower them. The compost should also be made up and thoroughly turned several times previous to use. The different varieties belonging to this section vary greatly in size and vigour, and the cultivator should use his discretion and put one, two or three in a pot accordingly, selecting the pots and plants according to their relative fitness or suitability. In the event of the weather being unsuitable for the operation it may be deferred for a week or two, but not later than the second or third week of March. Pot carefully and firmly.

Tree Carnations.

Cuttings for a successional batch of plants should now be taken and rooted by the method most convenient to the grower as recommended for the previous month. If in any way infested with aphis or red spider, the cuttings should be dipped in a strong solution of Gishurst compound or soft soap in warm

water. Leave them for a short time on the potting bench and then wash them with clean water.

Pot off rooted cuttings singly in small pots and stand the latter on a shelf close to the glass of a house at 50 deg. by night.

Marguerite Carnations.

Those who find this class of Carnations serviceable may make a sowing during this month in a temperature of 50 deg. to 60 deg. by night. The seed pans may be stood on a propagating bed to accelerate germination. As soon as the seed leaves are well developed the seed pans must be placed near the glass in the same house to keep them sturdy. When the first pair of leaves are well advanced the seedlings may be transplanted into boxes of fresh soil and this will urge them into healthy growth. They may next be potted singly in thumb pots when two or three inches high, and after they have taken to the fresh soil they may be placed in cold frames where they may get plenty of light and air during fine days.

American Carnations.

Cuttings may still be taken to furnish plants for a succession. Even the perpetual bloomers give the greatest quantity of flowers during a certain period of their growth and thus brighten the houses or furnish flowers for cutting. Pot off the earliest batch of cuttings as soon as they are fairly well rooted in order to keep them growing.

MARCH.

Border Carnations.

Injured or unhealthy plants that appeared sound in February may now only be showing signs of distress. The lengthening days and brighter sunshine puts all unhealthy plants to the test. All such should be removed and replaced by healthy plants from the reserve stock provided for the purpose.

Mostly every grower likes to raise seedlings, and may sow the seeds about the middle of the month in heat. Sow them thinly in pans of sandy soil, plunging the pots in a propagating bed kept at a temperature of 60 deg. Those who have a recently made up bed of fermenting manure may stand the seed pans upon it after the heat has declined to

85 deg. The pans may be plunged in the bed later on if the seedlings are tardy in making their appearance. Remove them to a cooler place as soon as they are well up.

Show Carnations and Picotees.

An effort should be made to complete the work of final potting if this had not been accomplished in February. The compost by this time should be in suitable condition if placed under cover in January and frequently turned since then, after mixing the various ingredients. Crushed oyster shells or mortar rubble are not merely good opening materials but supply a valuable element of plant food beliked of Carnations. Drain the pots well and press the compost firmly. Some knowledge of the habit of each variety is of great assistance to the grower when selecting pots of suitable size for it. This comes of experience. Get ready a bed of clean ashes outside, on which to stand the plants as soon as weather and the condition of the plants will permit. In the absence of ashes, strips of wood to keep the pots off the ground may be employed. Shelter from cutting east winds is still desirable.

Tree Carnations.

A third batch of cuttings may be taken during this month and rooted in the usual way in pots plunged in the tan or cocoanut bed of the forcing or propagating pit, where they can still get the benefit of bottom heat. In some establishments it is customary to make up a bed of sand in some warm house over the hot-water pipes for the purpose of propagating summer bedding plants. Carnations may be inserted in the sand, and the moisture economised by panes of glass supported on pegs. A hot-bed of fermenting manure for raising seedlings is often made in private establishments. Carnations may be inserted in pots as usual and the latter plunged in the soil covering the bed. The moisture here is often great and causes many cuttings to damp, unless care is taken to let the moisture escape for some time each day.

Make a point of potting up all cuttings as soon as they are rooted. The earliest potted young plants will require another shift towards the end of the month, using pots according to their size and vigour. Pot firmly at each stage, and make a point

of accomplishing this work before the roots get in any way matted round the sides of the pots. Seeds may be sown during the third and fourth week of this month.

Malmaison Carnations.

While tree and American Carnations are furnishing a supply of bloom, the Malmaisons should still be kept cool. The sun during the day will urge them on fast enough. A temperature of 40 deg. to 45 deg. at night will still be ample in cold weather.

Marguerite Carnations.

Those who have little or no convenience of raising a batch of seedlings in February will now find it an easier matter with the assistance of sun heat in the greenhouse. A hot-bed of fermenting manure is very serviceable in raising seedlings of all kinds, including Marguerite Carnations. If kept growing they will flower in the open during September in the southern counties, and in October in the northern counties of England, if grown in pots and placed under glass. By the latter method they will be in full bloom in November, under glass, in Scotland.

American Carnations.

The propagation of this section may be continued as advised for tree Carnations. In bright weather a little more care will be necessary in preserving the atmospheric moisture than in January, in order to prevent the foliage from flagging or wilting previous to the emission of roots. The leaves have a difficulty in regaining their plumpness if once allowed to dry out for want of moisture or by the action of the sun.

APRIL.

Border Carnations.

About the first or second week of this month the seedlings from seed sown the third week of March will be ready for transplanting into boxes 2in. apart each way. Return the boxes to the same house, placing them as near the glass as possible, and water down the soil with a fine-rosed can. This will keep them growing, but care should be taken to give ventilation whenever the sun gets hot, to prevent the seedlings getting drawn and leggy.

When the ground is fairly dry keep the Dutch hoe at work amongst plantations in the open borders.

Show Carnations and Picotees.

See that worms do not get into the pots during the mild moist weather that generally prevails during this month. Occasionally it is squally, and means should be taken to insure the safety of tall habited varieties by timely staking.

Sow seeds of choice varieties, or of crosses that may have been made during the previous summer. Label each sort or cross and number them as a record of the parentage for future guidance after the results have been determined by the flower produced. Be careful not to over-water the young seedlings.

Tree Carnations.

Pot or re-pot the young plants as this becomes necessary. They will now require more ventilation, and for this reason should be transferred to a well-lighted and airy greenhouse.

Seeds may still be sown as early in the month as possible if the operation was overlooked in March. They may be treated precisely like Stocks, Asters and other half hardy annuals.

Malmaison Carnations.

Some of the more forward plants will be throwing up their flower stems and towards the end of the month disbudding will be necessary if large blooms are required. Cut off and burn all decaying and diseased leaves.

Marguerite Carnations.

The earliest sown batch may be transplanted into boxes, or, if well forward, they may be potted up in pots of suitable size. Large plants derive considerable advantage by being established in pots previous to planting them in the open. When this is done no check to growth is experienced, as would be the case if taken from boxes, with little soil about the roots, and planted in the open. Transplant late batches into boxes as soon as fit.

American Carnations.

Perpetual blooming varieties will still be giving a supply of flowers. As the sun increases in power

take care to give the necessary watering and to ventilate more freely. This will serve to steady the growth and stiffen the flower stems. Attend to the potting of rooted cuttings and the re-potting of early batches into 3½in. and 5in. pots.

MAY.

Border Carnations.

Prepare the beds or ground intended for the seedlings sown in March. Level the ground, give a dusting of soot, rake the surface to clear off stones and other rubbish, and tread firmly. Plant out the seedlings 12in. to 15in. apart each way about the end of the month. Keep a reserve of plants in pots to fill up gaps that may occur in the beds owing to the ravages of slugs, wireworms or other causes.

As the month gets well advanced the flower stems will begin to run up and require attention in the way of staking. A tie given to each stem as it becomes necessary will prevent many a regretable mishap by the breaking of stems by boisterous gales or heavy rain. Wooden stakes painted green will suffice, but spirally twisted wire supports are very convenient and enable the operator to safeguard a larger number of plants in a given time than when ordinary stakes and raffia are used.

Keep down green fly by the timely destruction of the early colonies on the flower stems and buds.

Show Carnations and Picotees.

While wet or dull weather prevails, very little water will be required, especially if the plants were not potted before the middle of March. They will appreciate a liberal supply, however, if the weather be dry and warm.

Neat stakes, painted green, and of suitable length for each variety, should be inserted in the pots and the lengthening flower stems securely tied to them. Remove all decayed leaves and burn them if there is the least trace of disease. Stir the surface soil occasionally to keep it open after heavy rain or much watering.

Keep down green fly by syringing with strong soap suds to which some tobacco water is added. If the pest is secreted in the buds dust the same with tobacco powder. Seedlings may require attention in this respect.

Tree Carnations.

The natural rise of temperature will now be encouraging vigorous growth and all the earlier rooted plants should, therefore, be transferred to cold frames and freely ventilated on all favourable occasions.

Keep a close watch on the plants and re-pot the more advanced as well as the vigorous growing varieties before the roots become pot-bound, otherwise growth will be stunted and checked. When spoiled in this way by neglect it takes some time to get them into vigorous growth again, so that they can scarcely make such fine specimens by the time they come into flower as well-tended plants would. By the end of the month the sashes may be left off night and day, and the night dews will give them a healthy look.

Malmaison Carnations.

During the month this section of Carnations will flower freely, especially towards the end of it. As the buds become ready to expand tie a thin piece of raffia round the calyx to prevent it from bursting. India rubber rings for the purpose are easily obtainable at reasonable prices and save a deal of time in tying by simply slipping an elastic band over each bud. More water will now be required than during the early months of the year. A temperature of 50 deg. at night will be sufficiently high with plenty of air on fine days. Take off the small side shoots for cutting that are too high up for layering.

Marguerite Carnations.

Plants in the cold frames will now be rapidly advancing, and all those intended for planting in the open towards the end of the month should be freely ventilated night and day, and as the time for this operation draws nigh take the sashes off altogether.

American Carnations.

The treatment given to tree Carnations will apply to this section generally; but as most of the American varieties are of more vigorous growth than the better known tree Carnations they will require earlier re-potting and in some cases rather larger pots. Give them all the light and air possible or leave them fully exposed night and day when the

weather gets fine, and look well after them in the matter of watering, never overdoing it.

JUNE.

Border Carnations.

The latest sown seedlings should be planted out in the early days of June. Rake the beds level and mark them out in lines 12in. apart each way, but if ground is plentiful 15in. will not be too much, especially when they come to be layered.

In dry weather encourage growth by frequent heavy waterings well on in the afternoon. If applied with a hose this will serve to keep thrips, red spider (on dry soils), and green fly in check. Should the hose not be employed, then the plants must be plied with the syringe and every other means taken to keep down vermin.

Frequent attention must be given to trying to prevent the stems getting broken down. Dis-budding will be the order of the day during this month, whenever the side buds can be removed without injury to those left. This is necessary to insure specially fine blooms, though, for border decoration only, very little of this need be given.

Show Carnations and Picotees.

Continue to tie up the main or central stem of each plant and remove all others. Dis-budding is also imperative if the grower intends his flowers for exhibition. Vigorous varieties will bring three blooms to perfection on a stem, but less robust ones only two blooms. In removing the other buds be careful to leave the best situated at suitable intervals. Very weak growers should be allowed to bear one bud only, and that the top one. Plants intended for the production of seed should not be dis-budded.

Growth may further be encouraged by applications of weak liquid manure to encourage the swelling of the buds and the size of the blooms. Many of the fine varieties have rather a weak calyx, and if grown to large size are liable to split. This must be prevented by a timely tie with raffia or an elastic band. This will be work for the end of the month and beginning of July in the southern counties of England.

Tree Carnations.

As the plants continue to make progress the more forward of them should be re-potted as they require it. At this stage a more substantial compost should be given, leaving the turfy loam in a lumpy condition. Drain the pots carefully to prevent the soil getting sour and pot firmly. After this the plants may be stood in some sunny and open but sheltered position, where they will be fully exposed, except to north and east winds. A fairly deep bed of ashes should be made up for them to keep the pots cool and prevent the ingress of worms.

Seedling tree Carnations may be planted out in a piece of well-prepared ground where they will make good progress and possibly commence blooming late in the season. This is highly advantageous if the sowing is a large one, as the bulk can be greatly reduced by weeding out the rogues before the remainder requires to be potted up and housed.

Malmaison Carnations.

As the early plants pass out of bloom the pots may be plunged in a bed of prepared soil either in the open or in frames, preparatory to layering the leafy shoots or grass. June is the best month for layering this class, and this is the most satisfactory method of propagating them. In very hot weather the closing of the sashes, and shading during the heat of the day will serve to preserve the soil moisture and hasten the process of rooting.

American Carnations.

Hitherto most of the growers in this country have treated American Carnations much the same as the tree varieties by growing them in pots and placing them out of doors in June to make firm growth and build up a good constitution before winter. This may still be done by those who grow a moderate quantity.

Already there are signs that market growers in this country are adopting the American system of flowering them on benches or beds of soil in large span-roofed glass-houses. The American plan is to rear the plants from cuttings and plant them out in the fields early in June. After this period the plants are gone over once a week, and all shoots pushing up for bloom are cut back to encourage a

bushy habit. Lifting may be commenced any time after July 5th and onwards to the middle of September, but the third week of August is the average date for most varieties. The time for lifting depends upon variety, the maturity of the plants, and the object in view. The Carnations are lifted with as good a ball of soil as possible, and planted on the benches, the houses being kept close, shaded and moist for a time till the plants recommence growth. Moderate waterings at the root give the best results, and provided the soil is just nicely moist the plants will soon commence growing again. Very late planting causes the stems to be short, so that August 18 is a good date to bring the plants indoors.

Those who grow their plants in pots may practice stopping up to the beginning of September to get the best crop of bloom about Christmas, in the case of such early varieties as Mrs. T. W. Lawson and Harry Fenn. Late ones like Prosperity should not be stopped after the second week of July.

JULY.

Border Carnations.

Give unremitting attention to dis-budding and tying during this, the flowering, month, and secure those buds with raffia or rubber bands that are liable to split the calyx.

Layering may be commenced during this month in the south, though August is more suitable in the Midlands and the North. The operation may be commenced anywhere as soon as the grass is fit. This is usually just as the flowers commence to fade, though it may be done earlier in the South and sometime before the plants have finished flowering in Scotland, as Carnations there bloom till well into September.

The beds or plantations of seedlings planted out over a twelvemonth ago will commence flowering, and the enthusiastic raiser will inspect them more or less every day. Single and all inferior flowers may be pulled up at once to give the remainder more room, unless, indeed, the flowers are wanted for cutting.

Show Carnations and Picotees.

Those who grow for exhibition will find their hands full as this month advances. Tying, dis-

budding and fixing the cards before the expansion of the blooms will occupy a considerable amount of time. It is necessary with many varieties to open or fold back the points of the calyx to facilitate the equal or regular expansion of the flower.

It is usual also to take the plants under glass or canvas during the flowering period. If staged with judicious care and taste the grower and his visitors may enjoy a floral feast of rare beauty and charm not excelled by any other flower or race of flowers. This is the month also in which well studied crosses are made between varieties possessing desirable properties, with the object of raising new ones combining the properties of their parents.

Unremitting attention must also be given to the trapping of earwigs, the checking of thrips, and the destruction of greenfly.

When cutting flowers for exhibition select those of the different varieties that most nearly match one another in size, avoiding extremes, and contrasting and varying the colours so as to constitute a harmonious whole when placed on the show board. All this has to be carefully thought out at home.

Choice, early flowering varieties and those that winter badly should be propagated early and cuttings have been found to give most satisfaction. They may be rooted in pots of sandy soil under hand-lights in the open.

Tree Carnations.

Late propagated batches will still require repotting and establishing in the fresh soil before the plants are stood on ashes in the open. Water may be given liberally after the pots are well filled with roots, but previous to that it should be done with care or the soil will get sour and retard or ruin the plants.

Greenfly, in all likelihood, will establish themselves in the growing points of the leafy shoots, and syringing may fail to dislodge them in such hiding places. Tobacco powder is an effective cure and should be dusted into the crowns after syringing, even if it takes some little time to accomplish. Thrips will also be held in check by the same process.

Malmaison Carnations.

If cuttings were inserted in May they will require repotting sometime during this month, provided the

plants were potted as soon as rooted and made good growth afterwards.

The layers put down in June should before the end of the month be well rooted, and ready for potting into large 60's as they are usually very strong by comparison with those of other sections. Half of the compost should consist of turfy loam, half leaf soil and plenty of sand with some charcoal about the size of peas.

Marguerite Carnations.

Put a small, neat stake to each plant as the stems of the early batches approach the flowering stage, and neatly loop them to the stake.

American Carnations.

Still attend to the stopping of the flowering shoots of all early blooming varieties. Late varieties should not be stopped after the end of the first week, unless the intention is to retard flowering till well into winter. Late struck batches and perpetual blooming varieties will, however, obviate any necessity for retarding late sorts.

AUGUST.

Border Carnations.

Some cultivators commence layering their border Carnations towards the end of July, especially those who grow them in pots and have an object in getting them rooted early. The early part of August is the more appropriate time for the amateur to accomplish the work, which should no longer be delayed. The new plantation should be made at the beginning of October, and the work now should be accelerated with that object in view. Should the weather be hot the layers should be watered almost every day for a fortnight or longer if the weather continues dry.

Dig, trench or otherwise prepare the beds, borders or ground intended for the new plantations of layers when rooted. Soils of a light character should be prepared as early as possible in order that they may settle down sufficiently before planting time.

Show Carnations and Picotees.

As soon as the plants pass out of bloom they should be layered in the pots in which they are growing. The work should not be delayed until the shoots get hard. Provided they have been flowered

under canvas, the latter should be removed to expose the foliage to sunshine and air to harden it. The pots may be left on the staging and layered there, or if the operator chooses he may sit astride a form or board of suitable height and have the pot directly in front of him. This makes the operation easy for those unaccustomed to stooping or standing at their work. Remove about an inch of the top soil and replace it with a layering compost. When a few pots have been finished they should be watered down with a rosed watering pot.

Layers situated rather high on the plant for layering in the usual way may be pegged into small pots on the top of the large ones. If shoots are plentiful this method should be avoided as it encourages the layers to perpetuate the habit and assume the form of a tree Carnation. In the case of some seedlings it is unavoidable; to preserve such it becomes necessary to pull out the axillary shoots and use them as pipings. If all the lower shoots of certain varieties happen to be diseased they may be saved by this extreme method. They may be rooted in pots under bell-glasses over a spent hotbed if possible.

Tree Carnations.

The earliest rooted batches of plants, if not stopped too late, will commence flowering some time during this month. In such case they should be cleared of green fly and thrips preparatory to placing them under glass. Thrips are the most difficult to dislodge, but may be destroyed by nicotine vapour in some form or other after they are housed.

The latest batches should be put in their flowering pots towards the end of the month if not previously done. Other batches which have filled their flowering pots with roots should be assisted with some artificial fertiliser. Syringing should still be continued on plants in the open to keep them clean and healthy.

Malmaison Carnations.

Repot young plants as they require it, before the roots get matted. This keeps them growing steadily without check. Careful watering according to their needs, and syringing to keep them clean are the chief requirements at this season. Staking must not be overlooked as many varieties of this section are leggy plants.

Marguerite Carnations.

The earliest batches, sown in January or February, will reach their most floriferous condition during this month and those who have treated them properly will now be rewarded for their trouble. The flowers are very varied in colour and good strains furnish a large per cent. of perfectly double blooms. Very choice ones may be marked in order that seeds may be saved, for by such means the race may yet be improved.

American Carnations.

Plantations in the open ground should be lifted and housed during the third week of August, if intended to bloom during October and November. Naturally late flowering varieties, stopped not later than July 1st, should be housed about the middle of July. Early bloomers may be cut back as late as the middle of August, housing them soon after. In cold or wet seasons cutting back the plants should cease about the end of July.

Patches grown in pots may be stopped later as they do not get checked by lifting; but this will be determined largely upon the nature of the season, the earliness or otherwise of the varieties and the time they are required to be in bloom. The grower will be guided by the nature of the season as to the latest stopping and the habit of the varieties. If long stems are desired the plants must be under glass at least six or eight weeks previous to flowering.

SEPTEMBER.

Border Carnations.

The welfare of the layers will be the chief care of the cultivator during this month. Should the weather continue dry watering will still be necessary. Keep a good outlook for Carnation Maggot, which is particularly troublesome to layers. Eggs are laid somewhere on the plant and the grubs tunnel into the young leaves, often while still erect and closely folded in bud. Passing downwards they eventually reach the stem and bore down through the pith, devouring mostly everything except the skin, when the whole top of the layer comes away in the hand when lightly pulled. If the presence of

the enemy can be detected in time the base of the layer may be saved, even if the top has been cut off.

Some compost should be got ready to pot up a reserve of layers to fill vacancies in spring. Even in town gardens and where the soil is too heavy for autumn planting, all the layers required and some for a reserve will have to be put in 3in. pots. Some of the strongest layers may require a slightly larger pot and others a size smaller. Overpotting should be avoided, and in this the cultivator must exercise his judgment. The requisite number should be got ready.

Show Carnations and Picotees.

During this month the directions given for border Carnations will also apply here, the chief difference being that all of the plants intended for exhibition are grown in pots. Enthusiastic growers who like to be well forward with their work complete the operation of potting up the layers during the last ten days of the month. Where layering was commenced during the last week of July there will be no difficulty in the South if watering was properly attended to. Previous to this the list of stock should have been made out, and the desired number of plants of each variety tabulated so that the work may proceed without let or hindrance when the proper time arrives.

Before lifting the layers it should be ascertained whether they are properly rooted, otherwise a check will be given by too early severance from the parent. Pot firmly and in pots of moderate size, for overpotting is a great evil. Place the pots in a cold frame, keeping the sashes close for a few days and shading from bright sunshine till the roots commence to take hold of the soil. If the roots run freely round the sides of the pots before winter the plants will keep all the better. Water moderately, especially if the roots are yet but feebly developed.

Some varieties take longer to root than others, and may be potted and placed in a gentle bottom-heat to encourage root-formation. In the case of badly executed work and no roots have formed by the end of September, the shoots may be relayered, making the cuts carefully and using fresh soil on the top. The layers may remain on the plants till spring. The end of September is the time to get new varieties from the nurserymen.

Tree Carnations.

The earlier batches will now be advancing to the flowering stage, if not already in bloom. All the batches should, however, be housed towards the end of the month, and fumigated at once to destroy green fly, thrips and other insect pests.

Those in bloom may be taken to the show house, and successive batches treated according to their requirements so as to maintain a succession of bloom. Each batch in turn should be fumigated before the buds expand.

Malmaison Carnations.

The housing of the plants at the end of the month applies to this section as to the ordinary tree Carnation, provided they have been in the open air since the layers were potted. They should be stood in groups by themselves, never mixed with other plants, and as near the glass as possible. Proper Carnation houses are built so that the plants will never be far from the glass.

Marguerite Carnations.

Those in the open ground will keep up a display till towards the end of the month. Plants in pots for late flowering under glass must be housed towards the end of the month, not necessarily in the place where they are to bloom, but at least in frames where they can be sheltered from wind and rain.

American Carnations.

The housing of the latest and all of the plants must be accomplished by the end of the month. With those in pots the operation will be easy. They should be fumigated at once to free them from insect pests, should any be present.

Beds of seedlings will have been frequently examined before this time in order to mark the best varieties. Many of them may not yet have bloomed, but in order to avoid throwing away anything good the unflowered ones may be transferred to a bench and grown to the flowering stage. If this cannot be done the more promising of them may be potted up.

If a good crop of flowers is desired about Christmas a quantity of the early flowering varieties may be stopped about the middle of the month.

OCTOBER.

Border Carnations.

The first fortnight of this month is a very suitable time for making new plantations of rooted layers, so that if the operation was not completed at the end of September an effort should be made to do it without further delay. The layers have just sufficient time to get well established before the advent of winter. This applies also to those intended to be wintered in pots.

Show Carnations and Picotees

What potting of layers remains to be done should be completed at once. They winter best when the root system gets fairly well developed before cold weather puts a stop to active growth. Those which have already been in the frames for eight days to a fortnight will have taken to the soil sufficiently to permit of air being given night and day. Remove injured, broken, or decayed leaves and keep the plants clear of insect pests. Little water will now be required, though a few pots may require water occasionally to prevent the roots suffering in the present critical stage. The sashes should be utilised to keep off rain.

Experienced amateurs will not need to be advised to order early such varieties as they may desire to add to their collections. Some of them may be new or scarce, and in such cases it is best to order as early as the middle of September, but the second week of October should not be allowed to pass without getting and potting the requisite number.

Tree Carnations.

As autumn advances the early flowering varieties will make a good display. As the temperature declines some varieties are liable to develop badly. The experienced grower, who knows his plants, will place these together at the warmest end or situation in the house; or better still, he may put them in a heated house where a temperature of 50° to 55° at night is maintained. In all cases a well lighted and ventilated house is imperative, and the plants should never be staged far from the glass.

Malmaison Carnations.

As this race of tree Carnations does not flower well before spring a high temperature is not only un-

necessary but even harmful. Even if it sinks to 40° or 45° at night it will be quite sufficient. Plenty of air night and day is also essential, and the plants must be as near the glass as possible. Nothing is more essential to the foliage of this and other races of the Carnation under glass than light.

Marguerite Carnations.

Late batches in pots, intended for flowering under glass from November onwards should be carefully attended to in the matter of staking, tying, watering and even disbudding if large flowers are desired. This latter operation can easily be overdone and the less of it the better. Fumigation may be resorted to should there be any sign of green fly or thrips; and if accomplished before the expansion of the buds so much the better. Sometimes they are kept in frames at this period of the year, but if the house is ready for their reception they may be placed in their flowering quarters at once where they will be directly under the eye, and more conveniently attended to.

American Carnations.

Many of the early varieties should now be in full bloom and the grower reaping the reward of all his previous labour and trouble in connection with them. Every possible advantage in the matter of light, air, and attention should be afforded them as in the case of tree Carnations in a similar stage of their career. Where large blooms are desired (and most growers have a hankering after large flowers in this race), thinning of the buds should be practised as soon as they can be removed without injury to those that remain, and to the stems. As the days shorten less and less water will be required.

NOVEMBER.

Border Carnations.

If planted in good time and sufficiently established in firm ground before the advent of frost there should be little danger of the plants being raised out of the ground; but should this happen at any time during winter, they should be firmly pressed down again with the fingers. The labels are more likely to be thrown out of the ground than the plants, and to guard against displacement and mixing they should be examined after frost and pushed home again.

Show Carnations and Picotees.

The plants in pots stood in frames must be kept in a healthy and vigorous condition by the free admission of air night and day. In damp or foggy weather very little or no watering will be necessary, and the foliage must on no account be wetted as this favours rust and spot. During open, windy weather a fair amount of watering will be necessary, and should be accomplished on the mornings of bright dry days if possible. The roots will suffer if water is withheld for too long a period. Keep a sharp outlook for colonies of Aphides amongst the tender young leaves, and remove decaying specimens of the latter.

The plants should in no way be coddled as they soon get drawn and spoiled by confinement. The sashes may even be drawn off entirely in dry, open weather, except during the prevalence of wind. In order to keep the plants thoroughly at rest some growers adopt the plan of turning the frames round so as to face the north. This prevents fluctuations of temperature owing to bursts of sunshine on clear days.

Tree Carnations.

The days are now so short and sunless especially near large towns that great care is necessary to maintain the health of the plants. Air must be given on all occasions except when smoky fogs prevail as they are very injurious to the flowers. On such occasions the minimum night temperature may be allowed to fall a few degrees below 55°, because the higher the temperature the more damage is done by the fog. Keep the atmosphere of the house dry at all times and buoyant during the day when fine, as this tends to keep disease in check. Less water will be required than during any other month of the year.

Malmaison Carnations.

More care in keeping the house dry and cool will have to be exercised here than in the case of tree Carnations. The plants are hardy and can be grown out of doors, though their succulent stems render them liable to damping. As a temperature of 40° to 45° by night will suffice, the house must be kept as dry as possible, and when it becomes necessary to water a few plants, any water that is spilt in the operation must be wiped up.

Marguerite Carnations.

Maintain a night temperature of 50° and ventilate on every fine day to expel moisture, and keep the foliage and flowers dry. A low, span-roofed house is the best place for them, but batches may be kept in the conservatory as required. The health of the foliage after the flowering period is immaterial, as the plants are raised annually from seed.

American Carnations.

In our climate November is the worst month for this section, and the cultivator must refrain from overfeeding and overwatering; indeed, no stimulating artificial manures should be given at this season. A temperature of 50° by night will suffice for most varieties, but some of them require a few degrees higher to make their flowers open freely without bursting the calyx. Fiancée, Queen Louise and some others are liable to this defect, and if they can be placed in a house at 52° to 55° it will assist them to open properly at this dull season. During the day the temperature may be raised to 60° with fire heat and allowed to rise to 65° by sunheat, giving air at the same time. More reliance should be placed on such fine white varieties as Lady Bountiful and Vesper at this dull period, because they are not liable to the malady of splitting their calyxes.

DECEMBER.

Border Carnations.

Keeping the plants in frames dry and clean, well ventilated and safe from rain and cutting winds, is the sum total of the work during this month. Plants in beds and borders should be rendered secure and safe from rabbits, hares, and pheasants in rural districts where game abounds on the estate. These creatures are most troublesome during stormy weather.

Show Carnations and Picotees.

The instructions for border Carnations in frames also apply in this case. See that drip from broken panes does not fall in the pots.

Tree Carnations.

With a judicious selection of perpetual flowering varieties and the late varieties just coming into

bloom the Carnation house should not lack interest at this season of the ear. Keep the atmosphere buoyant by a genial temperature, but admit air on every favourable opportunity even if only a chink to prevent the stems and foliage from getting unduly drawn and soft.

Malmaison Carnations.

The same conditions must be maintained, as during the previous month. Remove and burn every leaf showing traces of Carnation spot or other fungoid disease

Marguerite Carnations.

If well cared for without coddling many of the plants will still be furnishing a supply of flowers, and this may continue till well into spring.

American Carnations.

Similar conditions should be observed as during November in this section. The successful cultivator will now be reaping the reward of his labours. The numerous varieties with large pink, cerise, red, scarlet, and crimson flowers produce such a galaxy of bright colours that the Carnation now takes rank second only to the Rose as a winter-flowering subject. More than one cultivator has succeeded in adopting the American system of growing Carnations on benches, even on a fairly extensive scale, so that flowers will soon be plentiful in our markets during winter, and those who cannot afford the luxury of growing them will be able to purchase flowers. Pot culture is yet the best understood in Britain, and, perhaps, is the best method in our climate, where sunshine is so often lacking. For the propagation of the early batches in January the necessary loam, leaf soil, and sand should be procured and placed under cover to get sufficiently dry for the operation of rooting the cuttings in pots. On a larger scale a bench in the propagating pit may be made up for the purpose, and covered with four inches of clean sharp sand, in which the cuttings may be inserted.

XVIII.—LACED AND BORDER PINKS.

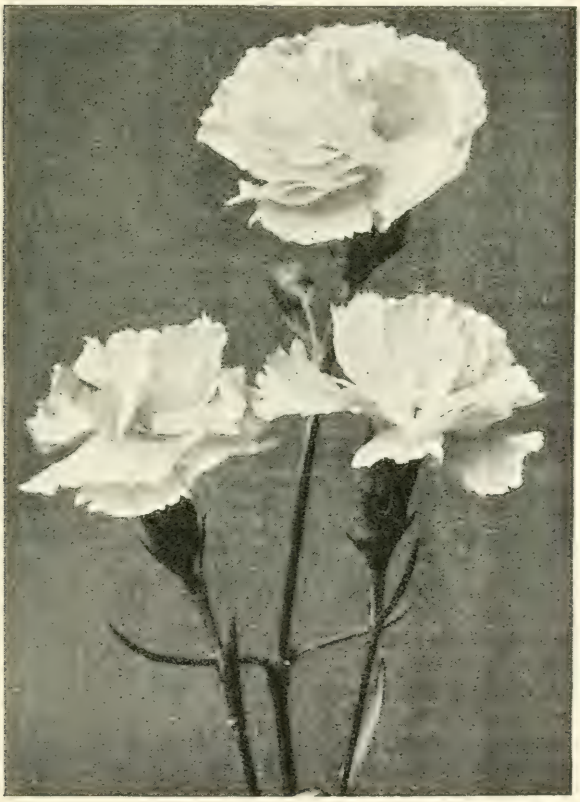
History.

The Common Pink (Dianthus plumarius, Linn) is a native of Europe and Asia, extending from Russia in the north to Croatia in the south, and from Austria to the river Ischin in Siberia. According to early botanical works, it was introduced to this country in 1629, and Paxton says 1640, but it had evidently been grown here before either of those dates, though it is impossible to fix the time. It has long been naturalised on old walls in England, and still continues to maintain itself in a few scattered localities. The wild Pink has pale pink flowers or sometimes white. The glaucous foliage and the densely tufted habit are characteristic features of the plant at all periods of the year.

For a long time after its introduction the Common Pink was simply grown as a border plant with little attempt at improvement. Gerrard mentions the White Jagged Pink (Caryophyllus plumarius albus and the Purple Jagged Pink (C. plumarius purpureus) and a wild white one. Parkinson gives a few varieties of it. As a florists' flower it does not seem to have come into vogue prior to 1770 or about that time. Thomas Hogg, of Paddington Green, wrote about the Pink at various periods from 1820 to 1839, and in the latter year he recorded 154 varieties after eliminating the inferior sorts then in existence. The Pink must have enjoyed a great wave of popularity about that time, for 95 florists and amateurs had been concerned in the raising of the above varieties.

More recently the manufacturers and mechanics were the chief cultivators of Pinks, especially the muslin weavers of Paisley. They had various sections and many varieties of each, to wit Cob Pinks, Early Red Pinks, and Pheasant's Eyes. The latter were the most popular, for Loudon says that the Paisley weavers had 300 varieties of them. Loudon said that the pheasant's eyes seemed to have sprung from Cobs, and D. Armerius and D. deltoides. Dr. F. N. Williams, who wrote a monograph of the genus Dianthus, was of opinion that the Maiden Pink (D. deltoides) was the source of origin of the Early Red

Pinks and the Pheasant's Eye Pinks, while D. plumarius gave rise to the double white Pinks with fringed petals. These are probably suppositions, for most of the modern garden Pinks have a strong family likeness, and, judging from the immense number of varieties and forms into which the Carnation has varied there seems little reason to doubt



BORDER PINK MRS. LAKIN.

that all the modern forms of Pinks have descended from D. plumarius.

Uses of the Pink.

The dwarf habit of the plant, the dense cushion of whitish sea-green foliage, the beautifully formed, double or single flowers of varied colours, and, above

all, their grateful and delicious fragrance are recommendations that endear the Pink in the heart of every true lover of flowers, and those who have once been enamoured of it and cultivated a few varieties will ever retain a haunting remembrance of the flowers of their early days.

The florists' or laced Pinks are usually grown in beds for convenience of attending to them in the matter of shading and shelter when they come into bloom. A frame light or sash is sometimes placed over them, and that greatly increases the size of the flower and its purity. The Pink may also be grown in borders, either as single plants, patches, or clumps. No more interesting way of growing them is there than as an edging to long borders on either side of a walk. The Carnation in far too many instances has partly or entirely lost its scent; not so the Pink, for every one is more or less strongly redolent of the original. What can be more charming than long lines of Her Majesty or Mrs. Sinkins, with their profuse mass of blossom, like snowdrift leading up the approach to the cottage, villa, or mansion? The spicy whiff of odour arising from them is more than sufficient alone to recall their presence.

Pinks may also be cut for use in the dwelling, a few of them in small glasses or epergnes being sufficient to brighten the room or fill it with their aromatic delicious fragrance. In bygone days Pinks were exceedingly popular for exhibition purposes, chiefly the laced varieties, beloved of the florist. For symmetery and beauty of marking few florists' flowers were more perfect. Many societies or their equivalents at one time existed for the encouragement of those who grew them or were engaged in the raising of new and improved varieties. Several shows a year were held in some towns and centres where the Pinks held sway in the hearts of artisans, mechanics, weavers, amateurs generally, and florists. An attempt was made in London to revive the old love, by the holding of exhibitions, the first show taking place at the Royal Aquarium on June 27th, 1890, but only a few shows were held owing to the lack of support. Nevertheless, a revival of the old love is growing, fostered by the general utility of the flowers for garden decoration in June, in advance of the Carnation. Border varieties as well as the charming laced varieties are receiving a growing measure of attention.

Another point in favour of the Pink, and which

cannot be overlooked, is its extreme hardiness by comparison even with the Carnation. Few cultivators have ever taken the trouble to grow it in pots. Even the finest florists' and border varieties are rooted and planted out in the open even in the far north of Scotland. Whether in beds or borders in the squire's garden or in that of the farmer or

BORDER PINK PADDINGTON.

cottager, the plants are summered and wintered in the garden. Where slips, cuttings, or division is the method of propagation, the plants are committed to the ground in the spring or autumn, as the case may be.

Properties of a Pink.

THE FLORISTS' OR LACED PINK should have a

pure white ground, a dark centre, and a lacing of pink, red, dark red or maroon, extending round the margin of each petal, just within the edge and agreeing with or conforming to the centre in colour. Needless to say, the flower should be symmetrical, as large as possible, and the lacing well defined. The flower should be quite double, but not too crowded with petals, the edge smooth and the calyx not liable to burst, though this is seldom a fault of the florists' Pink.

THE BORDER PINK is not hedged about by the severe canons of the florist, and may be of any decided colour that is intrinsically beautiful and effective. White, in a variety of forms, has always been popular; white flowers, with a dark centre, or dark in the centre with a border of some paler hue, are also admisible; and pink, rose, purple, and red selfs afford pleasing variation.

PERPETUAL FLOWERING PINKS.—The distinguishing feature of this section is the continuous flowering character of the varieties. Remontant would, perhaps, be a better term to apply in the same sense as the French apply it to Hybrid Perpetual Roses. The varieties come into bloom in May or June, but generally go to rest for a time after the latter month, especially if the weather is hot and dry and the soil sandy. Towards autumn, when the days become cooler and moister, the plants recommence growth and flower freely a second time. They are therefore very useful as border plants or for cut flowers.

Propagation.

The Pink is propagated by seed, pipings or cuttings, layers or division. The latter is a simple method sometimes resorted to by amateurs or even professional gardeners, especially when relaying edgings of Pinks. The plants are lifted, the ground manured and dug, and then the Pinks are pulled into sufficiently small pieces to make a narrow edging when laid in the trench. The long stems are either shortened or laid in a trench their full length, covered with soil and trodden firm.

SEED SOWING.—This method of propagation is that by which new and improved varieties are obtained. Seedlings are also raised for ordinary garden decoration; and if a good strain of seed is obtained there will be a good percentage of useful,

showy and double flowers. Seeds sown early in March in a minimum night temperature of 60° will germinate in eight or ten days. The seed pans or boxes should be placed on a shelf close to the glass as soon as the seedlings are well through the soil. When they have made a pair of rough leaves they may be transplanted into other boxes or into a cold frame in which a bed of sandy loam and leaf soil has been prepared for them. After they have taken to the fresh soil, ventilation must be given on all favourable occasions to maintain a sturdy habit. About the end of May or beginning of June, plant out the seedlings in beds, borders, or piece of ground that has been prepared for their reception, about 12in. apart each way. During the first year the plants will simply make tufts of leafy shoots, and flower in June the following year. By this time the plants will have made good patches of grass, and give a remarkable profusion of flowers.

LAYERING.—The proper time for this operation is in June just as the plants are passing out of flower. Where a moderate number of plants only are required this method will answer the purpose admirably, because relatively strong plants can be secured in a short time, and will make stronger specimens in a given time than cuttings. The strongest shoots only should be layered, and even of these a large number may be laid down round the margin of large stools.

Get ready a quantity of soil, leaf mould, and sand, as for Carnations, and scoop out some of the soil round the plants to be layered, filling the cavities so made with some of the prepared compost. Remove some of the lower leaves from the shoots and make a careful cut up the middle of the stem from one node to another to form a tongue, as in Carnations when being layered. Peg down the layers, cover them with soil, and water the stools to settle the soil. When rooted they may be severed from the parent plant and planted out in nursery lines to form roots and make some growth till the final planting time in September or October

CUTTINGS.—These may be taken at the same time as the plants are layered; and as Pinks produce such a dense cushion of shoots it is impossible to layer more than a small proportion of them. If a large quantity of plants of any particular variety is required they can be obtained by taking all the best

of the shoots not layered. They may be rooted in a compost of equal parts of loam, leaf soil, and sand.

Several different methods of rooting them may be employed. On a large scale in a bed of manure, about 1ft. in depth, may be made up in a frame or frames. Tread this down firmly and cover it with 4in. of the prepared compost, pressing it down quite firmly. After all danger of violent heating is past the cuttings may be inserted firmly at once, and the frame kept close till the cuttings show signs of rooting by commencing to grow. Shading will be required during the heat of the day till roots are fairly well formed, after which a gradually increasing amount of ventilation may be given and the shading gradually removed. When well rooted they may be planted out in nursery lines like the layers, and kept clear of weeds. Smaller quantities may be rooted in precisely a similar way by standing hand-lights on the bed of manure. Even those with the convenience of a hand-light only can root a considerable number in a bed of the prepared compost, with or without the aid of hand-lights. Shading must be given in either case during the heat of the day. Some growers may be able to procure a few barrow-loads of manure, and this can be used to excellent purpose in the open air without hand-lights or frames.

PLANTING.—In August, or as soon as the ground can be cleared of its occupants, it should be trenched or dug two spits deep, working in plenty of well-rotted farmyard manure. Allow it to settle and then put it into shape for planting in September or early in October. Level and rake the ground of bed or border ,tread firmly, and mark it off in lines 1ft. apart. The plants may stand at similar distances in the lines. Plant with the trowel and make the soil about the roots quite firm. They will get thoroughly established before winter, and require little attention till spring. During open weather, when the soil is sufficiently dry and workable, run the Dutch hoe over the ground between the plants to keep the surface fresh and open.

Labels of fair length should be employed to guard against their being cast out by frost. Wooden labels are sufficient, as they have only to stand for a year. The value of the plants is greatly enhanced by being correctly labelled so as to make sure of the proper name for each variety. Enthusiastic growers need hardly be reminded of this, but with amateurs

the practice of putting the nursery label to a plant and allowing the name to get obliterated is far too common.

Weeds will grow apace in spring, but they must be kept down by frequent hoeing. In gardens where the soil is dry and sandy a mulch of some sort will prove serviceable, if put on about the beginning of June, if the weather is any way hot and dry. When the season happens to be cold and wet no advantage will be derived from mulching. Well-decayed farmyard or stable manure, or even cocoanut fibre will answer, if required. The latter is the least offensive to the eye, but it affords no sustenance, and merely retains the moisture, keeping the ground cool. Staking is seldom given or required. The flower stems may be disbudded as early as possible if large flowers are required. The largest blooms often require the calyx to be tied or banded, as in the case of Carnations, but this is seldom attempted on any large scale. It can only be practicable in the case of a few choice flowers for a given purpose, such as for exhibition. Her Majesty and Mrs. Sinkins are very liable to this defect when grown strong.

Enemies of the Pink.

The Pink is liable to be attacked by most of the enemies which prove troublesome to Carnations. The principal of these are wireworms, leather jackets, slugs, aphides, thrips, hares, and rabbits, all of which will be found described in the chapter on "Insect and Other Pests." Leather jackets, wireworms and slugs are very difficult to deal with, and trapping and searching for them are laborious. Vaporite has been found effective in driving them away.

SELECT LIST OF PINKS.

Border Pinks.

Albino.—Flowers large, very double, well-formed, smooth in petal and pure white.

Anne Boleyn.—Rosy purple with darker centre; a very useful old favourite.

Clove Pink.—An early flowering, very fragrant rose self.

Fimbriata alba plena.—Pure white, finely fringed.

Her Majesty (Hooper).—Flowers large, very double and pure white; one of the most popular whites.

Mrs. Lakin (Lakin).—White with a faint crimson zone. (See illustration.)

Mrs. Sinkins (Sinkins).—An early flowering, white, fragrant and very double variety; it held first place for border work previous to the appearance of Her Majesty.

Mrs. Welsh.—Flower pure white, of fine form and choice.

Paddington.—Flowers small, early, very freely produced, fringed and rose with a darker centre. (See illustration).

Snowflake (Brownhill).—Flowers large, pure white, and profusely produced.

Souvenir de Sale.—A delicate, pale lavender flower.

Tottie (Paul).—Flowers freely produced and bright red.

Laced Pinks.

Amy (Brown).—Centre and lacing of a beautiful rich maroon.

Poiard (Turner).—Petals broad, with a lacing of very dark crimson; a handsome and effective variety.

Emerald (Hooper).—A large and very double flower, with a red lacing.

Empress of India.—Petals heavily laced with rosy purple on a pure white ground.

Excellent.—Centre and lacing of a rich claret colour.

Godfrey.—Centre and lacing red, and the flowers of good form.

Harry Hooper (Hooper).—A very fine variety, with reddish purple lacing, and choice in every way.

James Thurstan (Thurstan).—A large and handsome flower, laced. (See illustration.)

Lufra.—The large and handsome flowers have a maroon centre with a dark red lacing to the petals.

Minerva (Fellowes).—Flowers of beautiful form, with a dark rose centre and similar lacing.

Minnie.—Laced with bright red on a white ground.

Mrs. Dark (Brown).—Laced with red, and similar centre.

Mrs. Hooper (Hooper).—Beautifully laced with rosy claret.

Mrs. Pettifer.—Centre of flower purple with a heavy lacing of blood crimson.

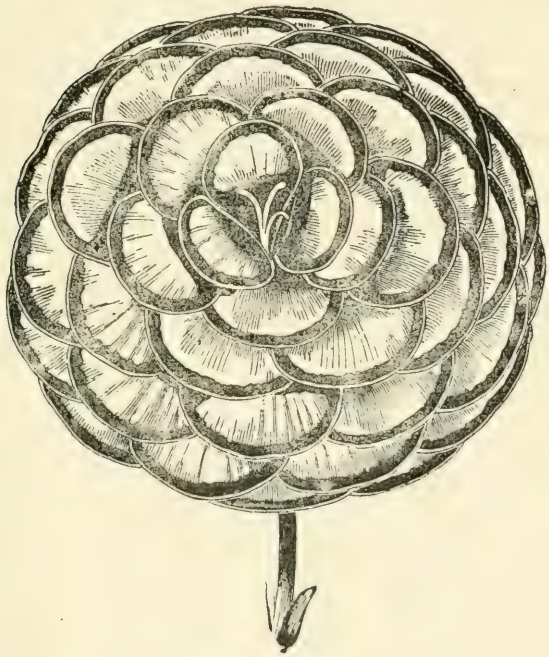
Mrs. Pomeroy.—Rosy purple lacing and centre with a white ground colour.

Mrs. Waite.—A beautiful flower, laced with crimson.

Morna.—Flower large white, with dark maroon-crimson centre and lacing.

Ne Plus Ultra.—Centre and lacing rosy purple.

Old Chelsea.—Flower with rosy centre and rose-red lacing.



Laced Pink James Thurstan.

Rainbow.—Flowers with a rosy lacing and darker centre.

Reliance.—A beautiful flower, of fine form, with red lacing.

Sarah.—Handsomely laced with red, and darker in the centre, the ground being white.

The Rector.—Handsomely laced with rosy purple, and centre darker.

Victoria.—A handsome variety with crimson lacing.

Perpetual Flowering Pinks.

Bridesmaid.—Soft silvery pink or nearly white.

Evelyn.—Flowers white, laced with pink, and deliciously scented.

Florence.—Flowers large, pure white with a richly coloured eye, very double, freely produced and deliciously fragrant; habit vigorous.

Marion.—Blooms rosy pink, 2-2½in. across, very freely produced from May till autumn, and deliciously scented; plant very vigorous.

Mrs. Mouland.—Rosy pink with chocolate centre; flowering throughout the season and highly fragrant.

Perpetual Pink.—Flowers laced with red on a white ground, freely and continuously produced.

INDEX.

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