Heredity and Variation in Plants

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BUD-VARIATIONS OR SPORTS.*

WHAT THEY ARE AND WHAT THEY ARE NOT.

It is highly desirable that we should attach a definite signification to this word. Among gardeners it may mean many things, whilst, among botanists, it is restricted to cases of bud-variation as distinguished from variation from seed and from dimorphism. In this note we shall use the word in its botanical sense, as applying to a special illustration of that tendency to vary which is common to all living beings. We shall, however, gain a clearer idea of what true sports are by the elimination of certain things which are not sports, though often called so.

Seedling Variations.

In the first place they are not seedling variations. Out of a hundred seeds of Lawson's Cypress that are sown, it is possible, I suppose, to get ten more or less distinct varieties, besides others which are more or less indistinct. The great variability of this species is now well known, and the seedlings of Abies subalpina, Engelmann (A. lasiocarpa of Hooker), furnish another illustration of the same tendency. These seedlings may be the result of cross-fertilisation between varieties, or they may be reversions to an earlier condition; at any rate, of whatever nature they are, they are not "sports" in the sense here intended.

Stages of Growth.

Next, sports are not mere stages of growth, or simple instances of dimorphism. Most plants put on a different appearance at various periods or stages of their growth, and sometimes these changes are very remarkable. Osmanthus aquifolium furnishes one example (see fig. 1). The Retinosporas of our gardens also furnish excellent illustrations. Retinospora (or, more strictly, Thuia) pisifera exhibits during its growth very different appearances in its foliage. There is the squarrose form, and the plumose form, the golden form, the silver form, the pendulous form, the thread-like form, the upright form, and perhaps others. All these, however, are not separate entities; they may all occur on the same bush. If cuttings, or if grafts be taken, they may be reproduced almost indefinitely. Many illustrations of Retinospora were given in *Gard. Chron.* for 1876, Feb. 19, which we need not reproduce; a less known but equally characteristic case of the kind is offered by Veronica cupressoides (fig. 2), and by Tillandsia (fig. 3). Barring the mere colour variation, these forms are but stages in the growth of the plant, occurring with more or less regularity, and in greater or less degree of prominence, in all the individuals of the species, as may be inferred from watching the growth of seedlings in a seed-bed. Colletia cruciata or bictonensis is now known to be only a form of

Fig. 1.—Osmanthus, showing difference in form of leaf, according to stage of growth.

C. spinosa, as shown by our illustration (fig. 4). Other instances of like nature are shown in Acacia elongata (fig. 5) and in Leptospermum lævigatum (fig. 6), but these instances may have been the result of insect puncture or other injury.

Other illustrations of variations arising during growth, are afforded by the differences often observable in the foliage according to the conditions of growth; Ficus repens against a wall has small,

* In consequence of the interest lately expressed on the subject, the following notes are reprinted. They formed originally the substance of an unwritten address given to a Society of gardeners. Those who desire to look into the literature of the subject should consult the writings of Meehan, Morren, Naudin, and others, and will find excellent summaries in Carrière's *Production et Fixation des Variétés*, and in Darwin's *Variation of Animals and Plants*.

FIG. 2.—VERONICA CUPRESSOIDES, TO ILLUSTRATE DIFFERENT FORMS OF FOLIAGE ON THE SAME PLANT.

FIG. 3.—TILLANDSIA VIRGINALIS: SHOWING TWO FORMS OF LEAVES ON THE SAME PLANT AT THE SAME TIME.

thin leaves, as shown in fig. 7; grown as a standard, the leaves assume the appearance shown in fig. 8. Similar diversities are noticeable on the flowering branches as contrasted with that on those branches which bear no flowers. The common Ivy furnishes an illustration. The short contracted shoots of the Laburnum, or the Apple, known as "fruit-spurs," constitute other examples.

Sexual Forms.

Another form of variation in flowers is that connected with difference of sex. A "pin-eyed" Primrose does not greatly differ in appearance from a "thrum-eyed" one, yet the difference between them is precisely of the same character as that between the variously formed flowers of some species of Catasetum and Mormodes. So utterly different are the male and female flowers of some of these species, that they were at first placed by very competent botanists in different genera. It was only when the protean plants produced all the forms of flowers on one and the same spike, that it was seen that, so far from belonging to different genera, they did not even belong to different species. It was left to Darwin, and recently to Rolfe, to show what this paradoxical variation really means; and now, when we meet with a case of the kind, we say, "Ah, yes; only a sexual form," just as if we had known all about it from our earliest years, and very possibly, in our haste, not discriminating cases of a different nature. But this is not what we propose to discuss just now; we simply say that these cases, though often so designated, are not sports—at least, in our acceptation of the term.

Bud Variations, or Sports Proper.

What, then, are sports? We have already characterised them as "bud-variations," but we must give some further indication of their peculiarities: First, as to the suddenness of their production. A tree or a shrub, all on a sudden, and without any cause—that is, apparent to the eye—will put forth a bud, which, as it lengthens into a shoot, displays leaves of a different character to any that the plant has hitherto produced, which have no definite relation to any particular stage of growth, and which are quite different from any that under ordinary circumstances the plant in question has produced, or is likely to produce, in future. In short, the

FIG. 4.—COLLETIA: TWO FORMS OF BRANCH ON THE SAME STEM.

FIG. 5.—ACACIA ELONGATA: TWO FORMS OF LEAVES ON THE SAME STEM.

occurrence is sudden and unforeseen. Gardeners, of course, avail themselves of these variations. They remove them, bud them, graft them, strike them from cuttings, or, in some way or another, endeavour to perpetuate the variety, and thus have originated our cut-leaved Beeches, Maples, Limes, and curled-leaved Willows and Banksias (see fig. 9). Thus, too, may have originated some of our weeping trees, and some of our pyramidal shrubs,

FIG. 6.—LEPTOSPERMUM LÆVIGATUM: TWO FORMS OF LEAVES ON THE SAME STEM.

though for the most part, these have, as I believe, originated as seedling variations.

Not only do these variations occur suddenly, but they are very local in their manifestation. One particular shoot "sports," while all the rest remain in their normal condition. It is very different in the case of seedling varieties, where the whole system of branches and leaves is more or less affected.

Another and a most remarkable feature about these sports is, that they sometimes occur simultaneously in widely different localities; thus the same sport of a Chrysanthemum "turns up" about the same time, not only in different nurseries in this country, but also on the Continent. This may be because all the plants in question have originated from one and the same stock.

There are several circumstances connected with sports which call for notice, and which may eventually lead to a clearer apprehension of the causes of their production. For instance, their relative frequency or the reverse in particular categories of plants. Thus, so far as we remember, there is no case on record of a sport other than a mere colour variation having appeared in an annual plant. Seedling variations and absolute malformations are

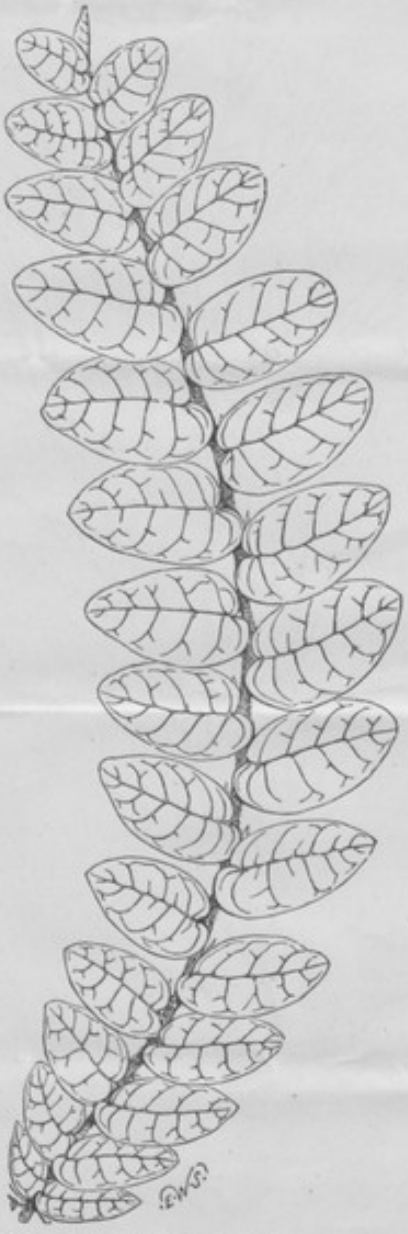

FIG. 7.—FICUS REPENS, AGAINST A WALL: STERILE STAGE.

of course common in annual plants, but we do not recall a single instance of true bud-variation among annuals. We have looked for them among the annuals grown every year in the trial grounds at Chiswick and elsewhere but in vain. Mere colour variations, such as occur in the Corn cockle (Centaurea cyanus), wherein on the same plant we may find flower heads of three or four colours, are not uncommon.

FIG. 8.—FICUS REPENS, GROWN AS A STANDARD: FRUITING STAGE.

Now, in an annual plant there is more or less continual growth from the start to the finish. The machine once set going, proceeds without interruption or change of direction to the end, at least relatively so. But in a perennial of whatever degree, growth is intermittent; there are periods of relaxation of growth, winter buds are formed, and growth ceases. But while growth is dormant it does not follow that the laboratory work carried on in the tissues of the plant is at a standstill; indeed, we know it is not so. Obviously, this intermittent energy, dependent as it must be upon wide variations of external conditions, is more favourable to the occurrence of variation than is the more or less continuous growth of annuals during the persistence of conditions sufficiently equable not to materially check or divert the current of growth.

These, then, are the special characteristics of a sport. Illustrations could be given by the hundred; but neither time nor space permit, nor, indeed, for our present purpose, is it requisite to do so.

CAUSES OF THEIR PRODUCTION.

Whoever will investigate the cause of these sudden outbursts of local variation must, of course, seduously examine each case for himself, according to the measure of his ability and of his opportunity. The circumstances, the history, the progress, the

anatomy, of each particular sport must be investigated, both absolutely and in relation to similar outgrowths in other plants. Until this is done—and it has not been done yet—any explanation as to the cause of the phenomenon must be a matter of speculation. Still, we cannot help guessing, and though we may be wrong in our surmises, at least the process does good by setting us observing and thinking. Observing and thinking are processes valuable to all of us, but in a particular degree to those who practice the cultural arts. And so it happens—or, at least, we will hope so—that although the causes which have been assigned for these changes are various, some, perhaps, utterly wrong, others partially so, and all more or less inadequate to explain the whole of the phenomena, yet some advantage may accrue

Fig. 9.—Banksia marginata, showing variation in leaf.

from the discussion. An indirect benefit is better than none at all, and anything which enforces us to take some measure of the extent of our own ignorance is likely to be beneficial. We should never be a bit the better if we simply acknowledged our ignorance, as, indeed, we needs must do in any case, but directly we attempt to find out in what particulars, and in what degree, we are ignorant, then there is some hope that some portion of our "nescience" may be dispelled. Under this impression, we may allude to some of the assigned causes of sporting.

External Causes.

External causes are those which the gardener most generally invokes. In his opinion a sport is the consequence of some alteration in the nutrition of the plant. It gets too much or too little food, or the food is not of a suitable character—containing too much of one thing, too little of another, or the climate is charged with the results observed. It is very convenient to have the weather to blame; it may be too hot or too cold, too moist or too dry, too brilliant or too obscure; or the soil may be at fault, the drainage may be defective, the earth not sufficiently aërated, its temperature too high or too low. Combined action of some of these conditions is, of course, possible, intermittent action equally so, whilst we, in this country, are abundantly familiar, first, with one thing in the way of the weather, and immediately afterward with another. It is, therefore, not surprising if some gardeners, without troubling themselves much to see how the explanation fits the facts, do attribute "sports" to such causes as we have mentioned. To our thinking, the objections to this kind of explanation are fatal. External circumstances are, no doubt, potent enough to effect very great changes. We are daily witnesses of them; but they do not produce the kind of change which we know as "sports."

On the contrary, sports occur sometimes when no alteration of external conditions is perceptible, and they do not occur when such alterations are very apparent. Or, again, they appear in one place, under one set of circumstances, and simultaneously at another place, under a different state of affairs; and although all the plants growing together have been exposed to the changed conditions of life, the sporting tendency shows itself in one particular plant only, and in one particular part of that plant, generally only in one bud. With all respect, then, for those who hold these views—and one, at least, of our most experienced and eminent plant-growers has lately publicly advocated them—we venture to think external causes, however adequate they may be in some cases, are inoperative in such cases as we are considering.

Separation of Mixed Elements—Reversion.

A better explanation is that offered by Darwin, by Naudin and others, according to which sports are due to a dissociation of mixed elements, and to a reversion to the character possessed by one or other of the ancestors of the plant, perhaps one or two, perhaps an indefinite number of generations ago. Let us recall for a moment what a very composite thing a plant is, even such a one as we call a simple plant. At first it is neutral and homogeneous, a mass of protoplasm—containing cells—at least, so it was once said; but the homogeneity of protoplasm is a thing of the past. We do not believe in it now. On the contrary, we believe in frameworks and interstitial fluid, in granules and fibres, in some parts that are alive, in others that are dead; in some that are stable and immutable, in others that are mobile and changeable; in short, we have come to the conclusion that, physically and mechanically, as it was previously known to be chemically, protoplasm is very much "mixed."

Again, another of our old beliefs has been dissipated. Once we were taught that the cells of plants were closed bags without apertures, and that, while the fluid passed from cell to cell by osmosis, there were no visible pores, and no means of transmitting anything more solid than cell-sap. The passage of protoplasm from cell to cell was not then thought of as possible. But Mr. Walter Gardiner has changed all that. He, and others who have followed in his steps, have taught us how to see the pores in the cell-walls, how to see the passage of protoplasm through these pores from cell to cell, and how to employ the phrase "continuity of protoplasm" in a manner that gives us, at present at least, great satisfaction. These modern discoveries of the composite nature of protoplasm, and of its passage, at certain times, and under certain conditions, from cell to cell, seem to us to furnish a clue to the explanation of some of these cases of sporting, as they do also in the case of some of those curious cases in which the stock seems to influence the scion or the scion the stock, in cases of grafting.

Again, in the life-history of a plant there are several stages. There is the neutral stage, when it is, at any rate, so far as sex is concerned, an epicene. Then there is the sperm stage, when our plant consists of a mass of neutral matter, a particular portion of which is developed into sperm-cells, or into what

FIG. 10.—NEUBERT'S HYBRID BERBERIS; SHOWING THE LEAVES CHARACTERISTIC OF EACH PARENT ON THE SAME SHOOT.

will ultimately produce them. At another time the neutral cells of one portion of the general plant-mass develop into germ or female cells, or it may happen that both sperm and germ-cells may be developed at one and the same time, when the plant has, of course, a three-fold constitution.

All these modifications occur in the course of the life of each individual plant. But each individual plant is, necessarily, compounded of elements derived from its two parents, so that, for illustration sake, if we may consider the original stock to consist of three portions—neutral, male and female, respectively—it is obvious that in the first generation there would be six component elements; in the second, twelve; in the third, twenty-four, and so on. Who can count the generations of plants? It is enough for our purpose if we succeed in showing clearly their composite nature.

This being granted, it will not seem remarkable that occasionally a partial separation takes place, just as a scum may rise to the surface of some mixed fluid, or a sediment fall to the bottom of another. This illustration may, perhaps, serve to suggest the reason for the separation of mixed elements in plants; but that is too speculative a matter for us to enter upon here.

ILLUSTRATIONS OF SEPARATION.

It will be better for our present purpose to note one or two examples of imperfect mix-

ture or dissociation of mixed characters wherein both the fact and its explanation are clear. One of the most interesting is that narrated by Mr. Noble, the originator of the white form of Jackman's Clematis. Noble's Clematis, is the result of a cross between Jackman's Clematis and C. patens. Soon after this Clematis was sent out, some dissatisfaction arose because, instead of producing flowers of good form and purity of colouring, more cut away, and only new wood thus suffered to produce flowers, no blooms of the patens character are seen, but only those of the Jackman type.

Another very interesting case of unmixing, or, if it be preferred, of partial mixture, is afforded by Neubert's Berberis (figs. 10, 11). This is a hybrid between the evergreen pinnate-leaved Mahonia and the deciduous simple-leaved Berberis vulgaris, and it bears leaves some of which are intermediate in appearance,

FIG. 11.—NEUBERT'S BERBERIS; SHOWING TRIFOLIATE LEAF INTERMEDIATE BETWEEN THAT OF BERBERIS AND MAHONIA.

or less mis-shapen blooms of an unattractive appearance were formed. The matter was mysterious. The raiser was blamed by those who did not know that he is a highly competent man in his business, and one whose integrity is beyond question. The plant was condemned. Fortunately, however, the edict was not carried out in its entirety—some specimens were left. These were watched, and in due time afforded the explanation of the mystery. Jackman's Clematis flowers in the autumn on shoots formed during the spring and summer—on the new wood, as gardeners say—just as happens with a Rose. Clematis patens flowers in spring on shoots that were formed during the previous summer—on the old wood, in gardening phrase. Now, when Noble's Clematis came to be scrutinised, it was found that it produced two kinds of flowers—those which expand in spring are solitary, semi-double, never white, but bluish-grey, like those of C. patens. Those which unfold in autumn are produced in pairs and are single, like those of C. Jackmanni, but white. In the spring no flowers of the Jackmanni type are ever seen, and when the old wood is while others are much like those of one or other of its parents.

A not uncommon illustration of a similar kind, is the production of a Peach and a Nectarine on the same branch (fig. 12), and we have just learnt from Canon Ellacombe that some of the Berlin Hellebores show evidence of their hybrid nature by occasionally producing foliage [and flowers?] of the two parents separately from the same root-stock.

In addition to the cases given above, we may here cite a few more which have come under our notice, such as a Chrysanthemum, half the florets of which are of one colour, half of another (fig. 13). A hybrid Calanthe, showing a similar piebald variation, is shown in fig. 14. A very curious case was that of the Narcissus (fig. 15) received from Mr. Walker, and in which flowers of two distinct varieties sprang from the same bulb. Grapes not uncommonly show their crossed origin by presenting a striped appearance, one stripe being of one colour, one of another, as may also be seen in the Orange, Apple, Lemon, and Currant (fig. 16). Red and white Roses on one stem, and buds destitute of

FIG. 12.—PEACH AND NECTARINE ON THE SAME SHOOT.

FIG. 13.—SPORT IN CHRYSANTHEMUM: SHOWING HALF THE FLORETS OF ONE COLOUR, THE REMAINDER OF ANOTHER.

FIG. 14.—SPORT OF CALANTHE VEITCHII, SHOWING SEPARATION OF THE MIXED COLOURS OF THE PARENTS.

moss produced on a Moss Rose, have often been recorded.

The illustrations above given are instances of the results of cross-fertilisation, in some of which the whole process of mixing and un-mixing, has taken place under our own eyes. But for how many centuries the Chrysanthemum has, we will say, been crossed and recrossed, and crossed

FIG. 15.—SPORT IN NARCISSUS; TWO VARIETIES FROM ONE BULB.

again, by insects if not by man? This process seems destined to come to an end, because the flowers, after a time, become sterile, owing to the fact that the stamens and pistils, one or both, are imperfectly or not at all developed. Seedling variations in such cases must become more and more rare, as the process of sterilisation becomes more and more marked. If new seedlings are desired, raisers will have to go back to less highly modified flowers; to flowers, that is, which are more nearly in their original condition. But although the production of varieties in the Chrysanthemum by fertilisation may be thus limited, the development of sports by bud-variation may, and probably will, still go on, to the delight of the grower and the interest of the student. It must, however, be said, that at least in the case of the Chrysanthemum, the change is sometimes very slight, depending solely on the presence of colouring matter in some cases and on its absence in others. The form of the flower and of the foliage in many of these Chrysanthemum-sports is in no wise different from that of the parent plant. This is only an illustration of the fact that all degrees of combination or of dissociation, as the case may be, may be expected to occur.

If the theory of unmixing be true, we ought to find "sports" more prevalent among those plants which are the outcome of repeated hybridisation or cross fertilisation, and among which have been longest in cultivation, than among those which are self-fertilised or pure bred, or which have been only a relatively short time in cultivation, and it certainly is so. What plants are most subject to bud-variation? Roses and Chrysanthemums, we should be inclined to answer. Now, both these plants, as we see them in gardens, are the outcome of crosses innumerable carried on for many generations. The same may be said of the Orange, which is very sportive, and of the Pelargoniums, which are the offspring of many crosses, and present many bud-variations.

FIG. 16.—SPORT IN CURRANTS: VARIOUSLY COLOURED BERRIES IN ONE CLUSTER.

The crossing need not necessarily be between species (true hybridisation), it may be between varieties of the same species. The Vine often produces sports, although there is in Europe but the one species, Vitis vinifera, most of the myriad forms of cultivated Grape having originated as seedling varieties of it. So also with Indian Azaleas, Camellias, Tulips, and Hyacinths, which have been in cultivation for many centuries, and of which the varieties have intercrossed; a long list of similar instances might be cited.

On the other hand, Heaths (Erica), and Rhododendrons, though much crossed, have not yet yielded many bud-variations, and must, therefore, be considered as exceptions to the rule, probably because the time during which they have been under cultivation is short in comparison with those plants before mentioned. Tuberous Begonias, again, which are the descendants of numerous species, though often presenting monstrous flowers, have not been up to this time remarkable for producing sports even from their tubers, but these Begonias are the products of our own generation. The hybrid Orchids, especially hybrid Cypripediums, like the hybrid Aroids originating from Anthurium Andreanum and A. Scherzerianum, crossed with other species, have not yet yielded sports apart from malformations (which latter in hybrid Cypripediums are very common). From all these plants, if the theory be true, we may expect to see bud-variation

in future, and one reason why we do not see them already, is, as has been said, probably the relatively short time they have been in cultivation. A hundred years is but a spot on the vast dial of Nature's time. In any case, the negative evidence they afford is of little weight as compared with the overwhelming testimony of an opposite character, presented by Roses, Chrysanthemums, and Pelargoniums.

Negative testimony is moreover by no means without weight; take for instance the case of the Chinese Primroses, or the Persian Cyclamen—all the varieties have been obtained by selection from the seedlings. There has been no crossing with other species, and no bud-sports have made their appearance.

Carnations and Picotees, again, which originate from one species, vary from seed but not from buds; and the same may be said of the Cineraria, the offspring of one species.

as above mentioned. Now that we know that not only water, but protoplasm itself, may, under certain circumstances, pass from cell to cell, the difficulties in the way of conceiving that any influence could be exerted on the scion by the stock, or *vice versâ*, are very materially lessened, if not entirely removed.

But before the time we speak of, there were some alleged facts, especially in the case of bifacial Oranges, which, provided the history given were true, could only be explained on the supposition of the commingling of elements by grafting and subsequent separation. In other words, the possibility of graft-hybridisation must be assumed. Whether it has been proved is another matter.

One of the strongest cases in its favour that we know of, is that of the famous Adams' Laburnum Cytisus Adami. We cannot go into detail as to the history of this extraordinary tree. It must suffice to say, that it is stated to have originated from the

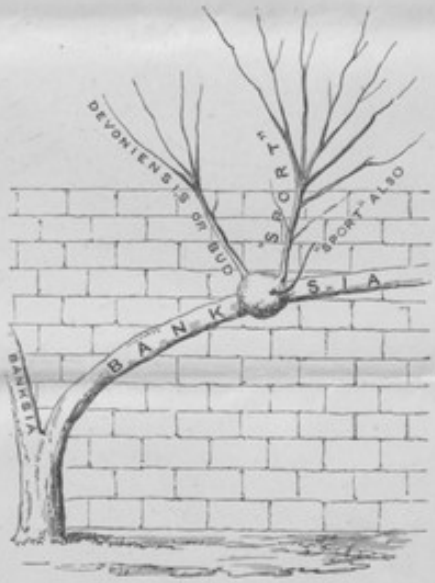

FIG. 17.—SPORTING BRANCH OF ROSA DEVONIENSIS.

GRAFT HYBRIDS.

Is there any commingling of the elements of stock and of scion in the case of grafts? Botanists and gardeners, almost without exception, have asserted that there is none, and they illustrate their contention in this wise. Place on a sheet of wet blotting-paper, which may represent the stock, a drier piece of the same substance, which may represent the graft, and there will be a passage of the fluid from the lower to the upper paper, but there will be no mixture of the constituents of the two, no blending of their actual substance.

We have always wondered if there were no reciprocal influence of stock on scion, why grafting should be practised at all, because we cannot understand the acknowledged advantages of the practice except upon the supposition of some modification being exerted. Gardeners pointed triumphantly, as they were quite justified in doing, to the millions upon millions of cases where no such modifications are visible. Botanists pointed to the closed cells from whose cavities only the thinnest of liquids could exude and permeate through the walls of adjoining cells. This was before the days of "continuity of protoplasm,"

implantation of a bud of the dwarf, shrubby, lilac-flowered Cytisus purpureus on to the common Laburnum. Be this as it may, we have in our gardens on this side of the Atlantic, trees which every year astonish the beholder by producing together with the foliage and flowers of the Laburnum, tufts of Cytisus purpureus, and all sorts of intermediate conditions between the two. If the stock exerted no influence on the scion, the buds should be pure Cytisus purpureus and pure C. Laburnum, without any intermediate forms.

A Fir, intermediate in character between A. Pinsapo and A. Nordmanniana, has been described in the *Revue Horticole* as the result of grafting, but it seems more probable that the hybrid originated from pollen of Nordmanniana impregnating flowers of P. Pinsapo. One of the best authenticated cases of the kind is that described in the *Gard. Chron.* for 1860. In this case, Mr. Poynter budded Rosa devoniensis on to a white Banksian (fig. 17), with the result that a sport was formed which was neither true devoniensis nor true Banksian. The sport was "greatly increased in vigour and in the size of all the parts, the leaves were also half-way between a Banksian and a Tea-scented Rose." What became

of this sport we have never heard. Many cases of variegation being communicated to the stock by implanting on to it a bud with variegated foliage are on record. We give an illustration of one case which was sent us by Mr. Swailes, of Beverley, and in which parti-coloured leaves were thrown out from an Elm stock which had been "worked with" a bud from a variegated plant (fig. 18). Many analogous cases in Citrus, Abutilon, Æsculus, and Laburnum have come under my own notice. It would lead me too far to give other illustrations of the production of shoots of an intermediate character between stock and scion. It must suffice to show that whilst we may, with a very great amount of probability, attribute the existence of some sports to the "unmixing" of elements blended by means of cross-fertilisation, whether between species (hybrids), or between varieties (cross-breds), we may, likewise, but with a less degree of probability, attribute the existence of others to a similar dissociation in the case of grafted plants. Obviously, the latter cases must be much less numerous than the former, and are purely artificial productions.

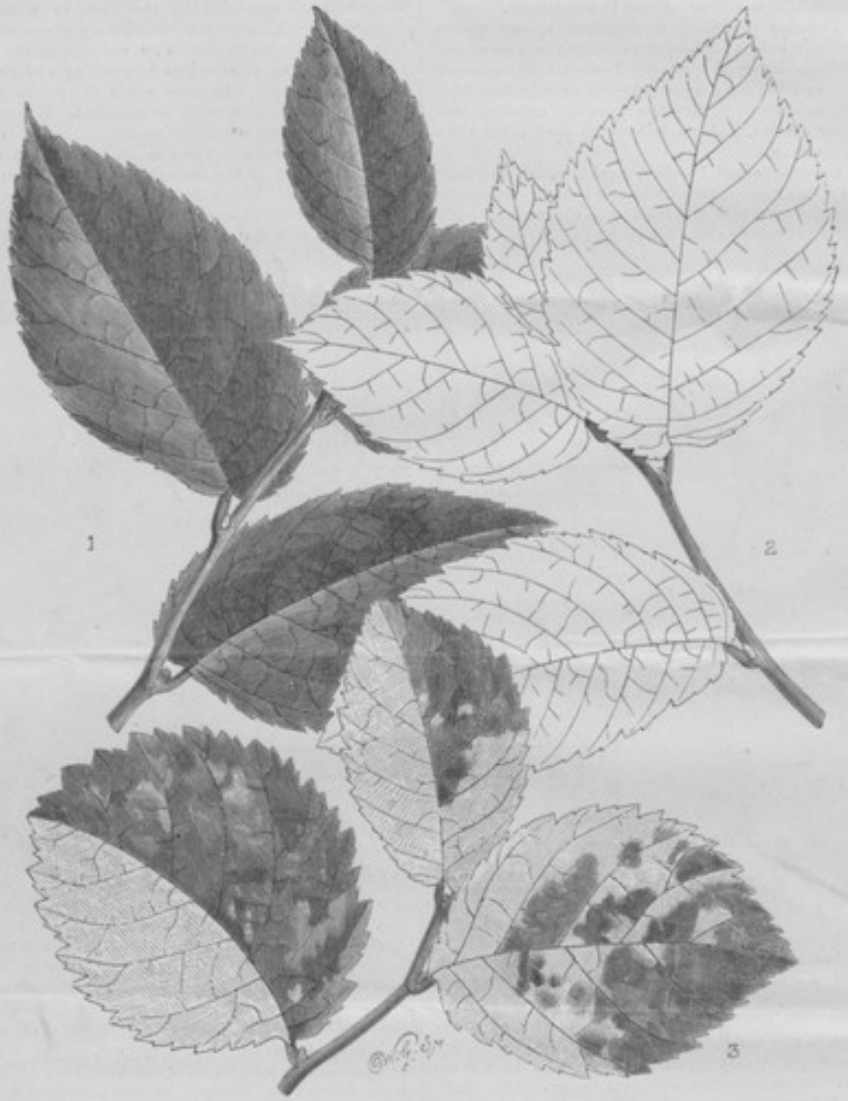

FIG. 18.—EFFECT OF VARIEGATED SCION ON THE STOCK.

Other assigned causes of sporting appear to me to pertain rather to variation in general than to that limited and localised form of it which is here considered as bud-variation, and may be here passed with the mere mention. *Maxwell T. Masters.*

THE BUSH LIMAS.

We have grown and tested each and all of these bush Lima beans ever since they were put upon the market, and given them a fair trial, and have read and heard what others, interested and disinterested, have had to say about them. Our opinion of them is that they are a valuable acquisition to our vegetables and indispensable to every well-appointed

have them, and hope never again to be without them. We have a distinct place for them that no other vegetable fills.

The tall, or pole Limas are the most tender of vegetable seeds we commit to the ground, more so than okra, melon or egg plant. On warm, sloping sandy land we do not dare to sow them before May 5 to 10, and on ordinary heavy land between May 20 and June 10, according to land and season. True we can force the season a little by starting the seeds in boxes or pots, and when the weather gets warm, planting the seedlings out o doors; but after oft-repeated trials, we question if the little gain in time of fruiting pays enough for the time and trouble spent in starting the plants. The small Lima or Sieva beans are hardier than the large Limas, and we sow them five to ten days earlier and gain a proportionate earliness in their fruiting time.

We begin picking from the tall Limas about the fifth to the fifteenth of August.

Between June 5 and July 15 we have any amount of peas, then they get mildew, and after the 20th we cannot count on having any more peas before fall. Just as the peas are going fast Henderson's bush Lima comes in and fills that gap between peas and pole Limas we never before had filled. It is earlier than the pole Sieva. And another thing about it is that its seeds are hardier than those of any other Lima. We sow them on warm sandy land about April 15, at the same time as we sow our earliest Valentines, and we have found, if the Valentines escaped the frost the little Limas did so too. And these same dwarf Limas from the time they begin fruiting keep on flowering and fruiting continuously, till they are cut down by frost in the fall. And a sowing made in July, if covered over with frames and sashes in September and banked about with manure, and preserved from cold and frost with mats and shutters over the glass, will yield us good young beans till Thanksgiving. Grown on rich ground, and picked young and used when fresh, the quality of this little Lima is excellent.

The dwarf Limas should be grown in the open ground in rows 2½ to 3 feet apart as we do snap beans or peas, and we have found that while they grow and bear very well with level cultivation, growing them on somewhat raised rows —not quite so high as we do potatoes— is better. Being so bushy and close when they lie flat on heavy level land the beans are sometimes apt to must and spoil, but on the ridges they are kept perfectly dry, and this evil is obviated.

Burpee's Bush Lima is a perfectly fixed dwarf form of the large white pole Lima, and its pods and beans are as large as those of the tall sort. It forms broad, branchy, rather upright bushes, but has no inclination to run, and it is quite prolific, and the fruit is of good quality. It keeps on blooming and bearing from early in August till frost comes.

Thorburn's (Kumerle) and Dreer's bush Limas are, we believe, identical. It is quite distinct from the other two. Our plants are dwarf, thick and bushy, and have shown no disposition whatever to run; they are also very prolific. The pods are somewhat short and knobby, and the beans short and chunky and of excellent flavor.

Our illustrations are made from photographs of good average plants pulled from the rows in the open field September 15, and from which in common with the others in the field we had been picking beans before that time.

As regards the origin of these bush Lima beans the following letters from the various seedsmen that disseminated them are self-explanatory:

To the Editor of Gardening—*Sir*: In 1884, Mr. Kumerle, of Newark, noticed a dwarf form among some of our Challenger pole Limas, and from these careful selections were made, resulting in the production of this veritable dwarf Lima, growing only 12 to 18 inches high, perfectly fixed in habit and with hardly any inclination of running to vine. It is considerably earlier in bearing than the pole sorts. It possesses the characteristic flavor of the genuine Lima. It is exceedingly productive, a single bush brought into our office here bearing no less than 47 pods.

New York. J. M. Thorburn & Co.

To the Editor of Gardening—*Sir*: Henderson's Bush Lima Bean was to the best of our knowledge first found by a "darkey" in the neighborhood of the Peaks of Ottar, Va. The quantity was increased by a market gardener near Lynchburg, Va., and it latterly found its

way into the hands of a seedsman in Richmond, Va., from whom we bought the entire stock. Its history after its introduction by us is well known.

PETER HENDERSON & Co.
New York.

TO THE EDITOR OF "GARDENING—*Sir:* The dwarf form of Dreer's Improved Lima Bean originated with Kumerle and was offered by J. M. Thorburn & Co., of New York, in 1889, who discontinued its sale for the next two years. We had meanwhile obtained a supply of the seed, which we introduced as Dreer's Bush Lima, by which name it is now appropriately and popularly known, being a dwarf variety of the Dreer's Improved Pole Lima.

HENRY A. DREER.
Philadelphia.

TO THE EDITOR OF GARDENING—*Sir:* Burpee's Bush Lima was discovered by Asher Palmer, of Kennett Square, Chester county, Pa., 40 miles from here. In 1883 his crop of Pole Lima beans was destroyed by cut worms, and in going over to remove the poles he discovered a little dwarf plant six inches high, bearing three pods, each containing one bean. Of the three plants raised from those beans, two retained their bush character in 1884, and from these two have been developed the variety which for several years has been just as true as the Red Valentine beans are to the bush character. I only wish you could be at our warehouse in Philadelphia to see the prize bushes grown this season, several of them having grown 300 pods; and the mass of testimony relative to the value of this bean is really phenomenal.

Philadelphia. W. ATLEE BURPEE.

CABBAGE SEEDLINGS DAMPING OFF.

TO THE EDITOR OF GARDENING—*Sir:* During the past season we have lost several thousand early cabbage plants; they seem to take a rot when just up a few days, and topple over, sometimes hundreds together. We sowed the seed in February in flats in a cool greenhouse, intending to prick off the seedlings when they were a few days old into other flats, but they mostly damped off before we could do this, some, however, did not damp off till they were a good size. The soil we used for the seed boxes was old, well-decayed and finely broken up hot-bed material—manure and loam mixed, but about two-thirds manure. Lettuces, tomatoes and celery do well in it, but cabbages and cauliflowers do not.

E. D. C.
Midland, Canada, Feb. 3, '93.

This seed-bed mould is very fatal to seedlings, especially within a week after they germinate. It is always more prevalent and destructive to seedlings raised in confined quarters, as pots or boxes, than in the open ground, and in dull weather and close quarters, than in bright weather and in ventilated houses. Sometimes it would appear that the closeness of the house caused it, again that too much humus in the soil encouraged it, also over-wetting, and not infrequently the mould seems to be present on the seeds before they are sown, and to spread in the ground as soon as given favorable conditions. It is to escape the ravages of this dread mould that we prick off our seedlings into other boxes as soon as they show above ground. We would use poorer soil for sowing in, be the earth be moist enough at the time, and start the seeds in a temperature of 60°, and prick them off as soon as you catch them peeping above ground. Because you suffered so severely last year is no reason why you should do the same this year. The moment you find it in your seed boxes prick off all the good seedlings and dump out the rest,—don't even save one that has a limp, or rotten root, and don't save a bit of earth to the roots.

HENDERSON'S BUSH LIMA

EARLY CABBAGES.—We used to sow our early cabbage plants in September and winter them in cold frames, planting them out into the open garden in early spring, and this is still done in the southern states. But in the north we have stopped it because from sowings made in a hotbed in February and early in March we get as early hearts as from fall sowings. Young plants start freely and keep on growing, and by planting out time, the first of April, they are pretty large plants. The Jersey Wakefield is the standard early sort hereabout. Sow some Early Summer at the same time to come in as a succession.

EARLY CAULIFLOWER.—Early Erfurt or Snowball are the most used earliest. Treat them as you would early cabbages, bearing in mind they are somewhat tenderer than cabbage.

VARIATION IN FERNS.

THE following extracts are taken from a paper read before the British Pteridological Society by Dr. Stansfield, on "Weismann's Theory of Heredity and its relations to British Ferns." We have eliminated much of the purely speculative part of the paper, and confined the matter as closely as possible to ascertained facts and inferences from them.

"Herbert Spencer defines heredity as the capacity of every plant and animal to produce other individuals of a like kind. We are so accustomed to this phenomenon of heredity that the superficial, who always form the vast majority of mankind, look upon it as a matter of course, and as a thing not requiring to be explained. The more thoughtful, on the other hand, have for long looked upon it as an inscrutable mystery—a thing not to be explained by human

[illegible] why there are so many different seedlings in a sowing of A. f.-f. setigerum, and so few variations in a sowing of L. ps.-mas crispa gracilis; why the same pair of human parents will have one child with red hair and another with black. Further, we want to know why children (animal and vegetable) occasionally bear a much closer resemblance to one or other of their grandparents, or even to some more remote ancestor, than they do to their immediate parents.

All these questions and many others Weismann tackles and answers more or less successfully. Those who care to go into the matter more fully, will find what they want in Weismann's book *The Germ-plasm*, which has been translated into English, and published in the contemporary science series by Walter Scott.

Of course the best-known method of reproduction of organisms is sexual reproduction—that is, by the union of two germs; but there are asexual modes of reproduction, buds, bulbils, and cuttings. Of similar asexual forms in the animal kingdom, I may mention the parthenogenetic production of drone eggs by the queen bee, and the viviparous reproduction of aphides, or green-fly, by the imperfect insect, both of which are quite independent of any process of fertilisation.

To begin, however, with the more familiar process of sexual generation, we know that the whole of the characters of the plant or animal must in some way be capable of being packed up within the extremely minute compass of a sperm-cell and a germ-cell, and since a spore is capable of producing both sperm-cells and germ-cells, the whole of the complex characters of a Fern, say Athyrium f.-f. clarissima or Lastrea montana Barnesii, must somehow be contained within the narrow compass of a spore.

The ultimate male and female elements are of course the ovum, or egg-cell, and the antherozoid, or sperm-cell. Of these, the egg-cell is very much the larger, but we do not therefore find that the offspring as a rule resemble the female parent much more than the male. On the other hand, the characters of the two parents are generally fairly equally balanced, and when they are unequal, those of the male are just about as likely to preponderate as those of the female.

The inference must be either that the hereditary substance is weaker in the large egg-cell than in the very small sperm-cell, or that only a small part of the egg-cell consists of hereditary substance, the rest being merely nutritive material. There is abundant evidence that the latter is the case. When the sperm-cell or antherozoid penetrates the egg-cell, it takes no notice of the great body of the latter, but plunges through it and makes straight for the nucleus with which it blends itself. We shall see by-and-by that there is reason to suppose—not that the hereditary substance is the nucleus or the cell, but that the nucleus contains the hereditary substance.

THE DIVISION OF THE NUCLEI.

The growth of plants and animals consists in the division and sub-division of cells. Within a comparatively few years, it has been observed that whenever a cell divides into two, a very complicated process is gone through.

Somewhere in the interior of the cell, and generally about the middle, can be seen by the microscope a small round spot, generally of a slightly darker colour than the rest of the cell—this is the nucleus. When the nucleus is stained and examined with the highest magnifying powers, it is found to be an extremely complex body; it is separated off from the rest of the cell by an extremely delicate membrane or wall, which, however, under certain circumstances, sometimes disappears. It is permeated by an extremely fine and complicated network of threads. When a cell is about to divide, some curious changes take place in the nucleus, and particularly in the network of threads which I have mentioned. The threads cease to be a network, and assume the form of a single coiled fibre; next, this breaks up into a number of detached pieces, which then arrange themselves in the form of a series of loops around the equator of the cell. Each of these loops then split along its whole length, as if a piece of untwisted rope had its strands separated into two thinner ropes, and the split portions are drawn gradually towards the two ends of the cell, where they join themselves together into two bundles, are followed by the rest of the nuclear substance, and form two separate nuclei. While this process has been going on, the protoplasm of the cell has been tending to collect itself around the two daughter nuclei, and by the time the nucleus has fully divided, the rest of the protoplasm is ready to follow its example, and to divide into two parts. This complicated process takes place whenever a cell divides; that is to say, it is taking place in millions of cells in almost every growing plant. To it the name of "mitosis" has been given by biologists, and it is highly suggestive of the extreme importance of the nuclear threads of which I have spoken, and to which the name of "chromosomes" has been given, because they have the property, in a pronounced degree, of absorbing colouring-matter, which may be brought in contact with the cell to which they belong. Now an egg-cell is developed from the ovary in the same way that other cells are developed. When, however, an egg-cell is fully developed or ripe, its nucleus divides into two parts; but, instead of the whole cell dividing, one of the halves of the nucleus is simply thrust outside the cell, and there perishes. The part thrown out is called a "polar body." The nuclear loops, however, in this case are not split, but simply one half of their number are removed in their entirety. From that moment no further development takes place in the egg-cell until fertilisation has occurred, and that process consists in the replacement of the lost half of the nucleus by another half nucleus, containing a similar series of rods or loops, from a sperm-cell. All this, of course, is a matter of observation and fact, and not of theory.

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REVERSION.

Let us now glance for a moment at the phenomenon of reversion or atavism. An organism will sometimes exhibit characters and peculiarities which cannot be detected in either of its parents, but which belonged to one or other of its grand-parents, or even to some ancestor many generations back. The explanation of this in Weismann's theory is very simple. I have already explained that the germ-plasm of an individual contains "ids," derived from a long line of ancestors. Every variety of recent origin probably contains some normal "ids" of the species to which it belongs. Mr. Druery can tell us that in raising young plants of A. f.-f. clarissima, some of the offspring tend to run back to the normal form of A. filix-fœmina. The reason for this is that by a reducing division the germ-cells have got rid of some of the clarissima ids, and so the normal ids have obtained a majority and gained the upper hand. There are probably, however, some clarissima ids still contained in the germ-plasm of these degenerate forms, but these form only a small minority, and are consequently unable to produce much impression upon the character of the plant. If, however, we sow again from these renegades we get a fresh series of reducing divisions, and in some of these it may happen that the clarissima ids gain the upper hand, and so we again get a few clarissima seedlings from the degenerated parents, although the bulk of the offspring are probably normal Athyrium filix-fœmina.

Let us take as another example Polypodium v. cornubiense, which produces normal fronds among the dissected ones. In this Fern the abnormal ids have presumably only a very small working majority, and so the government is apt, as it were, to be caught napping, and to be occasionally outvoted. Sometimes this defeat is so humiliating that the government resigns and the opposition takes office, that is to say, the Fern reverts entirely to the normal form. It is probable, however, that if we sowed spores from these reverted plants we should get fresh reducing divisions and re-combinations, in some of which the advanced party would again gain the majority and again take on the reins of government. I am not aware that this has been done in this particular case, because Fern-growers as a rule prefer to sow from their best plants and not from their worst. From the biological point of view, and for scientific reasons, however, it would be well worth while to occasionally sow from reverted forms and record the results.

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intelligence. Of late years, however, various attempts have been made to penetrate someway into the mystery, and of these, one of the most important is that of the German Professor, Weismann.

Heredity.

To put the problem in a concrete and familiar form, we want to know how it is that Ferns always produce Ferns; mice always reproduce mice, and men and women have human children. How it is that seedlings from a Scolopendrium are always Scolopendriums; that in a pure bred herd of Alderney cattle we never get a Kerry calf; that from a pure flock of, say, Black Spanish poultry, we never get a Cochin-China chicken. Again, we want to know why Alderney calves are not all alike, but on the contrary, are all different; why there are so many different seedlings in a sowing of A. f.-f. setigerum, and so few variations in a sowing of L. pumila crispa gracilis; why the same pair of human parents will have one child with red hair and another with black. Further, we want to know why children (animal and vegetable) occasionally bear a much closer resemblance to one or other of their grandparents, or even to some more remote ancestor, than they do to their immediate parents.

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part I have never satisfied myself that there was anything to be gained by sowing from particular parts of a frond, and I am certain that it is quite possible to obtain characteristic seedlings of a variety by sowing from parts of the frond which do not bear the particular character in question."

FLORISTS' FLOWERS.

WHEN TO PROPAGATE THE CHRYSANTHEMUM.

To those of your readers conversant with the columns of the *Gardeners' Chronicle* twenty years ago, this will be reviving an old subject, but even to them, and to our younger brethren of the spade, I hope it may be interesting; for as good wine requires no bush, neither does such a suitable subject require any commendation. To recall the past twenty years, and compare the varieties then in cultivation with those of the present day, we find none of the Japanese of 1876 now existing; while, on the other hand, those of the incurved section are, to a very great extent, still popular. But the improvements made in the Japanese section are simply marvellous, indeed, so much so that Mr. Norman Davis (who is a great authority on the Chrysanthemum), remarked to me a little while ago, "I think we have gone almost as far as we can get in improving them, and they will soon be on the wane." Well, this is quite reasonable. Have not many other species of plants had their day, and then made room for something more popular? It has occurred to me that we may do a good deal to preserve the popularity of this, the queen of autumn flowers, and as it is not the first time I have made suggestions which have afterwards been taken up with good results, I hope that my present proposals may be taken up with equal zest, and meet with as good results. It will be remembered that when this subject appeared in the pages of the *Gardeners' Chronicle* twenty years ago, it arose from a few seasonable remarks from the able pen of that excellent cultivator, the late Thomas Baines, December 8, 1877, on p. 719, where he advocates early propagation, and gives very pithy reasons for doing so. The subject was afterwards taken up by the late Mr. Hinds, who condemned early propagation, and gave reasons why it should be deferred to the end of January or early February (see *Gard. Chron.*, December 22, 1877, p. 779). This latter letter was criticised by the pen of the present writer (January 26, 1878, p. 107), and in doing so I made the following proposal:—"Perhaps it would be desirable to raise a subscription for the purchasing of a huge Challenge-cup or trophy, to be competed for annually at a meeting in connection with the Royal Horticultural Society, the victor having the custody of the cup from one annual meeting to the other, in the same way as some of the Challenge-cups and trophies are contested for at the National Rifle Association's meetings, and in addition to the cup a money prize may be awarded, the amount of which may be determined by the society. It would be a good plan to offer such a prize for twelve blooms in each section. This arrangement would admit growers of all classes, and would undoubtedly stimulate Chrysanthemum growers to the utmost extent, and prove a very considerable advantage to the society, as it would create considerable interest, and raise the Chrysanthemum a step beyond its infant days." At the time I wrote this there was no Challenge-cup in existence for Chrysanthemums, neither did the Royal Horticultural Society take the subject up. The Kingston Society, which was the first to adopt a Challenge-cup, had just held their first show on Nov. 21 and 22 (see *Gardeners' Chronicle*, p. 663, November 24, 1877); and on November 27, 1879, their first Challenge-cup was competed for, and from then until now that society can truly boast of a grand run of success, and the society has been supported by growers who stand unrivalled in the Chrysanthemum world. It is also interesting to note that at that time the amalgamation of those societies which were the parents of, and are now known as, that influential body, "The National Chrysanthemum Society," had not taken place, as it was not until March 25, 1883, that Mr. Cannell proposed the adopted name of this Society, and which came into operation January, 1884. That the adoption of Challenge-cups at Kingston had a remarkable effect in stimulating Chrysanthemum cultivation is certainly beyond dispute, for proof of which I may instance the numerous societies which have sprung into existence, and which have in most cases established their challenge competitions with cups, &c. We also have some of the best cultivators in the Kingston competitions, and in looking up the reports of the shows held there, I find the following winners, viz.:—1879, Mr. Harding, Putney; 1880, Mr. Tunnington, Liverpool; 1881, Mr. Faulkner, Liverpool; in 1882, the competition was limited to these three winners, but unfortunately Mr. Faulkner died a few days before the competition came off, but his blooms were staged, and Mr. Harding won the first cup for the last time, at the same time that the second cup was being competed for and won by Mr. E. Molyneux, Swanmore Park, Bishop's Waltham; in 1883, Mr. Molyneux winning again, and taking the second cup. In 1884, Mr. Molyneux was again to the fore; and in 1885 he repeated his victory, and finally won the third cup. In 1886, Mr. Gibson, of Morden, came to the front and won; and in 1887 he repeated his victory, and finally won the fourth cup. In 1888, Mr. Coombs, of Teddington, won; and in 1889 he repeated his victory, and finally won the fifth cup. In 1890, Mr. Beckett, of Surbiton, won; in 1891, Mr. Carpenter, Weybridge, won; in 1892, Mr. Mease, of Leatherhead, won; and in 1893 the competition was restricted to these three winners, and the cup was finally won by Mr. Mease; and the first competition for the sixth cup was taking place, it being won by Mr. Neville, of Twyford, Hants. In the year 1894 Mr. Higgs, of Leatherhead, came to the front a winner, repeating his victory the following year, winning the sixth cup. In the year now passed away, Mr. Hunt, of Leatherhead, won for the first time. This is a magnificent record of what can be done by a society determined to hold its own in the Chrysanthemum world, constituting a good example for others to copy. Only let a society offer good prizes, and a keen competition is sure to result, and where there is good competition, the public will assemble in large numbers, giving support to the society. As numerous Chrysanthemum societies have discovered who have competitions for Challenge-cups, some of greater value than others, which when won twice or thrice are finally won, it has occurred to me that if a few influential men were to join together and raise the sum of 200 or 300 guineas by subscriptions obtained from growers in general, we might then have a magnificent competition trophy. The competition might receive its start at a London show, and then go to, say, Edinburgh one year, Dublin another, Liverpool, Exeter, Birmingham, Glasgow, Belfast, and other centres in turn, and in perpetuity, adding a sum of money with the trophy each year. Such a prize ought to stimulate both employers and employed to take greater interest in our queen of autumn flowers, and so ward off the "wane" to the furthest date; and we should soon see cultivators from the provinces get into the front ranks—men who have never been heard of, and which is exactly what is wanted. We know the effect produced at Kingston by a 25-guinea cup; what, therefore, would a 300 guinea cup do? And who can say that such a trophy would not have the effect of creating county societies with trophies of their own to be competed for in their respective areas. Will the National Chrysanthemum Society or the Royal Horticultural Society take up the matter of organisation? as I feel sure such a move would meet with a hearty response from many quarters, and I should think affiliated societies would also help in the matter. The present is most opportune for getting the affair established, and so commemorate in the Chrysanthemum world Her Majesty's long reign. For some years past I have been drifting out of the ordinary course of gardening, and fettered with a multiplicity of estate duties, situated in two widely separated counties, I have consequently found it impossible to pay special attention to any one subject in gardening, but having lately got rid of the heaviest portion of my responsibilities, I am enabled to devote a little more time to Chrysanthemums. In furtherance of this idea I shall try this year a number of novelties, and I have got amongst others Mrs. Weeks, which Mr. Norman Davis told me was about the best Chrysanthemum ever raised. I purchased five plants at the beginning of April last, and as fast as shoots fit for cuttings appeared, I had them put in, and I now possess 200 plants. I will confess that I was much disappointed with the blooms of Mrs. Weeks which were staged at the show in the Royal Aquarium, and other shows. There is not the least doubt in my mind that cultivators working on the orthodox methods of putting in cuttings at given dates in a general way, have not hit on the proper time, so as to produce Mrs. Weeks at its best. Mr. Davis told me I was too late for the finest blooms, and other growers had stolen a march on me, but I determined to make a feature of them, and found the plants I purchased failed to produce the finest blooms; but cuttings taken off in the second week of April produced the finest blooms of any incurved Japanese Chrysanthemum that I ever saw. The plants were grown in the ordinary way with single stems and one bloom, the "buds taken" the second week in August (rather late); and on plants growing in 7-inch pots, the blooms measured over 2 feet in circumference in every direction. Mr. Lyne, when at Wimbledon House on November 11, remarked, "They are the finest blooms I ever saw, and worth a long journey to see. I shall go back to Kent and sing the praises of Mrs. Weeks." Other noted growers, including Mr. Gibson, the Messrs. Alderman's, Mr. Bates, and others made similar remarks. I would strongly advise those who wish to have Mrs. Weeks in her best form to put the cuttings in about the third week in March, and grow them on freely with single stems. Of the 200 plants of Mrs. Weeks which I grew, some of which were necessarily rooted late in the spring, and grown in small pots, I was more than satisfied, and had them in bloom till Christmas. Of the other forty varieties of novelties of 1896, that I cultivated in 1896, I shall be very pleased to record my experience if at all interesting to your readers. *J. Ollerhead, Wimbledon, S.W.*

WORTH PARK, SUSSEX, THE RESIDENCE OF MRS. MONTEFIORE.

THIS is distinctly a fine place, splendidly kept and at once a credit to the owner and her gardener, Mr. Glen. It is pleasant to visit places where wealth is, because, if with it there be joined a high appreciation for gardening, then is it seen in its finest and most attractive aspect. It is just this sense of plenty, and almost of sumptuousness, which gratifies the visitor to Worth Park, because everything is so well done. The lodge-entrance is but a quarter of a mile, or hardly so far, from the well-known Three Bridges railway station. There is at the first evidence in the broad, hard, well-kept carriage-road that something good lies beyond, and although the first aspect is that of newness, yet very soon the scene is changed to older surroundings, and the road runs up a gentle incline for perhaps half a mile, through fine but informal borderings of trees that are in this respect far more pleasing than the finest of straight avenues; whilst large bush Rhododendrons adorn the grass margin beneath. There is at the highest part a couple of rows of young Limes that rather jar upon the hitherto-pleased senses; and all the more so, because thus early, for it is but September 24, whilst nearly all other deciduous trees are so green-leaved, these have their foliage brown and sered. What a pity it is that straight lines of trees should ever be thus planted, and specially that they should be of such unsatisfactory trees as Limes! However, here on the right hand, first passing through a small pinetum where are many noble specimens, are found the glasshouses and the kitchen gardens.

Throughout the whole of the houses there is that excellence and smartness in everything which characterises all the place. Fruit is getting over, for in

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CONTENTS.

ILLUSTRATIONS.

NOTICE TO ADVERTISERS.

Owing to the large increase in the circulation, the hour of going to Press has been altered, and in future all Copy for Advertisements must be received by 5 P.M. on WEDNESDAY at THE LATEST.

SALES BY AUCTION.

Tuesday Next, May 25.

DIACRIUM (EPIDENDRUM) BICORNUTUM. A splendid lot in grand condition, varying from twenty to fifty bulbs. The consignment is of the free-flowering Trinidad form, bearing fine heads of large pure white flowers, the labellums marked with violet. A fine group of this type, in flower, was exhibited by Major Joicey, Sunningdale Park, Sunningdale (gr., Mr. Fred J. Thorne), at the Royal Horticultural Society on April 13, and was awarded a Silver Flora Medal. Also a few plants of an elegant and probably new Odontoglossum Cattleya Schroderæ, and various other interesting and rare species.

MESSRS. PROTHEROE AND MORRIS will include the above in their ORCHID SALE on TUESDAY NEXT, May 25, at half-past 12 o'Clock.

On view morning of Sale, and Catalogues had.

Tuesday Next, May 25.—From a Private Collection.

MESSRS. PROTHEROE AND MORRIS will include in their ORCHID SALE, on TUESDAY NEXT, May 25, at half-past 12 o'Clock, 10 CYPRIPEDIUM MORGANIÆ, grand specimen-plants; fine plants of CYPRIPEDIUM LEEANUM, C. NITIDISSIMUM, C. PAVONIUM, C. PITCHERIANUM, good specimens of a hybrid between CYPRIPEDIUM IO GRANDE and BOXALLI, and of C. DOLIARE × SPICERIANUM and other hybrids. Also, about 20 good plants of varieties of DENDROBIUM AINSWORTHII and LEECHIANUM.

On view morning of Sale, and Catalogues had.

Tuesday Next, May 25.

MESSRS. PROTHEROE AND MORRIS beg to announce that they will be holding a SPECIAL SALE of ORCHIDS in FLOWER and BUD, at their Central Sale Rooms, 67 and 68, Cheapside, London, E.C., on TUESDAY NEXT, May 25, at half-past 12 o'Clock.

On view morning of Sale, and Catalogues had.

Wednesday Next.

LILIUM AURATUM, RUBRUM, and ALBUM: 720 finest SHOW CARNATIONS from the Great Bookham Collection, including many recently introduced varieties; 500 BORDER CARNATIONS, HERBACEOUS PLANTS, CALCEOLARIAS, Double and Single BEGONIAS, KELWAY'S GLADIOLI, TUBEROSES, GLOXINIAS, JAPANESE IRIS, choice STOVE and GREENHOUSE FERNS, PALMS, Gold and Silver tricolor GERANIUMS, 400 GERANIUMS and PELARGONIUMS in variety, &c.

MESSRS. PROTHEROE AND MORRIS will SELL the above by AUCTION, at their Central Sale Rooms, 67 and 68, Cheapside, London, E.C., on WEDNESDAY NEXT, May 26, at Twelve o'Clock.

On view morning of Sale, and Catalogues had.

Friday Next, May 28.

By order of HUGH LOW & Co.

CATTLEYA GASKELLIANA.

MESSRS. PROTHEROE AND MORRIS will SELL by AUCTION, at their Central Sale Rooms, 67 and 68, Cheapside, London, E.C., on FRIDAY NEXT, May 28, at half-past 12 o'Clock, by order of Messrs. Hugh Low & Co., Upper Clapton, N.E., 600 lots of CATTLEYA GASKELLIANA, just to hand, and in grand leafy condition, with leads quite dormant. It is now a very long time since this Cattleya has been imported in quantity, and there is no denying its usefulness as a species, following upon Cattleyas Mossiæ and Mendelii. It is of extremely easy culture, and the flowers, which are freely produced, are at the same time deliciously scented.

On view morning of Sale, and Catalogues had.

Friday Next, May 28.

By order of Messrs. W. J. Lewis & Co.

GREAT SALE of IMPORTED ORCHIDS, grand representatives of choice species, comprising—

CATTLEYA CITRINA MAGNIFICA, some enormous-bulbed masses.
LÆLIA HARPOPHYLLA, grand plants of a grand species.
" AUTUMNALIS ATRO-RUBENS, the "cream" of 1000 plants of this glorious type.
ONCIDIUM VARICOSUM ROGERSII, *vide* our group at the Temple Show.
CATTLEYA SCHILLERIANA, beautiful plants of an almost extinct species.
LÆLIA ALBIDA, EPIDENDRUM VITELLINUM MAJUS, and EPIDENDRUM ERUBESCENS; together with 10 plants of a probably NEW WHITE-FLOWERED EPIDENDRUM.

MESSRS. PROTHEROE AND MORRIS will SELL the above by AUCTION at their Central Sale Rooms, 67 & 68, Cheapside, London, E.C., on FRIDAY NEXT, May 28, at half-past 12 o'Clock.

On view morning of Sale, and Catalogues had.

Friday Next.

A GRAND IMPORTATION OF

655 CALLA PENTLANDII.
40 " " with white spotted leaves.

(Exceptionally fine tubers, received direct.)

The sender writes: "I am sending this day two Cases of Yellow Arum Bulbs. I do not think the spotted-leaved one is Elliottiana, as the leaf is a different shape, although the flower is a fine deep yellow."

MESSRS. PROTHEROE AND MORRIS will include the above in their ORCHID SALE on FRIDAY NEXT, May 28, at half-past 12 o'Clock.

On view morning of Sale, and Catalogues had.

Hazelwood, King's Langley, Herts.

MESSRS. PROTHEROE AND MORRIS have received instructions from Admiral Cator to SELL by AUCTION, on the Premises, as above, on WEDNESDAY and THURSDAY, June 9 and 10, the whole of the ESTABLISHED ORCHIDS, comprising about 6000 plants.

Fuller particulars will appear in future announcements.

Friday Next.

ODONTOGLOSSUM CRISPUM HELIOTROPIUM, F.C.C., R.H.S., May, 1897.

LÆLIO-CATTLEYA LAWRIE MOSSIÆ, A.M., R.H.S.

MESSRS. PROTHEROE AND MORRIS will include the above two grand Plants in their ORCHID SALE on FRIDAY NEXT, May 28, at 2 o'Clock.

On view morning of Sale, and Catalogues had.

Thursday Next.

IMPORTED and ESTABLISHED ORCHIDS.
ORCHIDS in FLOWER and BUD.
100 Fine TREE CARNATIONS.
LILIES, BULBS, PLANTS, &c.
ARAUCARIAS from Ghent, &c., &c.

MR. J. C. STEVENS will SELL the above by AUCTION at his Great Rooms, 38, King Street, Covent Garden, W.C., on THURSDAY NEXT, May 27, at half-past 12 o'Clock precisely.

On view morning of Sale, and Catalogues had.

Lawford Lane Nurseries, Writtle, near Chelmsford.

10 minutes' drive from G. E. R., 45 minutes from London, 6 Acres BUILDING LAND, 1160 feet frontage, 10 Acres ORCHARD, 4000 young FRUIT TREES, 7000 feet super. area GLASSHOUSES, 2 BOILERS, good Water supply, 5½ Acres MEADOW next River, 2 COTTAGES, STABLES, SHEDS, &c., with immediate Possession.

G. B. HILLIARD AND SON are instructed by the Trustees under the will of the late Robert Warner, Esq., to SELL by AUCTION, at the Corn Exchange, Chelmsford, on FRIDAY, June 4, 1897, at 3 for 4 o'Clock in the afternoon, the above valuable Freehold Property, advantageously situated in a growing neighbourhood, and affording scope for considerable development, and offering a genuine opportunity for a sound investment.

Particulars and Conditions of Sale, with Plans, may be obtained at the offices of A. G. WELLS, Solicitor, Founder's Hall, St. Swithin's Lane, E.C.; and of the Auctioneers, Chelmsford, and 54½ Old Broad Street, E.C., or will be forwarded on receipt of application and address.

ORCHIDS! ORCHIDS!

THE

"OWTHORPE" COLLECTION.

JOHN COWAN & CO., Ltd.

Are pleased to state that they have just purchased from

Major-General HUTCHINSON, of OWTHORPE, BOURNEMOUTH,

His Entire Collection of Orchids.

The Collection has been removed to the Company's Premises, at Garston, where it is now on view, and will be on Sale (by Private Treaty), from

TUESDAY MORNING NEXT, the 25th inst.

The Collection is a very fine one, and the Company can with confidence recommend it to their Patrons. The CATTLEYAS are an especially grand lot, being clean, healthy, and vigorous, and many fine varieties are included amongst them; also a large number of unflowered plants. The LÆLIAS are also very fine. The DENDROBIUMS include the stock of a special D. NOBILE imported by the Major-General from China, and which received an Award of Merit this spring when exhibited before the Committee of the R.H.S. The other sections are also fine.

Inspection of this Grand Collection is earnestly Invited.

Descriptive and Priced Catalogues are now ready, and will be sent, post-free, on application to the Company—

THE VINEYARD AND NURSERIES,
GARSTON, near LIVERPOOL.

Orders will be executed strictly in rotation.

WANTED, to Rent or Purchase, SMALL NURSERY with clean stock and Four to Ten Glasshouses. Send full particulars to H. W. RENDELL, Auctioneer and Valuer, 90 and 91, Queen Street, Cheapside, E.C.

LONDON, S.E.—To be LET or SOLD, a good going FLORIST'S BUSINESS, fashionable suburb, splendid opening for pushing man. Price for Freehold, £1 500 (two-thirds can remain), or would be Let on Lease at £75. Small Stock at Valuation.

Particulars of PROTHEROE AND MORRIS, Estate Office, 67, Cheapside, London, E.C.

EXHIBITIONS.

CAMBRIDGE GREAT OPEN ROSE SHOW and BICYCLE CARNIVAL, WHIT MONDAY, June 7, 1897.—PRIZES for the variety of 48 Roses. All entries free. Money for Prizes to be paid immediately after the Judge's decision. Entries close June 3. No restriction as to number of stands staged:—

1st Prize ... £10 0 2nd Prize ... £5 0 3rd Prize ... £3 0
4th Prize ... £2 0 5th Prize ... £1 10 6th Prize ... £1 0

Schedules may be had on application to the Manager,
Mr. W. BARTHOLOMEW, The Poplars, Newnham, Cambridge.

CHELMSFORD and ESSEX HORTICULTURAL SOCIETY.

SUMMER SHOW, JUNE 9 and 10, in connection with the Essex County Agricultural Show, at GOLDLAY HOUSE CHELMSFORD. £300 IN PRIZES.

Schedules, &c., of G. T. WEEKS, Hon. Sec., Elm Cottage, Chelmsford.

GRAND YORKSHIRE GALA, YORK,
JUNE 16, 17, 18, 1897.
£750 OFFERED IN PRIZES.

£300 for Orchid, Stove, and Greenhouse Plants, &c.
£200 for Pelargoniums, Carnations, Begonias, &c.
£160 for Roses, Cut Flowers, &c.
£90 for Fruits and Vegetables.
THREE GOLD MEDALS for TRADE EXHIBITS.

Apply for Schedules to—
CHAS. W. SIMMONS, Harker's Hotel, York.

CRYSTAL PALACE.

GREAT VICTORIAN ERA FLOWER SHOW.

An Exhibition of the more prominent Plants and Flowers introduced to this country since Her Majesty's Accession to the Throne in 1837, will be held on WEDNESDAY and THURSDAY, June 23 and 24, 1897. Schedule of Prizes will be forwarded on application to— Mr. G. CASELTON,
Superintendent of Gardens, Crystal Palace, S.E.

LEEDS GRAND FLOWER SHOW and GALA, at the HEADINGLEY GROUNDS, on WEDNESDAY, THURSDAY, and FRIDAY, July 7, 8, 9, 1897.

Entries close WEDNESDAY, June 30, 1897.

For Schedules, and any further information, address the Secretary, W. B. PINDAR, Middleton, Leeds.

HANLEY PARK, County Borough of HANLEY, STAFFS.

A GRAND HORTICULTURAL FÊTE will be Held on WEDNESDAY and THURSDAY, July 7 and 8 next. The North Stafford Railway Co., in connection with the London & North Western, Midland, and other Main-line Companies, will convey Plants and Flowers to and from the Show, at Single Rates for the Double Journey, provided they remain the property of the Exhibitor. Stoke-on-Trent Station is within 10 minutes' distance of the Show-ground.

Schedules on application to J. KENT, Hanley Park.

A GRAND HORTICULTURAL SHOW and FÊTE will be held at Chester, on WEDNESDAY and THURSDAY, July 28 and 29 next. £500 in Prizes will be awarded for the Horticultural Department. Schedules may now be obtained from the Secretary, Major WALKER-JONES, at 6, Grosvenor Chambers, Chester.

NOTE.—The London and North-Western, Great Western, Cheshire Lines, and London and North-Western and Great Western Joint Railway Companies, will CONVEY PLANTS to and from the SHOW at SINGLE RATES for the DOUBLE JOURNEY, provided they remain the property of the Exhibitor.

THE ROYAL CALEDONIAN HORTICULTURAL SOCIETY.

AUTUMN SHOW, September 8 and 9, 1897.

SPECIAL PRIZES and MEDALS for PLANTS, FRUIT, FLOWERS, and VEGETABLES, in commemoration of the Diamond Jubilee.

Schedules to be obtained from ASSISTANT SECRETARY, 18, Waverley Market, Edinburgh.

£50 IN PRIZES.

STOKESLEY SHOW, Yorkshire.

For the BEST TWELVE POTATOS and SIX TURNIPS, Grown under Certain Conditions with the Normanby Patent Slag Manure.

Apply NORMANBY IRON-WORKS CO., LTD., MIDDLESBROUGH.

MANCHESTER and NORTH OF ENGLAND ORCHID SOCIETY.

HEAD QUARTERS: THE COAL EXCHANGE, MARKET PLACE, MANCHESTER.

THE MEETINGS of the COMMITTEE, for the purpose of Adjudicating upon the Orchids submitted, will take place on THURSDAY, May 20 inst., and EVERY ALTERNATE THURSDAY therefrom until September 23, 1897, at 12 o'Clock prompt.

W. A. GENT, Hon. Sec., 41, Faulkner St., Manchester.

FREEHOLD FARM and NURSERY for SALE (92a. 1r. 39p.).—Part could remain on mortgage at 4 per cent. Price of Freehold, £2,500. The Fields are all under good cultivation—arable and grass land. There is 12,000 feet of Glass, the produce of which is partly sent to Hitchin (3 miles distant), and part of the produce is sent to Covent Garden, London. There is a good Well 300 feet deep, and large Cement-tanks; also Potting-sheds, Cow-houses, Stables, Piggeries, &c. There is also an old-fashioned Dwelling-house and Dairy. Horses, Cows, Implements, &c., could be bought or not at the purchaser's option.

Apply, THOS. BYATT, Poynter's End Farm, Hitchin.

Willenhall Urban District Council.
TO LANDSCAPE GARDENERS AND OTHERS.
NEW CEMETERY—BENTLEY.

THE URBAN DISTRICT COUNCIL offer Premiums of £10, £5, and £2 10s. for the three best Designs for LAYING OUT and PLANTING of the above CEMETERY. Plan of site, regulations, and other information may be obtained at the Office of the Town Surveyor, on payment of £1, which will be returned on receipt of a *bond fide* design. Designs to be delivered to me, in sealed envelopes, on or before Friday, the 4th day of June, 1897.

CHAS. J. JENKIN, Assoc.M.Inst.C.E.,
Town Hall, Willenhall, Town Surveyor.
May 13, 1897.

FOR DISPOSAL.—A FLORIST and JOBBING BUSINESS, with good connection, all at Valuation. Owner would continue, as may be agreed, to get an introduction.—J. E., Box 8, 41, Wellington St., Strand, W.C.

SUSSEX.—FOR SALE. An Old Established NURSERY doing Genuine Trade, comprising 6 acres well planted with clean Nursery Stock, including fine selection of Roses, Eight Glasshouses well stocked, and good Jobbing Business. Price £1250, or offer.—Apply, H. W. KENDELL, Auctioneer and Valuer, 90 and 91, Queen Street, Cheapside.

OLD-ESTABLISHED JOBBING NURSERY and SEED BUSINESS.—Shop-fittings, Stock, and Fixtures, Glasshouse, everything as it stands, £300 or Offer. A genuine Business; suit one starting in the Trade. For particulars, apply to—
N. G., 3, Station Buildings, Wightman Road, Hornsey, N.

To Capitalists.

FOR SALE.—The old-established business of SUMMERLIN AND CO., SEED MERCHANTS, ROSE-GROWERS, FLORISTS, &c., Brisbane, Australia. Income for 1896, over £3000; Profit, over £700; Assets, about £4000.—Full particulars of Messrs. PROTHEROE AND MORRIS, 68, Cheapside, E.C.; or, GORDON AND GOTCH, 15, St. Bride St., E.C.

FOR DISPOSAL, an Old-established NURSERY BUSINESS, in the West of England, fully stocked, and in good working order, with good connection. Price for Buildings and Trade Utensils, &c., about £250, and Stock at valuation. Capital situation. Address—HORTUS, Box 3, *Gardeners' Chronicle* Office, 41, Wellington Street, Strand, W.C.

TO BE SOLD, cheap, within ten days, as a going concern.—STATION NURSERY, Grant Road, Addiscombe, Croydon. Established 1878. The General Nursery Business, lately carried on by Mr. E. RIX, deceased, Christmas, 1896. Fourteen years' lease; 7 Greenhouses, filled with General Stock; over 400 yards Hot-water Pipe; Boilers, Fittings, Plant, and Tools, complete.
Apply, Mrs. RIX, as above.

FOR DISPOSAL, a NURSERY and FLORIST BUSINESS in Berkshire, in full working order, well stocked, clean, and everything complete for an immediate return.
The property is part Freehold and part Leasehold. Capital required £1250. For cards to view, apply to—
F. W. HUNTON, Business Agent, Bracknell, Berks.

NURSERY TO BE LET or SOLD, in Hertfordshire.—Good Dwelling-house; 9½ acres of Land; 12 Glasshouses; Stabling.
MARTIN, Shenley Lodge, Barnet, Herts.

TO BE SOLD, as a Going Concern, an Old-established NURSERY, FLORIST, and SEED BUSINESS, with a well-stocked Nursery and Plant Houses, with sufficient Stock for a first-class Business. ALSO FLORIST SHOP in centre of town, which has done a substantial Business for over thirty-five years. Immediate possession may be arranged.—For particulars apply, FREDERICK PERKINS, Regent Street, Leamington.

TO LET.—MARKET GARDEN NURSERY, Six Glasshouses, Pigs, and Poultry Farm, near Liverpool. Neighbourhood good; plenty of Jobbing; Ingoing about £150. Full particulars from G., care of H. Gardener, 47, Woodville Terrace, Everton, Liverpool.

WANTED, a few thousand feet SECOND-HAND GLASSHOUSES; also, BOILER and PIPES.—Particulars, with lowest price, to GARDENER, King's Vale House, Newport, Mon.

Diamond Jubilee Celebrations.

MESSRS. THOS. CRIPPS AND SON, The Tunbridge Wells Nurseries, Kent, beg to offer CUT EVERGREENS for any style of Decoration.
Inspection Invited.

BATH'S SPRING CATALOGUE of Choice Carnations, Pansies, Violas, Dahlias, Pæonies, &c., with full Cultural Notes, is now ready, and will be forwarded post-free on application.—R. H. BATH, The Floral Farms, Wisbech.

BOX'S SPECIALTIES.—CHOICE FLOWER SEEDS. Own prize strains. Sow now Primula Giant White, Giant Pink, King of Blues, Intensity (red), Cineraria (1st prize C. P.), Calceolaria, very extra Cyclamen, Gloxinia, (Fire King, choicest spotted Crassifolia, and others), all at 1s., 1s. 6d., and 2s. 6d., per packet, or 7 packets for 6s.
JOHN R. BOX, Flower Seed Grower, Croydon.

WINTER-FLOWERING CARNATIONS. Madame Thérèse Franco, largest pale pink, suffused salmon, well rooted from stores, 4s. per dozen, 16s. per 100; Firefly, good scarlet, 4s. 6d. per dozen, 20s. per 100; Leonidas, large crimson scarlet, 25s. per 100. Packed free for cash.
CRANE AND CLARKE, The Nurseries, March, Cambs.

50,000 EUONYMUS, Green and Golden, all splendid bushy plants.—GREEN: 12 in. to 15 in., at 30s. per 100; 15 in. to 18 in., at 40s. per 100; 18 in. to 21 in., at 55s. per 100; 21 in. to 24 in., at 75s. per 100; 25 in. to 40 in. at special prices.
GOLDEN: 8 in. to 12 in., at 3s. to 8s. per dozen. Cash with order. J. J. CLARK, Goldstone, Brighton.

LOBELIA, Crystal Palace Compacts, and Emperor William.—Both strong plants, autumn-struck, 3s. per 100, 40s. per 1000. YELLOW MARGUERITES, Feu d'Or, from 60's, autumn-struck, 6s. per 100, 50s. per 1000.
FRANK LILLEY, St. Peter's, Guernsey.

BEDDING GERANIUMS.—Good plants, in small 60's, 12s. per 100; Flower of Spring, Golden Harry Hieover, Raspail, Madame Vaucher, Crystal Palace Gem, and others, 20s. per 100; Black Douglas and Rival Stella, 12s. per 100. CALCEOLARIA, Golden Gem, in 60's, from stores, 3s. per 100. Double White PETUNIAS; COLEUS, Verschaffeltii and Mixed; also HELIOTROPE and FUCHSIAS, in 60's, 15s. per 100. LOBELIA, Emperor William, from stores, 2s. 6d. per 100, 20s. per 1000. Free on rail for cash with order.—MANAGER, Blandford Nursery, Upper Teddington, Middlesex.

GARDENERS' ROYAL BENEVOLENT INSTITUTION.

THE 58TH ANNIVERSARY FESTIVAL DINNER, in Aid of the General Funds, and also the "Victorian Era Fund," which is being raised for the temporary assistance of applicants who are awaiting election, and to commemorate the Diamond Jubilee of Her Majesty the QUEEN, Patroness of the Institution, will be held at the Whitehall Rooms, "Hôtel Métropole," on WEDNESDAY, May 26, 1897.

The Right Hon. LORD ROTHSCHILD in the Chair.

The following further amounts have been promised or paid:—

	£	s.	d.
Lord Calthorpe ...	20	0	0
Lord Llangattock ...	10	10	0
Sir Trevor Lawrence, Bart.	10	10	0
Hebert Wagg & Co.	10	10	0
Henry Jones... ...	10	10	0
Frank Debenham ...	10	10	0
Jos. Burgess... ...	10	0	0
Mrs. Carstairs, per J. Howard... ...	10	10	0
Mrs. Powell, ditto ...		10	0
Messrs. Somerset, do.		10	0
Ernest W. Paul, per Geo. Paul	10	10	0
Joseph Rochford, do.	2	2	0
Geo. L. Paul, ditto...	1	1	0
Mr. Ray, ditto ...	1	1	0
Mr. Cobley, ditto ...	1	1	0
Mr. Stephens, ditto	1	1	0
Mr. Miles, ditto... ...		10	0
Sapeford and Altman, ditto		10	0
W. Farr	9	8	0
W. Wainwright, per R. Machellar ...	10	10	0
R. Machellar ...	2	2	0
W. Howe	4	10	0
Sir Mark Collet, Bart.	5	0	0
Sir Robert Pullar ...	5	0	0
R. Jones	5	18	0
A. Reid	7	10	0
Richard Clout ...	3	3	0
Thomas Coomber ...	4	2	6
Ditto (sub.) ...	1	1	0
J. Derricott	3	4	6
Ditto (J. Thompson)	0	5	0
Geo. H. Maycock ...	3	0	0
Charles Turner ...	2	3	0
Cornelius Cooper ...	2	2	0
John L. Woodroffe...	2	2	0
Ditto (W. Tidy) ...	1	1	0
G. Bastin	2	10	0
E. Burrell	2	0	6
George Cragg ...	6	10	0
R. G. Bennett ...	2	2	0
M. Gleeson	2	12	0
H. J. Wimsett ...	2	2	0
E. W. Cathie ...	5	5	0
Ditto (sub.) ...	1	1	0
C. B. Fischer ...	1	1	0
Ditto (sub.) ...	1	1	0
W. Bain	2	3	6
Ditto (sub.) ...	1	1	0
W. R. Lathom ...	1	1	0
W. Green	1	10	0
W. A. Minty ...	1	1	0
C. J. Salter	0	11	0
Ditto (J. Doe) ...	1	1	0
E. Wardle, per H. J. Clayton	1	0	0
Kay & Son, ditto ...	0	5	0
Small sums, ditto ...	0	7	6
W. Low		10	0
ditto (sub.) ...	1	1	0
S. Pratt	1	1	0
Arthur R. Wadds ...	1	1	0
E. Williams... ...	1	1	0
E. Jones	2	0	0
J. A. Bast	1	0	0
D. Morrison		15	0
Charles Ross... ...		10	6
John Turner		10	0
W. J. Rowe		10	0
G. Mitchison ...	3	10	0
W. Smith	1	6	0
W. Rhymes'... ...		14	0
T. W. George ...		10	0
ditto (sub.) ...	1	1	0
John Marshall ...	1	1	0
Anonymous	1	0	0
J. Woolford		10	6
G. Murray		10	0

Additional contributions will be most thankfully received and duly acknowledged by the Secretary, GEORGE J. INGRAM, 50, Parliament Street, London, S.W.

POLYPODIUM FIBRE, absolutely the best material for Potting Orchids, £1 per bale, about 66 gallons.—POLYPODIUM FIBRE CO., 268, Wellington Road, Handsworth, Birmingham.

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MAGNIFICENT IMPORTATION OF
CATTLEYA MENDELI.

We have just received the finest importation of the most beautiful and scarce Cattleya that has ever been imported into this country.

Our Mr. HUGH COLLINS collected them from an entirely unexplored district, and they are of the very best type, bearing spikes of beautiful dark mauve flowers with dark broad fringed lips. This Cattleya is becoming very scarce, and there can be but few more imported into this country. We can confidently recommend them to private gentlemen and others wishing to obtain specimen and well-leaved plants.

Inspection cordially invited. Prices from 5s.

COLLINS & COLLINS, CUMBERLAND PARK NURSERIES, WILLESDEN JUNCTION, LONDON.

THE
Gardeners' Chronicle.

SATURDAY, MAY 22, 1897.

THE BIBLIOGRAPHY OF THE DAHLIA.

THE short notice of "The Dahlia by Various Writers," which appears on p. 221 of the *Gardeners' Chronicle*, is a reminder of a long period of literary neglect, that a somewhat gorgeous and once highly-popular flower has had to undergo. There have, of course, been numerous articles in the horticultural press on Dahlia history and cultivation by writers specially interested in those subjects for many years past, but unless I am much mistaken no independent treatise worthy of the name has been written for a period of something like forty years. Before taking a brief survey of the bibliography of the Dahlia, it may be useful to mention that in addition to the Dahlia Conference held by the Royal Horticultural Society, there was also one held in 1889 at the Crystal Palace, under the auspices of the National Dahlia Society, primarily for the purpose of celebrating the centenary of the introduction of that flower into Europe, and the papers which were then read appeared in the Society's Report for the following year.

Having for some years past devoted a portion of my leisure to the collecting of books on florists' flowers, I have picked up from various sources a number of cultural and other treatises dealing with the Dahlia. I believe the collection to be complete, but it is possible that there may be some small insignificant works of merely local repute wanting. Many little paper-covered pamphlets on various florists' flowers have from time to time been issued, but owing to the flimsy form in which their authors have produced them, they have had but an ephemeral existence, and consequently are most difficult to obtain.

In the early part of the present century the Dahlia as a show flower occupied a position analogous to that enjoyed to-day by the Chrysanthemum, and similarly many of the novelties were of continental origin. So therefore the majority of the books, but particularly the earliest, were written by French authors.

It is beyond the scope of this article to refer at length to the contributions of such writers as those who wrote in the Journals and Transactions of the various horticultural and botanical societies at home and abroad when the Dahlia was first introduced. Cavanilles, Thouin, Willdenow, Sabine, de Candolle, Wedgwood, and others, have all in some way or other described the flower from a botanical or horticultural standpoint in such works as are alluded to.

The first independent treatise was that entitled *Essai sur la Culture, la Nomenclature, et la Classification des Dahlias*, by Messrs. Jacquin frères, of Paris, and was published in 1828. Two years later a second edition in a much enlarged form appeared, and besides giving between fifty and sixty pages of cultural directions, the authors supplied a descriptive catalogue of the varieties then known, classed according to their colour. This list, arranged in eleven main divisions, contains the names of 289 varieties, followed by a supplemental list of another 164 varieties, which bear no descriptions, as they had not been tested by the authors. As an example of the somewhat methodical way in which the varieties were classified, we see that Division I. comprises only white Dahlias. Then this division is sub-divided into sections:—1, Being for pure white; 2, for ivory-white; 3, for lilac-white; and 4, for rosy-white. Divisions II. to XI. are devoted to various other colours, viz., rose, lilac, violet, purple, amaranth, crimson, red (12 sections), yellow, &c., showing that very great diversity of colour existed even in those far off times.

The next book was from the pen of Comte Lelieur, whose name is frequently mentioned by English Dahlia writers as a prominent cultivator. This gentleman was Director of the Parks and Gardens of the King of France, and a corresponding member of the London Horticultural Society. His book was published in 1829, under the title of *Mémoire sur le Dahlia et sur sa Culture*. The Comte reviews much of the literary matter that had previously appeared in other works, both English and foreign, and deals liberally with the details of cultivation, without, however, adopting the very common practice of swelling the size of his volume with a long list of varieties at the end.

Most lovers of the Dahlia have either seen or heard of the *Annual Dahlia Register*, with its inordinately lengthy title and numerous coloured illustrations, of which there are about fifty in all. This was published in 1836 in London, and was no doubt regarded at the time as an *édition de luxe*. The intention was to make it an annual publication, but the price at which it was issued—£1 10s.—seems to have been prohibitive, notwithstanding the enthusiasm of the growers, and it never got beyond the first volume. The literary matter consists chiefly of dealers' catalogues, show reports, and a few odd articles on various subjects connected with the flower. The book, however, will long remain of value to the student of Dahlia literature, and the plates have an historic interest for those who are concerned with the evolution of their favourite. The style and get-up of the annual *Dahlia Register* certainly speaks much for the enthusiasm and hopefulness of its compiler, who is described as an amateur.

In 1838 Sir Joseph Paxton published a handy little cloth-covered book called *A Practical Treatise on the Cultivation of the Dahlia*, and this was in the following year translated into French, and issued under the title of *Traité pratique de la Culture du Dahlia*. The next book was also French, and came out about 1840 in the *Bibliothèque du Jardinier*. It was written by Pirolle, and its title was simply *Dahlia*. The same work, identical in every respect save the cover, appears to have been published by Pirolle, in 1840, under the title, *Traité Spécial et Didactique du Dahlia*, and then in 1841 Pirolle again appears on the scene with one called *Revue des Dahlias en* 1840, *ou Supplément au Traité des Dahlias*.

In 1843 yet another book, similar in form and size to the three preceding, and, like them, published in Paris, was written by Augustin Legrand. This was called, *Le Dahlia: Histoire et Culture detaillée*, and of this a second edition, bearing the title, *Manuel du Cultivateur de Dahlias*, revised and corrected by Pepin, was published in 1848. It is rather curious to note that while in the earliest French books the varieties mentioned in the descriptive lists were mainly of continental origin, those enumerated in the later ones contained a large percentage of varieties bearing undoubted English appellations, and these often accompanied by the raiser's names.

Probably none of the Dahlias then grown are known to modern cultivators, but it may be interesting to mention that in the last-named work, that by M. Pepin, the English raisers represented were Keynes, Brown, Drummond, Harrison, Girling, Kimberley, Proctor, Salter, Heale, Mitchell, Turner, and several more; and in addition to these there are names of others given which show that Dahlias were then being raised by German growers.

In *Tyas's Popular Flowers*, one of the series was devoted to the flower under notice, but it was only a small sixpenny pamphlet of a few pages, and its scope was rather restricted; its date of issue was 1844. In another series of gardening books called the gardeners' monthly volume, there appeared, in 1847, a volume entitled *The Dahlia, its Culture, Uses, and History*, by George W. Johnson and G. Turner; and from it I learn that Mr. Turner gave to the public in the preceding year his *Practical Observations on the Culture of the Dahlia*. Whether these observations were issued in a separate form, or appeared in some other horticultural publication, it does not say; nor do I know, for although no effort or expense has been spared to trace the "observations," the result has been far from satisfactory, and the only information gained is, that it is believed they formed the preface to Mr. Turner's trade catalogue of Dahlias for that year. In the treatise devoted to the Dahlia which appeared as one of he gardeners' monthly volumes, a brief sketch of the literature of the flower is given, beginning with Cavanilles' article, and M. Thouin's memoir in the *Annales du Muséum d'Histoire Naturelle* (1804), which is also in my collection, and in which a coloured plate is given of three varieties then known. They are all singles, the double form being then no doubt non-existent. Other references are also made to various contributions that appeared in the *Horticultural Transactions*, the *Gardeners' Dictionary*, and different botanical publications, but curiously enough there is not a single reference to any of the French publications to which attention has been called by me in the earlier part of this paper.

The late Dr. Hogg, in 1853, published *The Dahlia: its History and Cultivation, with Descriptions of all the best Show-flowers*. From a literary and artistic point of view, this book unquestionably ranks next in importance to the *Annual Dahlia Register*, for it is of the same size, although less bulky, and it contains eight large coloured illustrations, and is a well-printed, historical, and cultural hand-book, that no doubt was regarded as a standard work in its day.

Mr. Shirley Hibberd, who contributed much information of a valuable nature on the occasion of the two Dahlia Conferences held in 1889 and 1890 respectively, was the author of a little pamphlet, with a coloured frontispiece, in 1857. It was one of his series of "Garden Favourites;" and then occurs a great blank in the independent bibliography of our subject, which extends over four decades.

American gardening literature reveals little or nothing in the shape of Dahlia literature in

separate form, except a pamphlet published last autumn by Lawrence K. Peacock, the Secretary of the recently-formed American Dahlia Society; and a pamphlet issued early in the present year, being Bulletin 128 of the Cornell University, Horticultural Division, entitled "A Talk about Dahlias, by Wilhelm Miller," which is accompanied by a sixteen-page Inventory of the single, pompon, large-flowering, and cactus varieties grown at the Cornell Experiment Station during the past year. These, and the publication of *The Dahlia by Various Writers*, seem to point to a revival of literary interest in the flower, and cannot fail to be productive of beneficial results. *C. Harman Payne.*

New or Noteworthy Plants.

BOLBOPHYLLUM PTILOGLOSSUM, *Wendland and Kränzlin* (*Barbigera*).*

This curious Bulbophyllum was discovered by the late Johannes Braun. His last collection reached Europe in tolerably good condition, and was purchased by Mr. Hermann Wendland, who flowered the plant for the first time in 1896, at Herrenhausen, near Hanover. I am indebted to him for fine materials, i.e., a splendid raceme, and a sketch of the plant. About the affinity, it is clear at the first glance that it belongs undoubtedly to the little group of this genus, of which Bulbophyllum barbigerum, Lindl., is the first; and B. calamarium is, I believe, the best known representative. It is, however, easy to distinguish it from those species and others of the same affinity, by the want of horns on both sides of the anther, by the well-developed side-lobes of the lip, and by the long purplish hairs covering the whole margin from the very base to the top. In the other species, the hairiness is confined to the anterior part, or at least a smaller area of the lip, and in all the other species side-lobes are totally wanting. The flowers are smaller than those of B. calamarium, and of green colour, spotted with purple; they are somewhat larger than those of Bolbophyllum saltatorium, Lindl. Mr. Wendland, who has seen the flowers opening, says that the irritability and the movements of the lip are quite the same as in the Megaclinium, or Frog Orchids, and that they make the same striking impression on the beholder. *F. Kränzlin.*

* *Bolbophyllum ptiloglossum*, Wendland et Kränzlin (*Barbigera*). — Caule primario longe prorepente 1—2 mm. diam., caulibus secundariis (bulbis) cataphyllis quibusdam ovatis basi involutis, subtetragonis, ovoideis obtusis 2 cm. altis, 1·5 cm. crassis, monophyllis; folio e basi cuneata lineari-ligulato obtuso bilobulo ad 10 cm. longo ad 2 cm. lato; racemo folia excedente tenui ad 25 cm. alto subnutante; squamis arcte adpressis vestito rufinulo; bracteis palaceeis triangulis quam ovaria duplo longioribus acutis; sepalis triangulis acutis, lateralibus in mentulum fere rectangulum connatis levitor carinatis nitidis viridibus purpureo adspersis; petalis e basi multo latiore subito contractis linearibus sepalis fere sequantibus, labelli fusco-purpurei lobis lateralibus parvis rotundatis antice acutis satis longe fimbriatis, lobo intermedio lineari-oblongo subpanduroto crasso supra rivis longitudinali instructo toto margine pilis numerosissimis barbato; gynostemio crasso perbrevi, dentibus utrinque valde abbreviatis. Sepala 6 mm. longa, labellum paulo longius, ovarium crassiusculum turbinatum nitidum.

Madagascar, leg. Joh. Braun vir beatus.

Cultural Memoranda.

LILACS.

Where a large number of Lilacs is forced annually it is best to have two batches of plants, each batch being sufficient in number for one year's requirements. The plants need then only be forced every alternate year, which to a great extent will reduce the amount of labour necessary to prepare them. In cases where there is but one batch, the plants require early attention, and should be cut back to three or four buds on the previous year's wood, after which they may be placed near the glass in a temperature of 50°, where they may be thoroughly syringed occasionally. The plants will start away freely from the base, and if requisite they may be repotted into pots of a slightly larger size. Grow them sturdily, avoiding by all means a high temperature and weak spindly growth. When they have made sufficient growth, gradually harden the plants, and finally plunge the pots up to the rim in a sunny position.

If there are two lots, good results are more certain, and the plants after flowering need only be hard pruned, and planted out on a well-prepared border, making the soil about the roots firm, which will induce a solid growth, which, if not strong the first year, will, by due attention to pruning, &c., be succeeded the following season by strong wood in a good state for flowering. Thus, if there are two good batches, the plants will need attention less early, and house room is not required; besides which, the plants are more certain to give satisfaction.

Azalea indica.

As soon as these plants have done flowering, give the foliage a thorough syringing with a solution of Gishurst Compound, to destroy any thrips, &c. The operation should be done in the open, so that no thrips be dislodged from the plants into the house. If convenient, the plants may be fumigated, but even then it is good practice to thoroughly wash the plants with some insecticide. The seed-pods should be removed, and the plants stood in a warm structure to encourage an early free growth. Repot any that require more root-space as soon as new growth commences, using sweet fibrous peat and sharp grit. The fresh pots should be clean and well drained, and the roots in a moderately damp condition. Disentangle the outside roots with a pointed stick, and pot very firmly, taking great care to work the soil around the roots, and do not over-pot at one time. *H. Markham.*

Orchid Notes and Gleanings.

CATTLEYA SCHRODERÆ.

Several varieties of this delicately-tinted and fragrant Cattleya come from the collection of Joseph Broome, Esq., Sunny Hill, Llandudno, who certainly gets magnificent flowers on most of the species he cultivates. Most of the flowers are of the charming Peach-blossom tint peculiar to the species, but one is pure white with a bright yellow tinge on the lip, and another is white and closely veined with light purple, the labellum having a clear orange disc. In addition to its great beauty, C. Schroderæ, which is not plentiful, has the merit of completing the chain of varieties of C. labiata, and continuing the display of them the greater part of the year.

Two very distinct varieties of Lælio-Cattleya × Schilleriana, the one with a peculiar white tube to the lip, and the other with a richly-coloured front lobe, accompany the Cattleyas.

Orchids at the Grange, Wilmslow.

Science and experimenting go hand in hand, and although some experiments result in failure, a sufficient number to encourage the experimenters brings success, and in any case some amount of experience is gained. Thus in the gardens of such an enthusiast as Dr. Hodgkinson, who is fond of plants difficult to grow, and who is continually endeavouring to find out their requirements, it is not surprising to come upon a large number of species which many persons grow but indifferently, among the most thriving and floriferous in the care of Mr. Woore, the gardener there. Among these may be mentioned a number of Lælia majalis, which produce a fine show of their large, handsome flowers annually; numbers of Cattleya citrina, finely in bloom; Eulophiella Elisabethæ, with a fine spike, and which here grows and blooms well and regularly; Cattleya Rex and C. Schilleriana, in splendid forms; and Comparettia macroplectron, and a number of other kindred species, usually considered fragile, here thriving and flowering well.

In the cool-houses a pretty display was remarked of Odontoglossums, Masdevallias, and Sophronitis, one magnificent variety of S. grandiflora bearing seven noble flowers; and other interesting species. Specially good were the forms of Odontoglossum Cervantesii, including the rose-tinted O. C. lilacinum, O. Rossii majus, and the varieties of O. crispum, of which one handsome variety had the sepals furnished with heavy reddish-brown blotches, and resembling O. C. Trianæ.

In the intermediate-houses a good show was made with Cattleya Schroderæ, C. Mendeli, Lælia purpurata, and other species; good plants of Cattleya aurea, a fine lot of strong specimens of Odontoglossum citrosmum about to flower well; Miltonia cuneata, M. Roezli and its white variety; many kinds of Dendrobium, Arundina bambusæfolia, Lælia cinnabarina, and the chrome-yellow-flowered L. flava, together with L. cinnabarina aurantiaca, which seems intermediate between the two named; some species of Vandas, including the one known as V. gigantea (Stauropsis gigantea), and a number of species and hybrids of Cypripediums.

In all the houses interesting species, other than Orchids, are grown. In the cool-house were Darlingtonia californica, and other singular plants; and in the warm ones, Anthuriums and other stove plants not likely to harbour insects—and in many ways the gardens and houses are made specially interesting.

Odontoglossum crispum.

When viewing the fine flatly-displayed forms of this species, which are now regarded as "the best type," the question is often asked—But why crispum? for it is seldom that a variety which would suggest that name appears. A noble specimen, to which the term may be applied in its broadest sense, is sent by Capt. Holford, Westonbirt House, Tetbury, Gloucestershire (gr., Mr. Chapman). The flowers are large, the segments broad, and both sepals and petals are most beautifully crisped, curled and fringed, and yet in such a manner as to add to the artistic beauty of the whole inflorescence. The sepals are banded with bright purple on the reverse side, the tint appearing also in a lesser degree in the front. Each sepal has in the inner half a cluster of brown blotches. The petals are pure white, very much cut and fringed. The labellum has a bright yellow base, surrounded by a number of cinnamon-brown spots, and a white, crimped, and fringed margin.

Progress of the Cyclamen.*

(*Continued from p.* 318.)

Colour.—There is evidence that seminal variation as regards colours occurred at least as early as 1829, but the modern forms with large coloured flowers, according to Mr. Martin, originated in a different way, and can be traced back to the old crimson and white. That preserves the crimson ring round the throat, but is otherwise an albino. There is nothing remarkable in this. Any species in nature may produce white flowers; albinism is in effect the commonest of all variations. "Giant White" is a pure albino, in which the crimson ring has been suppressed.

The modern coloured forms were obtained in the first instance by selecting forms in which the coloured ring showed a disposition to spread into the white corolla segments. The first indication would be a scarcely perceptible streak. By selection from self-fertilised plants the streak was widened into a stripe. Continuing the process, the stripes united, and a uniformly coloured flower was obtained.

The more striking colours, such as that of "Vulcan," which is a dark crimson, were, however, obtained not by progressive selection, but amongst the progeny of cross-fertilised plants.

I learn from Messrs. Hugh Low & Co. that coloured varieties, of course when self-fertilised, come true from seed. This is in accordance with a well-known principle.†

The Butterfly Form.—This has been obtained in-

* "The cultural evolution of Cyclamen latifolium, *Sibthorp*." By W. T. Thiselton Dyer, C.M.G., C.I.E., F.R.S. Read March 18, 1897, before the Royal Society.

† Darwin, *Cross and Self-fertilisation*, p. 460.

dependently by several horticulturists. The segments are partially spreading, and concave on their inner surface. One of the most remarkable is that raised by M. de Langhe-Vervaene; it is represented in fig. 113. He informs me that "these are the products of the eleventh year of improvement." He adds: "I never crossed them with any other strain; I do not like crossing races. I prefer improving them." He has kindly favoured me with the following detailed account of the mode in which the strain has been developed and improved. I quote it in his own words:—[See also *Gardeners' Chronicle*, 1897, p. 71, fig. 19.]

"Les Cyclamen Papilio que j'ai obtenus sont issus directement des Cyclamen persicum, var. giganteum.

"Il y a environ une douzaine d'années je remarquais parmi mes semis de Cyclamen une plante qui attira mon attention par l'extrême beauté de son feuillage dentelé et marbré. En examinant la plante, je vis qu'elle portait une grande quantité de boutons; ceux-ci étaient de forme plus arrondie et plus courte que ne le sont généralement ceux des Cyclamen persicum. La plante fut mise apart; quand elle commença à fleurir, elle m'étonna par la forme bizarre de ses fleurs. Ces diverses circonstances m'engagèrent à en recolter les graines.

FIG. 112.—FLOWER OF SPREADING CYCLAMEN.
See p. 317, *ante*. (*Reduced one-half.*)

FIG. 113.—FLOWER OF BUTTERFLY CYCLAMEN.

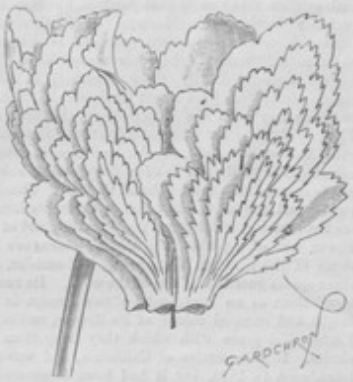

FIG. 114.—CRESTED CYCLAMEN.

"L'année suivante j'obtins quelques jeunes plantes. Au moment de leur floraison, elles purent être comparées à la plante mère.

"Les plus parfaites de ces plantes furent choisies pour servir de porte-graine, et leurs fleurs furent fécondées entre elles. L'année suivante je fus assez heureux pour constater un nouveau progrès; mes gains surpassaient leurs parents que j'avais conservés. On pouvait apercevoir, dans ces semis aux caractères persistants, le point de départ d'une race nouvelle.

"Je continuai dans cette voie; au bout de quatre ans, j'étais en possession de quelques sujets fort remarqués. Les pétales des fleurs étaient amples et plus longues; ils se redressaient comme les ailes d'un papillon qui s'apprête à prendre son vol.

"La race se caractérisa chaque année davantage.

"Encouragé par le résultat déjà obtenu, je m'occupai à rechercher la diversité des coloris. Après quatre années je ne possédais dans mes semis que des plantes à fleurs rouges; j'avais en triant les sujets pour la reproduction toujours écarté les fleurs les moins brillantes. Il s'agissait maintenant d'obtenir des fleurs à couleurs pâles. Des efforts nouveaux furent fait dans cette voie; je vis au bout de deux ans après apparaître la première fleur aux pétales blancs et à onglet rouge; dès lors les croisements se multiplièrent au point qu'après la neuvième année la perfection des formes et des coloris est telle que tous ceux qui voient mes Cyclamen Papilio sont unanimes à reconnaître leur mérite et leur perfection des fleurs."

In this case the basis of the new strain was found in a marked variation or "sport." The deviation from the type could not, however, have been very marked. The most remarkable feature in "Papilio" as now developed is the curled and toothed margin of the corolla segments. These peculiarities repeat characters which occur elsewhere in the order. In Soldanella the toothing is conspicuous; curling occurs in cultivated varieties of Primula sinensis. It is interesting to observe in "Papilio" that in the primary variation there was a correlation between the toothing of the corolla segments and of the leaves.

Cresting.—The most remarkable form which has made its appearance under cultivation is that in which a plumose crest has developed on the inner surface of each corolla segment. This is shown in fig. 114, which represents the "Bush Hill Pioneer," raised by Messrs. Hugh Low & Co. I quote the account of its development with which they have been so good as to furnish me:—

"This interesting variety was first observed in our nurseries some four years since, but how it originated we are unable to say.

"At that time, the only peculiarity about the variety was a very slightly raised rib running part of the way up the petals, and showing no tendency to branch. This was, however, considered sufficiently curious to follow up, and we seeded it with its own pollen.

"The young plants from this showed a decided improvement, the rib in some cases showing a marked tendency to branch. The best varieties (ten in number) were again fertilised with their own pollen, and the plants now being exhibited by us have resulted, although, needless to say, they are among the finest obtained up to the present, though all show a further improvement, every flower having a well-branched feather on the petals.

"We have this year found some colour in one plant, and we believe we shall have no trouble in obtaining crested flowers in a variety of colour."

The corolla segments of Cyclamen have no mid-rib. The appearance of such a structure is a reversion to the original leaf-type. The development of a crest from a mid-rib carries reversion very far back indeed. The branching of a leaf-structure in the plane in which it is expanded is common enough; branching in a plane at right angles to this is rare. Leafy outgrowths frequently occur from the mid-rib in the Cabbage.* In this case the structure of the leaf approximates to that of a stem, of which, indeed, the leaf may be regarded as a modification.

An interesting fact with regard to this singular variation is that it has appeared more than once, and independently. It first occurred in 1885, but seems afterwards to have been lost sight of.* It has also occurred in a red-flowered form in France,† in which case it was also perpetuated by seed.

I have not succeeded in discovering any similar structure in any primulaceous structure occurring in a wild state. Dr. Masters, however, informs me that it has been observed in cultivated forms of Primula sinensis. The tendency thus seems to be latent in the order, though why it should be so I am unable to explain.

Some theoretical interest appears to me to attach to the rapid development of so striking an ornament of a corolla segment. Such appendages are frequent enough in Orchids, and are regarded as adaptations to cross-fertilisation by insects. Their gradual evolution might be thought to require a long period of time, but in the present case we have definite evidence that such a structure may be developed by selection with great rapidity.

Conclusion.—1. The facts which I have stated appear to me to establish the result that when once specific stability‡ has been broken down in a plant, morphological changes of great variety and magnitude can be brought about in a comparatively short space of time. This appears to me to have a very important bearing on the rate of evolution. Mr. Darwin quotes Lord Kelvin as insisting "that the world at a very early period was subjected to more rapid and violent changes in its physical condition than those now occurring;" and he adds, "Such changes would have tended to induce changes at a corresponding rate in the organisms which then existed."§ That changes may be effected with considerable rapidity cannot, I think, be denied.

2. It is further, I think, abundantly proved in the present case that, though sudden variations do occur, they are, as far as we know, slight so long as self-fertilisation is adhered to. The striking results obtained by cultivators have been due to the patient accumulation by selection of gradual but continuous variation in any desired direction.

3. The size which any variable organ can reach does not appear to be governed by any principle of correlation. Large flowers are not necessarily accompanied by large leaves. Under natural conditions size is controlled by mechanical limitations and by the principal of economy. Nature cannot afford to indulge in anything unnecessary for the purpose in view.‖

4. The general tendency of a plant varying freely under artificial conditions seems to be atavistic, i.e.,

* Masters' *Teratology*, p. 455.

* *Gardeners' Chronicle*, 1885, p. 536.

† *Revue Horticole*, 1897, pp. 98 and 139.

‡ For a general discussion of the principles of variation and specific stability, see *Nature*, vol. 51, pp. 459—461.

§ *Origin*, 6th ed., p. 286.

‖ See Darwin, *Origin*, 6th ed., p. 117.

to shed adaptive modifications which have ceased to be useful, and either to revert to a more generalised type or to reproduce "characters which are already present in other members of the same group."* This conclusion must, however, be accepted with caution, for we must remember that in a case like the present we are only acquainted with variations which have been preserved with a particular end in view.

5. The case of "cresting" shows that the plant still possesses the power to strike out a new line, and to develop characters which would even be regarded as having specific value, as in the total change which has been effected in the form of the leaf in Primula sinensis. If such a race developed any degree of sterility with other races, it would have satisfied Huxley's criterion for the artificial production of a new species.

TREES AND SHRUBS.

RIBES SPECIOSUM (R. FUCHSIOIDES).

Of the two sections of the genus Ribes—the Gooseberries and the Currants—the latter contains much the more important species when regarded as ornamental shrubs. Amongst the former, R. speciosum is by far the most attractive. It is frequently treated as a wall-plant, and does, no doubt, flower with greatest freedom in that position, but that it is perfectly hardy, and blossoms profusely when planted in ordinarily exposed positions, is shown by a specimen flowering in the arboretum at Kew. The flowers appear (usually three together) in short racemes from each joint of last year's wood, and hang in a long row from the underside of the branches. The calyx is the most prominent feature of the flower, being half an inch long, tubular, and almost entirely covering the petals. It is of a deep scarlet colour, and is covered with short hairs at the base. Standing out beyond the calyx, and twice or thrice its length, are the stamens, which have the prevailing red of the flower, but of a pinkish tinge. The leaves are like those of the common Gooseberry, but smaller, and three spines guard each joint of the wood. Its recommendations as an ornamental shrub consist in the bright and unusual colour of its flowers, and in the Fuchsia-like grace with which they hang from the shoots. It is a native of California, and was first introduced in 1828, but it had been discovered by Archibald Menzies some thirty years previously. [Our experience is, that this species needs protection in the winter in the Midlands and the North. Ed.]

Cytisus albus.

So few among the Cytisus and Genistas have other than yellow flowers, that the white ones of this "Portugal Broom" give it a special value. But besides the colour of its flowers, their great abundance and the striking habit of the shrub entitle it to a place in the first rank among hardy plants. It produces a mass of slender, wiry, green twigs, whose abundance give it the character of an evergreen. The leaves, indeed, are never much in evidence except in seedling plants, when they are trifoliolate; in older specimens they are usually quite small, simple, and linear. The flowers are milk-white, and appear two or three together in a fascicle at each node. The habit of this shrub is somewhat erect when young, and with age it becomes bare at the base, the crowded mass of young branches then forming a heavy, but not ungraceful, crown. In early May this is transformed into one single mass of white, and is most beautiful and striking. This Cytisus grows 6, 10, or even more feet high, and is useful for planting towards the back of a shrubbery where the smaller things in front hide its naked base. When planted in more exposed places, it should be frequently stopped when young, so as to get plenty of branches near the ground.

Rhodothamnus Chamæcistus.

To most persons this small growing shrub is better known, perhaps, by repute than by experience in cultivating it. It is one of a sufficiently numerous class whose cultivation it is much easier to tell other people about than to successfully accomplish one's-self. It was introduced considerably over a hundred years ago, Messrs. Loddiges, of Hackney, having had seeds sent to them from the mountains of Carniola in 1786. Yet during all these years it has been rare, and seems likely to remain so, for it is one of the most difficult of Ericaceous plants to thoroughly establish, even in gardens where Rhododendrons and similar shrubs thrive perfectly well. There are, however, a few places where it succeeds (with Messrs. Backhouse, of York, for instance), and it is then one of the most charming of the dwarfer Ericaceæ. It is a dwarf procumbent shrub, whose branches are thickly set with small ovate, hairy leaves. The flowers are borne in April and May in clusters, at the ends of the branches. From two to four are in each cluster, the flat corolla being a little more than 1 inch across, and of a pale pink tint. A plant has flowered recently in the Kew rockery, where it was planted some years ago in a niche between two stones, and it is now become established. *W. J. B.*

* See Darwin, *Origin*, 6th ed., p. 127.

NARCISSUS POETICUS.

Modern horticulture has come to look upon any well-marked species of a valuable genus of cultivated plants that is at once beautiful in itself and fertile in both seed and pollen, as not only an end but a means. Or rather, we should say, that such a plant has a three-fold aspect, its own beauty and worth as it exists at present, its possibilities of evolution *per se* to enhanced perfection of size, form, and other desirable attributes, and its value as a factor in the production of new forms when interbred with other species. Narcissus poeticus is of high merit in all these ways, though, strangely enough, the second, namely, its improvement within its own limits, has been altogether neglected, so far as I know, save for some attempts of my own. It is remarkable that this flower appears both first and last of the cut Narcissi which fill the markets for quite five of the winter and spring months. Enormous quantities of the early Pheasant-eye Narcissus, p. ornatus, are forced into bloom in January and February, and for the market gardener there has probably been found more money in this than in any other "Daffodil." In the middle of May the double poeticus, a very attractive Gardenia-like flower, closes the season of the Narcissus. These two, with the old-fashioned recurvus, known exclusively as the Pheasant-eye Narcissus before the advent of ornatus, are the popular varieties, but several others are well distinguished, as might be expected from the wide geographical distribution of the wild plant. Roughly speaking, it extends in latitude from Switzerland to central Greece, and in longitude from the Western Pyrenees to Transylvania, whence Mr. Wolley Dod informs me he has received collected bulbs, and possibly somewhat further east, as it has been asserted that the cultivated variety known as grandiflorus was brought from the Crimea. In days when plant-geography was less exactly studied than now, N. poeticus was sometimes admitted into the British Flora, but the form in which it occurs, apparently wild, in a few English localities is that of patellaris, the type so abundant at Vevey, Montreux, and other Swiss places of summer resort, whence it was, no doubt, brought to England by tourists, and subsequently naturalised by escapes from gardens. This flower has broad, firm perianth divisions, and the corona very flat, whence its varietal name, with a clear ring of white inside the narrow red rim; it flowers very late, and seems to be the single form of the common double poeticus. Generally speaking, the species diminishes in beauty, according to the florists' standpoint, as it passes from west to east. In the high Pyrenees, where, in July, it whitens the mountain pastures, especially in the Luchon district, it is very variable, but many fine well-formed flowers may be selected, some with the corona wholly red and not merely edged with colour. Mr. James Allen, of Shepton Mallet, several years ago collected and kindly gave me bulbs of some of the best of these; they were late-blooming, and unfortunately did not prove robust in cultivation. The precise origin of ornatus has not been ascertained, but the wild flowers which resemble it most closely in form and earliness have come to me from Provence and North Italy. On the North Italian mountains poeticus takes a very dwarf alpine habit, but as regards shape of flower, I have picked out exact counterparts of ornatus on the high pastures above the Lake of Como in the month of April. It is curious that stray bulbs of this dwarf plant were brought to England from the vicinity of Lake Maggiore in Dean Herbert's time, as a rarity, and named N. p. verbanensis. It is really the prevailing N. Italian type, and extremely abundant. Ornatus was known in the Paris markets long before its introduction into England. This early, white, fragrant flower, absolutely vigorous, of rapid increase, and blooming from the smallest bulb, is one of the very best additions of this generation to our spring gardens. The variety poetarum may also be of Italian origin; it has the entire corona bright red, but the perianth is of flimsy, semi-transparent substance. It flowers in succession to ornatus, but is less robust in most soils. Another Italian variety, præcox, flowers very early, but is otherwise of inferior merit. Further east, N. poeticus assumes a narrow-petalled form. Mr. Baker tells me that the only Greek specimen in the Kew Herbarium, from the Pindus range, has divisions a quarter of an inch in width; and Mr. Wolley Dod's plants from Transylvania bore the same type of flower. It is not, however, safe to conclude that the garden varieties named angustifolius and stellaris are necessarily of eastern origin, for wherever the wild poeticus abounds, narrow as well as broad-petalled flowers occur; and among my own seedlings from the finest circular types, a percentage of flowers appears with almost linear segments.

There is a variety in cultivation to which the name poeticus verus of Linnæus has been given, quite arbitrarily, I think, small, with round, well-shaped flowers; this is said to be of Greek origin, but I know not on what authority. Var. grandiflorus has the appearance of a form from Eastern Europe; it is a somewhat ungainly flower, with narrow, spreading segments, and is of little value for the garden. Of the common recurvus, which must, I think, be referred to the wild lowland type of poeticus prevailing in South-western France, there seem to be superior and inferior varieties in cultivation, some having flatter, broader divisions than others. A distinguishing character is its lax foliage, reflexed for half its length, whence possibly its varietal name, though this has been thought to refer to its reflexed perianth. This old flower is still of considerable market value when highly cultivated. Some other varieties of poeticus with distinctive names are not of cultural importance. The vain attempt has been made to identify the many sorts enumerated by Parkinson under elaborate Latin names, which are merely descriptive of the minute differences in plants which he received from foreign collectors, and probably often from the same mountain-side.

N. poeticus has had a very large share in the creation of our modern garden Narcissi, since Dean Herbert, half a century ago, verified by experiment his guess that N. incomparabilis was a hybrid between it and the Trumpet Daffodil. To it the classes known as N. incomparabilis, Barri, Nelsoni, Leedsii, Burbidgei, owe their robustness, their extended blooming season, and the orange or red of their crowns, which is in all cases the solution or suffusion of the concentrated colour in the purple or deep red thread round the poeticus crown. A noteworthy proof of the power of poeticus to give vigour to its hybrids is found in the group N. Leedsii, many of its varieties being of indomitable constitution, though their other parent, the white Trumpet Daffodil, is the most fastidious of its kind.

It is surprising, if we consider the many fine qualities of this plant, that while so much pains was bestowed upon the production of its hybrids, nothing was done towards the improvement of the poeticus pure and simple. It is certain that, by careful seed selection and intercrossing of varieties which supplement one another's deficiencies in these points, it

may be at least as largely advanced as the Trumpet Daffodil has been in size and in attractiveness of form and colour. And such improved poeticus would in turn give us improved hybrids.

The cultivation of the poeticus is easier than that of most other Narcissi, but two memoranda should be made—first, that it is more capable than the rest of assimilating nitrogen—or, in plain words, that it likes farm-yard-manure; and, secondly, that it is the earliest to make fresh root-growth, and therefore should be the first to be attended to in the matter of lifting and replanting. On poor, dry soils, the double poeticus is apt to bear blind spathes; but where it is amply supplied with manure and water, it yields flowers as fine as white Camellias. *G. H. Engleheart*

AMELANCHIER CANADENSIS VAR. OBLONGIFOLIA.

The species and varieties of Amelanchier are by no means easy to distinguish one from another. To aid in the task we now give an illustration (fig. 115) of a plant which was in flower recently at Kew, and a description of which by Mr. Bean was given in a recent issue (p. 265).

F.G. 115.—AMELANCHIER CANADENSIS VAR. OBLONGIFOLIA.

COLONIAL NOTES.

ANTIGUA.

The report of the results obtained on the Experimental Farm in this island by Mr. Watts, Government Chemist, and Mr. Shepherd, Superintendent of Skerrett's School, has reached us. It contains details of experiments with various manures on different plots of Sugar-cane. The plots were duplicated, but the variations in the yield of some of these duplicated plots is greater than the variation caused by the application of the manures. This plainly brings out the fact that the variations in yield due to soil-condition are more important than those produced by the action of manures.

HONG KONG.

The typhoon which swept over the Colony on July 29 was the severest experienced here since the disastrous one of 1874. The gardens suffered very severely by the loss and injury of trees and shrubs, which, together with the losses in 1894 from successive typhoons of that year, left traces which will take many years to recover from. The plant-houses and other structures received but a small amount of damage owing to timely and efficient precautions having been taken to secure movable parts in such a manner as ensured their safety. Portions which were carried away were renewed in a more substantial manner. The glass-houses came out of the storm unscathed, with the exception of a few pieces of glass broken by material falling on them.

Many trees and shrubs were completely stripped of their foliage, but new growths of branches and leaves were quickly made, and in some instances trees which flower usually only once a year produced a second crop of flowers on the new shoots. The rainfall for the year as 77·6 inches.

SINGAPORE.

The most interesting item in the *Report of the Botanic Gardens* for home readers is the account of Mr. Curtis' botanical tour in the Malay States, from which we extract the following paragraphs:—

"On the second day we tacked about without making much progress until 5 P.M., when we landed on Pulau Panjang to do some cooking, and while this was being done I collected a few plants. Cirrhopetalum Medusæ appeared to be abundant on rocks in this island. At 6.30 P.M. we started again with a fresh breeze, standing straight across for the picturesque islands near the entrance to the Kasum River, under shelter of one of which, Pulau Prabat, we anchored until 5 A.M., when we got under way again. At 7 A.M. we landed on a small island to cook and collect plants; the most interesting kinds found here being two species of Begonia and two of Pogonia, the native name of one of the latter being 'elephant ear.' From this place we proceeded slowly against wind and tide to Kasum, which was reached between 3 and 4 P.M., so that I had actually been about forty-nine hours from Tongkah.

"The scenery among the islands before entering the Kasum River is magnificent, scores of islands of the most fantastic forms rising abruptly from these a to a height of several hundred feet. Similar scenery may be seen in Langkawi, but on a much reduced scale. On arrival in Kasum I sent my letters of introduction to the Governor, with a request for an empty house if possible. In a short time I received a message that the Governor was suffering from fever, and would not be able to see me for two or three days, but that a house was being prepared for me. This was the one decent-looking house in the village, originally intended, I was told, for a post-office; but as soon as the men commenced cleaning it out, it was found to be unsafe, so I had to go into a Chinese attap-house in the main street. For a place of its size, and it is a village of about a hundred houses, and perhaps 700 to 800 inhabitants, Kasum is the most miserable-looking place I ever set eyes on. The main street is overgrown with weeds, and in places knee-deep in mud. On either side are tall Bamboos leaning at all angles with the remnants of banners dangling in the breeze, the remains of the decorations of some religious festival long past. The houses are of plank and attaps, with very sharply-pitched roof, and a sort of covered 5-foot way in front; but it is only in places that one can cross from one side of the street to the other without sticking in the mud. A few days' residence in this place has a

most depressing effect. The morning after arrival, I collected Orchids, &c., along a road that was commenced three or four years ago, and cut for a distance of about 4 miles to a place called Wattam, where there is a Bhuddist temple in a cave in the limestone rock with numerous figures rapidly going to decay. One of the figures in a reclining position is about 45 feet long. I spent some time in botanising on this hill, and collected several interesting plants. One of the priests showed me a plant of Dendrobium Farmeri fastened on a block of wood which he assured me was very rare, and, so far as my experience goes, it is so, for I only collected two plants of it during the time I was there.

"On the second day, the Governer sent me a man who spoke Malay to accompany me anywhere I wished to go, and to assist me generally. Two days I went down the river to the limestone hills, and on another day walked across to Pongah and slept there, returning by another route the following day. The distance I estimate to be about 10 or 12 miles. Pongah is not so nice a place as it was in the old Raja's time; things are fast going to decay. It is interesting to note that several natives have a few Orchids growing around their houses, and one has quite an interesting little collection; and this, they told me, was the result of my previous visit. Dendrobium Farmeri is evidently the kind they prize most, which shows good taste on their part, but it is scarce, and they set a value on them that prevented me from buying. This is abundant in Mergui, and Pongah is apparently about its southern limit. One very interesting Dendrobium I saw in a garden which I was most anxious to get, but the owner would not part with it; he however, gave some flowers to dry which will, I hope, be sufficient for determination, but I have little doubt it is an undescribed species. On the limestone islands I collected a great number of interesting, and some, I believe, perfectly new plants, among the latter being a Ginger, Balsam, and Arum.

"Many plants we observed that it was quite impossible to get at, but, on the whole, I made a very satisfactory collection. The Ginger, which I believe to be new, and of which I only saw a single flower, although it had been flowering freely not long previously, grows in the chinks of the hardest rocks, where it is impossible to get at the roots without blasting them out. I saw hundreds, but only succeeded in getting about half-a-dozen, three of which I have sent to Kew. Of the Balsam, I dried a good series of specimens, and collected a nice lot of seeds, and of the Arum tubers.

"In one place, I saw enormous clumps of Cypripedium, but quite out of reach, and also a small growing Aërides (Aërides affine). For miles round Kasum the virgin forests have all been destroyed by the paddy-planters, and the present vegetation is composed largely of Bamboos, of which three or four species are so abundant that they may be said to be the prevailing feature of the vegetation on all the low hills.

"A lazier lot of men it would be difficult to find, and the only thing that really livens them up is a cock-fight, then the village turns up like one man!"

THE WEEK'S WORK.

PLANTS UNDER GLASS.

By G. H. MAYCOCK, Gardener, Luton Hoo Park, Luton.

Celosias and Cockscombs.—Repot these as soon as necessary, and keep them in a position close to the glass in a moderate temperature, and do not permit them to want for water. It is good practice to plunge the pots to the rims in Cocoa-nut fibre if the weather be hot. Keep a sharp look-out for thrips and red-spider.

Bouvardias.—Preparations should now be made for those intended to be planted out in frames such as those from which early Potatos have been dug. Take out some of the old soil, and replace with a mixture of loam, leaf-mould, and sand. Plants that were cut hard back after flowering will require more space than the spring-struck cuttings. These latter, however, I prefer to keep in pots all the season. Put out the old plants at 2 feet apart, and shade a little from strong sun until the fresh roots have obtained a hold of the new material. It is of the utmost importance that every plant should be clean and free from insects before they are planted out. Syringe the plants frequently. Move on the spring-struck cuttings into 5-inch pots, and keep in a temperature of 60° by night and 70° by day, pinching the points to induce a bushy growth. They should be moved on again into 7-inch pots as soon as these are well filled with roots. They may then be placed in a sunny position in cold frames, where they can be kept close to the glass. The lights may be removed altogether about the middle of August.

General Work.—Shake out and pot on old stock-plants of Euphorbia Jacquiniæflora and E. pulcherrima (Poinsettia) from which cuttings have been taken, and place them in a gentle bottom-heat for a few weeks; but when it is seen that young roots have been made, gradually harden off the plants, and treat them similarly to spring-struck cuttings. Afford shade to Calceolarias in bloom, water the plants with care, and remove all decaying blooms. A little air may be admitted to the structure by night and day to prevent damping, and the watering should be done early in the morning. Remove into larger pots all winter-blooming plants as soon as they are ready, such as Sericographis, Centropogons, Agathæa cœlestis, &c. If the cuttings were struck five or six in each pot, they should be divided before the roots become entangled. Examine young plants of Cyclamen for thrips, and if any are observed, fumigate the plants at once; inattention in this respect may lead to blindness. A lens is requisite to detect white thrips that may be secreted in the crowns. Salvias if struck now will flower in small pots, and the old plants may be put out in the open ground to grow into extra-sized specimens. If they be planted in a shallow trench much less labour in watering will be requisite. Afford copious supples of water to Cannas in pots, and give them weak manure-water once each week.

THE KITCHEN GARDEN.

By W. POPE, Gardener, Highclere Castle, Newbury.

Asparagus.—Apply a good dressing of common salt to beds now producing heads. If this be applied in dry weather it will help to keep the beds free from weeds without in the least injuring the young tops of Asparagus, and when carried to the roots by rain it becomes a very good manure. If the produce is weak from the beds being overtaxed in previous years, cutting should be discontinued early. Occasional dustings of guano may be applied during showery weather.

Mushrooms.—Continue to make up Mushroom-beds in the open as fresh manure is available. A good proportion of strawy-litter should be left with the droppings for these out-of-door beds, but care must be taken that the material be not too dry when used, this being a frequent cause of failure. Should more moisture be desirable, sprinkle well the manure with water, and throw it into a heap, turning it daily for a few days before making up the bed. Beat or tread this firmly together, and insert the spawn when the temperature is about 75°. Afterwards cover with 2 inches of good garden soil, which should be beaten firmly together with the spade, and covered with clean straw or mats.

Peas.—A good breadth of these may be sown now to come into use in August. At this time of the year it is sometimes advisable to sow in trenches, which will help them to withstand drought when coming into bearing. The manure used should be rich, and thoroughly decomposed. Well work this into the bottom of the trench, formed by taking out 1 foot or 15 inches of the surface soil. Return as much soil to the trench as needed, and tread firmly before sowing the seed. Should there be any likelihood of a break in the supply earlier, sow a row or two of an early variety at the same time as the foregoing, which will tend to lengthen the season of bearing. Earth and stake advancing crops before they are tall enough to be injured by high winds.

Hoeing and Cleaning Vegetable Crops.—Use the Dutch-hoe frequently amongst growing crops, for the double purpose of keeping the ground clean, and by a loose surface lessening the amount of evaporation during hot, dry weather. Should any weeds have arrived at the flowering-stage, let them be pulled up, and taken off the ground before hoeing begins. In the case of many weeds, such as Groundsel, Charlock, &c., if the flowers are allowed to open, many seeds will mature after the plants are cut off; therefore, clear them away at once. By a free use of the hoe whilst weeds are young, much labour will be saved, and the soil kept in the best possible condition. Water any newly-planted vegetables that may be suffering from drought, those that may have been turned out of pots being especially liable if neglected in this respect, as the roots require time to penetrate the surrounding soil. Newly-planted Celery requires frequent supplies, and freshly-planted Tomatos at the foot of walls or fences. Remove the lower heads from Rhubarb and Sea-kale, as these weaken the roots to no purpose. Old plantations of these will be greatly benefited by watering with liquid-manure, more especially the former. Discontinue pulling Rhubarb as soon as possible, or at least from a number of the roots that will be required to furnish produce early next year.

FRUITS UNDER GLASS.

By F. HARRIS, Gardener, Eastnor Castle, Ledbury.

Succession Peaches.—The trees which follow those in the early house will now have passed through the stoning period, and if they are not young trees, and are carrying good crops of fruit, occasional applications of liquid-manure, or failing that some artificial manure, will greatly improve the size and quality of the fruits. Ordinary fish-manure I find to be very beneficial to Peaches, and if the foliage is lacking in colour, one or two moderate applications well washed in with tepid water will speedily induce a healthy dark green tint. I first tried it for a few years past on two very old trees in tubs that had been condemned to the rubbish heap but after two dressings the trees so improved that they are now carrying good crops of fruit, and looking as healthy as any of our young trees. If the fruit has not been exposed to the light and sun, it should be done at once, and all shoots not required for next year, and that are not bearing fruit, should be removed, thereby giving next year's bearing wood a better chance to ripen well. Use the syringe frequently, especially in the afternoon at closing time, to prevent red-spider getting a footing. The house may now be closed a little later as the sun is likely to be powerful, and Peaches are impatient of a high temperature. If the temperature shows signs of rising above 85°, a little top-air should be left on for half an hour. I firmly believe that a high temperature is sometimes the cause of Peaches and Nectarines casting their fruits.

Late Houses.—Trees that have been retarded as much as possible will have set their fruits ere this, and usually in these houses there is a very heavy set; therefore no time should be lost before thinning is commenced, otherwise a needless strain will be laid upon the trees. Disbud the shoots gradually, and at the same time rub off all the small and deformed fruit, leaving two or three which are in the best position on each shoot. In a few days afterwards, when it can be seen for certain which fruits are taking the lead, remove the others, taking care that the crop is as evenly distributed as far as possible over the tree. If it is wished to keep back the trees as much as possible, ventilate the house all night unless there is likely to be frost or very cold winds. Heel-in the permanent shoots as soon as possible, taking the points out of others not required. If there are any signs of aphis, fumigate lightly on successive evenings after the sun has gone down, well syringing the trees early next morning before the sun gets powerful.

THE ORCHID HOUSES.

By W. H. WHITE, Orchid Grower, Burford, Dorking.

Phalænopsis.—Few Orchids equal these in graceful beauty when in bloom, the long arching spikes of such well-known species as P. Schilleriana, P. amabilis (grandiflora), P. Aphrodite, P. Sanderiana, P. Stuartiana, P. intermedia, P. Portei, P. casta, and P. leucorrhoda, produce large spikes of flowers that last in perfection for many successive weeks. Coming from some of the hottest regions of the East, these plants require the temperature of the East Indian house, or the warm humid atmosphere of the plant-stove. They appear to thrive best when suspended close to the roof-glass on the north or shady side of the house, and where they obtain a fair amount of light, but not actual sunshine. Such green-leaved varieties as P. Luddemanniana, P. Marie, P. speciosa, P. tetraspis, P. violacea, P. cornu-cervi, P. sumatrana, P. rosea, P. Micholitzii, P. Manni, &c., are very susceptible to injury from strong light at any time, stand them therefore low down upon the stage where they may be overshadowed by taller-growing species. The semi-terrestrial P. Esmeralda grows freely when suspended to the roof, and the same remarks apply to the deciduous P. Lowii. At this season, the majority of these plants have passed their flowering period, and have commenced to make fresh leaves and roots, therefore if any of the plants require to be top-dressed or repotted, this may be done. It is not good practice to rebasket the plants every year, as they dislike to have their roots detached

from substances they may be clinging to, but they will remain healthy in the same baskets for several years, providing the Teak-wood does not decay. Those plants that are in a healthy condition, well rooted, and have sufficient room for further development, should be relieved as much as possible of the old moss, which should be replaced with new material. Plants that require such attention should be placed at one end of the house, and allowed to become somewhat dry. In the case of those that require more space, great care is necessary in removing them from the old baskets, as the young roots are very susceptible to injury. Carefully pick out the sphagnum-moss and drainage material, then soak the basket, &c., in tepid water for a minute or so; the roots may then be easily detached from the wood with a sharp, thin-bladed pen-knife. It is important that new teak-baskets be used, as the young roots attach themselves more readily and firmer to new wood than to old. In transplanting the plant into the new basket, carefully arrange the roots around the teak rods, and keep the collar of the plant a trifle above the top rod. Then proceed to fill the basket to three-fourths of its depth with clean broken crocks. The remaining space around the base of the plant should be filled with living sphagnum-moss, mixing some small crocks with it to assist drainage. This is very important, because if the roots are buried in a solid heap of moss, which may become saturated, they will quickly decay. Weakly plants, having few or no roots, should be placed in small Orchid-pans, and suspended from the roof. When they are in better condition, they may be transferred to baskets again. After top-dressing or re-basketing, very little water is necessary. On no account should the plants be saturated by the usual dipping, it being safer to sprinkle the moss on the surface and around the sides of the baskets with tepid rain-water, applied through a fine rose watering-can. Afford no more water than is necessary to keep the surface-sphagnum alive, and prevent water getting into the centre of the growths. In houses where the atmosphere is nearly always at saturation point, insect pests rarely attack Phalænopsis; but where the house is naturally dry, thrips multiply with great rapidity, and quickly disfigure the handsome foliage. Periodical fumigation with the XL All vaporiser is an efficacious remedy; and good results may be obtained by washing the leaves occasionally with a soft sponge and clean rain-water. For a month or two look carefully over the plants at night for slugs.

THE FLOWER GARDEN.

By CHARLES HERRIN, Gardener, Dropmore, Maidenhead.

Bedding Arrangements.—In warm districts, the bedding-out of the less tender plants may now be commenced. If the flower-beds contain no spring-flowering plants, hardy edgings may be put out, and the ground-work of any carpet or other bedding design it is intended to use. A more pleasing style than carpet-bedding, however, is now prevalent, and plants of somewhat hardier and less formal characteristics are used. As these notes are written the weather is anything but genial, frosts occur almost each night, and by day a cold northerly wind and little sunshine is present. No tender plants should, in such circumstances, be exposed until a change takes place. Even in the case of Pelargoniums that have been hardened-off for some time in cold pits and frames, it will not be advisable to plant in such inclement weather, unless some temporary shelter can be provided on frosty nights. Where Sedums, Echeverias, and such-like, are used for edgings to beds on grass, the Sedums may be pulled into pieces, selected and re-planted after the edges have been prepared by adding a little new soil. The variegated grass—Dactylis glomerata variegata—makes a capital edging-plant, and is perfectly hardy. Old clumps, if lifted now, and pulled into small pieces, will make nice plants in a few weeks, and form a suitable edging to beds of scarlet or pink Pelargoniums. Summer-flowering Violas, where used in mixture with Pelargoniums, or as a ground-work for a mixed bed, thrive best when planted early; but if they are not already planted, let this be done at once. The dark purple Viola, Archie Grant, associated with the variegated-leaved Lady Plymouth Pelargonium, is an effective arrangement; and a white-flowering Viola, as Mrs. Gray, may be used in conjunction with West Brighton Gem, or Vesuvius scarlet-flowered Pelargonium. Where a taller and mixed bedding arrangement is possible, Fuchsias are admirable subjects; and if plants have been grown on as advised in early Calendars, they will now be strong plants, 4 to 5 feet in height, and well adapted for this purpose. Fuchsias such as these, dotted over large beds, with a carpeting of Violas, and interspersed with tuberous Begonias, 18 inches to 2 feet high, together with a suitable edging, make a pleasing arrangement. As examples, I may give the following:—Fuchsia Madame Cornillison, and crimson or red-flowered tuberous Begonias, on a ground-work of Viola Bluebell, and edged with the golden-leaved Lysimachia Nummularia; Fuchsias, Mrs. Marshall, 4 to 5 feet high, bed carpeted with Viola Bluebell; Begonia semperflorens, Duchess of York, 1½ foot, edged with a good band of the trailing Fuchsia Meteor; dark Heliotrope Florence Nightingale, 4 to 5 feet, with a scattered undergrowth of Nicotiana affinis and scarlet-flowered Pelargoniums to half the height (about 2 feet); ground-work, Alternanthera magnifica, with an edging of Mesembryanthemum cordifolium variegatum.

Herbaceous Borders.—Varieties of Pæonia moutan in sheltered positions are now in flower, but the severe frosts, after they were well into bud, destroyed many shoots, the flower-stems completely shrivelling up. The early simple herbaceous varieties suffered to a less extent. Later-flowering varieties may be relieved of some of the small flower-buds if large blooms are desired; if not, these back buds open later, and so form a slight succession, although the flowers are smaller. A good soaking of liquid-manure is of much assistance to established clumps of these Pæonies. Delphiniums in variety should be staked and tied before they become long enough to fall over, and so grow out of shape; when this occurs, they cannot be easily tied erect again. Other subjects requiring short stakes and ties are Oriental Poppies, Asphodelus albus, Sweet Rockets, &c. During the present dry weather, keep all borders well hoed over. The past week, although cold, has been very favourable for hoeing and cleaning.

THE HARDY FRUIT GARDEN.

By H. W. WARD, Rayleigh, Essex.

Training the Young Growths of Wall-Trees.—The training of young growths of wall-trees requires almost daily attention during the present and four following months. The terminal growths of leading shoots should be secured in position on the wall by means of nails and shreds, unless the wall is wired, laying-in side or lateral growths between each pair of branches with Birch or Hazel twigs. In the case of walls provided with a series of wires, fixed either horizontally or vertically at distances of 6 inches from each other, small bands of raffia or bast are employed for the same purpose. Twist the matting once round the wire to prevent its shifting from the desired position before tying the individual growths thereto, being careful to leave ample room in the ligature for the free expansion of the shoots. Peach and Morello Cherry trees, owing to the multitude of young growths, require prompt and frequent attention during the period of growth, the treatment being identical in each case. A sufficient number of the current year's growths being laid in for producing fruit next year, all surplus shoots, together with fore-right growths, being kept persistently pinched (and in some cases rubbed off) to within one joint of their origin. Very strong growths should be cut back to the lowest lateral or removed in order to direct the flow of sap into the weaker ones. Apricot, Plum, and Pear trees require the same kind of treatment as regards the training of young growths at regular intervals over the available wall-space, and the pinching of the same in the manner and for the purpose described above.

Insect Attacks.—Care should be exercised to keep all kinds of fruit trees free from the attacks of aphis and red-spider, and of mildew; and where these undesirable visitors have effected a lodgment on the young growths, prompt and effective remedial measures must be taken to dislodge them. The most difficult of dislodgement is the black-fly, which almost confines its vigorous and persistent attacks to the young growths of Cherry-trees. I have sometimes found it necessary to dip growths thus attacked in saucers containtng a solution of the "XL All Insecticide" (in the proportion of one part to thirty of water), or tobacco juice and water at the rate of one quart of the former to four gallons of the latter. The XL All Insecticide applied as above to Peach-trees affected with either green-fly or red-spider will have the desired effect. However, the aim of the cultivator should be to keep his trees—especially wall-trees—clean and healthy by a vigorous, timely, and well-directed use being made of clean water applied to the trees by the hand garden-engine or syringe, in addition to keeping the soil about the roots uniformly moist, but should this fail in securing the desired result, recourse must then be had to insecticides.

THE APIARY.

By EXPERT.

Feeding in the Open.—When the apiary has grown to a size that the stocks may be counted by the hundred, the bee-keeper has to get through his work speedily, and outside spring feeding works admirably, especially where time is a consideration. With the food-dish placed in a suitable spot, it is only necessary to pour in the supply on every fine day, when the bees will be found eagerly waiting for it. This occupies but a few minutes daily, and there is no danger of damage, which sometimes occurs from uncovering the brood nest to its detriment; nor is there any fear of mischief happening, as it may with the ordinary spring stimulating feeder of the bottle and stage pattern, such as allows the syrup to run down amongst the combs and partly drowns the bees. Any person, if once shown the right way, can give a supply of food outside; and even where but few hives are kept (provided they are isolated from other stocks in the district) the plan of open-air feeding has much to recommend it. Those who have not given this system a trial, and who may desire to do so, should observe the following rules, viz.: (1) Place the syrup dish in some sheltered warm spot, 30 or 40 yards away from any of the hives, and provide in it for a float some spent Tea-leaves or cut straw. (2) Put into an earthenware crock or other dish some granulated sugar; pour over it some boiling water, stirring till all is melted. This liquid must be much thinner than the ordinary syrup used for autumn-feeding; it should be similar to doubly-sweetened tea. (3) About 9 A.M. on any fine day pour into the food dish a supply of the syrup—1 lb. of sugar daily, to, say, eight or ten stocks, will be enough for stimulating purposes. (4) On dull, cloudy, or wet days the supply should be stopped; but even then, if the weather is not of a nature to chill the bees, some temporary cover may be placed over the dish, so that they can feed in safety. I always medicate the spring food given outside with salicyle acid solution.

The question of the foundation will, no doubt, be in some bee-keeper's minds. I have received enquiries as to which I consider the best. I have no wish to vaunt one maker over the other, but I can speak as I find, and when I am asked, "Do you like the 'Weed' foundation?" I say, "Yes, I have tried the 'Weed' last season, and liked it very well." I also consider the bees reduced the "system" more in the "Weed" than in that of ordinary make. This season I hope to decide the matter for myself by further trials. I also hope to give the new deep-celled foundation a trial, if any is procurable. Our American brethren are still actively engaged in perfecting a foundation with deeper cells and thinner bases.

Adulterating Honey.—Our friends abroad are progressing in the framing and passing of anti-adulteration Acts, heavy penalties being imposed for selling honey adulterated with any other substance, even though the admixture may not be detrimental as food. We in this country want something of the kind to restrain the hand of the spurious honey-maker.

Assisting Increase in Stock.—Comparatively few persons are aware how much may be done by way of assisting stocks of bees to increase in numbers in such a season as the present one. It is quite a common occurrence to find six or seven combs of brood in strong hives at the middle of April, and only three or four combs so occupied in the second week of May if such stocks are left to themselves, whereas if they had been "nursed" without disturbing them, fed slowly and continuously, and kept warmly wrapped up, with entrances narrowed in cold and opened wide in warm weather, breeding would have been maintained all along instead of dropping off because of the failure of income, as it so often does. The point is to keep brood nests supplied with food enough and no more, till supering-time comes round. If any honey at all is to be had outside, one hole of the feeder will suffice, but should the bees be kept indoors by stress of weather, three holes may be used; thus, by keeping up a continuous supply of warm food, populations are increased by thousands daily, and little inducement is needed to make them enter surplus chambers and deposit therein all the honey gathered. We do not suppose that much supering will be required before the third week in May, except in some such spots as one we know of where about 500 acres of ground are devoted to Strawberry and fruit culture. In such favoured beeground, some May sections will be possible, but they will be scarce this year.

EDITORIAL NOTICES.

ADVERTISEMENTS should be sent to the PUBLISHER.

Local News.—*Correspondents will greatly oblige by sending to the Editor early intelligence of local events likely to be of interest to our readers, or of any matters which it is desirable to bring under the notice of horticulturists.*

Newspapers.—*Correspondents sending newspapers should be careful to mark the paragraphs they wish the Editor to see.*

APPOINTMENTS FOR THE ENSUING WEEK.

SATURDAY,	MAY 22	Royal Botanic Society, Meeting.
MONDAY,	MAY 24	Linnean Society (Anniversary). Bath and West and Southern Counties Show at Southampton (5 days).
WEDNESDAY,	MAY 26	Temple Show of the Royal Horticultural Society (3 days). Gardeners' Royal Benevolent Institution (Annual Dinner).
FRIDAY,	MAY 28	Royal Botanic Society, Lecture.

SALES.

TUESDAY,	MAY 25	Special Sale of Orchids in Flower and Bud, at Protheroe & Morris' Rooms.
WEDNESDAY,	MAY 26	Lilies, Geraniums, Greenhouse Plants, Carnations, Herbaceous Plants in variety, &c., at Protheroe & Morris' Rooms.
FRIDAY,	MAY 28	Imported and Established Orchids, also Callas, at Protheroe & Morris' Rooms.

AVERAGE TEMPERATURE for the ensuing week, deduced from Observations of Forty-three years, at Chiswick.—66·7°.

ACTUAL TEMPERATURES:—

LONDON.—*May 19*: MAX., 67°; MIN., 44°.

PROVINCES.—*May 19 (8 P.M.)*: MAX., 64°, Hurst Castle; MIN., 44°, Shields.

Backwards and Forwards.

WE hear a good deal about progressive evolution now-a-days, and it suits our complacency to dwell upon it. We look back to the days of our forefathers, and plume ourselves that we live in times when Palms and Pine-apples are sold on costermongers' barrows, and when many things once unheard of, or only as the luxuries of the wealthy, are now in common use. So far good, there has been marked progress in gardening as in everything else. But it is as well to recollect that reversion may and does occur as well as progress, and, therefore, that it behoves us, whether "practical" men or students, to ascertain so far as we are able the influences at work which will result in improvement, and those which, if unchecked, will tend to deterioration. Two articles in our last and present numbers illustrate very aptly the state of affairs. On the one hand, we have the Director of Kew tracing, with the aid of specimens furnished by Messrs. SUTTON, the progressive development of the Cyclamen; and, on the other, we have Mr. FRANCIS GALTON asking, for scientific purposes, what plants it would be most suitable to observe, and how to manage them, so as to bring about, in the shortest and most complete manner, the reversion to the primitive condition? We learn as much or more from our failures as from our successes, and on this principle we shall profit by the practical demonstration of the causes which lead to degeneration. Thus, an investigation which seems at first to be of a purely abstract character, is soon seen to be eminently practical.

Change of circumstances is followed by alterations in structure and appearance—this is what might have been expected; but there are other and very-marked variations which occur without, so far as we know, any correspondingly marked changes in the environment. In the progressive development of the Cyclamen, for instance, there has been no change of treatment sufficiently great to account for the great variety that has ensued. A change presents itself, the quick eye of the cultivator notes it, favours its development, not so much by any active measures of his own, as by protecting it from injurious agencies and harmful competition. The nascent variation is thus allowed free play, and in this way the gardener is said to exercise selection. The cultivator cannot, however, create the variation, although he can and does control the circumstances which lead to its subsequent progress.

Cross-breeding and hybridisation are, of course, potent sources of change. It is said of the Cyclamen, that it is close-fertilised, that it has never been crossed by any other species. That may be so, but the term close-fertilisation is in this case not necessarily used in an absolute sense. It may happen that the pollen of a particular flower is applied to the stigma of the same flower, but more often it is the pollen from another flower of the same plant that is employed, or from a flower of another plant of the same strain or race. There are, therefore, various degrees of cross-breeding, and no one can demonstrate where cross-breeding ends and hybridisation begins. Some amount of cross-breeding may be expected even in the Cyclamen, but how far that amount is responsible for the changes that are manifest no one can say.

When we have allowed for changes of circumstance and cross-breeding in various degrees, there yet remains much variation, which, so far as we see, is not due to either of the causes we have mentioned. We call it spontaneous, innate, hereditary, a reversion, a property of protoplasm, and so, no doubt, it may be; but we must not allow these didactic expressions to conceal the fact that we are in reality ignorant, and that it behoves us in every way we can to lessen that ignorance. This is what Mr. GALTON proposes to attempt in his experiment.

He wants to breed back to the original form, and to ascertain by what stages and in what time the retrogression can be effected. A hardy annual is to be preferred, and one which has a well-marked variety—as, for instance, when the type has glabrous leaves, and the variety hairy ones, or one in which the variety is of dwarfer habit than the type. From this point of view, some of the Sweet Peas seem to us adapted for the purpose, as the wild original plant still exists in Sicily. Dwarf and Runner-Beans might also be employed, but their parentage is not so definitely known. The China Aster is another good plant for experiment. The soil to be employed should be a light one, that is, one that is not rich in nutritive matter—a poor sand, or a sandy-loam to begin with—and employing in each generation a soil proportionately poorer, but not so destitute of food as seriously to affect the health of the plant. The water to be applied would of course be carefully measured, and the quantity allotted would depend on the character of the season.

By some such process of reduced nutrition and successive retrograde selection, that is by continuously selecting the worst forms instead of the best, Mr. GALTON would undoubtedly get something different from that which he started with, but we suspect it would be a depauperated form rather than a representative of the original type. This is precisely the point to be determined; and if any of our readers can furnish hints for the prosecution of the experiment to Mr. GALTON, they will be obliging him and furthering the cause of scientific horticulture.

Carpet Bedding.

IN spite of what may be advanced against this system of garden decoration, on the score of inappropriateness and bad taste, it is certain that it hits the taste of the masses, and that it confers great pleasure to thousands who do not appreciate plants for their own sakes, but only as a display of colour or as parts of a design. It is certain, too, that a well-designed bed, which would be terribly out of place in a garden, or even in a park, when placed in a central situation in a town-square or before a railway station, or amid architectural surroundings, is not always so inharmonious and offensive as might be anticipated. Our continental friends indulge in these strange devices to a larger extent than we do, and however much we may dislike them as a rule, it would be affectation to deny their effectiveness in certain cases. Many are silly, glaring, and little better than outrages on taste. The worst specimens we have heard of are some in the United States. Still, it is not necessary they should be inharmonious and repellent; in the hands of a true artist they are capable of being rendered valuable object-lessons and things of beauty.

For those who have to construct these beds, and are at a loss how to carry out the work and what plants to select, we may call attention to the second edition of a book by Herr KARL GÖTZE. It is entitled *Album fur Teppichgärtnerei und Gruppenbepflanzung*, or album for carpet-bedding and arrangement of ornamental plants. The fact that it is written in German by no means precludes its use by those not familiar with that language. In the first place, there are nearly 300 plans and 366 engravings, all of which are intelligible to gardeners of any nationality. Then there are copious lists of plants, arranged according to the use to which they may be put. These lists are very serviceable, and they afford an excellent illustration of the desirability of the use of Latin, rather than of vernacular names. As it is, the names are as intelligible as the pictures themselves; and neither Russian nor Turk need experience any more difficulty in the matter than the Germans, for whom the work is primarily written.

In order further to make the work useful to gardeners, a short garden dictionary is appended, giving the explanation of gardening terms used in Germany, France, England, Italy, and Holland. We have, therefore, no hesitation in recommending this volume to those of our readers interested in this kind of work, as they will find in it a larger number and a greater diversity of plans and illustrations than in any work of the kind that we know of. It may be had from Herr LUDWIG MÖLLER, of Erfurt, or from any foreign bookseller at the cost of a few shillings.

ARISTOLOCHIA GOLDIEANA.—One of the most extraordinary flowers now in bloom in the Victoria-house, Kew, is this West African species. Our illustration (fig. 116, p. 337) is about half the real size. The flower is naturally pendulous, or nearly so, the lower part of the tube is irregularly cylindrical, cream-coloured, smooth, and bent upwards nearly at a right angle into a funnel-shaped upper half. This part of the tube is marked with prominent purple ribs; and expands into a bowl-shaped three-lobed limb, strongly marked with purplish ribs, the three lobes prolonged into acuminate points; the interior of the bowl is yellowish, thickly marbled with velvety purplish-brown spots. The entire flower is as large as one's hat, and very striking in appearance, just one of those interesting plants which the Floral Committee wou'd pass over as of no commercial value! Although in point of size, form, and colour, it is very attractive, we cannot say so much for the odour,

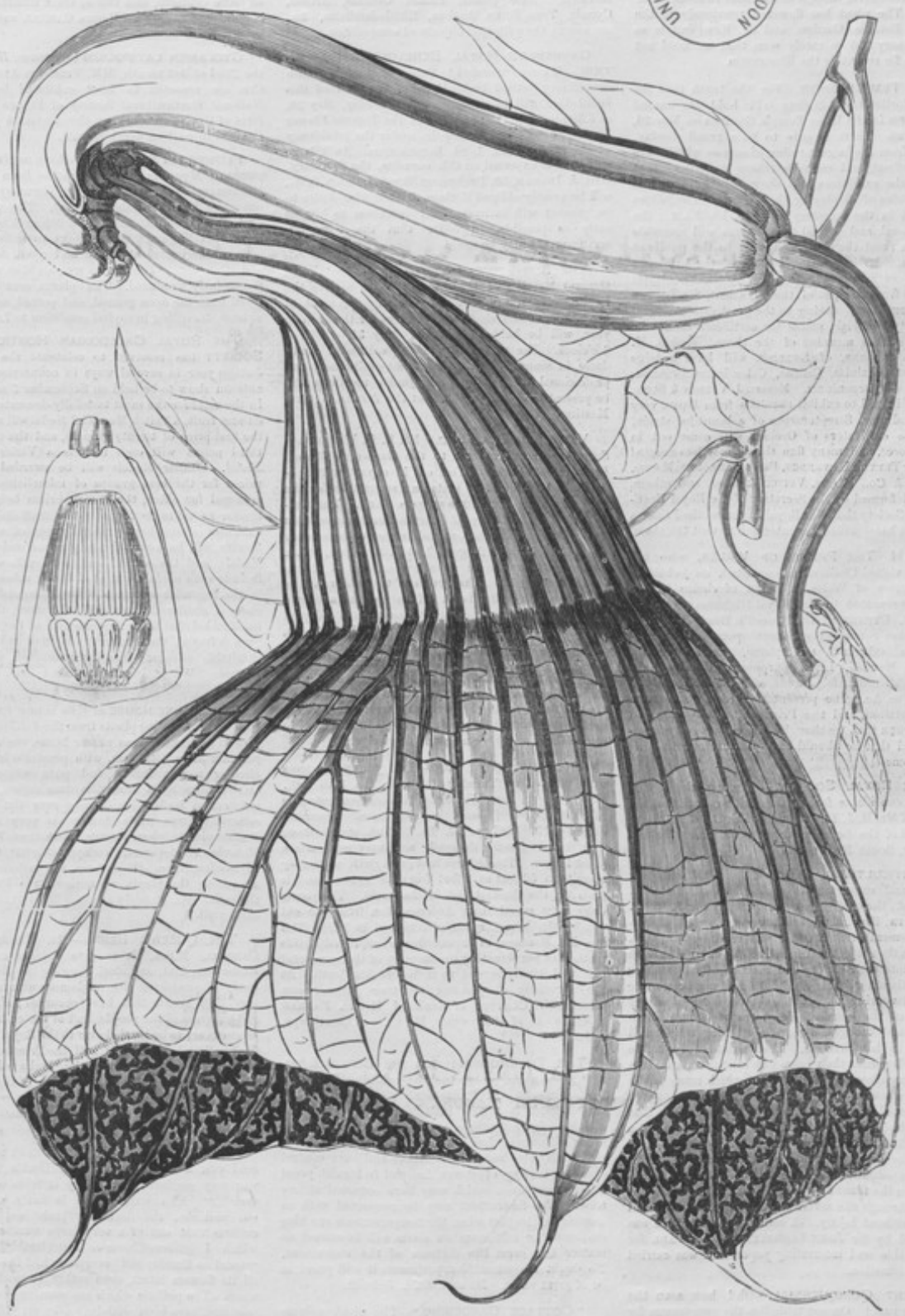

FIG. 116.—ARISTOLOCHIA GOLDIEANA (HALF-SIZE): FLOWER CREAM-COLOURED, WITH PURPLE RIBS AND SPOTS ON A YELLOW GROUND. (SEE P. 336.)

which is repulsive, though less so than in some other species. The plant has flowered previously in the Glasgow Botanic Garden and at Kew, but is so extraordinary and so rarely seen, that we need not apologise for repeating the illustration.

THE TEMPLE SHOW.—For the tenth time the Royal Horticultural Society will hold its annual flower show in the Inner Temple Gardens on May 26, 27, and 28. There is sure to be a grand display, judging from the large number of entries which have been received, and there is reason to believe that some of the exhibitors will show something original in the modes of displaying their plants. The judges will meet in the secretary's tent at 10.30 A.M.; the Fruit, Floral, and Orchid Committees will assemble at 11 A.M., and the show will open to the public at 12.30 P.M. An interesting feature of the catalogue will be an article on the "Royal Horticultural Society," from the pen of the President, Sir TREVOR LAWRENCE, Bart. Owing to the great pressure upon the society's officials, plants for certificate cannot be entered on the morning of the show. Messrs. H. CANNELL & SONS, of Swanley, will have a large exhibit of Gloxinias, Cannas, Calceolarias, Begonias, and Regal Pelargoniums. Messrs. J. VEITCH & SONS, Chelsea, intend to exhibit novelties from Japan, very fine Caladiums, Streptocarpus of a beautiful strain, &c. The cultivators of Orchids will come out in strong force, and many fine things may be expected from Sir TREVOR LAWRENCE, Baron SCHRODER, Messrs. SANDER & Co., Messrs. VEITCH & SONS, and others. We are informed by the Secretary of the Royal Horticultural Society that Her Royal Highness the Princess of WALES has signified her intention to visit the show.

H.R.H. THE PRINCE OF WALES, who has recently visited Cheltenham, accepted, on behalf of the Princess of Wales, a basket of choice Orchid blooms, presented to His Royal Highness personally by Mr. J. CYPHER, of the Queen's Road Nurseries. The basket contained excellent spikes of Odontoglossums crispum, triumphans, and cirrosum, Cattleya Mendeli, Lælia purpurata, Cypripediums Rothschildianum and grande, and Oncidium-obrysatum majus, &c. The presentation took place at the railway station, and the Prince graciously informed Mr. CYPHER that he thought the blooms very beautiful, and that he should have pleasure in conveying them home.

THE ROYAL SOCIETY.—Among the fifteen selected candidates for election this year we find the names of Mr. H. J. ELWES and Mr. G. R. M. MURRAY, the head of the botanical department of the British Museum, South Kensington.

HORTICULTURAL CLUB.—The usual monthly dinner and conversazione took place on Tuesday, 11th inst., the chair being occupied by Sir J. T. D. LLEWELYN, Bart., M.P., and there was a good attendance of members. A paper was read by Mr. GEO. PAUL on the subject of Amaryllis. He entered at some length into their history and method of cultivation; he questioned whether a mistake had not been made in endeavouring to get the broad form of flower instead of the long tubular form of Lilium longiflorum, and thought perhaps something might still be done in that direction. Their slowness of increase militated against their more general cultivation. An interesting discussion followed, in which many of the members present participated; considerable surprise was evinced at the statement of the secretary, that he had had the hybrids of A. vittata raised by the late M. SOUCHET growing and flowering in the open air for the last twelvemonths; they were planted in the same situation as Amaryllis belladonna, i.e., in a border in the front of a greenhouse facing south, and passed through the severe winters which we have had of late without injury. A cordial vote of thanks was proposed by Sir JOHN LLEWELYN to Mr. PAUL for his valuable and interesting paper, and was carried with acclamation.

GHENT QUINQUENNIAL.—Oh! how soon the years fly past! On our table lies the programme for the next quinquennial exhibition at Ghent in April next. Seven hundred and sixteen classes are enumerated. New plants, Palms, Orchids, Aroids, Cycads, Tree Ferns, Azaleas, Rhododendrons, &c., are among the principal objects of competition.

GARDENERS' ROYAL BENEVOLENT INSTITUTION.—We are requested to state that the fifty-eighth anniversary festival dinner in aid of the funds of this Institution will take place on Wednesday, May 26, at 6.30 for 7 P.M. (the first day of the Temple Flower Show), at the Hôtel Métropole, under the presidency of the Right Hon. Lord ROTHSCHILD. As a large gathering is expected on this occasion, the Secretary, GEO. J. INGRAM, 50, Parliament Street, London, S.W., will be greatly obliged if those friends who desire to be present will intimate their intention to him as early as possible, in order that the necessary arrangements may be made.

THE SURVEYORS' INSTITUTION.—The Annual General Meeting of the Institution, to receive the Report of the Council, and the announcement of the result of the election of officers for the ensuing year, will be held on Monday, May 31, 1897, at 3 o'clock. The prizes awarded to successful candidates, in connection with the recent preliminary and professional examinations and junior meetings, will be presented by the president at the Annual General Meeting.

VICTORIAN ERA FUND.—Mr. R. G. WATERMAN, Secretary and Treasurer to the Gardeners' Mutual Improvement Society, Woolton, Liverpool, writes:—Might I be allowed to state as a suggestion for the above what my committee purpose doing. The committee of the Liverpool Horticultural Association have placed at our disposal tabling at their summer show, July 31 and August 2, at Sefton Park, where we hope to arrange an attractive exhibit of plants, fruits, flowers, &c. The proceeds to be devoted to the above deserving fund. This appears a simple means of raising a considerable amount if adopted throughout the country, especially near large towns, where flowers, &c., readily obtain purchasers. Exhibitors and other persons interested would willingly supply the necessaries, and this is especially applicable to Rose shows. If the committees of the societies are unable to make the necessary arrangements, the management could be handed over (as in this case) to some other society, or a few willing helpers.

THE COWTHORPE OAK.—Two young Oak trees were planted on Tuesday afternoon, the 11th inst., at Cowthorpe, near Wetherby, to commemorate the celebrated tree [figured in *Gardeners' Chronicle*, January 19, 1895, p. 73. ED.], which stands there still, but is greatly decayed, and may not endure much longer. The old tree is of great girth, measuring more than 50 feet at 3 feet from the ground, and is probably the thickest Oak in the world. The young Oaks were raised from Acorns taken from the old tree by Mr. John Clayton, of Bradford, in 1893. The late Mr. Montagu, of Ingmanthorpe, approved of this method of perpetuating the memory of the wonderful tree, and kindly agreed to it before his death. At the ceremony of planting the trees, there were present Mr. CLAYTON of Bradford, Messrs. FARRAH & MILLWARD of Harrowgate, Mr. CASS of Cowthorpe, and others.

THE THERMOGRAPH AT THE BERLIN EXHIBITION.—In his prospectus, the exhibitor, Mr. OTTO BOHNE, Berlin, S. Prinzenstr., 90, says:—"The thermograph is a new instrument, registering the changes of temperature. Its appliance in various kinds of business has proved most successful, being also adapted to secure a constant and sure control over the heating of stoves, &c., and to furnish proof of any negligence which may have occurred at any time." The instrument may be connected with an electric bell, so that when the temperature is reaching maximum or minimum an alarm will be caused, no matter how great the distance of the instrument. No doubt for scientific experiments it will prove to be of great value. Its cost is £6. *Behnick.*

"COTTAGE GARDENING."—The ninth volume of this very inexpensive publication is before us. Each number costs but one halfpenny, and contains eighteen or more columns, and two or three illustrations. It is published weekly by Messrs. CASSELL, and is edited by Mr. W. ROBINSON.

CYCLAMEN LATIFOLIUM (persicum, *Hort.*). On the 22nd of last month, MM. VILMORIN ANDRIEUX ET CIE. are reported to have exhibited before the National Horticultural Society of France the wild form of Cyclamen, showing the degree of perfection attained in modern developments.

FLOWERS IN SEASON.—We have received several plants of Myosotis alpestris gracilis from Mr. F. C. HEINEMANN, seed-grower, Erfurt, Germany, a variety not much known in this country. The plant is of neat, dwarf, compact habit, well fitting it for market-work, dividing-lines and edgings to beds of other spring-flowering plants, table and room decorations, and other uses. The flowers are pale blue, small, and numerously produced. The plants sent had been lifted from the open ground, and potted, and sent off at once, travelling in capital condition to London.

THE ROYAL CALEDONIAN HORTICULTURAL SOCIETY has resolved to celebrate the Diamond Jubilee year in several ways in connection with its autumn show to be held on September 8 and 9 next. In the class for the most tastefully-decorated table of dessert fruit, a Veitch Memorial Medal will accompany the first prize of twenty guineas, and the second and third prizes will each include a Victoria Jubilee Medal. Similar Medals will be awarded with the prizes for the best groups of miscellaneous plants arranged for effect, the money prizes being exactly similar in value to those in the fruit classes. The exhibitor of the best-arranged table of various cut flowers will be awarded ten guineas and a Jubilee Medal; and the second and third prizes will also include such medals, but of differing value. A class in the vegetable section will be distinguished in precisely a similar manner. Furthermore, the Council has decided that after the expenses of the show have been defrayed, the surplus funds shall be devoted to charitable purposes directly connected with horticulture. We anticipate the show will be a very fine one.

THE ALPINE-HOUSE at Kew is now full of beautiful and interesting plants from the Falkland Islands, as well as from regions nearer home, such as Geum parviflorum, a little gem, with prostrate habit, small circular rugose leaves, and pure white flowers; Oxalis enneaphylla, from the same region, with nine glaucescent leaflets folding one over the other, and relatively large white flowers, is very attractive; Ranunculus trilobus, various Androsaces, Ramondias, Haberlea rhodopensis, Cassiope fastigiata, Campanula thyrsoidea, Arum albispathum, and various Saxifrages are among the plants we noticed in a hurried walk through. We strongly advise plant-lovers to pay an early visit.

THE QUEEN'S REIGN.—Mr. HENRY RUMSEY CANNELL, M.S.A., is to give a lecture, exhibiting tinder-box, flint, and steel, showing the old-fashioned mode of producing fire, explaining numerous alterations and events that have occurred; also the rise and progress of the people, and of the country. The proceeds are to be handed over to the Royal Gardeners' Orphan Fund, of which H.R.H. the Princess of WALES is a patroness, his Grace the Duke of BEDFORD President, and Mr. H. CANNELL one of the founders. Seventy children are at this moment receiving 5*s.* per week from the Association. Tickets, 6*d.*, 3*d.*, and 1*d.* each.

ORCHIS MORIO.—Mr. ENGLEHEART writes: "I send you a small gathering of Orchis morio, that you may see how very pretty it is in some of its varieties. The pure white is fairly common in our pastures, the decidedly pink less so. It is curious that out of a very large number of spikes which I gathered over a considerable stretch of ground on Sunday last, every one had the pollinia of all its flowers intact, even spikes somewhat on the wane. The pollinia which are wanting in the flowers now sent have been withdrawn by myself. Has the moth or other insect which commonly fertilises this Orchis failed to appear here this season? The

weather has been sunny by day, and sufficiently warm at night to keep insects on the wing. In withdrawing the pollinia of O. morio by a sharp pencil thrust into the flower, I observe that their subsequent depression is less than in the case of O. mascula, if Darwin's drawing is accurate (*Fertilisation of Orchids*, p. 15), i.e., that they remain at a greater angle to the horizon. This means, I suppose, that the stigma of O. morio is higher above the head of an insect entering the flower than it is in O. mascula."

THE SOUTH AFRICAN FLORA.—A gentleman in the Cape Colony writes to tell me he is able to furnish me with seeds of every South African species, and will send me twenty packages of seeds every week. I beg to invite all interested in the very important, enormous, and most beautiful flora of South Africa to communicate with me on the subject immediately after reading this. *M. Buysman, Middelburg, Holland.*

DICTIONNAIRE ICONOGRAPHIQUE DES ORCHIDÉES.—A new issue of these useful illustrations of Orchids, accompanied by the little *Chronique Orchidéenne*, has reached us, and found to be of equal importance to its predecessors. The genus Coelogyne is commenced by the usual scientific description and table of essential characters, and plates of C. cristata and C. cristata alba given. Most of the other species illustrated are of the ordinary showy kind, the only one specially interesting botanically being Lycaste Skinneri alba, a species not often seen in gardens. The others well illustrated are Odontoglossum Rossii majus and its variety rubescens; Cattleya Trianæi and its variety alba; Dendrobium Wardianum, and D. W. album; Cypripedium Godseffianum var. Jupiter; and C. Spicerianum and C. S. magnificum, neither of which by the way can the artist be accused of having "overdone."

SPRING-GARDENING AT BELVOIR CASTLE.

THE woods around this famous place were fast putting on their spring mantle of greenery, and the beautiful gardens, unique of their kind in Great Britain, were looking their best, when after a lapse of eleven years we again visited it.

The genial guiding-spirit of the place, and partcreator of the woodland-gardens, William Ingram is, alas! no more, and another gardener has taken up his onerous duties.

If to Ingram much of the initiative in regard to the improvements at Belvoir is justly due, we must concede to the present head-gardener, Mr. W. H. Divers, the carrying out of much needed improvements in the management of the gardens, the vineries, pits, and plant-houses, a greater regard to cleanliness and orderliness, matters of first-class importance in any garden, and especially so at Belvoir. Unfortunately the pressure of the times is felt by Duke and peasant alike, and the inevitable reduction in the garden-staff has taken place here; still, it is at the present unaccompanied by any visible effect in the up-keep of the garden.

The Vines, which had been starved at the root, and unskilfully treated at the top, have much improved, although their great age might have tempted many a gardener to clear them out, and plant new ones in new borders, so generally unsatisfactory being the attempts made to put new life and vigour into almost dry bones.

There is, fortunately or unfortunately, as may be, a reverence at Belvoir for the antique, which extends to many things besides gardens and gardening, and the present Duke of Rutland being in favour of the retention of the old gnarled Vines, they are making fairly strong wood, substantial leaves, and shapely bunches of medium size in all of the vineries. Mr. Divers, in improving the Vines, has relied upon frequent dressings of artificial manure, the securing of good drainage and applications of rich pasture loam and crushed bones. Very early Grapes are not wanted, so that the Vines are not distressed by hard forcing.

The area of 7 acres forming the vegetable garden was dug or trenched in every part, and numerous new crops were becoming visible, and old ones in process of being cleared off the land. This vegetable-garden, with its unusually high wall, rounded angles, and ornamental entrances, is, as all visitors to Belvoir know, a fine feature of the place. The walks, or rather roads, are of great width, the central one being not less than 20 feet, the side ones 12 feet. All are edged with Box, the formidable task of relaying which was recently completed.

Fruit trees of various kinds, dimensions, and ages, clothe the walls in faultless examples, of which, with the exception of young ones of recent planting, were loaded with bloom in the case of the Pears, and with fruits in that of the stone-fruits. It is a work requiring much labour to cover and uncover daily the great area of wall planted with such kinds as need protection in the spring, and a simple plan is adopted, namely, to fasten "Frigi Domo" or close netting to the top of the wall, then place smooth quarterings under the coping and extending some 4 feet from the base, and sufficiently close together to prevent the material touching the face of the wall. The curtain is lowered and raised in great lengths by a man or two working from a ladder at the opposite side, or standing on the wide coping of the wall, and secured when not in use at the top—no rollers, rings, cords, and pulleys being employed.

In consequence of the great number of spring-flowering plants employed in the various parterres round the castle, and the necessity of having two-year-old plants in the case of Polyanthuses, Alyssum maritimum, Arabis sempervirens, Heuchera sanguinea, &c., and of dividing and planting out many other species to grow into serviceable stock for putting in the beds in the autumn, a considerable area of the vegetable garden is occupied with these spring bedders. An acre or more immediately in front of the vineries in this garden is likewise planted with perennials and bulbs, and the collection is particularly rich in species and varieties. These plants are arranged in long oblong beds, with Box edgings, and narrow walks of gravel between. Immense lots of Narcissus and Violets are grown, the former for cutting and planting in the grass and the beds, and the latter for putting in the beds only. Those who have visited Belvoir may skip the next few sentences.

The site of the present structure on the top of an abrupt hill, once difficult of access on all sides, but now connected with the range of hills of which it formed an outlying spur by a wide and naturally-effected embankment, is about 470 feet above sea-level, and 250 feet above the level of the kitchen garden. From the terrace and windows of the castle beautiful and very extensive views, north and eastward—so far, indeed, as Lincoln and Newark, are obtained. From the earliest times it was selected as a place of strength, British, Roman, Saxon, and Norman having held it in turn as a fortified position, dominating a wide stretch of fertile country; and during the civil war, being held for the king, it withstood a siege of some duration, and only capitulated on being bombarded by a mortar brought for the purpose from Reading by the parliamentary troops.

On the north-east the ground is very steep, but it has been rendered easy of management as grass land by three wide and bare terraces; and on other sides also, excepting that those are furnished with narrow winding walks and ancient specimens of Oak, that do well here on the tenacious marly soil, common Yew, Portugal Laurel, and a wealth of exotic flowering shrubs.

Nothing that is ancient is to be found on the exterior of the castle, and inside there is but little, if we except a portion of the cellars. The present structure dates from the second decade of the present century, and was greatly injured by fire in 1816 when approaching completion, many valuable pictures, tapestry, books, &c., being destroyed, the loss of which was irremediable. This portion was soon rebuilt by the then possessor, but being constructed of a different kind of stone, it is easily distinguished from the other portion.

Close to the castle itself no gardening of any kind is attempted, if we exalt a narrow strip on a bastion enclosed with a low embattlemented wall on this side overlooking the woods and pleasances. This small garden was furnished at the time of our visit with a mixture of bulbs and spring-flowering subjects, the beds being bordered with ancient Box edging 1 foot high and broad, the middle of which had been cut out, thus forming, as it were, a double line. The reason for this being done by Ingram might be found in the death of the central portion from old age. The position is a warm one, and vegetation was very forward, Roses of various kinds being already in flower, and a couple of big specimens of Magnolia Soulangeana formed shoots of white and lilac-coloured flowers.

Amongst others on the higher wall of the bastion the following were remarked:—Several Figs, Rosa Banksiæ, which blooms abundantly, and is never cut by frost; R. simplicifolia, R. Gloire de Dijon, Catherine Mermet, Maréchal Niel, Rombre, and others; besides Chimonanthus fragrans, whose blooms fill the air with fragrance in late winter. Of Jasmines, J. nudiflorum, flowering for the second time this year; Lonicera Standishi, with flowers deliciously fragrant for a great part of the year, never producing many blooms, however, open at any one time; the highly ornamental Californian May-bush, Photinia arbutifolia, the young leaves and shoots of which are of a rich reddish-brown at this season, and the flowers white, coming in panicles; Crataegus pyracantha; Ivies in much variety; Clematis; Ceanothus in variety, including the hardy C. azureus; Pyrus coccinea, and others; Mühlenbeckia complexa, a graceful, dwarf-creeping plant with orbicular leaves, and black shining stems; and Azara microphylla, an excellent plant for clothing a wall with bright shining green foliage.

On the slope at the foot of the outer wall of this outwork of the castle there grow, in the shelter of big Yew trees, a rounded specimen of Choisya ternata in fine bloom, three of the Spanish Whin about 4 feet wide and 2½ feet high, and a small plant of the Wig-bush Rhus Cotinus.

By following the walk at the foot of this slope the towering side of the castle comes into view, and turning to the left at the end of the walk, we are all at once brought up by the castle garden. This small parterre, the first reached by anyone coming from the castle at this point, consists of a number of irregular-shaped beds, and some of regular geometric outline, a few of which are planted similarly in pairs. We give the contents of some of those beds as they now and will continue to appear for about a fortnight longer. The beds, although differing in the kinds and varieties of the plants used to fill them, rely chiefly for effect on various Aubrietias, Alyssum saxatile, Saxifraga muscoides var. atropurpurea, Tulips, Pansies, and Primula polyanthus. A big oval bed was planted with the rich-coloured Aubrietia Leichtlini as an edging one foot wide, the next line being Veitch's strain of Primula polyanthus, followed by a row of Tulip Keizer's Kroon, intermixed with Megasea cordifolia purpurea, and the central area with some dark red-brown kind of Wallflower. As an example of another kind of planting, a narrow oval with high sides (2 feet) had an edging of crimson-flowered Daisy, next came the white variety of Myosotis dissitiflora—a capital subject where a low white flowered plant is a desideratum; then a row of the dark purple coloured self-Pansy Admiration, then double red and yellow Tulips, and behind these came Saxifraga crassifolia—behind all was a permanent bordering of Enonymus radicans variegata, the central space being filled with what should have been the true Belvoir yellow Wallflower. A circular bed at one of the corners of this parterre contained Myosotis alpestris Victoria (which is a variety that flowers later than M. dissitiflora) intermixed with some yellow-flowered Tulips bounded by a line of Primula polyanthus and yellow Pansies, an edging 1 foot wide of Aubrietia graeca giving the desired finish to the whole.

The beds we most admired were two of a star shape, planted with Phlox amœna, dotted over with white Tulips, bounded by a broad row of Gilbert's Harbinger Polyanthus, creamy white, with a yellow eye, and very early to flower; then came Pansy Admiration, followed by an Aubrietia, and lastly a row of a red Daisy.

As a variation of this design were two stars, in which the pretty, fragrant, pale lilac-coloured Phlox divaricata, the Phlox canadensis of some, with Vermilion Brilliant Tulips intermixed, occupied the central area, follow by Primula polyanthus in a mixture of colours; then came Skylark Pansy, a free-flowering variety, white with a blue edge, and lastly Aubrietia Leichtlini.

A much-raised bed, with the sides faced with Ivy, was planted with Skylark and Cliveden Purple Pansies. These raised beds are the least pleasing, presenting, as they do, a stumpish appearance, with but little elegance, their height being out of proportion to the width. The parterre was bounded on the upper side by a crescent-shaped bed of large size, which was planted so as to afford flowers from the earliest part of the year; and we noted Eranthis hyemalis, the leaves now dying down; Empress Daffodil, Megasea ligulata, the earliest species to blossom; Myosotis, Arabis, and Doronicum plantagineum excelsum in bloom at the present time. In the summer time Humea elegans and ordinary bedding plants continue the show. The late-flowering Ardwell Gem Pansy, together with single-flowered Tulips, made a nice display.

One of Leichtlin's Aubrietias named Ingrami is a fine acquisition, the colour a bright rosy-purple, and the flowers of nearly the size of a shilling. This fine variety, mixed with Royal Standard Tulips, had a rich effect. Vermilion Brilliant Tulip, set out on a groundwork of the Harbinger Polyanthus, was permissible, but rather bizarre. Phlox divaricata and Tulip Couleur Cardinal will not do, the latter seeming to take nearly all the colour out of the former. A nice example of Magnolia umbrella, a somewhat straggling, hardy, deciduous half tree, with white flowers, was a prominent object in the castle garden, and a hedge of Kerria japonica, an old-fashioned plant seldom given the position it

deserves in a garden, shut off the garden from an adjacent walk.

The Statuary Garden is situated on a lower level than the one from which we have just departed, and derives its name from some statuary representing the seasons, dating from the days of Queen Anne. To the right on looking down on this miniature garden is a fine specimen 70 feet high of Abies pectinata (Silver Fir). This parterre, lying deep down amongst tall trees, consists of a series of steps, the upper one formed of small oval beds filled with purple Pansies, red Tulips, Aubrietias, with Daisies forming the lines of division. The middle step consists of beds of white and blue flowered Myosotis mixed with yellow Wallflowers; and the beds on the lowest step are planted wholly with Wallflowers. The prevailing tint is blue, and the effect in early morning or late evening very charming.

The Duchess' Garden, the one most remote from the castle, being about ten minutes' walk from the last, is situated in a curve of the hillside, and about half way down the declivity, with a rich foreground of woodland at a distance of 100 yards, and a precipitous bank at the rear, the middle distance being furnished with a rather intricate mass of flowering shrubs, slender Conifers, Birches, &c. It is very charming, unique of its kind, and almost inimitable, failing similar surroundings.

A walk skirts the uppermost series of beds, another running lengthwise at a lower level. A plan of this garden appears in the *Gardeners' Chronicle* for April 10, 1880, p. 457, and we do not remark any alteration having been made in it since that time, the mode of planting the beds presenting very similar features. The newness of the surroundings, due to extensive felling, have wholly disappeared, and the exotic and native shrubs and trees have thriven amazingly in the moist, sheltered hollow. As in the other gardens, the prevailing tints are blue and purple, obtained by using extensively Phlox divaricata, Aubrietias, and Pansies. Wallflowers are used to impart lightness. A square bed, cut into four triangles by a cross, having a circle in the middle, that is, the form of an Irish Cross, excepting that the arms are of equal length, was pretty. The filling of the triangles consisted of Phlox divaricata, Aubrietia, and red and white Daisies, with margins of golden Pyrethrum and Arabis.

The largest bed on this bank is planted in wavy lines of considerable breadth with blue and white Myosotis, Alyssum saxatile, white Pansies, yellow Polyanthus, Phlox amœna and divaricata, and Skylark Pansy.

The lowermost series of beds are planted in similar wavy lines with Myosotis alpestris Victoria, a neat habited, small-flowered variety, and a white form of it, a great smallart t with the style of planting followed in the castle garden being remarked.

A pretty feature noticed in the Duchess' Garden was a horseshoe-shaped bed filled with yellow Wallflowers, and edged all round with Myosotis alpestris. Amongst plants that have become naturalised in this part of the grounds requiring merely to be kept free of that enemy to wild gardening, the everywhere present Goutweed, are Anemone nemorosa flore-pleno, and A. Robinsoniana, the first with white, and the second with light blue-coloured double flowers. Heuchera sanguinea continues to be used for its pretty dark bronzy-green leaves and light scarlet flowers, but not so largely as formerly. Several square perches of Tussilago fragrans now in full leaf must have pervaded the air hereabouts with the perfume of its blossoms early in the year.

Shrubs in flower at this point worthy of notice were Azara microphylla, just going over, the fragrance of the tiny blossoms being scarcely perceptible; Azalea alterclarensis, the orange-coloured flowers just opening; Spiræa Thunbergi, a very fine seedling Rhododendron with hundreds of corymbs of rosy-crimson blossoms; R. Falconeri, a big plant, was covered with heads of white blossoms, and a nightingale hidden away among its branches was pouring forth floods of song.

Some large plants of Camellias were literally smothered with fresh as well as fading double, red blooms. The beautiful scarlet flowered Rhododendron Thomsoni, which had been loaded with blooms, was just going over. A large number of plants of Saxifraga peltata were showing for flower. Halesia tetrapters, seldom observed of large size, forms here a bush of considerable dimensions, as does Acer polymorphum; and Arundinaria falcata and Bambusa Metake grow vigorously, and large examples of both exist hereabouts.

The rock garden, made on the hill-side at some little distance from this garden, and within view from it, is thickly planted with spring-flowering plants, Ferns, bulbs, &c. Vesicaria utriculata, very early in bloom and very free, and 2 feet in height; and Veronica rupestris, excellent for clothing rocks, were remarked, the latter not yet in flower.

Presently, all this scene of floral beauty must be cleared away, and its place occupied by the gaudier, and certainly less pleasing, flowering plants of summer. We had looked on the scene late in the day, when the sun was setting, and lengthening shadows fell across the glen; in the early morning, when the sun's rays glinted on flower and leaf, wet with dew, and at mid-day; but of all hours, give us those of early morning for viewing the spring flower-gardens of Belvoir Castle.

HOME CORRESPONDENCE.

THE RENAISSANCE OF THE HOLLYHOCK.—I am surprised that "D. T. F." should agree with me on so many points, and then put himself to so much trouble to differ with me on one on which he seems a little rusty: namely, the raising of Hollyhocks from seed in Scotland. "D. T. F.'s" advice as to the treatment of seedling Hollyhocks may do well enough in the south of England. But when he comes to some of the colder quarters of Scotland, where there are only from six to eight weeks clear of frost out of the fifty-two, and the thermometer goes down from 8° to 10° below 32°, Fahrenheit, almost every spring, he would find that seed sown in the open air in March or April would only produce small plants, and so weakly that they could hardly be expected to stand a severe winter. I have tried both ways, and have come to the conclusion that the best time to sow seed is March, and in heat, and work on as formerly advised. I have hitherto practised with success what I preach. "D. T. F." seems to put great faith in Mr. Forbes' collection, and his methods of propagation. It would be interesting to know whether the cuttings are struck in heat, or out in the open air, and whether the budding and grafting are done out in the open air or not. From what I know of the climate about Hawick, I hardly think they are. Another thing in favour of seedlings is, that those who cannot afford to pay such large prices as are usually asked can, for a nominal sum, work themselves into a good strain of healthy plants. "D. T. F." seems to take objection to the Spruce Fir branches as protection during winter. I should hardly think it necessary to remind him that prevention is better than cure. *D. L. M.*

FRUIT PROSPECTS.—All kind of fruit-trees, with the exception of Damsons, and one or two varieties of Plums, have been, or are still covered with blossom, and up to so late as May 10, the prospects of a good fruit season were very promising. Although one or two sharp frosts were experienced during April, very little damage appeared to have been done, with the exception of a few of the earlier bunches of Red and White Currants, on the most exposed branches of those bushes growing in the outside rows of the fruit-quarters, and these bunches were denuded of half their blossoms. During the last few days the weather has been such as to make the earlier rosy prospects extremely doubtful. On the morning of the 11th we registered 5° of frost; the afternoon previous we had a few falls of hail and rain, but with a good wind, the foliage and bloom were dry, or nearly so, before the frost commenced, therefore little or no damage was done; but during the evening of the 11th, it commenced to rain about 7, and continued until nearly 11. Almost immediately afterwards, it began freezing, as by midnight the whole of the surface of the woodwork on garden-lights, &c., was coated with ice. Next morning we had registered 7° at 3 feet 6 inches from the ground. Of course it is early yet to speak with certainty as to the actual amount of damage the frost has done, but the Pears which were just setting appear to have suffered most, the ground underneath the trees being covered with the embryo fruits. The early blooms of the Strawberry have had their pistils blackened where unprotected. Wall trees, which have had their coverings removed, are well clothed with foliage, which has protected the young fruit to a great extent, and which appear to have escaped so far any serious damage. The larger trees growing in the orchard, and more especially Apples, were, previous to the 11th, literally covered with their bright showy blossoms, but these are now of a dull sickly colour. The smaller trees growing as pyramids or espaliers do not seem to have suffered so much, as their blossoms still retain their healthy appearance. One can only hope that from the abundance of the fruit-blossoms on most trees, sufficient may have escaped to produce a fair crop. *G. Woodgate, Rolleston Hall Gardens, Burton-on-Trent.*

FRUIT TREE GRAFTS FAILING TO GROW.—This season we find that the grafts on the Plum are doing very badly in this district [Northampton], owing, probably, to the harsh, drying winds that have prevailed. I have never seen the like before. Hundreds of grafts are quite shrivelled up. With showery weather some of these may come round, but it looks as if we should have almost a failure of grafts of all kinds. Will some of the readers of this note inform me if such a state of things is common this year? *H. K.*

COCKROACHES.—In consequence of a paragraph that appeared in Answers to Correspondents, I have received a large number of letters from your readers. My efforts at clearing cockroaches were confined to the Sheffield Workhouse, where the pest swarmed, and I was quite successful in clearing it. I did not contemplate making my remedy public, but owing to the many requests made to me I have arranged to put it on sale, and it can now be obtained from Mr. Hewitt, chemist, 66, Division Street, Sheffield; Messrs. Dunnill & Pater, chemists, Broomhill, Sheffield; and the Apothecaries Company, Virginia Street, Glasgow. All the tins bear my signature across the label, and I guarantee the efficacy of the paste in clearing cockroaches. Particulars are given in your advertising columns, and I shall be greatly obliged if you will kindly insert this letter, as I believe it will benefit your readers, and greatly relieve my correspondence. *E. Howarth, F.L.S., Sheffield.*

PHORMIUM TENAX AND VARIETIES.—Mr. Pettigrew's experience with seedling variegated New Zealand Flax is the same as mine, that is, that when any variegated variety forms seed, it is rarely if ever that a variegated or white seedling can be got to live, which is because there is little healthy sap or chlorophyll in the leaves. Plants raised from seeds of the variegated varieties will often come with leaves quite green, that is, like the true P. tenax, from which all have doubtless been derived. Phormium tenax var. atropurpurea will sometimes come true from seed, and many, although taken from the same seed-pod, will be the true P. tenax. I have planted clumps of P. tenax variegata, Colensoi, and Veitchi, but in course of time most of them reverted to the original species. P. t. atropurpurea is, I think, the handsomest variety. *W. O., Fota, Cork.*

CYTISUS PRÆCOX.—In your issue of May 8, you have a note on Cytisus præcox ×, in which the writer expresses his ignorance of its origin. It may interest him and other readers to know that it was found among a bed of seedlings of C. purgans, some thirty years since, by my grandfather, the late George Wheeler, of the Warminster nurseries, and I have in my possession a photograph of the original shrub. I cordially agree with "W. J. B." that this distinct early and free-flowering variety deserves much more attention than it gets, as for the edges of shrubberies and large mixed borders there is no prettier object than a good specimen simply covered with bloom as it is in mid-April. *H. J. Wheeler, The Nurseries, Warminster.*

EELWORM IN PASTURES.—I was surprised to see on p. 323 of last week's *Gardeners' Chronicle*, Mr. J. J. Willis writing to the effect that small doses of certain artificial manures applied to pastures formed a remedy against eelworm. Although Mr. Willis is a specialist on artificial manures, he has evidently had, if any, very little practical experience in destroying eelworm pests. No doubt this a bold assertion, but nevertheless it is true, as may be seen by following closely what he has said on the above subject, p. 323. Mr. Willis first of all informs us that, "if the eelworm is in the pasture, the infested soil should not be used." I should like to ask your correspondent to what species of eelworm his indefinite remarks apply, and also why the turf should not be used? There are very many different kinds of eelworm found in England; some of them, however, do not attack or destroy any plants under the gardeners' care. If soil contained only harmless species of eelworm, why should it not be used for growing plants? A few of the harmful species are as follows: Tylenchus devastatrix (stem eelworm), which attacks Clover, Oats, Potatos, Onions, &c.; T. obtusus (stem and root eelworm), which attacks Vegetable Marrows, Carnations, Melons, Dracænas, &c.; T. triticea, found in the seeds of the Wheat-plant; and Heterodera radicicola (root-eelworm), which attacks Lettuce, Beans, Cucumbers, Tomatos, &c. The last-named is the worst of all the eelworm pests, and if the turf were infested with this species, it ought not to be used for potting any kind of soft-wooded plants in unless the soil be previously disinfected. The other species named above are present in most turf-soil; indeed, we have never yet examined a soil which did not contain some eelworm. I have seen it stated in many text-books on agriculture that kainit, basic-slag, and other chemical manures would, if applied, eradicate eelworm from soils; but from many practical experiments carried out with the greatest care, it has been found that ten times the amount advised by Mr. Willis and the text-books writers will not do so! Mr. Willis further tells us to take some of the infested turf, mix with it kainit and basic-slag, and watch the result. This is all very well from a scientist's point of view, but what practical gardeners want to know is how much kainit and basic slag to use per load of soil; and also

whether they (the manures) will kill the eelworm if used. When gardeners are compelled to, they can carry out the "watching for result" process without being told to do so; but Mr. Willis' advice would have been more valuable if he had first of all carried out the experiments and then given us the results. There is still another sentence on p. 323 to which I should like to make a few remarks, Mr. Willis says that, "a little sulphate of iron for watering will assist the plants in overcoming the eelworm attack." It might do so, but what quantity are we to use? Perhaps it may interest Mr. Willis to know that in one experiment 82 ozs. of sulphate of iron in 12 cwts. of infested soil, and in another 1 lb. of sulphate of iron in 160 lb. of infested soil, did not affect plants or kill eelworm. Fearing I may be encroaching on your valuable space, I will leave the remedies we have found successful until a future issue; but before closing I may say that water at 130° Fahr. will kill eelworm, and if turf infested with this pest be treated with scalding water it will prove a cheap and effectual remedy in destroying eelworm. *A Novice.*

DARWIN TULIPS.—There seems to be prevalent a notion that the section of late-flowering single Tulips having the above appellation is of the late Charles Darwin's raising. That is not so. The raiser was Mr. Krelage, the well-known bulb grower, who, having evolved this beautiful section from out of others by intercrossing and hard selection, feeling that the section presented an admirable illustration of the progress of evolution, named them Darwin Tulips, in honour of the great apostle of evolution. The flowers of these Tulips have nothing in them that is quaint or singular, such as may be seen in the Parrot section; rather they are remarkable for fine rotund form, and singularly beautiful colours in exceeding variety. Having already Van Thols, Dutch, English, Parrots, late, and numerous species, there can be no room for objection to the addition of yet a further section under the appellation of Darwin, and a section, too, that when well known promises to become most popular. *D.*

PREMATURELY-DUG BULBS.—In the few remarks you kindly published in the *Gardeners' Chronicle* of May 8, I endeavoured to explain how Mr. Jordan succeeded in conserving prematurely-dug bulbs in a manner at once simple, and devoid of much labour, and perfect as regards the means of retaining the names of the same. Though it is matter of notoriety how well gardening is carried out at Regent's Park, I wrote in particular of the general excellence of the spring-flowering bulbs, and drew the inference that Mr. Jordan's new plan of treating his bulbs was a successful one. To whatever purpose the bulbs thus conserved are put, I am not able to state; suffice, that all that are there grown are worthy of admiration. Last week Mr. Jenkins asked whether I intended to tell the readers of the note, in all sincerity, that the best beds were obtained by the method of defoliation I had described. My former communication entirely negatives such a supposition. Is it necessary for me again to inform your correspondent that I was dealing with bulbs prematurely dug up? Can your correspondent show, by any possible amount of word-twisting, how any bulbs so dug up can be used for filling the beds the next year in anywise to resemble those specially prepared for what he calls the "best beds?" As the subject will not bear discussion, the oft-quoted "grain of salt" is not in requisition. Happily, I only endeavoured to describe the method practised by Mr. Jordan. Had I thought out and practised the method myself, I should have been the more prominently subjected to the charge of plagiarism which is made against everything new, or which traverses old methods and practices. As the subject of "barbarous defoliation" has been mooted, I think it should not be allowed to rest without a few more remarks, albeit only scientists and those versed in plant physiology are capable of dealing with it in all its bearings. I may, however, ask at what stage of growth or age of leaf does defoliation become "barbarous?" In other words, when do leaves cease to perform their necessary functions? I refer now to deciduous plants. An Apple-tree, for instance, forms its flower-buds prominently whilst the summer's leaves are perfect, and before any signs of fading or disease are observable; the Peach-tree has its leaves brushed off with a besom whilst they are perfectly green and apparently full of vigour as they ever were; Potatos may be dug when full grown, even if the skin should peel off them with slight rubbing, and they will keep as well and prove as floury as those left in the ground until winter, notwithstanding the fact that the haulm is perfectly green. Again, Onion-bulbs do not seem to enlarge in circumference after their tubular leaves cease to grow; Dahlias and Jerusalem Artichokes are all but suddenly cut down by frost when growing vigorously, yet they produce, nevertheless perfect tubers, and have continued to do so through a long course of years, still maintaining vigorous health and a capacity for propagation for an indefinite time. And bulbous plants, when do they cease to receive assistance from the leaves? Tropical bulbous plants have to make their growth during a short rainy season, for once that is past, the tropical sun soon licks up all surface moisture wherein their shallow roots rest, then comes a sudden and intense aridity of the air and soil—yet these bulbous plants survive. When do Hyacinths and Narcissi leaves cease their offices, obedient to the demands of the plants? Is it when growth, and with growth useful activity ceases, or do the leaves in decay feed the bulbs? When Mr. Jenkins can answer these questions, he will be in a better position to talk of barbarous defoliation. *William Earley.*

CATALPA BIGNONIOIDES.—Seeing in the *Gardeners' Chronicle* a record of an old Catalpa syringaflora, and judging from the photograph, I think my tree is far older than the one spoken of, and far bigger in the timber. I give the dimensions below, but am afraid to say the age after the assertion that the tree represented, if not the first, was one of the first imported to this country:—Girth 3 feet 10 in. from ground, where it divides into three branches, 13 feet 10½ inches; girth 7 feet from ground, first branch, 6½ feet; second branch, 6 feet; third branch, 4 feet 4 inches. Spread, east to west, 55 feet; north to south, 47 feet 6 inches. Height, about 37 feet. *H. T. Pitt.*

SOCIETIES.

ROYAL HORTICULTURAL.

Scientific Committee.

May 11.—*Present:* Dr. M. T. Masters (in the chair); Mr. Douglas, Mr. McLachlan, Rev. W. Wilks, Dr. Müller, Dr. Bonavia, Mr. A. Sutton, and Rev. G. Henslow, Hon. Sec.

Weevils on Fruit Trees.—Mr. Robt. Smith, of Shrewsbury, forwarded some living specimens received by him from Mr. J. Jones, Chelmick Pools, Church Stretton. They were described as attacking Plum and Apple grafts, Roses and Raspberry buds. They proved to be Otiorrhynchus picipes. The trees and bushes might be sprayed, though a better plan is to shake the boughs over a large sheet of paper, in which they can be caught and then destroyed.

Birch Branch with Phytoptus.—Dr. Masters showed specimens illustrating the early stage of the attack on boughs by this insect. It is not often the commencement of the so-called "Witches' Brooms" can be detected as in this instance.

Abies bractenta.—He also exhibited sprays of this handsome tree from Tortworth, remarkable for the silvery under-surface of the leaves, which are about 3 inches in length. It is a native of S. California.

Abies Menziesii.—He also showed a branch of this splendid timber tree from Vancouver laden with Catkins, from Tortworth (Earl of Ducie).

Petalless Apples.—Flowering-shoots of the Ecklinville (Seedling) Apples were received, remarkable for having no petals. They were sent from the Glewstone Gardens, Ross. There were 600 bushes of twelve years' growth, all being similarly affected. No particular cause could be suggested.

Double Narcissus.—Dr. Masters showed a single and double flower of a N. incomparabilis, of a somewhat novel character. The perianth consisted of twelve pieces regularly arranged in "threes." The short cup-shaped corona, as well as the stamens, were totally absent; but the styles above the tube were free and petaloid, suggesting the normal condition in an Iris.

Sclerotia (?)—Mr. M. Taylor, of The Gardens, Penbidw Hall, Nannerch, sent some remarkable specimens of a fungus, consisting of large branching lumps, which appeared in a Mushroom-bed. They were forwarded to Kew for investigation.

Improved Method of Grafting.—Mr. Robert Smith, of Bradwell Villas, Bishop Street, Shrewsbury, sent a number of specimens of grafts, illustrating a new method. This being, that in preparing the scion, while one "tongue" is inserted as usual, the opposite half of the scion is carried over the flat top or "crown," and inserted on the opposite side, or two grafts may be thus inserted on opposite sides of the stem, the result being, as shown in the specimens sent, that the summit is completely covered in with new growth. This was seen in small specimens of whip-grafting, but none were sent to show how far large crowns would become covered over. Another advantage arose from the new method of preventing loss of grafts by wind breakage, for it thus gave a better and stronger union. It was thought by Mr. Douglas that it was a decided improvement upon the old method, as long as the scion and stock were of the same size; but further information was desirable as to the success when the surface of the stock much exceeded that of the scion. See *Gardeners' Chronicle*, 1874, vol. ii., p. 359.

Double White Auricula.—Mr. R. Dean sent a plant which was the result of fifteen years' selection from a single white variety; the petals were not of a pure white, but slightly yellowish-green tint.

THE TULIP CONFERENCE AT REGENT'S PARK.

At the Conference held on the 12th inst., in connection with the exhibition of Tulips, which was reported in these columns last week, there were read the following three papers:—1, "The History of the Tulip," by Mr. J. W. Bentley; 2, "The Hybridisation of Tulips, and Raising of Seedlings," by the Rev. F. D. Horner; and, 3, "The Cultivation of the Tulip," by Mr. C. W. Needham. The meeting was held in the Museum, and the attendance was less than two score. The chair was taken by Mr. Jno. Wright, who, in opening the proceedings, addressed to the audience a few words of encouragement in their efforts to popularise in the Southern Counties the culture and love of Tulips as they are regarded by the florists. He spoke of certain indications of a re-assuring kind that he had observed, and incidentally mentioned that the late Dr. Hogg, who had acquired a considerable collection of Tulips, had once given the sum of £90 for a single bulb.

THE HISTORY OF THE TULIP.

Mr. J. W. Bentley, Hon. Sec. of the National Tulip Society, and an authority upon the history of the florists' Tulips, gave a brief discourse upon their history since, in 1559, they were cultivated in Augsburg, according to Gesner, whose memory has been perpetuated by the Tulipa Gesneriana. The regard held by the Turks for the Tulip no doubt existed for years before the love or knowledge of them travelled westward. In 1577 Tulips had reached England, and little time elapsed before the English florists had raised many seedlings of diverse characteristics. Thus, Jno. Parkinson was familiar with 174 varieties; and in 1665, in Jno. Ray's catalogue there were 184, whilst in a subsequent edition there were 300 recorded. The Tulip mania, with which everyone is more or less familiar, was passed by the lecturer in a few words, it was merely a form of gambling. Early in the eighteenth century, viz., 1710, *The Tattler* levelled ridicule at the Tulip raisers, on account of the excessively long names given by them to the varieties, and the same paper quoted a declaration by a florist to the effect that his bed of Tulips was of more value than 100 acres of the best land in the country. Many of the Dutch Tulips were thought by Mr. Bentley to have been French seedlings, but the French were so frequently embroiled in warlike proceedings, that the cultivation of them was more common in Holland.

At the commencement of the present century, Tulips were cultivated in considerable quantity, and the bulk of them were Dutch varieties; but immediately after this time the British raisers bestirred themselves, and in 1820 the position of British Tulips was assured. Until years later, the southerners had the business in their own hands, but after 1840 the midlands caught up the declining interest in the south. Since then the cultivation of Tulips has much lessened, and what interest has survived has gone north. There was little seed saving and Tulip raising carried out at the present time, but the work is still practised by the Rev. F. D. Horner, and by Mr. Jas. Thurston, Cannock, Staffordshire. One of the objects of the conference was to stimulate an interest in the cultivation of Tulips in the south, and he hoped it would be successful. The English florists' Tulips were later in flowering, larger, and of better form than Dutch sorts. The flower-stem should be sufficiently strong to support the flower erect. The six segments should be broad, rounded, equal in size and shape, that when expanded would form half of a hollow cup. The florists' regulations as to colour were next given. The base should be pure white or yellow, stamens pure as base, and anthers bold and black (see report of the show in last issue, p. 327).

The characteristics of bizarres, roses, and bybloemens were then briefly discussed. The bizarres have a yellow ground, with brown or blackish markings, and are very vigorous. Roses and bybloemens have a yellow ground, but in the former case the markings are of rose, red, or crimson, and in the latter of purple, black, or violet. The seedling form of the flower before it "breaks" or is "rectified" is known as "breeder." After it has broken into feather or flame it is rectified, and is a flamed or feathered rose, bizarre, or bybloemen, as the case may be. The differences between the branched flame and the marginal feather colour on the segment is well known. Mr. Bentley was unable to suggest any explanation of the reason for Tulips becoming "rectified," except that it was evidently a step in their maturation or history. Rectified varieties could be propagated truly by offsets. A good strain was necessary, even in the case of good varieties, for these differed much. The best flowers as breeders were often useless after rectification, and a variety of poor colour when a breeder often makes a desirable rectified variety. Seldom was a variety good in all three classes, but this was the case in Sir J. Paxton, either as feathered, flamed, or breeder. Dr. Hardy and Modesty were good in two, and Glory of Stakehill in one only, viz., breeder. Even the rectified Tulips were very inconstant, one year flamed, another feathered. So that the grower had experience of various kinds; indeed, it was this succession of anticipation, disappointment, and unexpected delight that made the study and culture of Tulips a never-failing source of interest and pleasure.

THE CULTIVATION OF THE TULIP.

Mr. C. W. Needham, Hon. Treasurer of the National Tulip Society, commenced his practical paper by remarking that in almost all descriptions of soil and locality the Tulip would exist and produce a floral display, but in order to obtain perfect flowers, the plants needed careful cultivation and a persistent attention to small details. The position of the beds should be sheltered a little from the east and north. The beds should be 4 feet wide, well drained, and raised 6 or 8 inches above the level of the ground. If not well drained naturally, it would be well to take away the soil to a depth of 2 feet and put in a layer of rough rubble, and a drain-pipe that should be connected with one that will conduct the surplus water some distance away. Ordinary well-manured soil from the kitchen garden was an excellent medium for the bulbs to grow in, and it should be porous rather than stiff. Old turf that has been stacked a twelvemonth was also specially suitable when available. The bulbs should be put in rows across the bed about 6 inches distant each way; or if the object was to provide a floral display only, they might be planted at distances of 4½ inches. If the varieties were similar, two bulbs might be placed in a hole. When the bed is finished, the bulbs should be covered to a depth of 4 inches. If it be necessary to add manure, it is best applied as a top-dressing, using thoroughly well-decomposed manure for the purpose. It is an advantage to change the soil each season where this is practicable, and mould that had been richly manured for a preceding crop is best, as it would require no additional manure at time of planting. If a little stimulant is required, moderate applications of nitrates, superphosphate of lime or kainit are best. In order to obtain pure, perfect blooms for exhibition, some growers found it to be an advantage to grow the bulbs alternately strong and weak. Every other year they would be cultivated in what is termed a "fat bed." Gross feeding was certain to tend to coarseness in growth and in flower. The old growers used to talk of "starving their flowers into purity."

The correct time to lift the bulbs was when the stem was drooping, and would bend double without breaking. Great care was necessary to ensure that the bulbs were dried in a dry cool place. On no account should the skin be allowed to be burned by the sun. Enthusiasts would require box with divisions at some distance apart, in the order the bulbs were planted in the bed, so that when the boxes were full the bulbs would be placed exactly as before lifted. In any case, it would be necessary to take care they were stored in a suitable position, and in such a manner that their nomenclature was not disarranged, and their identity thereby lost. The Tulip-grower required a book, in which he would enter the characteristics each variety displayed, with such observations upon them as circumstances suggested. At the end of the season, the collection would be weeded out according to the register in the book.

The chief source of injuries to Tulips whilst growing was hailstorms, and bright sun succeeding frost. If the flowers were desired without blemish, it would be necessary to protect them by blinds of stiff tiffany or netting, which should be drawn across the beds immediately above the plants. It was a critical time for the Tulip when the bud was just above the ground—it was often ruptured by frost at that period. Exhibitors frequently protected their Tulips by movable frames, that could be placed over them at critical periods, and removed for different purposes at other times.

HYBRIDISATION AND RAISING OF SEEDLINGS.

A very interesting paper by the Rev. F. D. Horner upon this subject was read by Mr. Bentley. The reverend gentleman commenced by insisting upon the condition necessary in the hybridisation of any plant with a view to obtaining improved progeny, viz., that of parentage. In the selection of parents, much thought and care were essential. The hybridist need not be careful to select "rectified" varieties only, as breeders were just as good, and, indeed breeders generally carried more seed than a rectified variety.

Then Mr. Horner enumerated the characteristics desirable in a good Tulip. Form and colouring were each necessary of consideration, and neither need be given the precedence over the other, but there was further room for improvement in form, such as in perfecting the roundness of the cup, increasing the shoulder, and the breadth of the segments, also in clearing the ground colour, and in improving the markings.

In order to accentuate the class distinctions in the florists' flowers, it was essential to use only pure blood, i.e., to cross bizarres with bizarres, roses with roses, &c., otherwise flowers with indefinite and undesirable markings would result. Before any flower is fertilised, it was necessary to see that the stigmatic surface was in a perfect condition, and it should be guarded by a shield of cotton-wool, as well from the pollen of the same flower as from that of others that might be conveyed by bees, &c. This shield would have to be removed when cross-fertilisation was to be effected, and this over, the stigma might be again guarded with a new shield of the same material. The petals would not wither immediately after fertilisation had occurred, as was the case in many flowers; but when they have dropped, it was advisable to cut off that part of the pistil above the seed pod, to prevent water from lodging, and thus causing decay. The seed-pod would swell rapidly during June and July, and ripen in August. At the time the bulbs are usually lifted, the new bulb attached to a plant that has been cross-fertilised may be detached and lifted, and reated as ordinary ones. It has borne no part in the development of flower or seed. The seeds are best sown as soon as ripe, or early in September, in boxes or pans, under glass, if preferred, or in the open air, covering them about a quarter of an inch deep. If the seed is not sown until February, the seedlings will be up in May. They first appear similarly to an Onion, with one leaf only, and though increasing each year in size, as the bulb increases also, one leaf only will be produced until the bulb has reached its age to flower, which will vary from four to seven or eight years, according to whether the bulb produces a "dropper bulb" or not after the fourth year (see fig. 117). If it produced a "dropper bulb" the flowering stage is considerably delayed. Seedlings should be selected as soon as possible, though it was not always advisable to pass final judgment upon a variety for the first few years. All seedlings exhibiting poor form in the flowers should be destroyed before they have become "rectified." Had this been strictly done in earlier years, there would now be fewer flamed and feathered varieties with attenuated petals, possessing little to recommend them, except satisfactory markings. Generally, the bizarres showed the greatest development at present in form and markings.

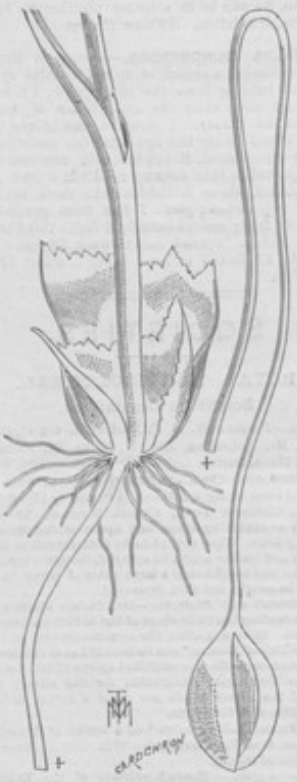

Fig. 117.—Tulip with "dropped" bulb.

The New Bulb is placed at the bottom of a tube or sheath prolonged downwards.

(See Report of "Tulip Conference.")

THE DISCUSSION.

A considerable discussion was engaged in by several of the gentlemen present, the greater part of which had reference to a disease by which the plants are sometimes attacked. Mr. Wright was surprised that more had not been said by Mr. Needham respecting the disease, and after referring to many instances in the south where it had done much mischief, invited the latter gentleman to inform the conference whether it was prevalent in the north, and if so, if the cultivators there had found means to prevent it becoming an epidemic. Mr. Needham replied that he was unaware that the disease had been so common among northern collections as it was in the south. From the appearances of diseased plants in various parts of Tulip-growing counties, they were convinced that plants were not attacked by the fungus before the epidermis had been broken by hail or frost, or some other cause. They admitted, however, that when the fungus had obtained a footing upon such a plant, the spores from the same were afterwards sufficiently strong to successfully attack a healthy and undamaged plant. Mr. Bentley replied to much the same effect. Mr. W. Barr also attributed the fungus to be an after-result of damage to or weakness of the plant. A gentleman remarked that his Tulips were attacked by a fungus in spring that worked much injury upon them, and that later in the season his Snapdragons (Antirrhinums) were attacked by a disease caused apparently by the same fungus(?)

Mr. Krelage, Haarlem, remarked that in Holland the fungus disease had been observed, and that it was shortly to form the subject of a scientific enquiry, but in the meantime cultivators were of opinion that it was the result of a soil possessing an insufficient quantity of calcium or lime.

Mr. R. Dean said that in Bedfont, Middlesex, he had been unable to grow certain plants owing to fungus attacks, and it appeared that in that ground there was something that tended to produce a disease in Sweet Williams, for they would not succeed there.

Mr. Chater thought that the trouble was resultant from damage only.

The Chairman said that it appeared to be the same in the case of this Tulip disease as they had found it in many others. The best thing to do was to make the culture as perfect as possible, to keep the plants in such perfect health that the spores of a deleterious fungus could not affect them.

Mr. Barr subsequently differed from Mr. Needham in the necessary distances that the bulbs should be placed in the beds; 3 or 4 inches apart was quite sufficient, and the leaves then served to protect the plants in some measure from hail and other injury. At Long Ditton the best results had followed moderately close planting.

Mr. Chater was of the same opinion as Mr. Needham, and favoured more space.

A question was asked as to whether it was not possible to give some explanation of the change described as "rectification," but beyond the statement that the "breeder" stage was an immature form, none was given of the cause of the change—there was not even an intelligent theory. Mr. R. Dean asked Mr. Bentley if he had ever known of a "rectified" flower reverting to the "breeder" form, and in reply the latter gentleman stated that they so far lost their character that the base colour changed and was diffused, but that in all cases he had observed the feather or flame could still be seen, and the deterioration was due to gross feeding. Mr. Dean said his experience had been similar.

Mr. Krelage having been asked to explain the meaning of the word "byblomen," said that in England the meaning of the word was imperfectly known. "Byblomen" was plural and meant several, the singular being "Byblom." It was difficult to explain the meaning the word had, but literally it was "second section." Its meaning was contrary to "first," and he supposed that at some time this class was considered a second section or class. Asked by Mr. Dean if in Holland the Tulip bulbs were accustomed to throw "droppers" (see fig. 117), Mr. Krelage said that botanical species occasionally did so. Such varieties as were in the habit of producing them were planted over a hard bottom of stones. The florists' Tulip is seldom "dropped."

Votes of thanks to the Chairman and Essayists concluded the proceedings.

CAMBRIDGE PHILOSOPHICAL.

At a meeting held on Monday, May 10, 1897, Professor Liveing, Vice-President, in the chair, the following communications were made to the Society:—

I. "Observations on Stomata by a New Method," by Mr. Francis Darwin (President).

The method consists in the use of "Chinese sensitive-leaf," i.e., thin sheets of horn treated in a special manner. When a strip of this substance is placed on the stomatal surface of a leaf, it gives evidence of the condition of the stomata by its movement. If they are open, it curves away from the source of moisture; if shut, it remains stationary. By means of a simple apparatus, the degree of curvature of the horn is recorded. All the ordinary experiments with stomata can be easily and rapidly shown with a hygroscope of this sort.

By taking readings at regular intervals the diurnal course of the stomata can be studied; in this way it has been shown that the nocturnal closure of the stomata is a periodic phenomenon like the "sleep" of leaves.

A number of observations were made on the effects of the withering of leaves on the stomata; it was shown that while the stomata of certain species simply close as the leaf withers, in others the first effect is a well-marked opening. This fact is of interest in connection with the mechanism of the stomata, since it indicates the share which the pressure of the surrounding epidermic cells has on the guard-cells.

It was shown that many plants open their stomata in long-continued darkness; this fact bears on the mode of action of the guard-cells, since it shows that they do not (as is often assumed) lose their turgescence when the assimilation of CO_2 is prevented.

II. By Mr. Bateson: "Notes on Hybrid Cinerarias, produced by Mr. Lynch and Miss Pertz."

It is stated by many writers that the garden Cineraria arose as the hybrid offspring of several species of Senecio from the Canary Islands. This statement has been questioned by Mr. Thiselton Dyer on various grounds. The author exhibited hybrids raised from S. cruentus, S. multiflorus, and S. Heritieri (=lanatus) raised in the Cambridge Botanic Gardens by Mr. Lynch and Miss Pertz, which illustrated the very great variability which appears in the offspring of the various crosses. In particular, specimens of Heritieri ♀ × cruentus ♂ and of the reciprocal cross were produced, showing excessive variability, and proving how greatly the peculiar characters of Heritieri may be obscured in the offspring, even of the first cross. Five specimens of multiflorus ♀ × Heritieri ♂ were exhibited, each of which was exceedingly distinct from the rest. Experiments had entirely confirmed Darwin's observation,

that Cinerarias are self-sterile in a high degree. They hybridise, on the contrary, with great readiness. An accidental hybrid between Heritieri ♀ × garden Cineraria ♂, and the reciprocal were also shown, the two plants being quite unlike each other. One seedling multiflorus ♀ × garden Cineraria ♂, had been produced which was almost entirely female, a few anthers only appearing in later inflorescences. These experiments were to be continued, but so far as they had gone they were entirely consistent with the view that the Cineraria was a hybrid between several species, cruentus, Heritieri, and probably multiflorus being among them. The two first are named by most writers as probable parents.

ROYAL BOTANIC.

MAY 19.—The annual summer exhibition of the Royal Botanic Society was held on Wednesday last in the usual spot in the society's gardens at Regent's Park. In comparison with the display last year, the exhibition recently held was not weaker; in comparison with what it should be, however, seeing there are upwards of twenty classes, it was unsatisfactory. The society will probably have some difficulty in restoring the popularity of this show, seeing that the Temple Show is now so great a success, always at a date but little removed. Mr. Sowerby is, however making efforts to bring about this result, and if the best methods are adopted, more or less success will assuredly follow. The comparative absence of competitive collections was in some measure atoned for by the trade displays, and though small, the exhibition was a pretty one, and being held in most auspicious weather the visitors to the gardens were numerous.

Below we have noticed the exhibits other than competitive.

HONORARY EXHIBITS.

Exhibits of Roses were made by Messrs. WM. PAUL & SON, Waltham Cross, and Mr. W. RUMSEY, Jopning's Nursery, also at Waltham Cross. Messrs. PAUL's collection was a very fine one, and exhibited a careful arrangement. Standards or tall plants with furnished stems of such varieties as Crimson Rambler, Claire Jacquier, Pride of Waltham, and White Lady, were dotted among the well-flowered dwarf plants of many varieties. Boxes containing blooms and plants of Adiantum Fems gave a nice facing to the group. The new Tea Rose Enchantress was represented by some very pretty flowering sprays of pale flesh coloured blooms. Mr. RUMSEY's exhibit included, in addition to plants in pots and cut blooms in variety, a few dwarf plants in flower of the new and vigorous growing variety Mrs. Rumsey.

Mr. CHAS. TURNER, Royal Nurseries, Slough, made a display with well flowered plants of desirable varieties of Indian Azaleas, interspersed with a few Spiræas.

New or interesting plants from Mr. W. BULL, 536, King's Road, Chelsea, included Animia rotundifolia noticed at the Drill Hall last week, a variegated variety of Ficus radicans, Asparagus Sprengeri, Davallia epiphylla, and Dracæna rex, having broad leaves, widely margined with yellow.

A very commendable group of miscellaneous plants that might have been mistaken for one from Messrs. Laing or Peed, was exhibited by Mr. R. Scott, gr. to CAMPBELL NEWINGTON, Esq., The Holmes, Regent's Park. It was staged with considerable taste, though a few of the plants might have been disposed more effectively. Mr. Scott also contributed a group of Pelargoniums in flower

A display of herbaceous Calceolarias in bloom was made by Mr. JNO. R. BOX, West Wickham and Croydon. The flowers denoted a good strain.

Hardy Rhododendrons in named varieties were shown by Messrs. JNO. WATERER & SONS, Ltd., Bagshot, Surrey. The plants were from 2 to 3 feet in height, and well-flowered.

Messrs. T. F. RIVERS & SONS effectively ornamented one of the half-circle little mounds with a group of Nectarine and Peach trees in pots, all of them almost perfect in appearance, and splendidly cropped with handsome fruits.

Double-flowered Begonias were shown by Mr. THOS. S. WARE, Hale Farm Nurseries, Tottenham, in a few choice varieties. The Jubilee Beauty is a pretty flower with salmon-scarlet outer petals, and white centre; Prince of Wales is a dazzling shade of scarlet, with a small pure white centre, being a new break in this section; Golden Queen of England is a good smooth-petalled Camellia-like flower of pleasing tint.

Messrs. SCRIVENER & Co., Watford, had tasteful floral arrangements of diverse description.

An exhibit of fruits, vegetables, and flowers grown in the vicinity of Regent's Park by Mr. Kelf, gr. to Mrs. ABBOT, was exceptionally commendable as being from a local garden. This included a couple of Nectarine trees in fruit, a couple of dozen well-fruited Strawberry plants of the variety Royal Sovereign; Peas, Sutton's Seedling Marrowfat, ready to gather; French Beans in a similar stage, and some Gloxinias, &c.

A fine display of Tulips was made by Messrs. P. BARR & SONS, King Street, Covent Garden, London; a great many of the late-flowering varieties were represented in excellent condition in this collection. Several other species of hardy flowers were included also, such as Papaver, Prince of Orange, a very brightly coloured flower of large size. A few varieties of the florist's section were exhibited to name upon trays. Altogether a very bright exhibit was made.

An exhibit of Mr. H. O. TANOURE, 196, Brompton Road, S.W., illustrated the systems adopted in Japan of arranging cut flowers and foliage in positions as if growing.

Obituary.

MR. DUNCAN MCLELLAN.—We note the death, on April 19 last, at the age of 83 years, of Mr. Duncan McLellan, for many years superintendent of the Glasgow public parks. The deceased was a native of LUSS, Dumbartonshire, a place famed for the beauty of the surrounding landscape, which must have awakened in him a taste for landscape gardening that he carried out with so much success in the parks of the northern city. He was appointed superintendent of the parks in 1853. At that time Glasgow possessed only one park, The Green; but in 1852 the corporation had purchased the land of Kelvin Grove for the purpose of a public park.

Sir J. Paxton was consulted, and furnished a plan for laying out the ground, and the carrying out of the same was entrusted to the newly-appointed superintendent, and he performed the work in an excellent manner. Four years later the Queen's Park was laid out according to plans made by Sir J. Paxton; Alexandra and Maxwell Parks were also under his charge, the former having been laid out by him, and the latter much improved after it came under his care. After forty years' active service, Mr. McLellan retired in 1893, and on that occasion his friends presented him with his portrait, which now adorns the walls of the Corporation Galleries.

MARKETS.

COVENT GARDEN, MAY 20.

CUT FLOWERS.—AVERAGE WHOLESALE PRICES.

	s. d.	s. d.
Anemones, 12 bun.	1 6-	2 6
Arums, p. 12 blooms	2 0-	4 0
Azalea, doz. sprays	0 6-	0 9
Bouvardias, per bn.	0 6-	0 9
Carnations, pr. doz. blooms	1 0-	3 0
Eucharis, per dozen	3 0-	4 0
Iris, p. doz. bun. ...	3 0-	6 0
Lilac, English, per dozen bunches	4 0-	9 0
— white (French), per bunch ...	3 0-	4 0
Lilium Harrisi, per doz. blooms ...	2 0-	4 0
Lily of the Valley, dozen sprays ...	0 6-	1 0
doz. bunches	5 0-	9 0
— French, per bunch	0 9-	1 0
Maidenhair Fern, per 12 bunches...	4 0-	8 0
Marguerites, per 12 bunches	2 0-	4 0
Mignonette, per doz. bunches ...	4 0-	6 0
Myosotis, or Forget-me-Not, 12 bunch	1 6-	3 0
Narcissus, various, per doz. bunches	1 6-	6 0
Orchids:—		
Cattleya, 12 blms.	6 0-	12 0
Odontoglossum crispum, 12 bm.	2 0-	6 0
Pansies, doz. bun.	1 6-	2 0
Pelargoniums, scarlet, per 12 bun.	4 0-	6 0
— per 12 sprays...	0 6-	0 9
Polyanthus, doz. bn.	1 0-	2 6
Pyrethrums, 12 bn.	2 0-	4 0
Roses, Tea, per doz.	1 0-	1 6
— yellow (Maréchal), per doz.	1 6-	6 0
— red, per dozen	2 0-	4 0
— pink, per doz.	3 0-	6 0
— Safrano, p. doz.	1 0-	2 0
Stephanotis, dozen sprays	2 6-	3 0
Tuberoses, 12 blms.	1 0-	1 6
Tulips, per doz. bun.	1 6-	4 0
Violets (Fr.) Parme, per bunch	3 0-	4 0
— (Eng.), per doz. bun.	0 6-	1 0
Wallflowers, doz. bn.	2 0-	3 0

ORCHID-BLOOM in variety.

FRUIT.—AVERAGE WHOLESALE PRICES.

	s. d.	s. d.
Apples, New South Wales, selected samples ...	10 0-	14 0
— — ordinary ...	7 0-	8 0
— Tasmanian, per case, selected samples... ...	8 0-	9 0
— — per case, ordinary samples	5 0-	6 0
Figs, per doz. ...	2 0-	4 0
Gooseberries, ½ bus.	6 0-	7 0
Grapes, Hamburghs, per lb.	2 6-	3 0
— Muscats, per lb.	5 0-	6 0
— Belgium, per lb.	1 3-	1 6
Melons, Channel Islands, each...	1 0-	1 6
Nuts, Cob, per 100 lb.	70 0-	72 6
Peaches, selected, per doz. ...	10 0-	12 0
— Medium, per doz.	4 0-	6 0
— Seconds, per doz.	2 6-	3 0
Pine-apples, St. Michael, each ...	4 0-	7 6
Strawberries, mortleing gathered, per lb.	3 6-	5 0
— packed in boxes, per lb.	1 0-	1 6
— 2nds, per lb. ...	1 6-	2 0

VEGETABLES.—AVERAGE WHOLESALE PRICES.

	s. d.	s. d.
Artichokes, Globe, per doz. ...	3 0-	3 6
Asparagus, Worcester, per bundle	1 6-	2 0
Beans, French, p. lb.	1 0-	1 3
Cauliflowers, Kent, per doz. ...	1 0-	2 0
Cucumbers, home-grown, select., per doz. ...	2 6-	3 0
— 2nds, per dozen	1 6-	2 0
Horseradish, English, pr. bundle	2 0	—
— Foreign, per bundle ..	1 6	—
Mint, per bunch ...	0 3-	0 4
Mushrooms (Indoor) per lb.	0 8-	0 9
Peas, ordinary (Channel Islands), per lb.	0 6	—
— Telephones (Channel Islands), per lb.	0 9-	10
Potatos, New Kidneys, Channel Islands, per lb.	—	—
Salad, small, per doz. punnets...	1 6	—
Sea Kale, per punnet, 2½ to 4 lb. weight	1 6-	1 8
Tomatos, selected smooth, per lb.	0 9-	1 0
— Channel Is., lb.	0 6-	0 7

POTATOS.

Finest quality standing colour have advanced a shade; trade very dull for second-rate samples:—Dunbar Main-crops, 100s.; do., Saxons, 77s. to 90s.; Lincoln Bruce and Main-crops, 80s. to 75s.; do., Giants, 80s. to 60s.; do., Saxons, 40s. to 60s. per ton. Canary, new, 12s. to 15s.; Malta, do., 14s. to 16s.; Jersey do., 14s. to 16s. *John Bath, Wellington Street, Covent Garden.*

PLANTS IN POTS.—AVERAGE WHOLESALE PRICES.

	s. d.	s. d.
Adiantum, per doz.	4 0-	12 0
Aspidistras, per doz.	12 0-	30 0
— specimen, each	5 0-	15 0
Azaleas, per doz. ...	18 0-	36 0
Calceolarias, dozen	4 0-	9 0
Cinerarias, per doz.	6 0-	9 0
Dracænas, each ...	1 0-	7 6
— various, p. doz.	12 0-	24 0
Ericas, various, per dozen	9 0-	18 0
Evergreen Shrubs, in variety, doz....	6 0-	24 0
Ferns, small, doz....	1 0-	2 0
— various, doz.	5 0-	12 0
Ficus elastica, each	1 0-	7 6
Foliage plants, per doz.	12 0-	36 0
Fuchsia, per doz....	6 0-	9 0
Genistas, per doz...	6 0-	9 0
Heliotropes, dozen	6 0-	8 0
Hydrangeas, per dozen	9 0-	18 0
Lobelias, per dozen	4 0-	6 0
Marguerites, p. doz.	6 0-	9 0
Mignonette, p. doz.	5 0-	8 0
Palms, various, ea.	2 0-	10 0
— specimens, ea.	10 0-	84 0
Pelargoniums, Ivy-leaved, per doz.	4 0-	8 0
— Scarlet, per doz.	3 0-	8 0
Rhodanthes, dozen	4 0-	6 0
Spiræa palmata, per dozen	12 0-	18 0
Spiræas, per doz....	6 0-	9 0

BEDDING PLANTS AND ROOTS FOR THE GARDEN in variety coming very good.

THE WEATHER.

[The term "accumulated temperature" indicates the aggregate amount, as well as the duration, of degrees of temperature above or below 42° Fahr. for the period named: and this combined result is expressed in Day-degrees—a "Day-degree" signifying 1° continued for twenty-four hours, or any other number of degrees for an inversely proportional number of hours.]

Districts.	Temperature. Above (+) or below (−) the Mean for the week ending May 15.	Accumulated. Above 42° for the Week.	Accumulated. Below 42° for the week.	Accumulated. Above 42°, difference from Mean since January 1, 1897.	Accumulated. Below 42°, difference from Mean since January 1, 1897.	Rainfall. More (+) or less (−) than Mean for the Week.	Rainfall. No. of Rainy Days since January 1, 1897.	Rainfall. Total Fall since Jan. 1, 1897.	Bright Sun. Percentage of possible Duration for the Week.	Bright Sun. Percentage of possible Duration since Jan. 1, 1897.
		Day-deg.	Day-deg.	Day-deg.	Day-deg.	10ths Inch.	-	Ins.		
0	5 −	24	14	− 23	+ 5	2 −	91	15·9	24	26
1	4 −	37	14	− 27	+ 10	2 −	80	9·3	32	28
2	4 −	35	11	+ 29	− 73	2 −	78	8·1	36	29
3	5 −	42	13	+ 29	− 114	1 −	78	9·2	48	31
4	5 −	42	15	− 4	− 110	3 −	75	10·2	41	29
5	4 −	46	6	+ 22	− 176	3 −	70	11·3	50	32
6	4 −	36	9	− 48	− 17	4 −	83	14·9	42	29
7	4 −	34	4	− 7	− 85	4 −	86	11·5	44	28
8	4 −	41	4	+ 12	− 136	5 −	90	17·4	43	30
9	3 −	35	4	− 69	+ 13	4 −	95	13·6	24	27
10	3 −	43	0	− 10	− 54	6 −	87	16·1	31	29
*	3 −	50	0	+ 117	− 83	4 −	94	14·7	62	34

The districts indicated by number in the first column are the following:—

0, Scotland N. *Principal Wheat-producing Districts*—1, Scotland, E.; 2, England, N.E.; 3, England, E.; 4, Midland Counties; 5, England, including London, S. *Principal Grazing, &c., Districts*—6, Scotland, W.; 7, England, N.W.; 8, England, S.W.; 9, Ireland, N.; 10, Ireland, S.; *Channel Islands.

ENQUIRY.

"*He that questioneth much shall learn much.*"—BACON.

WATER-LILIES DYING OFF.—A correspondent sends the following communication, together with a large mass of Water-Lily root. "The root sent is that of the common Water-Lily. I don't know what is the matter with it. I planted a dozen of them six years ago, which grew wonderfully till this year. I have examined them at various times, but I can find no trace of growth. [There are a few healthy buds visible. ED.] The pond is formed in a peat bog, the bottom of it being peat, accumulated mud, and vegetable matter; the water, which is of good quality, is furnished by a spring, and the depth in all parts of the pond is 2 feet, and width 70 yards by 30 yards. The pond is much infested by water-rats; there are also a few ducks on the water. Last year we had a pair of swans, but as soon as the flowers of the Water-Lilies made their appearance they gobbled them up, so we had to shift the swans to another pond in the locality. Some persons think that it is the rats that are eating the Lilies, others that the ducks are the delinquents. I have watched them both, but could not detect either in interfering with the roots. I shall be exceedingly thankful to have the mystery unravelled."

NOTICES TO CORRESPONDENTS.

APPLE SHOOTS: *A. W.* The buds had partially become fruit-buds, but from some climatal or other circumstances, they, as it were, altered their mind. Thus the half-and-half character of the development.

A JOB OF RENOVATING A SMALL GARDEN: *N. M.* The charge seems to be by no means excessive, and is less than labourer's pay would amount to, so that you get nothing for your skill as a garden-craftsman. As no estimate was made, the owner will doubtless have to pay your bill. Can you not obtain professional advice in the neighbourhood, so as to get the work valued?

BOOKS: *Otto Schutz.* A small manual, *The Peach and Nectarine*, published by Mr. Upcott Gill, *Bazaar* Office, 170, Strand, London, W.C., 1*s.* 7*d.* by post, would answer your purpose.

CHRYSANTHEMUM: *J. C.* The bloom of the variety, W. H. Lincoln, is a very good one for the date, but Chrysanthemums being superfluous flowers at this season we cannot favour them. Try to extend the season by obtaining good blooms in late January and February, after which month the less we see of large Chrysanthemum blooms the better—until October, at least.

CORRECTION.—Mr. St. Julien Arabin, Belmont Nurseries, Portswood, Southampton, desires to inform our readers that Mr. J. Fulford was not appointed manager of the nurseries, as was stated in a recent issue of the *Gardeners' Chronicle*, but to some other office in the same business. The manager of the glass department, recently appointed, is Mr. Tyler, who was with Mr. H. B. May of Edmonton for many years.

CUCUMBER DISFIGURED: *A. G. B.* The injury remarked is of a mechanical kind, the nature of which we do not know.

FIGS DROPPING FROM POT-TREES: *B. C. M.* Dryness or excessive wetness of the soil at an early stage of growth, causing a check to development. As the season advances, the evil usually declines.

FINGER-AND-TOE, OR ANBURY: *T. C. R.* The disease clubbing is found in Cruciferæ only, and is due to a fungus, Plasmodiophora Brassicæ. The best method of averting an attack, for it is infectious is to constantly change the crops, never following a crop of Cabbage, Cauliflower, &c., by one belonging to the same family, and to plant no seedlings which possess swellings on the root. All frames and pits in which the early sowings are raised should be disinfected with burning sulphur; and if the soil can be spread out and similarly disinfected, it will afford more complete security. Leave no remains of diseased plants in the ground, but dig them up, so as to leave nothing behind, and clear forthwith, or bury them three spits deep, as by trenching the land is readily done.

FRUITS AND LEAVES OF STRAWBERRY INJURED: *G. M. T.* No fungus, but most probably caused by draughts of frosty air impinging on the plants, arresting development, and at last setting up decay.

INSECTS IN PALM-SEEDS: *G. B.* The insects infesting seeds of Chamærops are no doubt minute beetles, but it is impossible to give a name without seeing some of them. The eggs are probably laid when the seeds are soft, and from those seeds with holes in them the perfect insect has no doubt escaped. Supposing the seeds to have germinating power, there should be no *primâ facie* reason why they should not be sown. The insects would not be likely to attack any part of the plant but the seeds, and it would probably be several years before the plants were in a seed-bearing condition, even if allowed to arrive at that stage. As a matter of precaution, we would advise that the seeds be placed with a little naphthaline in a practically air-tight box for a few days before sowing. *R. McL.*

INSECT ON DENDROBIUM: *W. K.* The beetle damaging Dendrobium is Diaxenes dendrobii, several times noticed in this Journal. Its origin is supposed to be Burma or Assam, but all the known examples have been found in Orchid-houses in this country. It is no doubt imported in the plants in the larva or pupa state. Whether it actually breeds here is uncertain. *R. McL.*

INSECTS: *T. W., Blenheim.* Millepedes: very common indeed, and equally harmless.—*Cucumber.* We do not find any insects likely to have injured your plants, and the roots seem healthy.

MANURE FOR ROSE AND FRUIT-TREE STOCKS: *W. H. B.* In reply to an enquiry on this subject, it may be stated generally that manures are either forcing or maturing in their effects. Sturdiness of growth can only be secured by the process of maturation and solidity of the plant-tissues; this will be effected by mineral manures of which the ashes of plants are constituted, such as superphosphate of lime, basic slag, bone meal, potash, and the like. Vigour of growth and succulence, on the other hand, are obtained by the application of nitrogenous manures, of which may be mentioned nitrate of soda, sulphate of ammonia, dried blood, guano, &c. To aid the decomposition of the dung which has already been applied, give during the summer the following ingredients per acre:—nitrate of soda 100 lb., superphosphate 300 lb., kainit salt 200 lb. Mix together and apply at two dressings. Or, about 2 ounces of the mixture may be sown per square yard around each tree. Lightly fork or rake in. Ammoniacal guano applied at the rate of from 1½ to 2 cwt. per acre, or 1 ounce per square yard, twice during the growing season will be found of great benefit. The nitrogen and phosphate present in good guano are in such different degrees of solubility that they supply plant food more slowly and evenly through a period of growth than can be done by other fertilisers. It is therefore particularly adapted for sturdiness combined with a free growth of wood. *J. J. Willis, Harpenden.*

MANURES FOR FRUIT TREES: *W. H. B.* Superphosphate of lime, either animal or mineral, potash; sulphate of ammonia, or nitrate of soda, if the land be poor in nitrogen; bone-meal, kainit, lime. Quantity, separate or alone, from 2 to 3 cwt. per acre, at twice or thrice, with the exception of the last three, which may be used much more freely; soot also is good as manure.

MARKET GARDENING: *Alpha.* The cold wind-swept stretch of country between Chester and Liverpool is not one which a skilled gardener would select in which to grow produce for market; some warm Welch valley, or a spot near the seaboard of South Wales, South Devon, South Cornwall, Sussex, or the indented coast of South Essex, would be preferable even should all the culture be carried on under glass, and still more so if out-of-doors crops be those chiefly depended upon. Round London for a distance easily reached by horse and waggon—say 15 miles—land of good quality is obtainable without much difficulty, but rent is higher and labour dearer than in more remote districts. The Vale of Aylesbury, now well served by railways, should be a good place to start in business as a grower for market. That part of Kent stretching from Maidstone and Rochester towards Swanley, Orpington, and Westerham is a favourite gardening district, as is shown by the great number of orchards, Hop gardens, Strawberry, and Raspberry gardens, &c. existing there.

MUSCAT OF ALEXANDRIA GRAPES, DISEASED, SENT IN TIN BOX, WITH AN UNSIGNED NOTE ACCOMPANYING THEM.—The fruits show signs of "spot," *Cladosporium leticolor*. There is no known cure, although it might be prevented by the use of the Bordeaux Mixture in an attenuated form, or the free use of flowers-of-sulphur in the syringing-water and in evaporating-pans, and as a smear mixed with whitewash on the hot-water pipes. Cut off and burn every affected berry, and avoid suddenly chilling the air of the vinery.

MICRO ORGANISMS, &C.: *C. D. M., Bombay.* It requires a volume to answer your questions. We think you will get what you want in the earlier chapters of *The Natural History of Plants*, by Kerner, Oliver's translation.

NAMES OF PLANTS: *Correspondents not answered in this issue are requested to be so good as to consult the following number.—H. J. R., Florence.* Cypripedium Gardneri is a synonym of C. præstans, and could not be applied to the specimen you send, which is C. Godefroyæ.—*F. R., Villeroy.* The name Maxillaria vanillodora is applied in gardens to the species of which you send a flower, but we are unable to verify the name; 2 is near to Miltonia spectabilis radians, but the spaces between the lines on the lip in yours is lilac colour in place of white. The three Odontoglossums are all varieties of O. luteo-purpureum, an extremely variable species.—*C. G.* Claytonia perfoliata.—*R. W. B.* The weed is Achillea millefolium. If a lawn be badly infested nothing less than deep digging and sowing with the best lawn mixture is of any use. Where the weed is not very abundant, dressings of manures to cause the grasses to grow close and thick and smother the plants, do good. These are rotten manure, nitrate of soda, sulphate of ammonia, dried blood, &c.—*Rob Roy.* Tilia Europea.—*Rito.* 1, Lamium maculatum; 2, Prunus Padus; 3, Polystichum angulare proliferum; 4, Cyperus laxus variegatus; 5, Ardisia crenulata.—*J. M.* Prunus Padus (Bird Cherry).—*Jane Eyre.* Ceanothus azureus var. Gloire de Versailles.—*J. M.* Prunus Padus.—*G. C.* 1, Limnanthes Douglasii; 2, Scilla campanulata; 3, Cheiranthus ochroleucus; 4, Valeriana officinalis; 5, Euphorbia Cyparissias; 6, An Epimedium; we cannot tell which without the flowers.—*W. C.* Coronilla Emerus.—*Sample from Germany.* Oncidium sphacelatum.—*Bulbous Plant in box with Selaginella.* Tritonia crocata.

PARSNIP BROWNING OF THE ROOTS: *L. P.* The cause of the disfigurement is due to a fungus. Change of ground, or sowing on prepared soil placed in holes made with a large dibber, are remedies. Fungus-infested land might be dressed with gas-lime in the autumn.

PEACH LEAVES: *J. P.* Peach-blister, caused by a fungus; cut off the leaves and burn forthwith.

PEACHES: *A. S.* The fruits are mildewed, and should be cleared off and burnt. Apply flowers of sulphur to the trees when the leaves are moist. The latter are injured as if by scalding. There is no fungus on them.

PHALÆNOPSIS: *A. G. Sesto Fiorentino.* The collapse of the tissues shown in the leaf of your Phalænopsis is common in Phalænopsis under cultivation, and may generally be taken to indicate something unsuitable in their surroundings; or a check in the nutrition of the foliage at some time or other. Sometimes the evil arises from the plants being placed where the direct heat from the hot-water piping reaches them; at others a sudden fall in the temperature may cause it; or defective ventilation. The cause is difficult to name unless one is in a position to see the plants in the situation they were when the mischief happened.

PLUM TREES: *W. D.* The silver-leaf disease, very common in Rosaceæ. Its origin is mysterious, probably due to a fungus. Cut away freely all diseased portions, and feed the trees well, and they may outgrow it; but generally they die, whether under glass or outside.

SOFT-SOAP TO KILL APHIS: *A Reader of the Gardeners' Chronicle.* Two to three ounces in a gallon of warm water: half-pint of tobacco-water, or a handful of Quassia Chips soaked in the soap-suds for twenty-four hours would make it more deadly.

STRAWBERRIES BY POST: *R. G.* Wrap each fruit separately in a soft leaf, say those of the French Bean, Lime-tree, &c., and then place on a bed, half-inch thick, of the softest green moss, in one layer only, with moss between the fruits, in boxes of 8 by 12 by 2½ inches. Several boxes might be tied together if necessary.

TO CLEAN FLOWER-POTS: *M. P.* If you do not want to wash them, you might make a fire of garden rubbish, and place the pots thereon, and thus destroy all confervæ, moss, mould, &c., that may be adhering to them. We should not advise you to use "weed-killer," as it contains arsenic, some of which might impregnate the pottery, and injure the plants placed in the pots. It is a good plan to bury dirty pots in the soil or in coal-ashes, letting them remain for several months, then cleaning them with a dry brush or wisp of straw.

TOBACCO PAPER: *Fumigator.* The sample sent seems to be all right, but if it be not, we have no means of knowing. Probably the quantity employed was too large for the houses, considering the very tender and easily-injured condition of the foliage and fruits of the Peaches.

TOMATOS: *W. & Son.* Your fruits are affected with "spot" fungus (Cladosporium fulvum), many times figured in these pages. Remove and burn all fruits that are observed to be attacked, and it is important that this be done before the fungus has an opportunity to spread.

COMMUNICATIONS RECEIVED.—J. A.—W. T. T. D.—Behnick.—Royal Botanic Society.—W. T. T. D.—J. M. H.—J. E. T. A.—J. H. S.—H. J. A.—A. C. F.—Royal Aquarium.—T. B. R.—J. O. B.—A. D.—G. T.—W. O.—B.—W. C.—C. D. B.—G. C.—J. B.—W. D.—A. E. R.—J. S.—J. B.—F. M., Rosher.—E. J. H., Dorchester.—L. P.—W. M.—W. H.—H. G. C.—, F. U.—B. A. & Co.—Colville Brown.—T. B. R.—J. E. T. Aitchison.—J. M. H.—A. F. C.—T. B.—G. W.—D. T. F.—D. R. W.—W. J. B.—H. C.—J. Hudson.—W. F. D.—Handed to publisher, K. G. S.—J. B.—C. J. J.

SPECIMENS, PHOTOGRAPHS, &C., RECEIVED WITH THANKS.—Medinilla.

THE GARDENERS' CHRONICLE

PUBLISHER'S NOTICES.

GARDENERS' CHRONICLE TELEGRAMS. — *The Registered Address for Foreign and Inland Telegrams is* "GARDCHRON, LONDON."

ADVERTISEMENTS.

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22 words may be reckoned for the first 4 lines, and 9 words for every additional line.

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10	,,	..	0	6	0	21	,,	.. 0	11	6
11	,,	..	0	6	6	22	,,	.. 0	12	0
12	,,	..	0	7	0	23	,,	.. 0	12	6
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POSTAL ORDERS.—*To Advertisers, Subscribers, and Others.—It is very important in remitting by Postal Order that it should be filled in payable at GREAT QUEEN STREET, London, W.C., to* H. G. COVE, *as, unless the number of a Postal Order is known, and it has been made payable at a particular office, and to a particular person, it is impossible to prevent any person into whose hands it may fall from negotiating it.*

Advertisements for the current week MUST *reach the Office by Wednesday, 5* P.M., *at the latest.*

SUBSCRIPTIONS.

All Subscriptions payable in advance. The United Kingdom, 12 months, 15s.; 6 months, 7s. 6d.; 3 months, 3s. 9d. All Foreign Subscriptions, including Postage, 17s. 6d. for 12 months. Post-office Orders to be made payable at the Post-office, Great Queen Street, London, W.C., to H. G. COVE.

Subscribers who experience any difficulty in obtaining their copies regularly, are particularly requested to communicate with the Publisher (in cases of delay in the delivery by post, the cover should be forwarded with complaint).

All Advertisements should be addressed to the PUBLISHER.

Publishing Office and Office for Advertisements:—41, WELLINGTON STREET, STRAND, W.C.

NEW ROSES.

EMPRESS ALEXANDRA OF RUSSIA (Tea-scented).—Rich lake-red shaded with orange and fiery crimson: a gorgeous decorative Rose, very distinct in colour and habit, and of splendid effect both on the plant and when cut. Award of Merit from the R. H. S. Plants ready end of May, 10*s.* 6*d.* each.

WALTHAM STANDARD (Hybrid Perpetual).—Brilliant carmine shaded with scarlet and violet: shape and petal of A. K. WILLIAMS; fine for exhibition and garden decoration. Plants ready end of May, 10*s.* 6*d.* each.

ENCHANTRESS (Tea-scented).—Creamy-white tinted with buff in the centre, large, full, and globular; of extraordinary freedom in blooming, and one of the most lovely and effective Roses of recent introduction. Award of Merit and Silver Banksian Medal from the R. H. S. 3*s.* 6*d.* and 5*s.* each.

QUEEN MAB (China).—A charming decorative and buttonhole Rose, producing large quantities of finely formed buds, colour soft rosy-apricot shaded with orange and tinted with rose. Award of Merit R. H. S., and Certificate of Merit Royal Botanic Society. 3*s.* 6*d.* each; 36*s.* per dozen.

THE NEW CONTINENTAL ROSES OF 1897.—A selection of Twenty best varieties, 3*s.* 6*d.* each; 36*s.* per dozen.

THE NEW ENGLISH AND CONTINENTAL ROSES OF 1896.—A selection of the best kinds, including the White Maréchal Niel, 2*s.* to 3*s.* 6*d.* each.

A Large General Collection of Roses, in 5-inch pots, for pot culture and for present planting, 10*s.* 6*d.* to 18*s.* per dozen. Extra-sized plants, in 8-inch pots, 24*s.* to 42*s.* per dozen.

Half-specimen and Specimen Roses, magnificent trained plants, coming into bloom, 5*s.* to £3 3*s.* each.

PRICED DESCRIPTIVE CATALOGUE post-free on application.

WM. PAUL & SON, PAULS' NURSERIES, WALTHAM CROSS, HERTS.

GRASS IS GREEN AND BRILLIANT

AFTER AN APPLICATION OF

CLAY'S FERTILIZER.

CLAY'S LONDON FERTILIZER TRADE MARK

USE IT ON THE LAWN.

"As a dressing for grass land it will be difficult to find anything to equal it."—*The Gardeners' Magazine.*

It is sold by the Trade in **6d.** and **1s. Packets**, and **SEALED BAGS**:—7 lb., **2s. 6d.**; 14 lb., **4s. 6d.**; 28 lb., **7s. 6d.**; 56 lb., **12s. 6d.**; 112 lb., **20s.** Or from the Manufacturers, Carriage Paid in the United Kingdom for Cash with order (except 6*d.* Packets).

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Crushed Bones, Peruvian Guano, Sulphate of Ammonia, Nitrate of Soda, Nitrate of Potash, Sulphate of Potash, Kainit, Superphosphate of Lime, &c. Tobacco Cloth and Paper. Best Qualities only. Write for Prices

CLAY & SON, Manure Manufacturers, Bone Crushers, &c., STRATFORD, LONDON, E.

W. H. WILLCOX & CO., 34 & 36, SOUTHWARK ST., LONDON, S.E.

PATENT WIRE-BOUND GARDEN-HOSE.

This is NOT made from India-rubber, but specially manufactured Canvas, dressed with a Patent Composition, and will not rot. Does not kink; very flexible; and is the best and strongest Garden Hose in the market.

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Special Estimates given for Large Contracts in Fencing, Roofing, &c. Personal Surveys of Estates made, and practical advice given as to the best and most economical Fences to put down. *Illustrated Catalogues Free by Post.*
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CONSERVATORIES IN ALL STYLES.

No. 50.—LEAN-TO GREENHOUSE.

SURVEYS MADE.

No. 51.—¾-SPAN GREENHOUSE.

SPECIAL DESIGNS PREPARED.

No. 52.—SPAN-ROOF GREENHOUSE.

ESTIMATES SUBMITTED.

WRITE FOR CATALOGUES.

No. 49*a*.

AMATEUR SPAN-ROOF GREENHOUSE.

10 ft. by 8 ft. Price £10 10*s.*
Well-made, Glazed, Painted, and Carriage Paid.

ROYAL HORTICULTURAL SOCIETY'S

TEMPLE SHOW,

May 26, 27, & 28, 1897.

THE

GARDENERS' CHRONICLE

FOR MAY 29 WILL CONTAIN A FULL AND ILLUSTRATED

REPORT.

Copies may be had, Post-free 3½d., from THE PUBLISHER,

THE GARDENERS' CHRONICLE OFFICE,

41, WELLINGTON STREET, STRAND, LONDON, W.C.;

OR AT THE RAILWAY BOOKSTALLS.

MARQUEES!—NEW AND SECOND-HAND.—Always in Stock. Write for Catalogues and Prices, and give size (about) of Tent required. The following Testimonial was unsolicited, and is one out of many received daily:—

"The Dell, near Cowes, Isle of Wight, May 3, 1897.

"I enclose Cheque for Marquee, which arrived in good order, and I have to add my thanks for its accelerated despatch.

"Yours obliged, T. R. HUDSON, Captain R.N."

A. POTTER, Tent Department, Wolverhampton.

BURIAL AUTHORITY for the DISTRICT of BRIDLINGTON.

This Authority will, at a meeting to be held on TUESDAY the 8th day of June next, consider applications for the appointment of a WORKING SUPERINTENDENT at the Cemetery for this District. The person appointed will be required to dig the graves, keep the Register of Interments in the Cemetery, and (with the necessary assistance), keep the Cemetery in proper order.

Applications, in the Applicant's own handwriting, marked "Superintendent," together with testimonials as to character and efficiency, to be forwarded to me not later than Friday, the 4th June next.

The salary will be £55 per annum, with excellent residence and garden adjoining the Cemetery.

Canvassing the Members of the Authority after this notice will be held a disqualification.

CHAS. GRAY, Clerk to the said Authority.

40, High Street, Bridlington, May 12, 1897.

WANTED, HEAD WORKING GARDENER-BAILIFF. Two under men kept. Must understand Cows, &c. Wife to look after Poultry and Dairy. Good cottage provided on the estate. Wages, £1 5s. per week.—E. EVISON, Blizewood, Whyteleafe, Surrey.

WANTED, an efficient LANDSCAPE GARDENER.—Must be possessed of good taste in the Laying-out of New and Remodelling Old Pleasure and Kitchen Gardens, with a good knowledge of Trees and Plants. Must be a good Draughtsman, and capable of Making-out Estimates.—Apply, with all particulars as to experience, and salary expected, to WILLIAM FELL AND CO., Royal Seed and Nursery Establishment, Hexham.

WANTED, HEAD WORKING GARDENER, man and boy under him. One Greenhouse. Wages, 18s. a week, and excellent cottage.—Colonel BENYON, Stukeley Hall, Huntingdon.

WANTED, GARDENER (for Bothy), immediately, FIRST JOURNEYMAN. Must understand Glass, and be thoroughly practical.—State wages, and apply to Mr. A. TOMS, The Gardens, Dalham, Newmarket.

WANTED, GARDENER (for Bothy), immediately, to attend to the Kitchen Garden and Pleasure-grounds.—State wages, and apply to Mr. A. TOMS, The Gardens, Dalham, Newmarket.

WANTED, for middle of July, a married MAN, not over 35, as UNDER GARDENER; well up to work, and able to take charge of Glasshouses, &c. Wife to be an experienced Laundress, as she would be required to undertake the Laundry Work of House. Full particulars by Letter.—CARTER PAGE & CO., 53, London Wall, E.C.

WANTED, GROOM-GARDENER, under 30, married; wages 20s., small cottage and garden; total abstainer; country, near Cardiff. Apply, with testimonials and references, to JOHN BASHAM, Fairoak Nurseries, Rumney, near Newport, Mon.

WANTED, for Scotland, PROPAGATOR and GROWER.—Well up in Roses (under glass), Ferns, Chrysanthemums, Tomatos, &c., and General Stuff for Forcing and Cutting. Particulars as to wages, &c., to Box 4, *Gardeners' Chronicle* Office, 41, Wellington St., Strand, W.C.

WANTED, an experienced SOFT-WOOD PROPAGATOR, FERN and ROSE-GROWER, next to the Foreman, in a good Lancashire Nursery.—State particulars, age, and wages expected, to ADIANTUM, *Gardeners' Chronicle* Office, 41, Wellington Street, Strand, W.C.

Propagator Wanted.

WANTED, a FOREMAN and PROPAGATOR for Greenhouse Department, principally Soft-wooded. Apply, stating age, where last employed, wages expected, to JNO. JEFFERIES AND SON, Royal Nurseries, Cirencester.

WANTED, a young MARRIED MAN for Flower and Kitchen Garden, also to assist with Houses and Fires. Wages, 16s. per week.—Apply, MASTERS, Shuckburgh Gardens, Daventry.

WANTED, FOREMAN, to start a Market-garden. Must understand Cucumbers, Grapes, Tomatos, Mushrooms, and Cut Flowers. Must be experienced in London and other Markets, and competent to take entire charge. State age, salary, experience, and all particulars, to K. G. S., Westburg, Highland Road, Bromley, Kent.

WANTED, Young MAN, as BUDDER and GRAFTER, among Roses and Fruits.—Of good character, &c.—Apply to J. PEED AND SONS, The Nurseries, Streatham, S.W.

WANTED, experienced KNIFESMAN, understanding general Outdoor Nursery Work, Budding, Grafting Roses and Fruit. ALSO a GROWER of Market Produce and Cut Bloom under Glass.—H. BECKER, Nurseryman and Fruit Grower, Jersey.

WANTED, for Rose and Hardy Flower Department, ONE or TWO YOUNG MEN, expert at Budding and Layering.—Full particulars and wages required to DOBBIE AND CO., Orpington, Kent.

WANTED AT ONCE, SECOND HAND in Small Nursery. One experienced in all branches of Nursery work. Salary, 18s. Apply by letter.—CROFT, Nursery, Harpenden, Herts.

WANTED, energetic, trustworthy MAN, to take entire charge of small general Nursery. State age, wage, experience, with copy of testimonials, to FOSTER, Lake Road, Portsmouth.

WANTED, a strong, active young MAN, Inside and Out, Conservatory; wages, 17s. per week, with bothy.—Apply, F. MOULAND, The Tower Lodge, Belvedere Park, Kent.

WANTED, YOUNG MAN, well up in Grapes, Cucumbers, Tomatos. Wages to begin, 18s.—Apply, with references, to MANAGER, The Vineyard, Mitcham.

WANTED, TWO or THREE MEN, for Cut Flower Department. Permanency for suitable men.—H. DICKINSON, Shardlow, near Derby.

WANTED, YOUNG MAN in small Nursery, for Jobbing, &c. Wages 18s.—AYLOTT, New Malden, Surrey.

To those Waiting for a Place.

WANTED, a YOUNG MAN, thoroughly used to Potting and Tying.—Leave at moment's notice, if desired. Six or eight weeks. £1 per week. Possible permanency.—At once to UFF, Ivy Nursery, West Molesey, Surrey.

WANTED, YOUNG MAN to assist Gardener, attend to Poultry, and make himself generally useful. Lodgings found.—Apply by letter, stating wages required, to A. T., Kenton Lodge, The Hyde, N.W.

WANTED, YOUNG MAN, capable of Growing Vines and all Soft-wooded Stuff. State wages and send testimonials.—JOHN PEED AND SONS, Roupell Park Nurseries, West Norwood, S.W.

WANTED, YOUNG MAN, well up in Tomatos, Cucumbers, Chrysanthemums, Mushrooms.—Apply, stating experience and wage, to MANAGER, Frimley Nurseries, Frimley Green, Surrey.

WANTED, JOURNEYMAN, about 20, with fair knowledge of Inside Plant Culture. State experience, and wages required.—WOOLLEY, The Gardens, Leicester Frith, Leicester.

WANTED, a MAN of long experience in Trade, to work cheaply and well; about a dozen Houses of Soft-wooded Plants, Tomatos, &c.—BOX, 101, London Road, Portsmouth.

WANTED at once, strong active YOUNG MAN, about 21, for Kitchen Garden, with experience.—Apply, stating wages required, to F. TOMS, Great Clacton, Essex.

WANTED, IMMEDIATELY, a YOUTH, about 20, with thorough knowledge of Potting and Watering Orchids; also light Garden-work. Wages, 17s. Good character indispensable.—Apply, by letter, VERNON, 68, Borough Road, London, S.E.

WANTED.—A well-educated YOUTH can be received in an old-established Nursery, Florist, and Seed Business. Board and residence. Premium required.—PERRY, Nurseries, Banbury.

Wholesale Seed Trade.

WANTED, WAREHOUSE PORTER, used to Cleaning Seeds, and General Warehouse-work. Must be strong.—Apply, WATKINS AND SIMPSON, Mercer Avenue, Neal Street, Long Acre, W.C.

WANTED, JOINER and HANDY-MAN, chiefly for greenhouse repairs.—Address, P. JAKEMAN, The Gardens, Blackmoor, West Derby, Liverpool.

WANTED, HANDY-MAN, for Gentleman's Estate, to do Rough Carpentering, Painting, &c., fill up time in Garden. Wages 24s. per week.—Apply, by letter, E. T., 4, Leamington Terrace, Spring Grove, Kew Bridge.

WANTED, YOUNG MEN, as IMPROVERS.—Apply, SANDER AND CO., St. Albans.

Seed Trade (Wholesale).

WANTED, TRAVELLER.—Good opening for energetic man, with good general knowledge of the Trade.—Apply, No. 161, KEITH AND CO., Advertising Agents, Edinburgh.

WANTED, an experienced TRAVELLER for Midlands and North, for Horticultural Sundries. One with good connection amongst Seedsmen. Good salary and expenses given to competent man. Applications treated with strictest confidence.—H. J., Box 13, 41, Wellington Street, Strand, W.C.

WANTED, SECOND SHOPMAN.—Apply by letter only, stating experience, age, wages expected, &c. Must be smart and of good address, and used to the Retail Trade.—JOHN LAING AND SONS, The Nurseries, Forest Hill, S.E.

A VACANCY occurs in a Wholesale London Seed Establishment for a YOUNG MAN as ASSISTANT SHOPMAN; he must be smart, willing, a good Penman, and used to parcelling. State age, experience, salary required, to ASSISTANT, Mr. Alfred Legerton, Seed Merchant, 5, Aldgate, London, E.

WANT PLACES.

TO GARDENERS AND OTHERS SEEKING SITUATIONS.

Advertisers are cautioned against having Letters addressed to initials at Post-offices, as all Letters so addressed are opened by the authorities and returned to the sender.

The pressure upon our space at this season of the year is so great, we are compelled to state that advertisements received after 5 P.M. on Wednesday will, in all probability, be held over to the next week.

RICHARD SMITH AND CO. beg to announce that they are constantly receiving applications from Gardeners seeking situations, and that they will be able to supply any Lady or Gentleman with particulars, &c.—St. John's Nurseries, Worcester.

Gardeners, Farm-Bailiffs, Foresters, &c.

DICKSONS, Royal Nurseries, Chester, are always in a position to RECOMMEND MEN of the *highest respectability, and thoroughly practical* at their business. All particulars on application.

Telegraphic and Postal Address—"DICKSONS, CHESTER."

F. SANDER AND CO. can recommend several highly qualified and energetic HEAD and UNDER GARDENERS, of excellent character and proved ability; men thoroughly fitted for all the various duties of their profession. For all particulars, please apply to—

F. SANDER AND CO., St. Albans.

GARDENER (HEAD).—Age 41, married, two children. Scotch. Well recommended. Understands Vines, Melons, Orchids, &c.—J. CADDEN, Blairhill, Rumbling Bridge, N.B.

GARDENER (HEAD).—Age 40, married; a thorough practical all-round Gardener, with life experience in all kinds of Fruit, Flowers, Vegetables, &c. Highly recommended by present and previous employers.—G. NEWTON, 149, Cornwall Road, Notting Hill, W.

GARDENER (HEAD).—A GENTLEMAN wishes to recommend his Head Gardener, with two or three under; thoroughly efficient, active and steady. Age 31; married, one child. At liberty June 30. Highest testimonials. Giving up the place sole reason for parting with him.—Apply, H. SOAMES, Esq., Renishaw Hall, Chesterfield.

GARDENER (HEAD).—Life experience; three years in last place. Good at Fruit, Indoor and Out; Plants, Kitchen Garden, &c. Age 36, family grown up. No Single-handed place accepted.—Particulars from STEPHEN CASTLE, F.R.H.S., Bottesford Vineries, Notts.

GARDENER (HEAD).—Age 33; married, no family; thorough knowledge of Fruit and Plant Houses, also Kitchen and Flower Garden. Four and a half years in last situation. Excellent character. South preferred.—WM. SMITH, Astley Town, Stourport.

GARDENER (HEAD).—A GENTLEMAN will gladly recommend his late Gardener. Capital Vegetable, Fruit and Flower Grower. Thoroughly honest and sober. First-class previous.—T. JEFFREY, Highfield Nurseries, Potternewton, Leeds.

GARDENER (HEAD).—Age 41, married, one child; over twenty years' experience in Orchids, and the whole routine of a Gentleman's Establishment; excellent testimonials; abstainer.—MAY, 2, Cherry-tree Cottages, Lancing, Sussex.

GARDENER (HEAD); age 30, single.—R. MORRIS, Esq., Beechfield Hall, can with confidence recommend his Foreman to any Lady or Gentleman requiring the above. Fully experienced in Stove and Greenhouse Plants, Orchids, and Table Decorations. Testimonials will bear strictest investigation.—The GARDENS, Beechfield Hall, Doncaster, Yorks.

GARDENER (HEAD, or good SINGLE-HANDED).—Age 39, married, two children, youngest 7 years; good practical experience. Fifteen months' character.—M., The Hermitage, Uxbridge.

GARDENER (HEAD, or FOREMAN in a good establishment).—Age 26, single; twelve years' experience with Vines, Peaches, Melons, Tomatos, Stove and Greenhouse Plants, Flower and Kitchen Gardens, &c.—W. USHER, Hoe Place, Woking, Surrey.

GARDENER (HEAD), or FOREMAN.—Age 30, single; experienced in the Cultivation of Fruit, Flowers, and Vegetables. Excellent references. Abstainer.—A. PAYNE, New Lodge, Rowfant, near Crawley, Sussex.

GARDENER (HEAD).—Nineteen years in large private and market nursery establishments, all departments. First-class recommendations. Married, no family.—LOFTHOUSE, 34, Greenwich Street, Hoggs Field, Leeds.

£5 BONUS for information leading to an appointment as HEAD-WORKING GARDENER; thoroughly practical; highest references. Married, age 36.—Address, A. B., Box 7, 41, Wellington Street, Strand, W.C.

GARDENER (HEAD WORKING, or good SINGLE-HANDED); age 30, married, no children.—Mr. GARDNER, Elsham Hall Gardens, Lincoln, can well recommend a good man as above. Thirteen years' experience in good gardens.

GARDENER (HEAD WORKING), where several are kept.—Twenty years' practical experience in the General Routine of well-kept Establishments. Character will bear strictest investigation for honesty, industry, and sobriety.—L., Gardener's Cottage, Woolverton, Bath.

GARDENER (HEAD WORKING).—Married, no family; thorough practical experience in all branches; very successful in Fruit, Flowers, and Vegetables; good references; disengaged.—R. Meadow Croft, Horley, Surrey.

GARDENER (HEAD WORKING), seeks re-engagement. Well up in all branches. Eight years in last situation; left then through death of employer.—G., Crest House, Faushawe Road, Hertford.

GARDENER (HEAD WORKING).—Age 34, married, no family; thoroughly experienced in Vines, Stove, Early and Late Forcing. Wife capable of taking charge during absence of family. Four and a half years' excellent character.—ASHWELL, Brook House, Thurleston, Ipswich.

GARDENER (HEAD WORKING).—Age 32; fourteen years' practical experience in all Branches; no fault in leaving. A lady will highly recommend as above.—D. PRICE, Manul Gamage, Staunton-on-Wye, Hereford.

GARDENER (HEAD WORKING).—Age 34; life experience in all branches, Inside and out, including Orchids. Good references and testimonials.—W. BURLEY, Highland Road, Leatherhead, Surrey.

GARDENER (HEAD WORKING).—Married, one boy (age 6); seventeen years in all branches, Superintend Cows, &c., if required. Three years' good character.—GOUGH, Croxley Green, Rickmansworth, Herts.

GARDENER (HEAD WORKING).—Age 47, married, no incumbrance; thorough practical all-round man, used to place where the surplus is sold. Character will bear the strictest investigation.—M., Box 10, 41, Wellington Street, Strand, W.C.

GARDENER (HEAD WORKING).—Age 32, married, one child; nineteen years' practical experience in all branches in good situations. Good references. Recommended.—T. WALKER, 95, Reservoir Road, Edgbaston, Birmingham.

GARDENER (HEAD WORKING, where four or six are kept), age 32.—The HEAD GARDENER, Sudbrooke Holme, Lincoln, will be pleased to recommend his General Foreman, who has been with him six years, as a thorough all-round gardener in every department; fifteen years' experience.

GARDENER (HEAD, or good SINGLE-HANDED).—Married, age 27; life experience in all departments Inside and Out. Good Fruit Grower. Excellent references.—G. DAVIES, Brooklands, Dartford.

GARDENER (SINGLE-HANDED, or SECOND).—Age 22, single; nine years' experience with Glass and Kitchen Garden. Good references.—ARTHUR MORGAN, Charlton, Hitchin, Herts.

GARDENER (SINGLE-HANDED or otherwise).—Age 24, married; excellent character and references.—E. G., Gorse Cottage, Tupsley, Hereford.

GARDENER (SINGLE-HANDED; age 26, married, one child).—A Gentleman can recommend his Second Gardener as above. Ten years' experience; five years' character.—N., 21, Dancers Hill, Barnet, Herts.

GARDENER (SINGLE-HANDED, or SECOND).—Age 30, single; good all-round man, with Glass, Kitchen, and Flower Gardens. Disengaged May 23. Good references, and satisfactory reasons for leaving. Fifteen years' experience.—G. DUNKLEY, 13, May Terrace, Herbert Road, Gloucester.

£1 GIVEN to any person finding Advertiser a situation as UNDER or SINGLE-HANDED. Nine years' experience, Inside and Out. Could take charge of Electrical Plant for Gentleman's private residence. Excellent characters. Age 22.—State wages and particulars to W. S. G., 92, Dunstall Road, Wolverhampton.

GARDENER (SINGLE-HANDED, or SECOND of four or five).—Age 28; ten years' experience Inside and Out. Can be well recommended from present place.—R. STREETER, Mount Noddy, Worth.

GARDENER (SINGLE-HANDED).—Age 26; experienced Inside and Out; four years' excellent character.—J. MOYLE, 362, Holdenhurst Rd., Bournemouth.

GARDENER (good SINGLE-HANDED, with help).—Age 27; thorough knowledge Inside and Out. Good references. Total abstainer.—J. L., 157, North End Road, West Kensington.

GARDENER (SINGLE-HANDED).—Age 26, married, no family. Eleven years' experience in general routine, Inside and Out. £1, if cottage.—COOK, Lodge, Sudbury Lodge, near Harrow

GARDENER (SINGLE-HANDED, or SECOND).—Married, no children; ten years' practical experience in good places. Well recommended.—W. LANGRIDGE, 91, Gladstone Road, Wimbledon, S.W. No circulars.

GARDENER.—A married Gardener, age 36, seeks situation in Private Family or Nursery. Twenty-four years' thorough experience in every branch of his trade. Good references.—W. H., Box 6, 41, Wellington Street, Strand, W.C.

GARDENER, age 28, with exceptional experience in Outdoor Work, desires situation, SINGLE-HANDED, or otherwise. Trees, Shrubs, and Herbaceous Plants a specialty.—G. A., Mrs. Nicklen, Doughty Cottage, Kew.

GARDENER.—Has had thorough training in Nursery; also about eight years private. Highest reference as to character and ability.—GARDENER, 7, Albion Terrace, Child's Hill, West Hampstead.

GARDENER.—Sir CHARLES OAKELEY, Bart., can strongly recommend his Head Gardener as a thorough competent man in all Branches, including Cows and Sheep. Left through no fault.—Apply, F. ENDERSBY, 147, Camden Road, Tunbridge Wells.

GARDENER.—Mr. NEWBURY, of Northfield, Worcestershire, wishes to recommend his Gardener, who is leaving after having served faithfully for two years. Cause of leaving Mr. NEWBURY is removing to another district, where he intends cultivating Orchids.

GARDENER.—Miss GOOLDEN wishes to recommend her Under Gardener, who has lived with her three and a half years, as a thorough practical all-round man, Inside and Out. Married when suited.—Address J. COOPER, Grove Gardens, Cookham, Berks.

GARDENER.—Age 22; well up in all branches. Good characters from France, Germany, and Switzerland.—G. V., 14, Crown Terrace, Richmond, Surrey.

GARDENER (SECOND, where three or more are employed, or good SINGLE-HANDED).—Age 24, single; good references.—A. R., Myrtle Villa, Park Street, Maidenhead, Berks.

GARDENER (SECOND), or JOURNEYMAN.—Age 24; experienced, Inside and Out. Good references. Scotland preferred.—J. MILLS, 77, Wellington Street, Slough, Bucks.

GARDENER (SECOND).—Young man, age 23; six years' experience in all branches. Decorations. Good testimonials.—E. DEXTER, Alva Terrace, Shipley, Yorks.

GARDENER (UNDER), where two are kept.—Age 20; four years' experience.—W. M., Box 5, *Gardeners' Chronicle* Office, 41, Wellington St., Strand, W.C.

GARDENER (UNDER), Inside and Out.—Age 21; three years' good character from present situation. Leaving to improve himself.—L. A. PIKE, West Clandon, Guildford, Surrey.

GARDENER (UNDER, or SINGLE-HANDED).—Situated wanted, by young Man. Age 24, married when suited; used to Inside and Out. Good character.—Address, A. KNEVER, The Garden, Brooklands, Weybridge, Surrey.

GARDENER (UNDER) seeks situation, Inside and Out preferred. Age 22. Good references from previous Gardeners.—F. HILL, The Dene, Harpsden, Henley-on-Thames.

GARDENER (UNDER), or JOURNEYMAN, Inside and Out. Age 23. Two and four years' good characters. Eight years' experience. Well recommended.—CHAS. HICKS, Ashford Vineries, Fordingbridge, Hants.

LANDSCAPE GARDENER.—Great practical experience in this branch. Several Prize Medals for Garden Plans.—VILLOINGT, 14, Crown Terrace, Richmond Surrey.

To Nurserymen.

FIRST HAND in Rose Nursery.—Young man seeks situation as above. Nine years' experience. Good references. State wages.—H. DREW, Longworth, Faringdon.

PROPAGATOR (ASSISTANT).—Eleven years' experience in Ferns, Palms, Bedding, Clematis, Cucumbers, Tomatos, and general Pot-stuff; eight and a half years in good old-established trade firm.—ALBA, Box 21, 41, Wellington Street, Strand, W.C.

PROPAGATOR and GROWER.—Well up in Ferns, Stove, and all kinds of Soft-wooded Stuff; also well up in Cut Stuff, Tomatos, Forcing, and General Market Work. Good references.—R. H., Box 9, 41, Wellington Street, Strand, W.C.

MUSHROOM GROWER (Prize Medalist), is open for engagement; could introduce valuable wholesale connection for the disposal of Produce. First-class testimonials.—Address, A. B., 39, Stanly Grove, Longsight, Manchester.

GROWER.—Age 23; experienced in the Cultivation of Roses, Cut Flowers, Chrysanthemums, Cyclamen, Asparagus, Grapes, Tomatos, General Nursery Work.—E. DUN, 2, Newbury Road, Bromley, Kent.

GROWER, Market Nursery.—Age 28; used to Palms, Ferns, Vines, Cucumbers, and Cut Flowers. Twelve years' experience.—Address, W. CHRISTAPHERS, 44, Doods Road, Reigate, Surrey.

TO HEAD GARDENERS, requiring a reliable FOREMAN. A young man of experience, three years in present large place in Sussex, is seeking a change.—Apply to THOS. HUTCHER, Nurseryman, South Norwood, who will put applicants into communication with Head Gardener, for full particulars.

FOREMAN.—Age 25; good practical knowledge of Fruit, Plants, House and Table Decorations. Well recommended.—W. HUGHES, The Gardens, Shelborne Park, Northleach, Gloucestershire.

FOREMAN, in a good establishment.—Age 26; good knowledge of Fruit and Plant culture. Good testimonials.—L. JONES, 26, Russell St., Altrincham, Cheshire.

FOREMAN (INSIDE, or good SECOND).—Age 24; eight years' experience in the general routine of Gardening. Good characters.—G. WESTWOOD, 13, Guthrie Street, Chelsea, S.W.

JOURNEYMAN (FIRST), Inside, in a good establishment.—Age 22; seven years' experience. Good character. Mr. MINCHER, Barrow Court Gardens, Flax Bourton, Bristol, will be pleased to recommend a young man as above.

JOURNEYMAN (under Foreman), in the House, or Inside and Out.—Age 20; experienced in Fruit and Plants. Good references.—C. F., Pine Cottage, 20, North Hill, Highgate, N.

JOURNEYMAN.—Highly recommended for Inside or Inside and Out. Five years' experience. Age 20. First-class references.—H. SANDERS, care of Mr. Simpson, Sywell, Northampton.

JOURNEYMAN, in a good establishment.—Mr. ELLIS, The Gardens, Pepper Arden, Northallerton, would be pleased to recommend F. ATKIN as above; seven years' good character in previous and present situation. Abstainer. Bothy preferred.

JOURNEYMAN (Inside and Out).—Young man (age 21), seven years' Market-garden and Nursery experience, seeks situation as above. Excellent references.—J. WALKER, Devonshire Villa, Old Whittington, Chesterfield

JOURNEYMAN in a good establishment.—Age 21; seven years' experience in Fruit, Plants, and Orchids. Good character.—J. SMALLWOOD, Rosebank, Fordingbridge, Hants.

JOURNEYMAN, or good SECOND, in Fruit or Orchid Houses (age 24), seeks situation as above. Life experience; seven-and-a-half years' references, four in last place, including Orchids.—H. G., Pitt House Lodge, Ewell, Surrey.

JOURNEYMAN.—Age 18; tall, active, strong, and willing. Has had six and a half years' experience under Glass with the Toddington Orchard Co.—H. ASHLEY, Newtown, Winchcombe, Gloucestershire.

JOURNEYMAN (SECOND), Inside.—S. HAINES, Coleshill Gardens, Highworth, Wilts, can recommend J. SMITH, age 21, as above. Three years' experience, one year in present situation.

JOURNEYMAN.—Mr. PAINE will be pleased to recommend GEORGE OTTLEY as above. Age 20.—Marchfield, Bracknell, Berks.

IMPROVER.—In the Houses; age 18; four years in present situation. Good character.—W. SNAPES, 17, Denmark Terrace, Norfolk Park, Maidenhead.

IMPROVER.—G. BURT wishes to obtain situation as above.—For particulars, apply to T. FOAKES, The Gardens, Iwerne Minster, Blandford.

TO GARDENERS.—Situation wanted by an active young Man, age 23, in Kitchen Gardens or Pleasure-grounds. Good experience. Good references.—L. DURLING, 4, Crown Lane, Chislehurst, Kent.

YOUNG DUTCHMAN seeks situation in a Flower Nursery. Good experience.—W. LUCAS, Shepperton-on-Thames.

SITUATION wanted by a Lad, age 16; slight knowledge of Garden-work. To live in.—Apply, T. TOWLER, Old Whittington, Chesterfield.

YOUNG MAN (age 19) seeks situation in a Gentleman's Garden, Inside and Out. Five years last place.—Apply, A. TUFFIN, Whitton Hall, Westbury, Salop.

IN NURSERY.—Thoroughly experienced in Budding and Grafting Fruit Trees, Roses, Clematis and general Outdoor Nursery-work. Age 33.—JAMES BAWN, Stapleton, near Bristol.

HANDY MAN.—A Carpenter (married), seeks situation. Can do Painting and Glazing. Would make himself useful in House, Garden, or Estate. Abstainer. Good references.—E. NEWBY, Marlborough Street, Andover.

SALESMAN by a Smart Young Man, age 28; situation as above; good experience in Wholesale and Retail Nursery Trade. Can be well recommended, with good references.—F. P., 24, Prince's Road, Ealing Dean.

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